Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

212 Stuart Street

Submitted to:
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Submitted by:
Transom Real Estate, LLC
527 Albany Street, Suite 100
Boston, MA 02118

Prepared by:
Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
Höweler + Yoon Architecture
Sasaki Associates, Inc.
AHA Consulting Engineers, Inc.
Haley & Aldrich, Inc.
Howard Stein Hudson
Nitsch Engineering
RWDI

December 8, 2016

Epsilon
ASSOCIATES INC.

Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

212 STUART STREET

Submitted to:
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Submitted by:
Transom Real Estate, LLC
527 Albany Street, Suite 100
Boston, MA 02118

Prepared by:
Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
Höweler + Yoon Architecture
Sasaki Associates, Inc.
AHA Consulting Engineers, Inc.
Haley & Aldrich, Inc.
Howard Stein Hudson
Nitsch Engineering
RWDI

December 8, 2016

Table of Contents

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

List of Appendices

List of Figures

List of Figures (Continued)

List of Figures (Continued)

List of Tables

List of Tables (Continued)

Chapter 1.0

General Information

1.0 GENERAL INFORMATION

1.1 Introduction

Transom Real Estate, LLC on behalf of its affiliates, Stuart Acquisition 12, LLC and Stuart Acquisition 22, LLC, and its partner Wheelock Street Capital, LLC (the "Proponent") proposes the redevelopment of the blighted site located at 212 Stuart Street in the Bay Village neighborhood of Boston into a new residential building with ground floor retail (the "Project"). The site is made up of four parcels, 212-222 Stuart Street and 17-19 Shawmut Street, bound by Stuart Street to the north, Shawmut Street to the south, the 200 Stuart Street parking garage to the east, and a pedestrian-only portion of Church Street to the west. The Project site, or a portion thereof, was the subject of two previous projects that were approved by the Boston Redevelopment Authority (BRA) Board in 2006 and 2008.

Located at the edge of Bay Village and Back Bay, the Project will be a part of the transition between the two neighborhoods, and frame the Church Street pedestrian gateway to the Bay Village neighborhood from the north. The materials and form of the building are proposed to connect to both neighborhoods, while being a unique focal point in the skyline. The ground floor will include retail space to activate the Stuart Street corridor. The plaza located to the west of the site is also proposed to be improved as part of the Project. This improved plaza is envisioned to include new landscaping and hardscapes to provide an aesthetically pleasing gateway into Bay Village. In order to respect the Bay Village neighbors to the south of the site, pedestrian access and the loading bay will only be accessible from Stuart Street. Furthermore, the Project's housing component and single small scale retail space will blend with the existing uses of the predominantly residential neighborhood. As a true connector to its surroundings, the building will fill the void in the Stuart Street corridor bringing together the streetscape from west to east, and the neighborhoods from north to south.

This Expanded Project Notification Form (PNF) is being submitted to the BRA doing business as Boston Planning and Development Agency (herein, the "BPDA" except when referring to activities prior to 2016), to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code. The PNF offers a description of the Project, its minimal impacts and its benefits to the City of Boston.

1.2 Project Identification and Team

Address/Location:	212 Stuart Street, Boston, MA 02116
Proponent:	Stuart Acquisition 12, LLC and Stuart Acquisition 22, LLC c/o Transom Real Estate, LLC 527 Albany Street, Suite 100 Boston, MA 02118 (617) 307-6530 Peter Spellios Neal Howard Bryan Lee
Executive Architect:	Sasaki Associates, Inc. 64 Pleasant Street Watertown, MA 02472 (617) 926-3300 Victor Vizgaitis Benjamin Kou
Design Architect:	Höweler + Yoon Architecture 150 Lincoln Street, #3A Boston, MA 02111 (617) 517-4101 Eric Höweler Meejin Yoon Kyle Coburn
Landscape Architect:	Sasaki Associates, Inc. 64 Pleasant Street Watertown, MA 02472 (617) 926-3300 Isabel Zempel
Legal Counsel:	Rubin and Rudman LLP 50 Rowes Wharf Boston, MA 02110 (617) 330-7000 Paula Devereaux

Environmental Permitting Consultant:	Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Geoff Starsiak
Transportation Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Michael Santos
Civil Engineer:	Nitsch Engineering Two Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 John Schmid
MEP Engineer:	AHA Consulting Engineers, Inc. 24 Hartwell Avenue, 3rd Floor Lexington, MA 02421 (781) 372-3000 Dan Campia
Geotechnical and Environmental Consultant:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Boston, MA 02129 (617) 86-7400 Mike Atwood Elliot Steinberg

1.3 Public Benefits

The development of the Project will transform a blighted urban infill site into a high-quality building that will seamlessly blend into the existing area context while creating a continuous street frontage activated by engaging ground floor uses, including retail and residential lobby space. Additionally, the proximity to existing cultural, entertainment, office, and leisure amenities will reduce vehicular traffic by minimizing the needs for residents, employees and visitors to undertake daily vehicle trips outside of the neighborhood. Additional benefits are described below.

Infill Development

The Project will transform a site that has been underutilized for decades into a welcoming gateway into the Bay Village neighborhood from the north. Currently, the site is partially vacant and blighted, only partially used as a surface parking lot, creating a break in the urban fabric along Stuart Street. The Project will fill this void with a building that complements the surrounding area, and a site design that encourages pedestrian activity and provides a true gateway to Bay Village.

Improved Street and Pedestrian Environment

The Project's site design will significantly improve the pedestrian environment by replacing a surface parking lot and underused site with a new building containing ground floor retail, bound by improved sidewalks and the adjacent plaza extension of Church Street that will include new street trees and enhancements that will highlight this area as the pedestrian gateway from the north into Bay Village.

Increased Employment

The Project will create approximately 300 construction jobs and approximately 30 permanent jobs. The Proponent will make reasonable good-faith efforts to have at least 50% of the construction employee work hours be for Boston residents, at least 25% such employee work hours be for minorities and at least 10% of such employee work hours be for women. The Proponent will enter into a Boston Permanent Employment Agreement with the City of Boston.

Affordable Housing

The Project will comply with the Inclusionary Development Policy which requires developers to contribute affordable housing to the Boston housing stock.

New Tax Revenues

The Project will significantly increase the property tax revenues for the site, as well as provide new revenues related to the retail space and new residents.

1.4 Legal Information

1.4.1 Legal Judgements Adverse to the Project

There are no legal judgments that affect the Proposed Project.

1.4.2 History of Tax Arrears on Property

Property taxes are paid when due and there are no outstanding unpaid taxes or other fees owed by the Proponent.

1.4.3 Site Control/Public Easements

The portion of the site located at 212 Stuart Street is owned by Stuart Acquisition 12, LLC, a Massachusetts limited liability company pursuant to Deed dated May 3, 2016 and recorded with the Suffolk County Registry of Deeds in Book 56087, Page 180. The portion of the site located at 222 Stuart Street and 17-19 Shawmut Street is owned by Stuart Acquisition 22, LLC, a Massachusetts limited liability company pursuant to a Deed dated May 4, 2016 and recorded with said Registry in Book 56086, Page 324. The site is subject to the easements shown on the Survey for the site attached as Appendix A, none of which prohibit the construction of the proposed Project.

1.5 Public Participation

Since early summer of 2016, 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 abutters and the greater community as the Project moves forward.

Chapter 2.0

Project Description

2.0 PROJECT DESCRIPTION

2.1 Project Site

2.1.1 Description of Site

The approximately 7,712 square foot (sf) Project site comprises four parcels, 212-222 Stuart Street and 17-19 Shawmut Street (a portion of which was renamed Cocoanut Grove Lane in 2013), located within the Bay Village neighborhood in Boston. The long-blighted site is generally bound by Stuart Street to the north, Shawmut Street to the south, the 200 Stuart Street parking garage to the east, and a pedestrian-only portion of Church Street to the west (the "Church Street plaza"). See Figure 2-1 for the aerial locus map of the Project site. Currently, the western half of the site is dominated by a surface parking lot containing approximately 20 spaces. A one-story, approximately 600 sf brick office/garage building located in the center of the northern portion of the site serves as the parking attendant office for the adjacent parking lot. The currently vacant eastern portion of the site was once occupied by a three-story brick and concrete building, which a prior owner demolished and replaced with a fenced-off gravel surface in 2014. See Figures 2-2 and 2-3 for the existing conditions of the Project site. Figures 2-4 to 2-7 include photographs of the existing site and adjacent context.

The Project site is lined to the west by the Church Street plaza, a pedestrian thoroughfare, and beyond by the residential South Cove Plaza, which contains two mid-rise brick and masonry towers, composed of one and two bedroom apartments restricted to elderly and disabled households. The limestone and concrete Motor Mart parking garage is located to the north across Stuart Street. The site shares a property line with the pre-cast concrete Revere Hotel and above-grade parking garage to the east. A series of brick townhomes face the Project site across Shawmut Street to the south.

2.1.2 Previous Article 80 Filing on the Site

Two previous developments were approved by the BRA for the site in 2006 and 2008.

In 2005, Ceres-MHP Development LLC proposed an eight-story, plus penthouse at 115 feet tall, residential building on the 212 Stuart Street site; the 222 Stuart Street parcel was not included in the project. The BRA Board approved the project on June 29, 2006.

In September 2007, Rena, LLC purchased the 212 Stuart Street property, along with the adjacent 222 Stuart Street property. A PNF for the proposed redevelopment of 212-222 Stuart Street was submitted to the BRA on April 28, 2008. The project included the construction of a ten-story (approximately 112-feet in height), approximately 65,700 sf building with a mixed-use program consisting of office and retail space (the "previously proposed project"). No on-site parking was proposed. The BRA Board approved the

212-222 Stuart Street project on August 12, 2008. However, construction on the project never commenced.

2.2 Proposed Project

The Project includes the development of an approximately 146,000 sf, 19-story (approximately 199 feet[1] in height) building that will consist of approximately 131 residential units and approximately 3,000 sf of ground floor retail space for potential local businesses, such as a restaurant. The residential units are anticipated to be rentals in a range of sizes and number of bedrooms, including studios and one to three bedrooms. The final types and sizes will be determined during the final design phases and will be dependent on market analyses. The proposed Project will contain one basement level that will include retail, residential amenity spaces, bike storage and building operational needs. No on-site parking is proposed, but the Proponent has finalized a long-term parking lease for up to 50 parking spaces in the adjacent 200 Stuart Street garage. Figures 2-8 to 2-12 include floor plans and Figure 2-13 includes a Project section.

The proposed Project is anticipated to be of flat slab concrete construction with a half-floor mechanical penthouse integrated into the design of the north elevation. Adjacent to the mechanical penthouse on the southern side of the roof will be an outdoor amenity deck for use by the residents of the building. This space will be designed to be desirable to a diverse range of residents and will be a dedicated area for social gathering and relaxation. The southern exposure will allow for a variety of plants and other features that will make the space attractive and comfortable.

The Project includes many important features that were also included in the previously proposed project, including:

- No on-site parking is proposed; however, the Proponent has secured a long-term agreement for parking in the adjacent 200 Stuart Street garage;
- Loading and service areas accessed from Stuart Street instead of Shawmut Street or Cocoanut Grove Lane;
- Public realm improvements around the perimeter of the building, including the adjacent Church Street plaza to the west of the site; and
- Ground floor retail to activate the immediate area.

1 As measured according to the Boston Zoning Code.

2.3 City of Boston Zoning

The Project site is located at 212-222 Stuart Street and 17-19 Shawmut Street within the Bay Village Neighborhood District which is governed by Article 63 of the Boston Zoning Code (Code). The majority of the site is located within the Multifamily Residential (MFR) subdistrict with a small portion of the site located in the Rowhouse subdistrict (RH). The site is presently comprised of four separate parcels and it is proposed that the parcels be combined to allow for the construction and operation of the proposed Project. It is anticipated that relief from the provisions of the Code will be obtained for the proposed Project from the Boston Board of Appeals. The relief will include, without limitation, relief for use (for example, multifamily use and ground floor retail uses are not allowed in the Rowhouse subdistrict, but are generally allowed in the MFR subdistrict) as well as relief for dimensional requirements such as height, floor area ratio, and yard violations. A conditional use permit from the Board of Appeals for groundwater recharge under Article 32 of the Code will also be required. As the proposed Project proceeds with Article 80 Review, the exact nature and form of the relief that will be sought by the Proponent from the Board of Appeals will be finalized.

2.4 Anticipated Permits and Approvals

Table 2-1 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 2-1 Anticipated Permits and Approvals

Agency Name	Permit / Approval
Federal	
U.S. Environmental Protection Agency	Notice of Intent for EPA Construction Activities General Discharge Permit with associated SWPPP, if required.
Federal Aviation Administration	Determination of No Hazard to Air Navigation (if required)
State	
Massachusetts Department of Environmental Protection, Division of Air Quality Control	Fossil Fuel Permit (if required)
Local	
Bay Village Historic District Commission	Design Approval
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code

Table 2-1 Anticipated Permits and Approvals (Continued)

Agency Name	Permit / Approval
Local (continued)	
Boston Fire Department	Fuel Storage Permit; Approval of Fire Safety Equipment
Boston Inspectional Service Department	Building Permit; Certificate of Occupancy
Boston Parks and Recreation Commission	Design Review (if required)
Boston Public Improvement Commission/ Department of Public Works	Specific Repair Approvals; Tieback/Earth Excavation Approvals (if required); Sidewalk Occupancy Permit
Boston Public Safety Commission, Committee on Licenses	License for Storage of Inflammables
Boston Public Works Department	Curb Cut Permits; Street Opening Permits; Street/Sidewalk Occupancy Permits
Boston Planning and Development Agency	Article 80 Review and Execution of Related Agreements; Cooperation Agreement; Boston Residents Construction Employment Plan Agreement; Certifications of Compliance
Boston Transportation Department	Transportation Access Plan Agreement; Review and Approval of a Construction Management Plan
Boston Water and Sewer Commission	Site Plan Approval; Temporary Construction Dewatering Permit (if required); Cross Connection/Backflow Prevention Approval; Storm Drainage Approval
Boston Zoning Board of Appeal	Zoning Code variance(s), Conditional Use Permits (if required)

2.5 Schedule

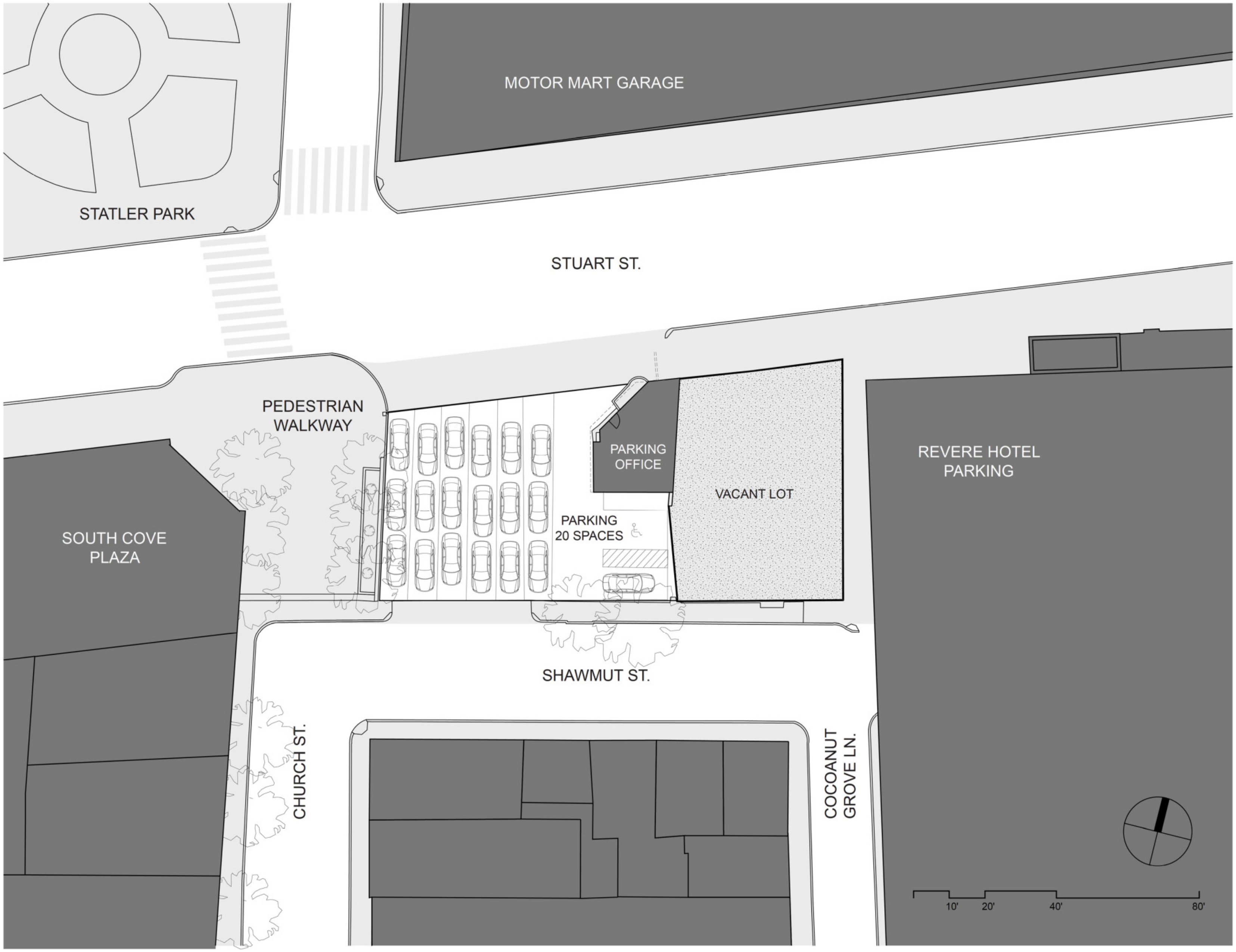
Construction is anticipated to commence in the fourth quarter of 2017, with completion anticipated in approximately 20 months.

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

212 Stuart Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 2-1
Aerial Locus Map



212 Stuart Street   Boston, Massachusetts

HÖWELER + YOON

Figure 2-2

Existing Conditions

212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 2-3

Aerial View of the Existing Conditions

212 Stuart Street Boston, Massachusetts

Figure 2-4

View of the Project Site from the Northeast

HÖWELER + YOON

212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 2-5

View of the Project Site from the Northwest

212 Stuart Street **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 2-6

View of the Project Site from the Southeast

Figure 2-7

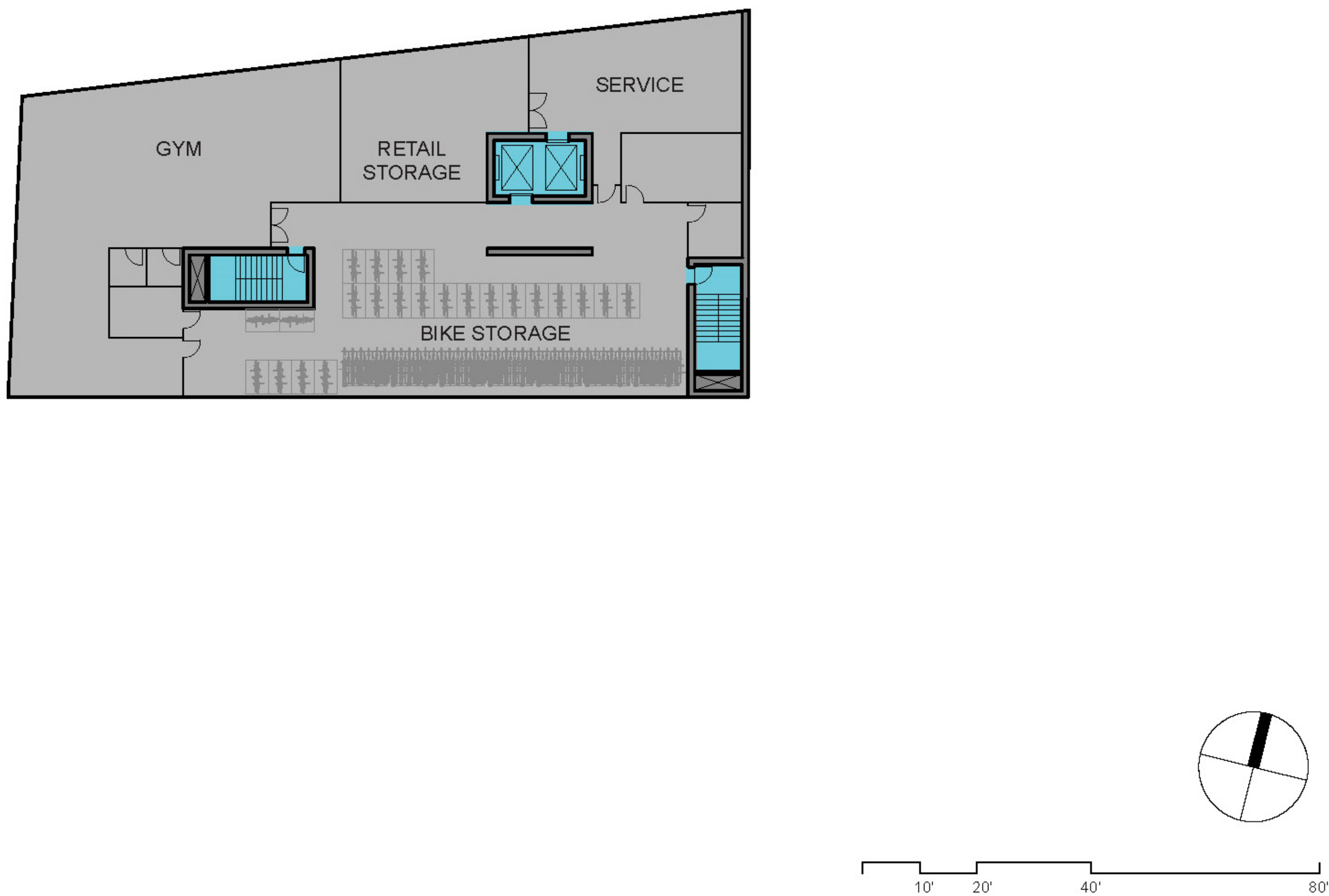
View of the Project Site from the Southwest

212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 2-8

Ground Floor Plan

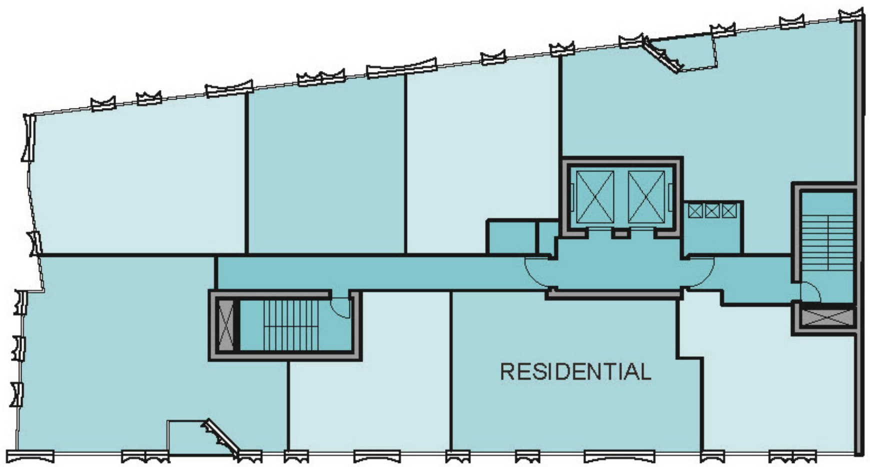


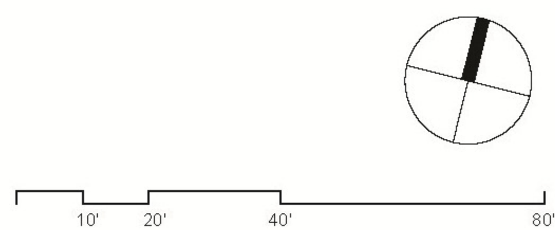
212 Stuart Street   Boston, Massachusetts

HÖWELER + YOON

Figure 2-9

Basement Level





HÖWELER + YOON

Figure 2-10

Residential Floor Plan

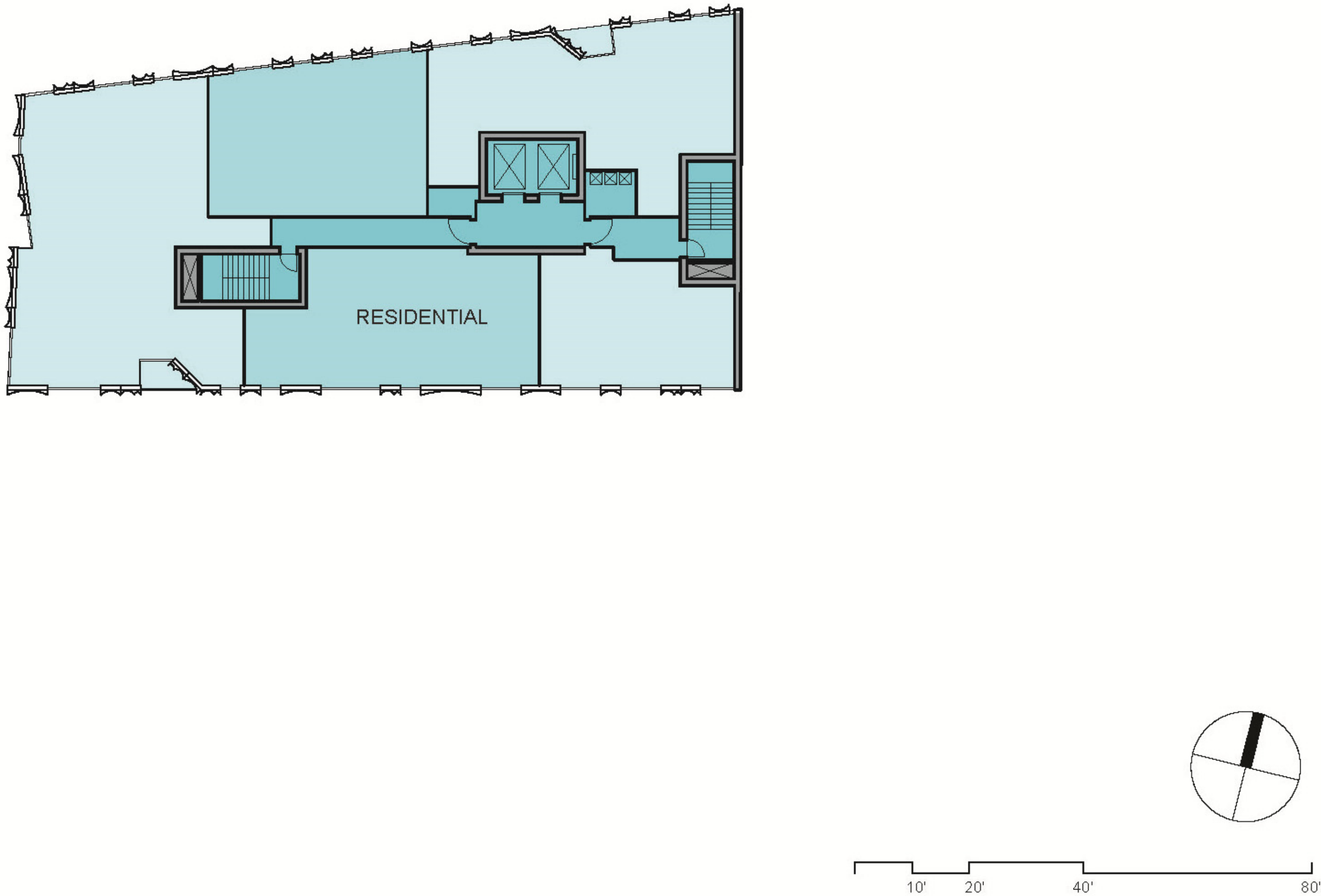
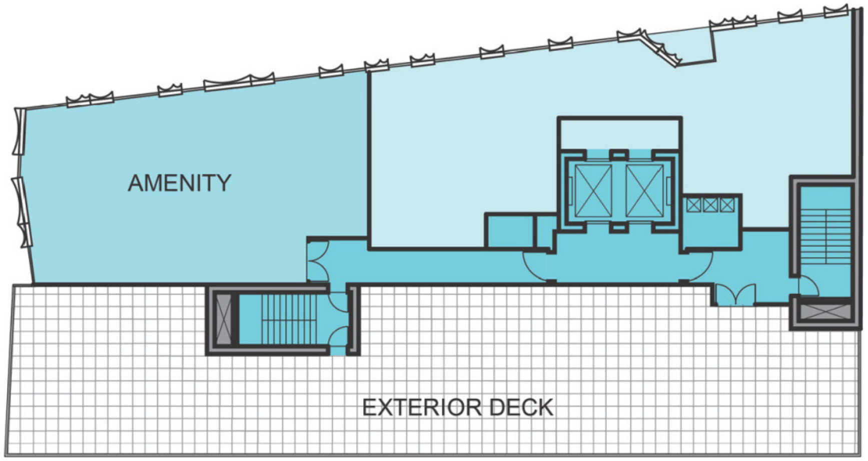
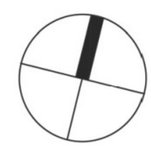
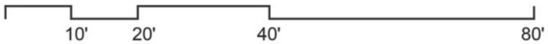


Figure 2-11

Residential Floor Plan



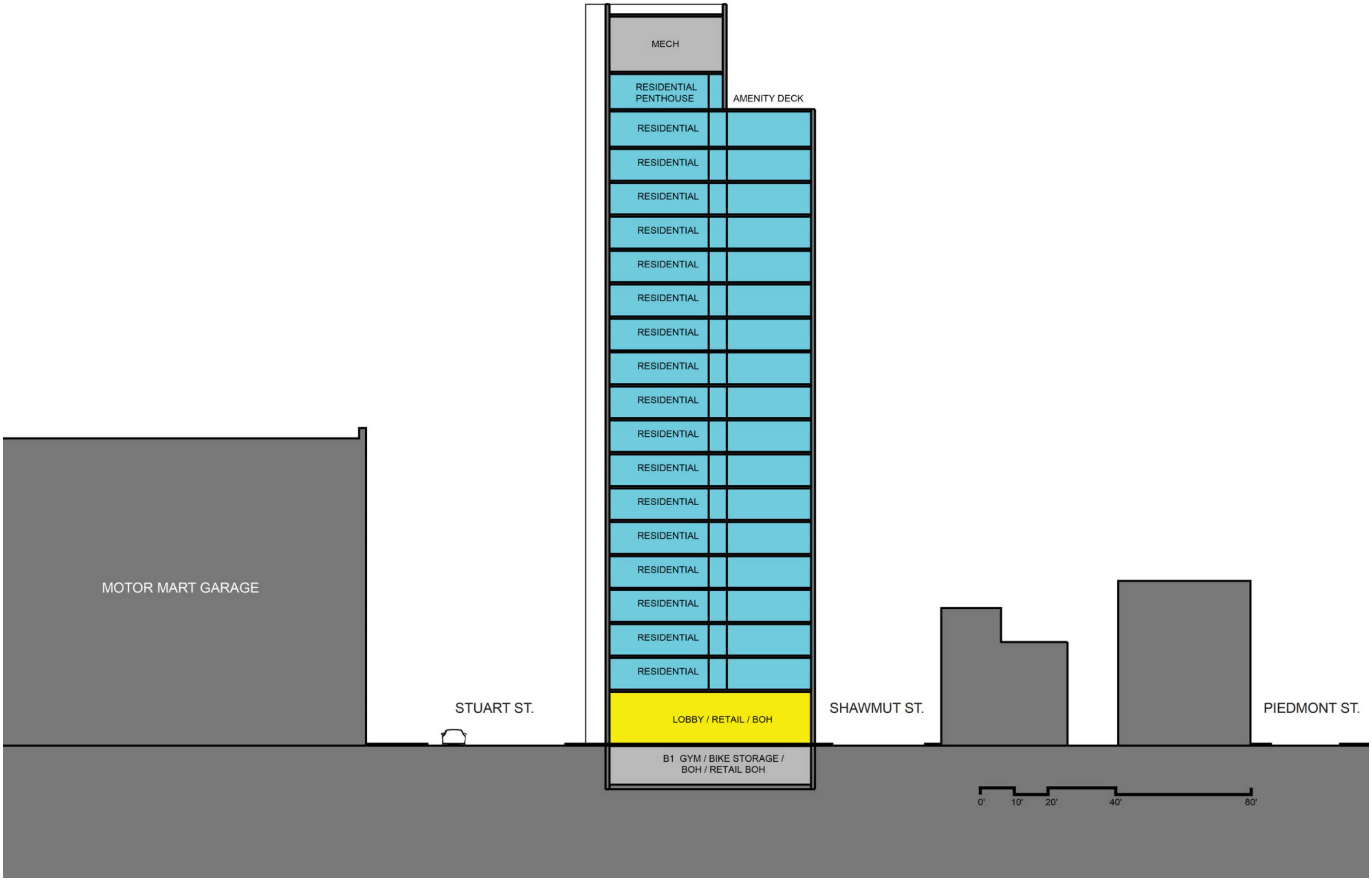




HÖWELER + YOON

Figure 2-12

Residential, Amenity and Roof Deck



212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 2-13

Project Section

Chapter 3.0

Urban Design

3.0 URBAN DESIGN

3.1 Area Context

3.1.1 A Neighborhood Link

The proposed Project is located along the northernmost edge of the Bay Village neighborhood across Stuart Street from the Midtown Cultural District, with close proximity to the Chinatown neighborhood to the east and the Back Bay neighborhood to the west. The site's location fronting Stuart Street positions it within the "High Spine" of Boston (see Figures 3-1 and 3-2), an area of increased development linking Copley Square to the downtown Financial District. The High Spine contains a mix of uses, including office, commercial, hospitality, retail and residential within high-rise and mid-rise structures. Materially, these buildings consist of glass curtainwall, limestone with punched windows, precast concrete and/or tan or red brick.

3.1.2 Negotiating Two Scales

The nature of the surrounding context shifts moving south from Stuart Street and the High Spine towards the Bay Village neighborhood (see Figure 3-3). This residential neighborhood consists of predominately lower height brick buildings and row houses with periodic larger scale multi-unit buildings. The Bay Village neighborhood, developed in the 1820s by Ephraim Marsh, has a strong sense of community and is the smallest officially recognized neighborhood within the City of Boston. The neighborhood is defined by small scale streets punctuated with old-growth trees and lined with red brick buildings featuring rich architectural detail, as shown in Figure 3-4.

3.1.3 A Central Location

A number of public space amenities are located within close proximity to the Project site. Directly adjacent to the northwest of the site is the quarter-acre Statler Park, which features a historically prominent fountain sculpture created in 1930 by the American artist Ulysses Ricci. The Bay Village community garden is located to the south of the site along Church Street and the Bay Village Neighborhood Park to the southeast at the intersection of Melrose and Charles streets. The Boston Public Garden and Boston Common fall within the larger context of the Project site to the north, within close walking distance.

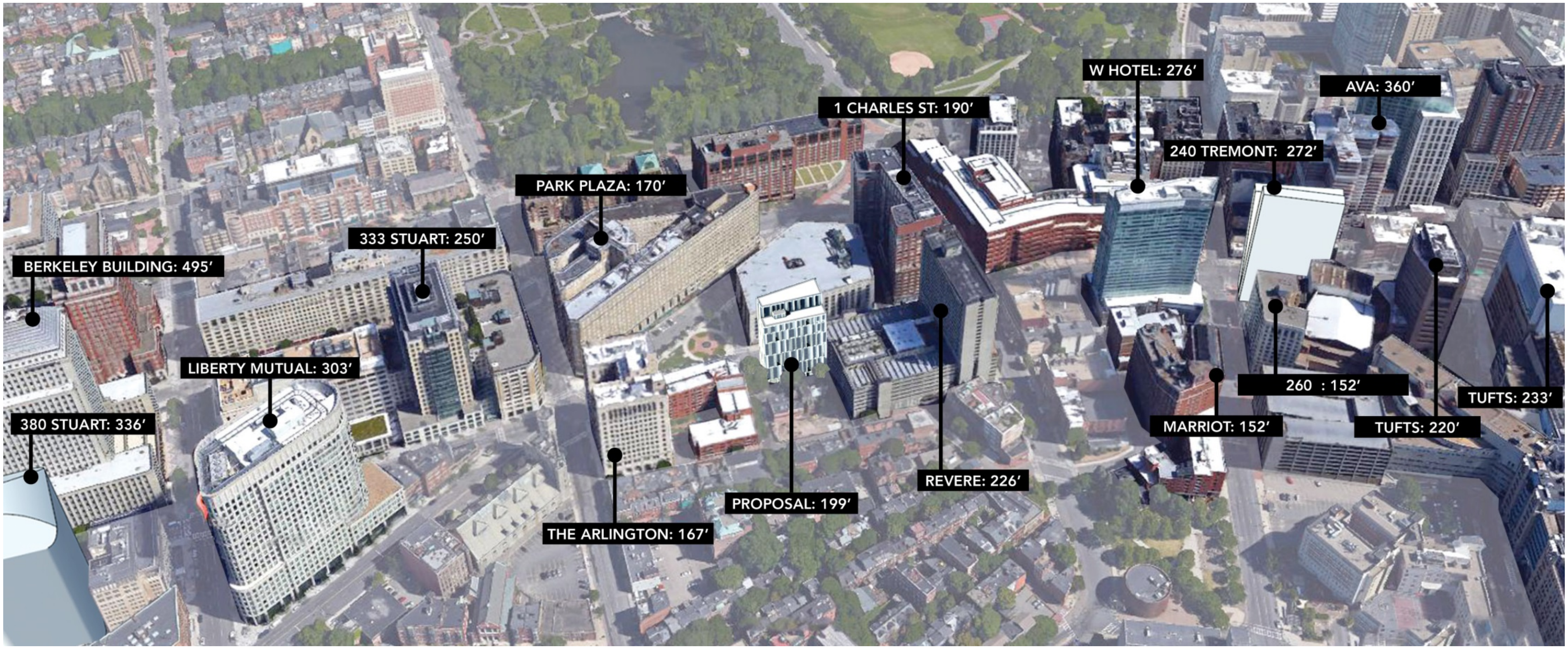


Figure 3-1

View of the High Spine Massing

Figure 3-2

View of the High Spine Elevation

212 Stuart Street **Boston, Massachusetts**

Figure 3-3

Area Context Buildings

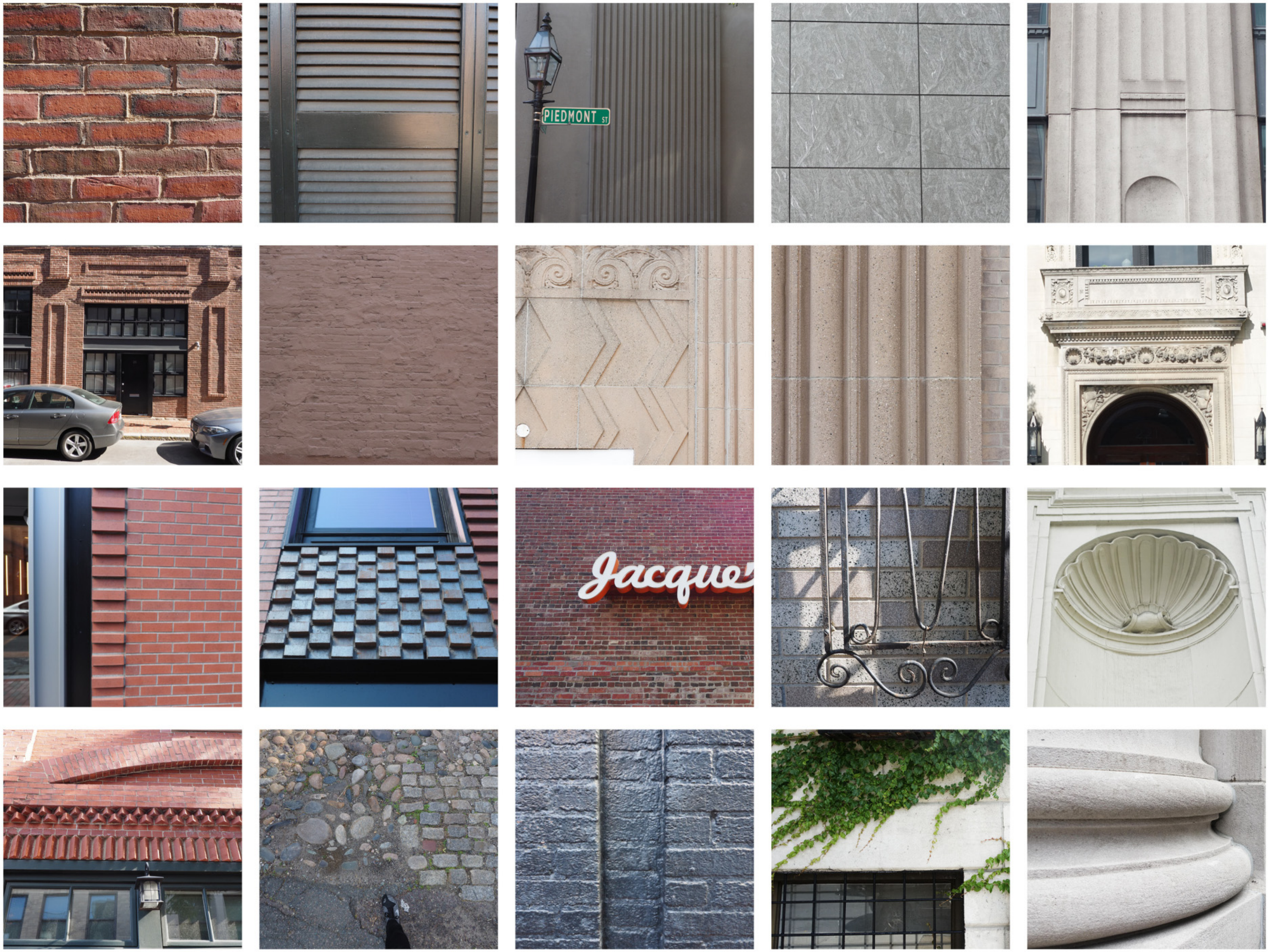


Figure 3-4

Area Context Details

3.2 Public Realm Improvements

As part of the Project, the Proponent proposes to make upgrades, consistent with the City's Complete Streets Design Guidelines, to Stuart Street and its adjacent sidewalks, the Church Street plaza and the northern sidewalk of Shawmut Street, in order to create a distinct and memorable pedestrian experience around the site that residents and visitors alike can name, identify with and return to.

A generous and barrier-free pedestrian zone will knit seamlessly from Church Street to Stuart Street, creating a neighborhood gateway and pedestrian plaza, while maintaining the existing emergency vehicle access over this area, as shown in Figure 3-5. Enhancement of this pedestrian zone will be achieved through the introduction of new plaza trees, paving and lighting, as shown in Figure 3-6. Sustainability features are proposed to include pervious pavers that allow stormwater infiltration in tree root zones. Paver grates and continuous tree wells would allow for more soil space for the root zones of the trees.

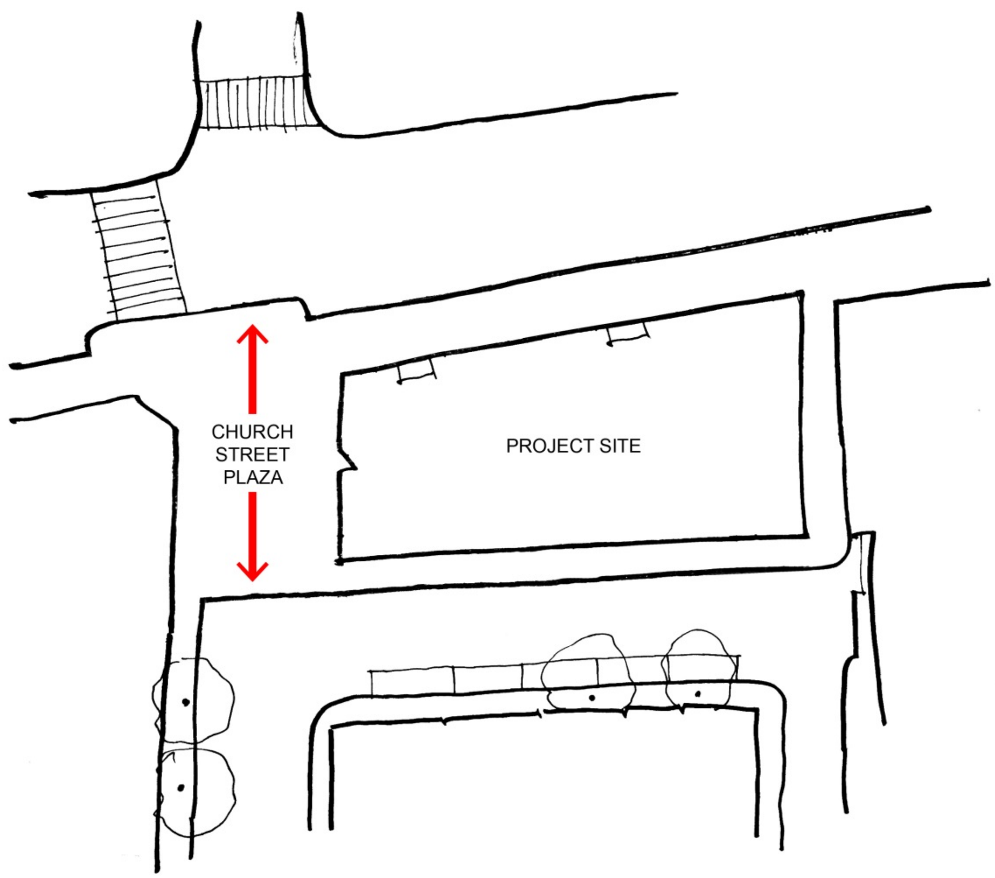
Entrances to the residences, retail space and lobby areas have been carefully designed to make the pedestrian spaces immediately adjacent to the site feel unified and integrated. This continuous outdoor space will be energized by the display windows of the Project's retail space (see Figure 3-6).

The sidewalks along Stuart Street will feature new street trees, lighting and a drop-off lane for visitors. As shown in Figure 3-7, the Proponent proposes to make upgrades to the existing pedestrian crossing and connection across Stuart Street to Statler Park and the northern extension of Church Street by realigning the crosswalk, adding an additional crosswalk and graphically treating the intersection in order to slow down traffic and enhance the overall pedestrian flow from Bay Village, past the site to Columbus Avenue.

The northern sidewalk of Shawmut Street will be enhanced through barrier-free paving and new street trees, as shown in Figure 3-8. Two new on-street parking spaces will be created on Shawmut Street through closure of an existing curb cut. The overall pedestrian experience of the Project will create a distinct and memorable experience that residents and visitors alike can name, identify with and return to.

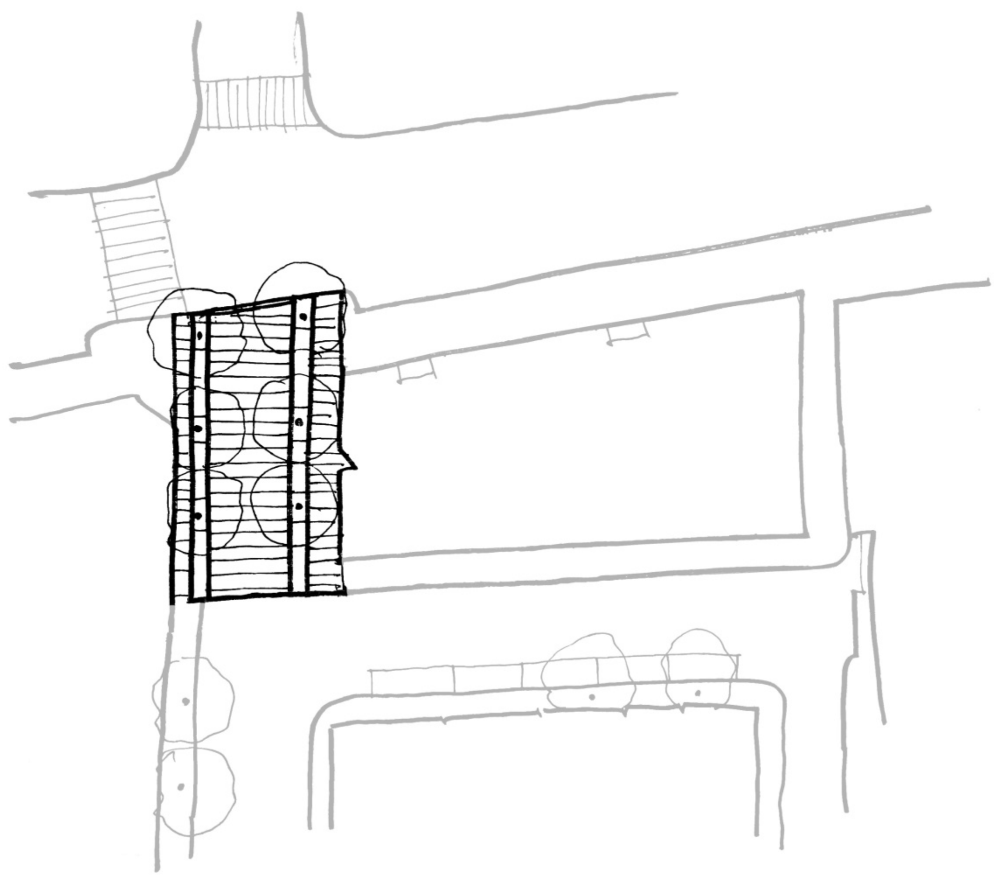
3.2.1 Bay Village Front Door

The Church Street plaza belongs to Bay Village, and its improvements and design will reflect the character and atmosphere of the neighborhood that it is serving. The plaza marks an important transitional space from the large scale bustling urban fabric of the High Spine to the small scale richly textured nature of Bay Village – the plaza is a signal of "coming home". The Project recognizes the importance of the plaza and makes a conscientious effort not to impose itself on the essence of this space.



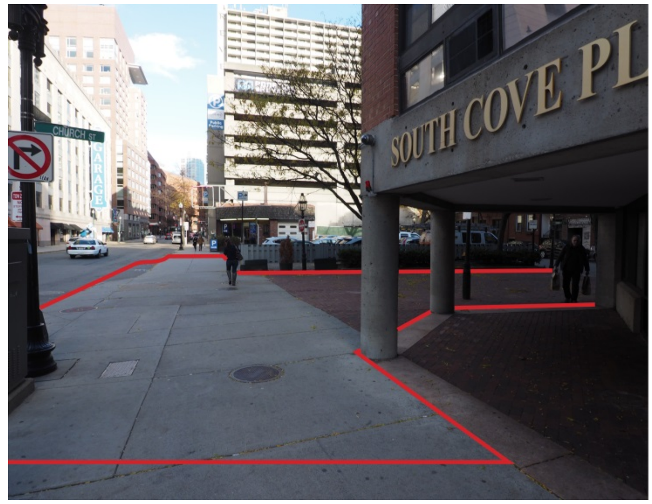
3.2.2 *Verdant Gateway*

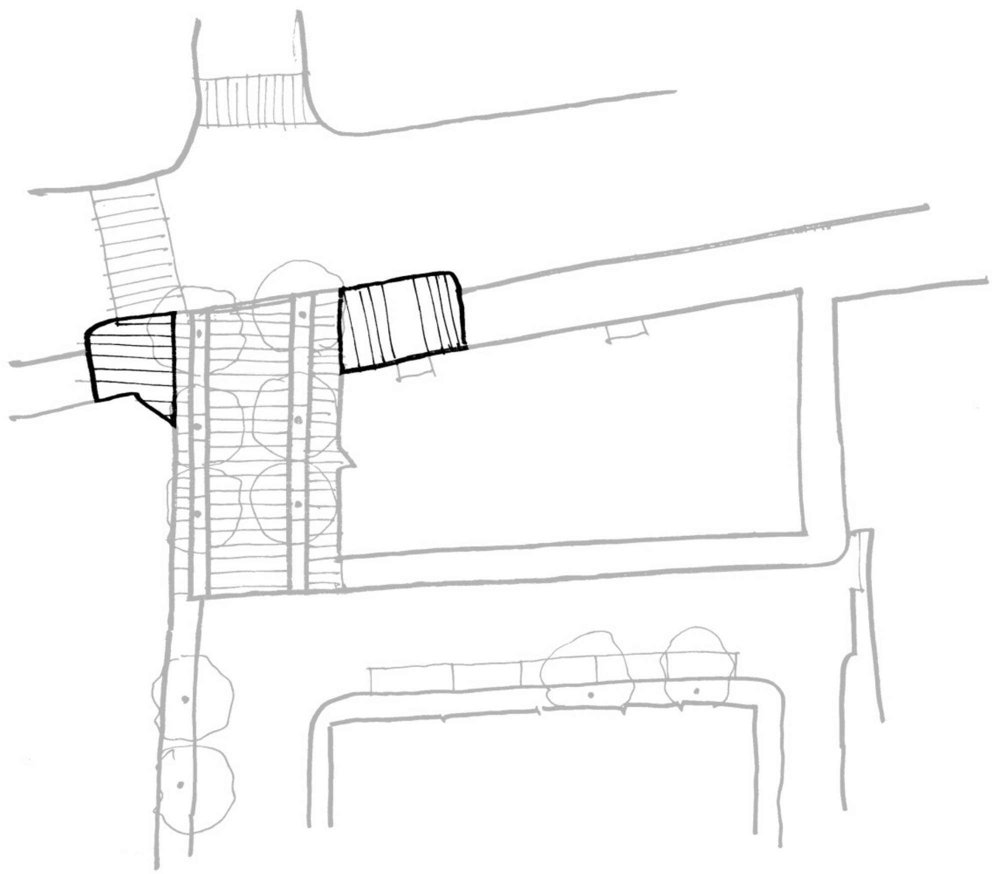
The salient characteristic of the existing Church Street plaza is the lush overhead canopy of flanking Honey Locust trees. This condition will be maintained and enhanced with the improvements to the plaza, allowing the trees to form a subtle gateway to the neighborhood. Improvements will be made to the underfoot experience through a richly textured paving pattern that references the cobblestone and brick paving of the various pocket parks located within Bay Village. Permeable pavers will further add to the texture of the plaza, while helping to mitigate the effects of stormwater runoff.



3.2.3 Augmented Plaza Entrance

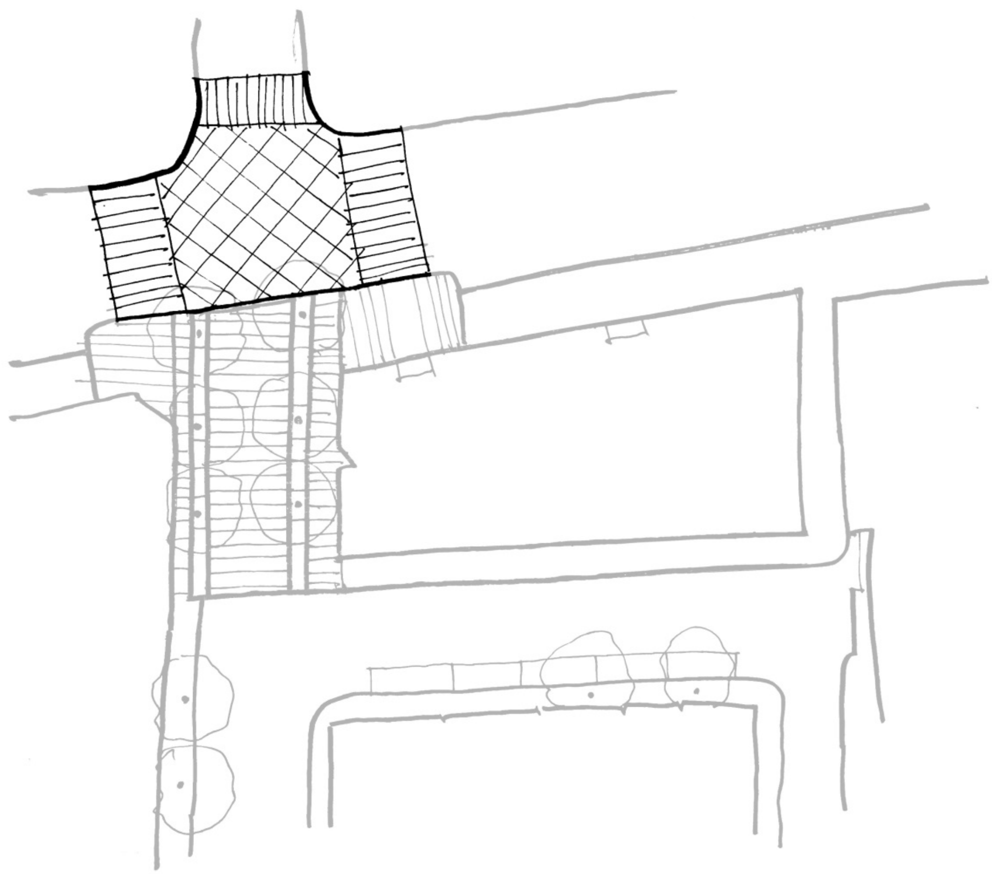
Moving north through the Church Street plaza, the public realm improvements will fan out as it meets the Stuart Street sidewalk to establish a larger catchment area for the entrance to the plaza. Portions of the sidewalk to the west and east will be improved to mark the plaza as a unique moment within the pedestrian experience of Stuart Street. This moment of visual interest will help to soften and integrate the experience of the Church Street plaza with the adjacent context.





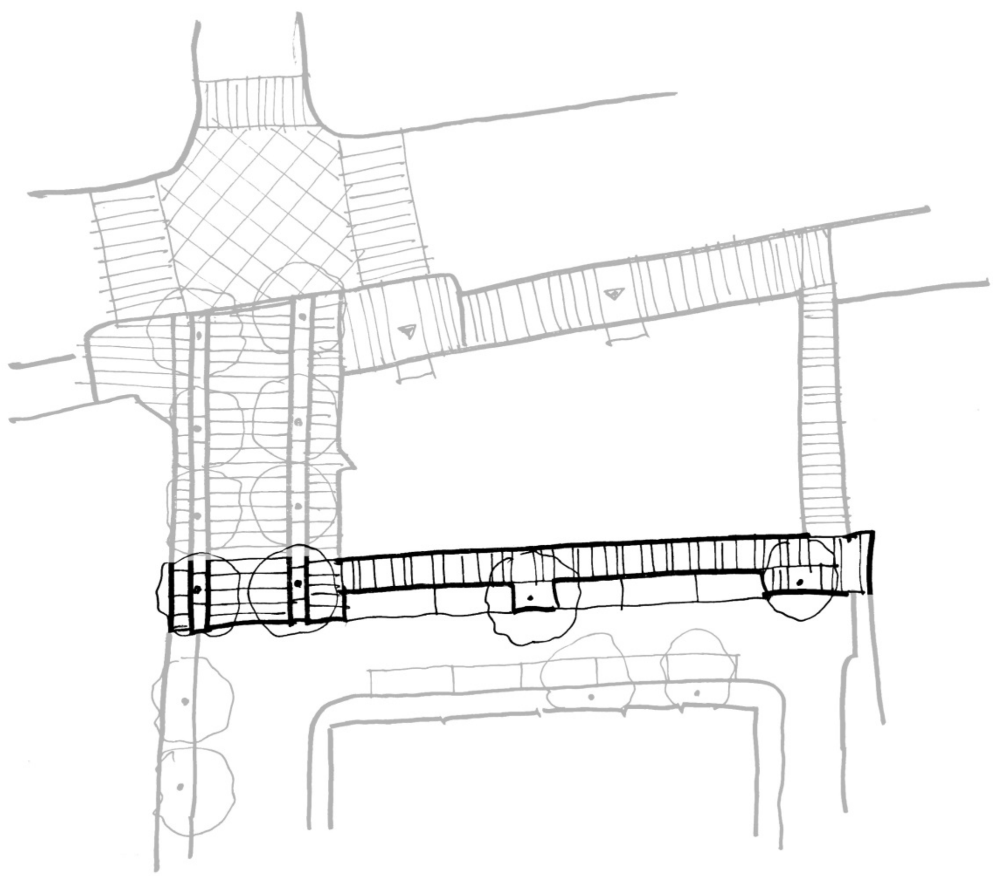
3.2.4 *Expanded Pedestrian Crossing*

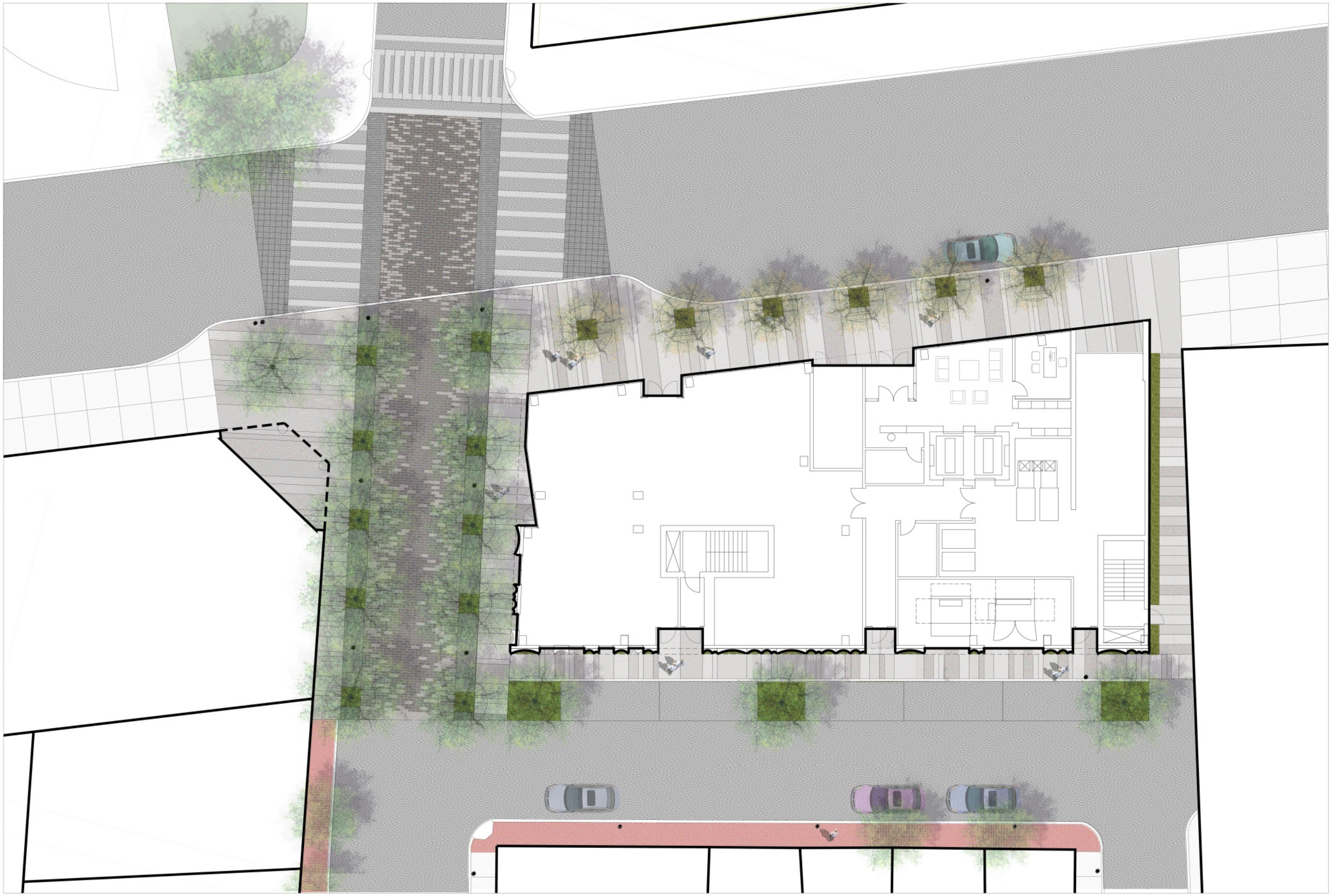
The intersection of the Church Street plaza and Stuart Street offers a unique opportunity to transform territory once associated with the car, to that of the pedestrian. The surface patterning of the plaza will be extended into Stuart Street to provide an expanded pedestrian crossing. Because the one-way traffic flow of Stuart Street is completely stopped by the corresponding signal, pedestrians will be able to cross Stuart Street along a number of varying routes within the newly defined area. The improved roadway surface will serve as a visual and tactile cue to passing cars that an increased level of pedestrian activity occurs in the area and will also serve as an enhanced visual cue identifying the gateway to Bay Village.



3.2.5 *Animated Shawmut Street Edge*

The northern edge of Shawmut Street to the south of the plaza contains latent area that will be reclaimed by the site improvements, thus adding to the effective length of the plaza. The proposal is to reconfigure an otherwise underutilized and banal portion of the site for pedestrian benefit. Farther west along Shawmut Street, parallel street parking will be maintained and expanded for use by Bay Village residents and will be visually broken by a series of new trees.





212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 3-5

Proposed Landscape Plan

Figure 3-6

Church Street Facing South Toward the Project Site

HÖWELER + YOON

Figure 3-7

Statler Park Facing South Toward the Project Site

212 Street Boston, Massachusetts

HÖWELER + YOON

Figure 3-8

Intersection of Shawmut and Church Streets Facing North Toward Project Site

3.3 Evolution of Design

3.3.1 Massing

The overall massing was carefully considered, and a number of formal manipulations were applied to it in order to enhance the Project's reading from the adjacent context. The Project is visually split in the east-west direction to break down the overall volume into two slender north and south portions (see Figure 3-9). These volumes are then sheared vertically, raising the northern volume higher than the southern. This produces a diminished reading of height from the southern Bay Village views towards the Project. This gesture also allows a taller massing to address the taller buildings along the High Spine. Rather than treating the mechanical penthouse as a separate object placed on the roof, it is visually integrated into the design of the north elevation and associated volume to form a cohesive language.

3.3.2 Articulation of Scale

In addition to the considerations of the overall massing, certain strategies are utilized in order to establish a middle scale of the Project. This is accomplished by visually grouping floors into packages on the elevation, producing perceived volumes in increments of 10 feet, from six stories to two (see Figures 3-10 and 3-11). These packages break down the overall height of the Project, and draw a relationship to the three, four and five story townhouses of the adjacent context. On the north elevation, as shown in Figure 3-10, larger packages occur on the upper portion of the building. The south elevation is a reversal of the north, as shown in Figure 3-11, with smaller floor packages occurring on the top portion of the building, further diminishing the reading of height from the Bay Village neighborhood.

3.3.3 Rich Detail

The design of the Project façade is intended to be completely unique and new to Boston, yet is intended to be perceived as a condition not unfamiliar or foreign. Through the close analysis of stone and brick detailing of the adjacent context, as shown in Figure 3-4, a scallop motif emerged which serves as the primary component and formal language of the façade system.

The façade is composed of a series of scalloped panels ranging in widths of 9 feet to 3 feet. Depending on the panel width, the radius of the scallop changes, producing a different visual reading for each unit (see Figures 3-9 to 3-11). These modules are packaged into the heights discussed above. The subtly curved nature of the scallop profile will catch light, and produce dynamic shadow patterns on the building's façade that change depending on the time of day and season. The low morning and afternoon sun will produce long curved shadows across the scallop profiles; the high mid-day sun will produce a softness to the façade and an even gradient across the curved surfaces. The scalloped façade panels produce a richness of detail from different distances and vantage points. It also introduces a small scale component to the elevation, not unlike the intricate brick coursework and stone details of the Bay Village neighborhood.

3.3.4 Activation of the Ground Floor

As previously described, the ground level of the Project site will provide a substantial improvement to the existing condition. Currently, the site is blighted and exists as a break in the activated experience along Stuart Street, which is otherwise lined with restaurants and public amenities. The ground floor of the Project is designed as transparent and inviting, with a large percentage being designated to retail space. The prominent northwest corner will continue this open perception and will be considered a visual extension of the adjacent pedestrian plaza and even Statler Park beyond, as shown in Figure 3-7.

3.4 Building in the Round

The Project design recognizes the importance of its urban significance on all four sides, not just the Project's address on Stuart Street to the north. Each elevation of the building will address the unique and diverse conditions of the adjacent urban context. As previously discussed, the Project is responsible for negotiating the shift in scale between the high-rise buildings along the High Spine to the north, west and east, and the low-rise buildings of Bay Village to the south. The intention of the design is to be legible and coherent as a whole, and will not treat the north and south elevation as irreconcilable opposites.

3.5 Circulation

3.5.1 Improving the Pedestrian Experience

The pedestrian circulation around the site is carefully considered in the proposed development. Stuart Street has significant pedestrian traffic from people moving between the Theater District, Bay Village and Back Bay. In addition to the pedestrian improvements through the Church Street plaza on the west side of the site, the Project will enhance pedestrian circulation and experience along Stuart Street with visual improvements created by the Project's lobby and proposed retail space, as shown in Figure 3-6. The Project also anticipates improving the small pedestrian alley to the east of the site between the Project and the Revere parking garage. This will be achieved through the use of lighting or additional design elements.

The primary pedestrian entrance to the Project for tenants will occur through the main entrance and lobby on the north side off of Stuart Street. The retail entrances will occur on the northwest side of the building in order to draw relationships to the pedestrian walkway to the west and to Statler Park to the northwest across Stuart Street. Figure 3-12 shows pedestrian circulation routes around the site, as well as the building entrances.

3.5.2 Minimal Traffic Disruption

Pick-up and drop-off activities will occur on the north side of the site off of Stuart Street through the main residential entrance and lobby. The loading area will be located on the northeast corner of the site with all loading to occur off of Stuart Street, as shown in Figure 3-12. The loading dock will handle all residential move-in activities and deliveries to the retail space on the ground floor. No loading activities will occur off of Shawmut Street to the south. The loading area will also serve as the trash and recyclable area for the residential and retail uses. No trash will be stored on the street.

212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 3-9

View of the Project Facing Northwest from Statler Park

HÖWELER + YOON

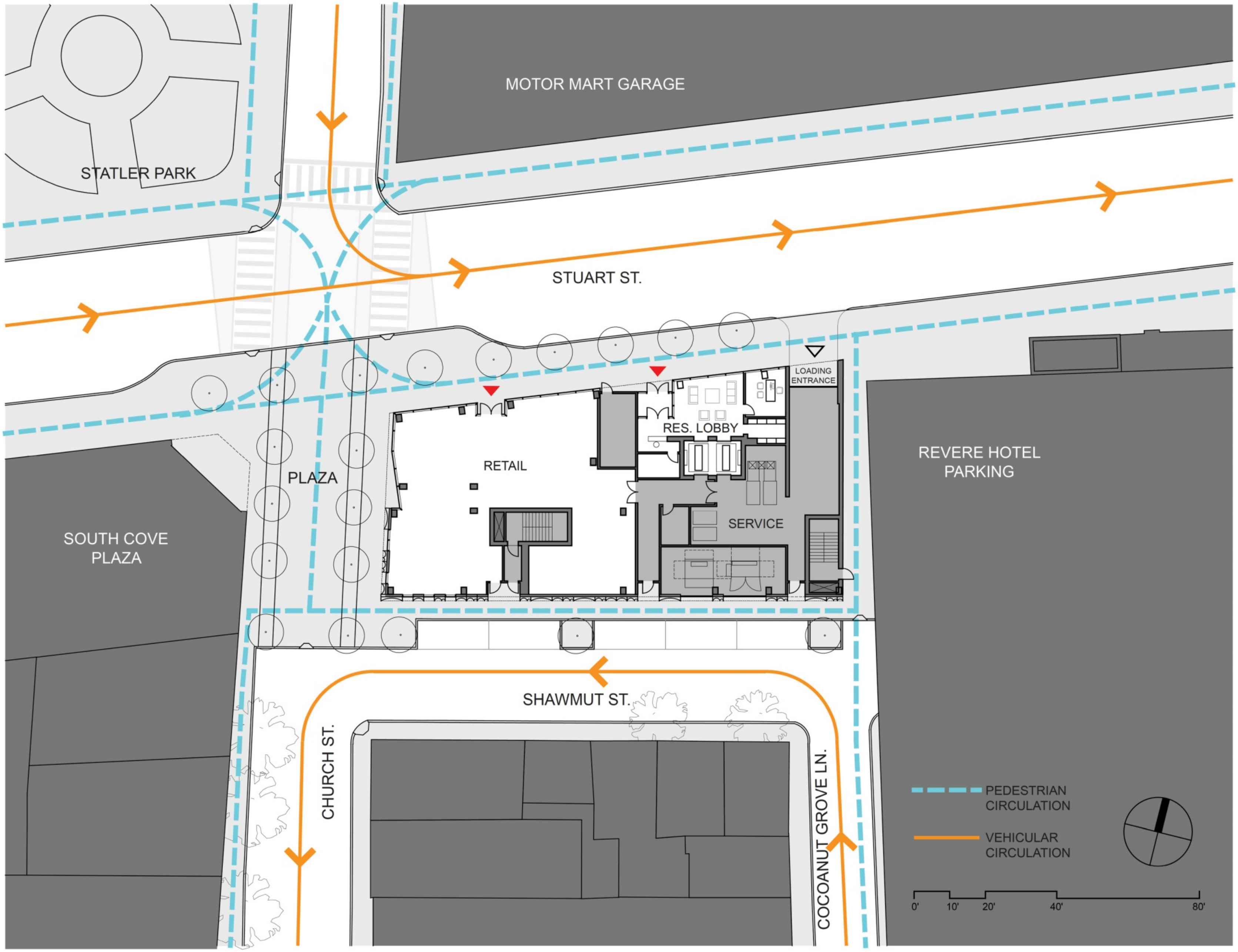
Figure 3-10

North Elevation

HÖWELER + YOON

Figure 3-11

South Elevation



212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 3-12

Site Circulation

Chapter 4.0

Transportation

4.0 TRANSPORTATION

4.1 Introduction

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the proposed Project. This transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and BPDA Article 80 Large Project Review process. This study includes an evaluation of the existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian and bicycle activity. The Project will have minimal impact on the study area intersections and the pedestrian and public transportation facilities in the area.

4.1.1 Previous Studies Conducted for the Site

An Expanded Project Notification Form (EPNF) was filed on April 28, 2008 for a 65,700 sf office building with ground floor retail space proposed for the site. This iteration of the project was approved by the BRA board on August 12, 2008. A comparison of the trip generation characteristics for the previously approved project and the currently proposed Project is provided in this chapter. The previously approved project did not propose any on-site parking and would have accommodated all loading and service activity on-site.

4.1.2 Project Description

As described in detail in Chapter 2, the Project is located at 212-222 Stuart Street on the edge of Boston's Bay Village neighborhood. The 212 Stuart Street lot is currently vacant and the 222 Stuart Street parcel is being used as a public parking lot with a small attendant's office as the only structure that exists on both parcels.

The Project consists of the construction of a 19-floor building containing approximately 131 residential units with approximately 3,000 sf of retail/restaurant space located on the ground floor. Vehicular parking will not be provided on site. Instead, residents of the building will have the option of renting a parking space at the 200 Stuart Street garage, located immediately adjacent to the east side of the Project site. The Proponent has an agreement in place with the 200 Stuart Street garage owner to accommodate up to 50 parking spaces to satisfy the anticipated parking needs of the Project. There are over 2,000 parking spaces located adjacent to the Project site at 200 Stuart Street and the Motor Mart Garage as well as several other nearby public garages that residents will have access to, if needed. The Project will include a bicycle storage room on site that will store approximately 131 bicycles (one per unit). The Project will include a loading bay to accommodate all loading, retail deliveries, and move-in/move-out activity on the site.

4.1.3 Study Methodology

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

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. A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analyses evaluate potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2023, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2023) 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 Project site.

The Build (2023) 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 (2023) Condition analysis. The transportation study identifies expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies.

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 are necessary to accommodate the Project.

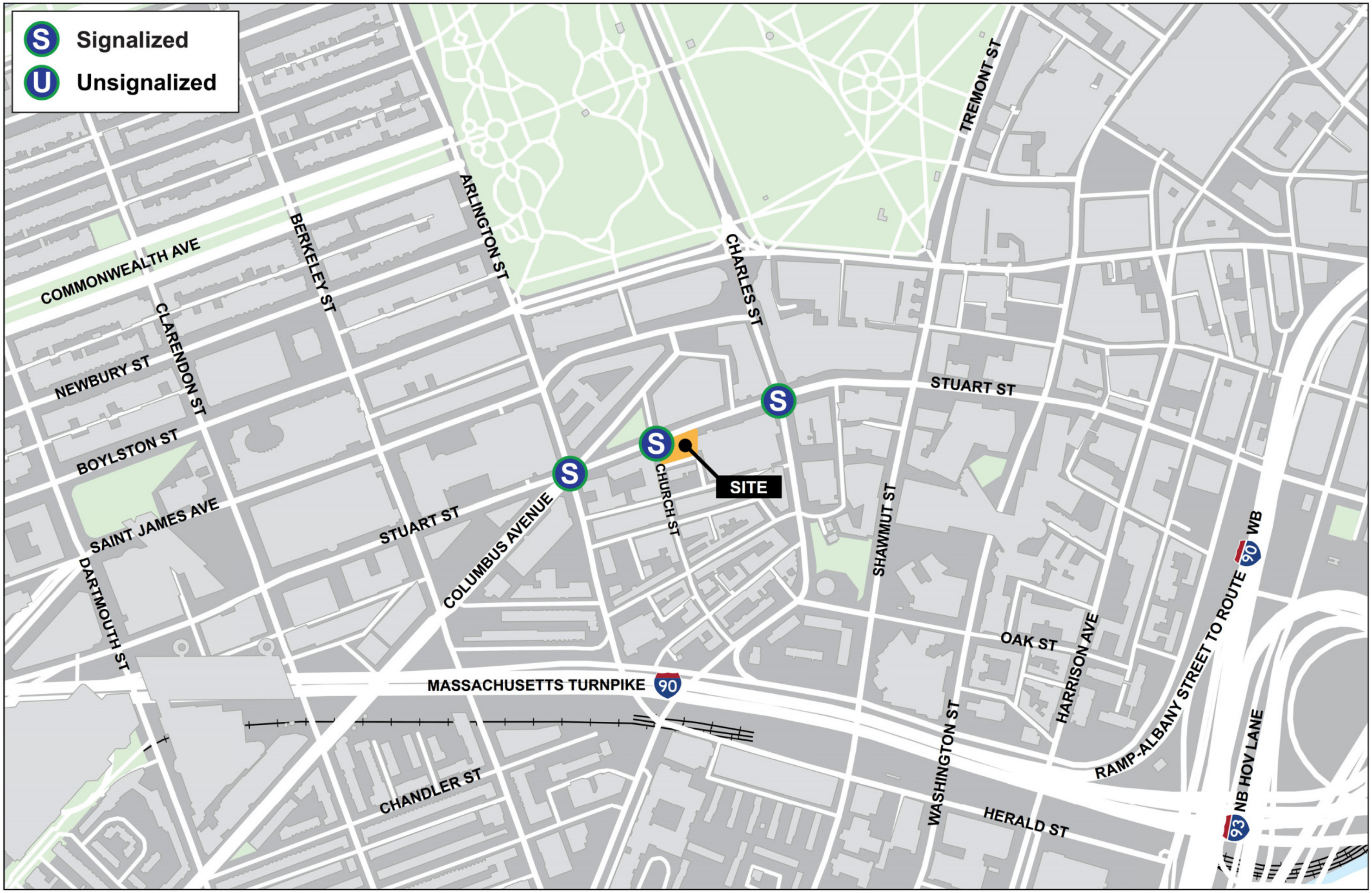
An evaluation of short-term traffic impacts associated with construction activities is also provided.

4.1.4 Study Area

The transportation study area consists of Stuart Street between Charles Street to the east and Arlington Street to the west, including the following three intersections:

- Stuart Street/Arlington Street/Columbus Avenue (signalized);
- Stuart Street/Church Street (signalized); and
- Stuart Street/Charles Street (signalized).

The study area is shown in Figure 4-1.



212 Stuart Street   Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-1

Site Location Map

4.2 Existing (2016) Condition

This section includes descriptions of existing study area roadway geometries, intersection geometry and traffic control, parking and curbs usage, public transportation services, peak-hour traffic volumes for vehicles, bicycles, and pedestrians, and intersection traffic operations.

4.2.1 Existing Roadway Conditions

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

Stuart Street is a one-way eastbound, two-lane roadway west of Charles Street, and a two-way, four-lane roadway east of Charles Street that is adjacent to the north of the Project site and runs in an east-west direction between Huntington Avenue to the west and Washington Street to the east, where it becomes Kneeland Street. Stuart Street is classified as an urban principal arterial under BTD jurisdiction. On-street parking and sidewalks are provided on both sides of Stuart Street.

Arlington Street is a one-way southbound, three-lane roadway located west of the Project site that runs in a north-south direction between Beacon Street to the north and Tremont Street to the south. Arlington Street is classified as an urban principal arterial under BTD jurisdiction. On-street parking is provided on both sides of Arlington Street south of Stuart Street and is available on the west side north of Stuart Street. Sidewalks are provided on both sides of Arlington Street.

Columbus Avenue is a one-way southwest bound, two-lane roadway east of Arlington Street, and a two-way, four-lane roadway west of Arlington Street that runs in a northeast to southwest direction between Park Plaza to the northeast and Tremont Street to the southwest. Columbus Avenue is classified as an urban principal arterial under BTD jurisdiction. On-street parking and sidewalks are provided on both sides of Columbus Avenue.

Church Street is adjacent to the west of the Project site and is separated into two segments by an exclusive pedestrian way south of Stuart Street. The segment of Church Street north of Stuart Street is a one-way northbound, one-lane roadway, and the segment of Church Street south of Stuart Street and the exclusive pedestrian way is a one-way southbound, one-lane roadway. Church Street runs in a north-south direction from Columbus Avenue to the north and Tremont Street to the south. Church Street is classified as a local roadway under BTD jurisdiction. On-street parking is generally provided on both sides of Church Street, with some sections only providing parking on the west side south of Stuart Street. Sidewalks are provided on both sides of Church Street.

Charles Street is a one-way northbound, three-lane roadway located to the east of the Project site that runs in a north-south direction from Tremont Street in the south to Beacon Street in the north. Charles Street is classified as an urban principal arterial under BTD jurisdiction. On-street parking and sidewalks are provided on both sides of Charles Street in the vicinity of the Project site.

4.2.2 Existing Intersection Conditions

The existing study area intersections are described below. Intersection characteristics such as traffic control, lane usage, pedestrian facilities, pavement markings, and adjacent land use are described.

Stuart Street/Arlington Street/Columbus Avenue is a six-leg, signalized intersection with four approaches. The Stuart Street eastbound approach has two lanes: an exclusive through lane and a shared through/right-turn lane. The Arlington Street southbound approach has three lanes: a shared left-turn/through lane, an exclusive through lane, and a shared through/right-turn lane. The Columbus Avenue northeast bound approach has two lanes: an exclusive through lane and a shared through/right-turn lane. The Columbus Avenue southwest bound approach has two lanes: an exclusive through lane and a shared left-turn/through lane. On-street parking is provided on both sides of both Columbus Avenue approaches and the Stuart Street approach, and is provided on the east side of the Arlington Street approach. Sidewalks, crosswalks, wheelchair ramps, pedestrian signal heads, and push buttons are provided for all legs of the intersection.

Stuart Street/Church Street is a three-leg, signalized intersection with one approach. The Stuart Street eastbound approach consists of two lanes: a shared left-turn/through lane and an exclusive through lane. On-street parking is provided on both sides of the Stuart Street eastbound approach and the Church Street leg of the intersection. Sidewalks are provided on both sides of each leg of the intersection. Crosswalks, wheelchair ramps, pedestrian signal heads, and push buttons are provided across all but the eastern leg of the intersection.

Stuart Street/Charles Street is a four-leg, signalized intersection with three approaches. The Stuart Street eastbound approach has three lanes: an exclusive channelized left-turn lane and two exclusive through lanes. The Stuart Street westbound approach has two exclusive right-turn lanes. The Charles Street northbound approach has three lanes: two exclusive through lanes and a shared through/right-turn lane. On-street parking is provided on both sides of the Stuart Street westbound approach and the Charles Street northbound approach. Sidewalks, crosswalks, wheelchair ramps, pedestrian signal heads, and push buttons are provided across all legs of the intersection.

4.2.3 Existing Parking and Curb Use

On-street parking surrounding the Project site generally consists of residential, metered, and commercial parking. The on-street parking regulations within the study area are shown in Figure 4-2.

4.2.4 Existing Off-Street Parking

There are 6,055 publicly accessible parking spaces located in 15 public off-street parking lots/garages within one-quarter mile, or a five-minute walk, from the Project site. The nearest two garages to the Project site are the 200 Stuart Street garage at the Revere Hotel and the Motor Mart Garage. The open-air public parking lot operating at 222 Stuart Street will be removed as part of the Project. The off-street parking facilities located within one-quarter mile of the site are shown in Figure 4-3.

4.2.5 Car and Bicycle Sharing Services

Car sharing services enable 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. Pick-up/drop-off locations are typically in existing parking lots or other parking areas throughout neighborhoods as a convenience to users of the services. Nearby car sharing services provide an important transportation option and reduce the need for private vehicle ownership.

Two major car sharing services with vehicle locations near the Project site are Zipcar and Enterprise CarShare. There are currently four Zipcar locations and one Enterprise CarShare location within a quarter-mile walk of the Project site. The nearest car sharing location to the Project site is located at the Revere Hotel to the east of the Project site.

The Project site is also located in proximity to a bicycle sharing station provided by Hubway. Hubway is the Boston area's bicycle sharing service, which was launched in 2011 and currently consists of more than 1,600 shared bicycles at more than 160 stations throughout Boston, Brookline, Cambridge, and Somerville. The nearest Hubway station to the Project site is located at the intersection of Stuart Street / Charles Street. This station has 19 bicycle docks and is less than a 0.2-mile walk to the east from the Project site. The nearby car and bicycle sharing locations within a quarter-mile of the Project site are shown in Figure 4-4.

4.2.6 Existing Traffic Conditions

4.2.6.1 Turning Movement Counts

Traffic volume data was collected at the study area intersections on September 20 and September 21, 2016. Traffic volume data was also collected at the existing curb cut that serves the site. 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. Detailed traffic counts are provided in Appendix B.

4.2.6.2 Seasonal Adjustment

In order to account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT were reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the September 2016 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) during the month of September is 0.93. This indicates that average month traffic volumes are approximately seven percent less than the traffic volumes that were collected. The traffic counts were not adjusted downward to reflect average month conditions in order to provide a conservatively high analysis consistent with the peak season traffic volumes.

Existing traffic volumes were collected to develop the 2016 Existing Condition vehicular traffic volumes. The 2016 Existing Condition weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown in Figure 4-5 and Figure 4-6, respectively.

4.2.7 Existing Pedestrian Conditions

Sidewalks are provided along all roadways in the study area and are generally in good condition. Crosswalks and pedestrian signal equipment are provided at all three signalized study area intersections.

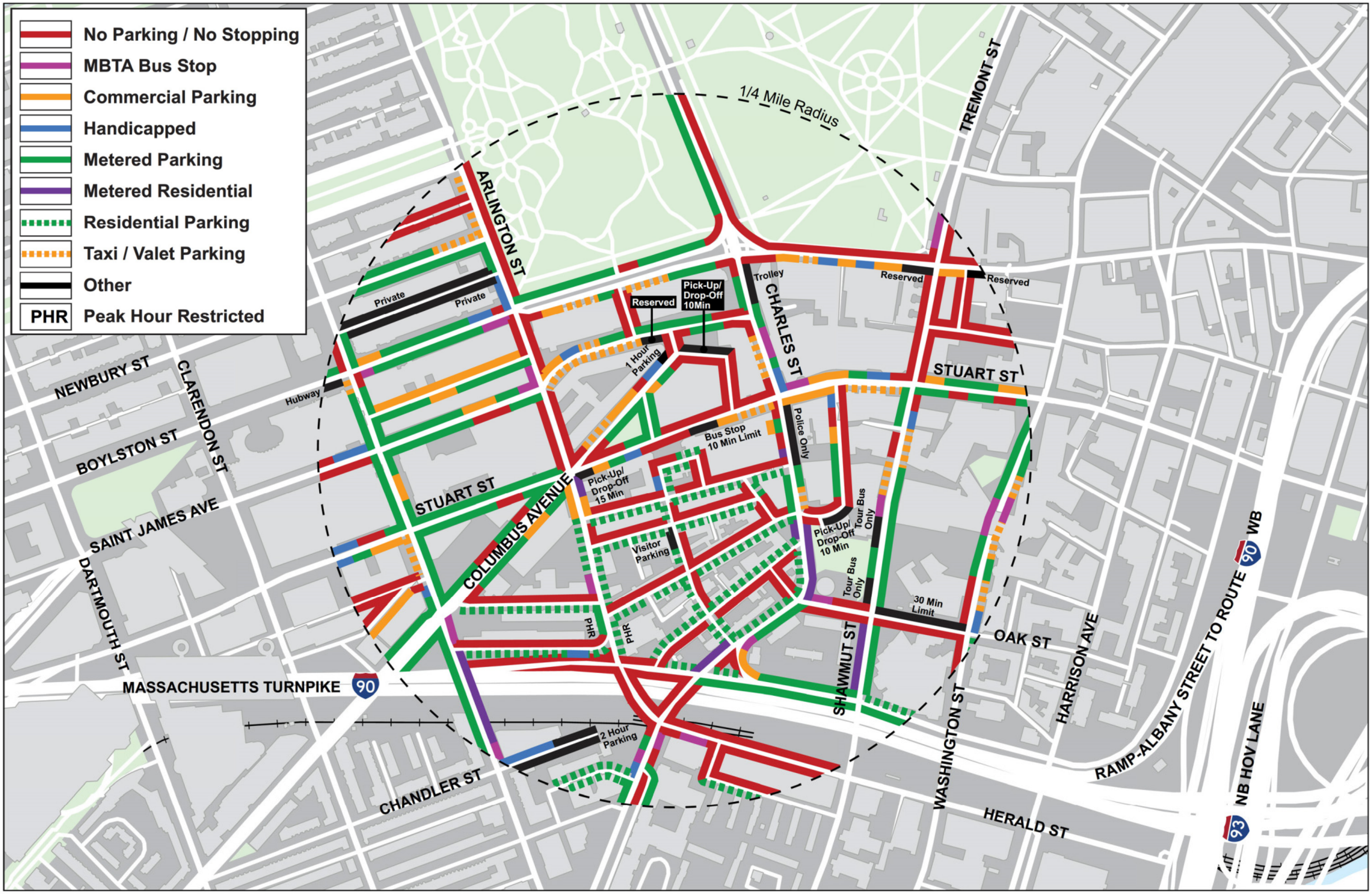
To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersections and are presented in Figure 4-7.

4.2.8 Existing Bicycle Conditions

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is conveniently located in close proximity to several bicycle facilities. The City of Boston's 2013 "Bike Routes of Boston" map designates Arlington Street and Stuart Street as advanced routes, suitable for experienced and traffic-confident cyclists. Neither street has bicycle markings on the roadway.

Columbus Avenue southwest of Stuart Street is designated an intermediate route, suitable for riders with some on-road experience, and the roadway is marked with bicycle sharrows. There are no beginner bike routes within a quarter mile of the Project site.

Bicycle counts were conducted concurrent with the vehicular TMCs and are presented in Figure 4-8.



212 Stuart Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-2
On-Street Parking

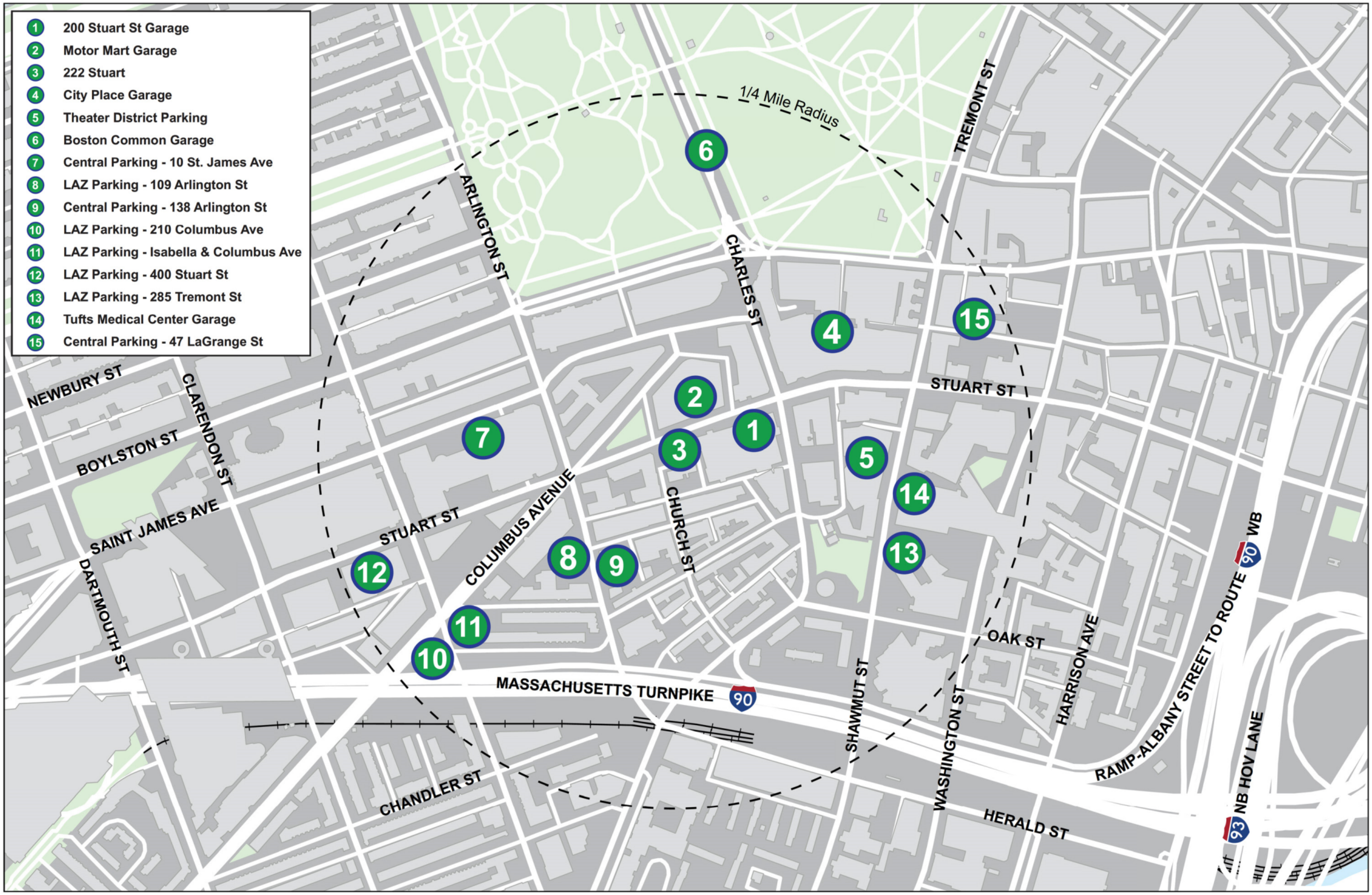
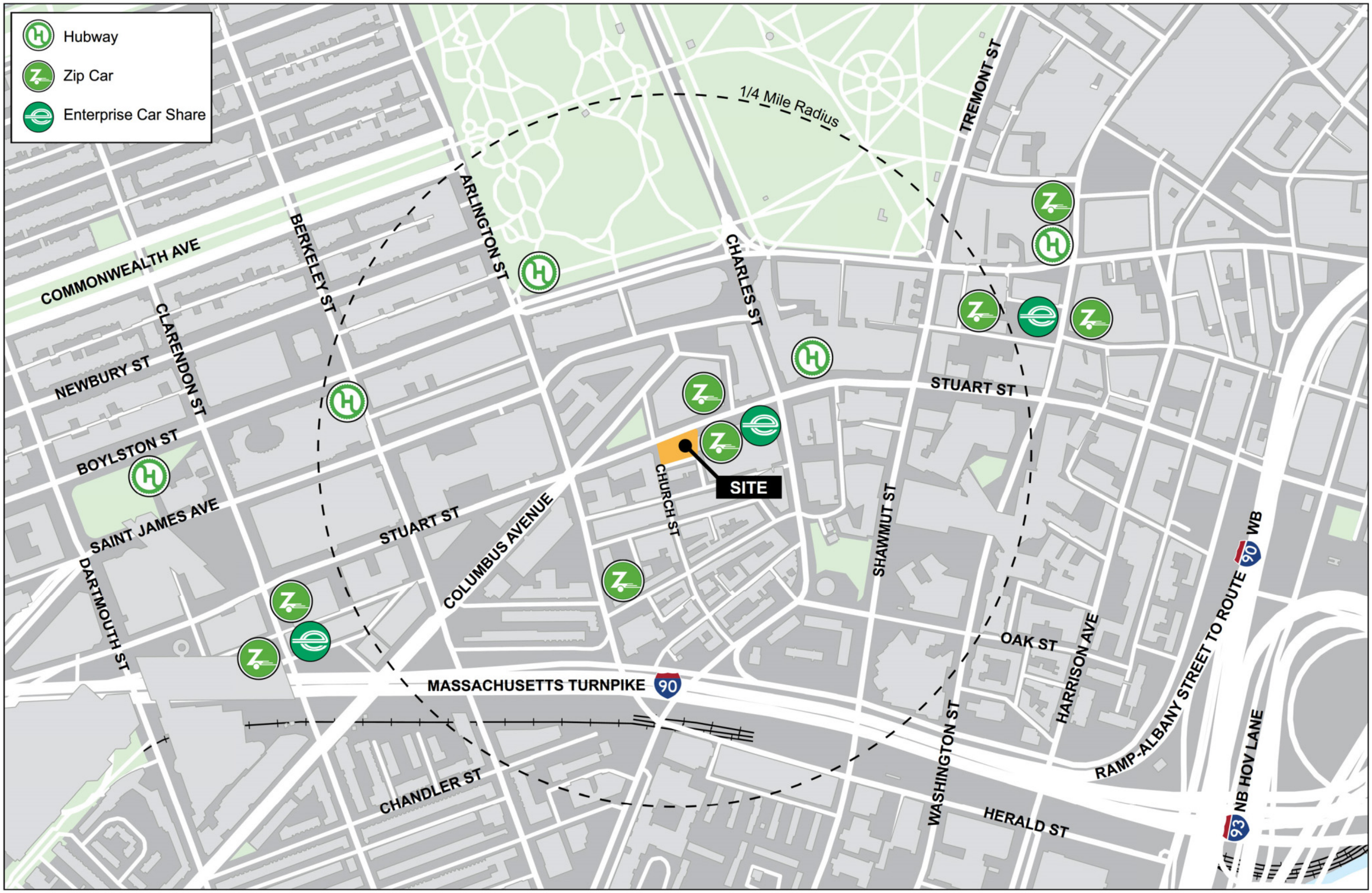


Figure 4-3

Off-Street Parking



212 Street Boston, Massachusetts

Figure 4-4

Car / Bike Sharing Locations

212 Stuart Street   Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-5

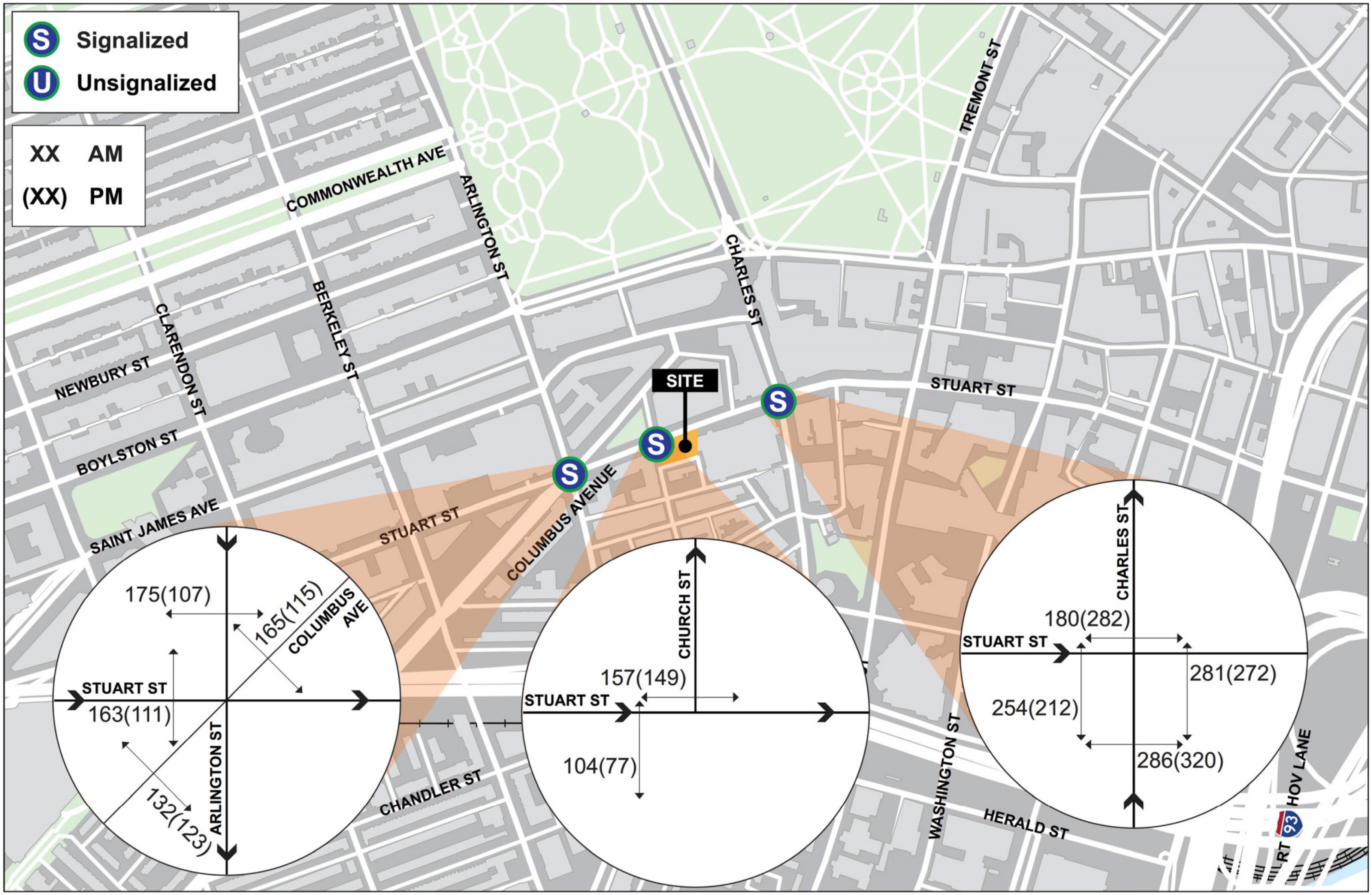
2016 Existing Weekday Morning Peak Hour Traffic Volumes

212 Street Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-6

2016 Existing Weekday Evening Peak Hour Traffic Volumes



212 Stuart Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-7

2016 Existing Weekday Morning and Evening Peak Hour Pedestrian Volumes

212 Stuart Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-8

2016 Existing Weekday Morning and Evening Peak Hour Bicycle Volumes

4.2.9 *Existing Public Transportation*

The Project site area is well-served by public transportation. The MBTA's Green Line, Orange Line, and several bus lines are located in proximity to the site and provide access throughout the city. The closest Green Line station, Arlington Station, is 0.2 miles away and serves all of the Green Line's branches. The closest Orange Line stations, Tufts Medical Center and Chinatown, are less than 0.5 miles away. The Orange Line runs between Oak Grove Station in Malden to Forest Hills Station in Jamaica Plain. The MBTA Silver Line also operates the SL5 bus line along Washington Street, a short walk east of the Project site.

The route 9 bus travels along Arlington Street to the west of the Project site with bus stops along Arlington Street north and south of the intersection of Stuart Street/Arlington Street/Columbus Avenue. The route 43 bus travels along Charles Street and Tremont Street to the west of the Project site with a bus stop located north of the intersection of Stuart Street/Charles Street. The route 55 bus travels along Boylston Street and Charles Street with nearby stops located at Arlington Station and Stuart Street at Charles Street. The nearby public transit services are shown in Figure 4-9 and summarized in Table 4-1.

Table 4-1 Existing Public Transportation

Transit Service	Description	Peak-Hour Headway (minutes)[1]
Subway Lines		
Green Line	B Line – Government Center Station – Boston College Station C Line – North Station – Cleveland Circle Station D Line – Government Center Station – Riverside Station E Line – Lechmere Station – Heath Street Station	6
Orange Line	Oak Grove Station – Forest Hills Station	6
Bus Routes		
SL 5	Dudley Station – Downtown Crossing at Temple Place via Washington Street	7-9
9	City Point – Copley Square via Broadway Station	4-6
43	Ruggles Station – Park Street & Tremont Street via Tremont Street	15-18
55	Jersey & Queensberry – Copley Square or Park Street & Tremont Street via Ipswich Street	15-30

1 Headway is the scheduled time between trains or buses. Headways are approximate.
Source: www.mbta.com, September 2016.

4.2.10 Traffic Operations Analysis

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 4-2 displays the 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 acceptable in an urban area. However, LOS E or F is often typical for a stop controlled minor street that intersects a major roadway.

Table 4-2 Vehicle Level of Service Criteria

Level of Service	Average Stopped Delay (sec/veh) Signalized Intersection	Unsignalized Intersection
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

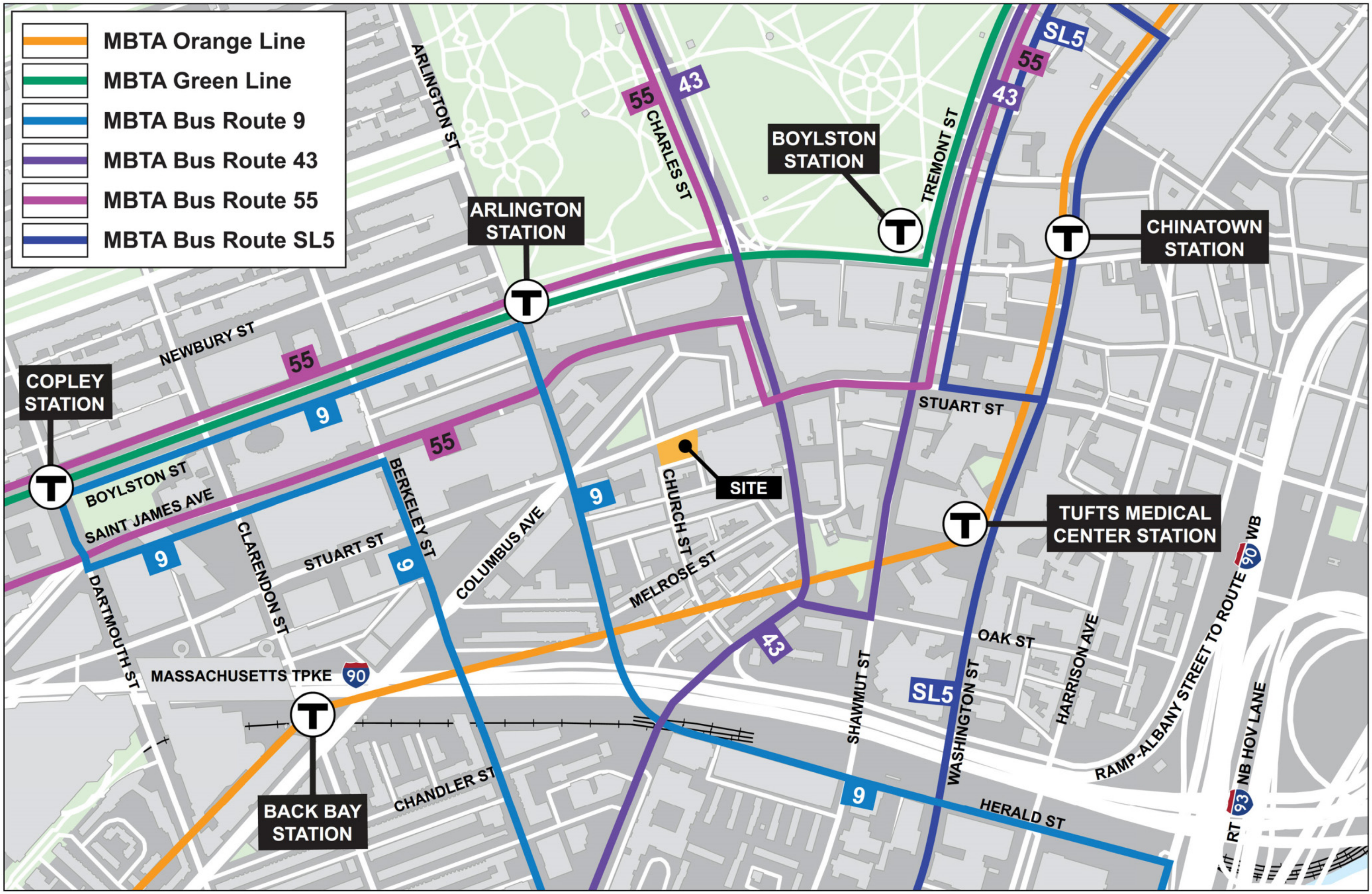
Source: 2000 Highway Capacity Manual, Transportation Research Board.

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 50th percentile queue length, measured in feet, represents the maximum queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes.

The 95th percentile queue length, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during five percent of all signal cycles. The 95th percentile queue will not be seen during each cycle. The queue would be this long only five percent of the time and would typically not occur during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile



212 Stuart Street **Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-9
Public Transportation

queue represents what can be considered a "worst case" scenario. Queues at the intersection are generally below the 95th percentile queue throughout the course of the peak hour. It is also unlikely that the 95th percentile queues for each approach to the intersection will occur simultaneously.

4.2.11 Existing (2016) Condition Traffic Operations Analysis

Table 4-3 and Table 4-4 summarize the Existing (2016) Condition capacity analysis for the study area intersection during the weekday a.m. Peak Hour and the weekday p.m. Peak Hour. The detailed analysis sheets are provided in Appendix B.

Table 4-3 Existing (2016) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	E	57.7	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~253	#381
Arlington St SB left/thru | thru | thru/right	D	42.7	0.85	261	308
Columbus Ave NEB right | right	F	>80.0	0.99	130	#233
Columbus Ave SWB left/thru | thru	C	27.8	0.48	47	88
Stuart Street / Church Street	A	5.7	-	-	-
Stuart St EB left/thru | thru	A	5.7	0.50	100	140
Stuart Street / Charles Street	B	13.5	-	-	-
Stuart St EB left	A	2.3	0.34	0	39
Stuart St EB thru | thru	B	12.0	0.24	63	93
Stuart St WB right | right	A	0.8	0.42	0	0
Charles St NB thru | thru | thru/right	D	41.4	0.73	82	123

\# 95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey shading indicates LOS E or F.

Table 4-4 Existing (2016) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	F	>80.0	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~395	#496
Arlington St SB left/thru | thru | thru/right	D	35.8	0.74	243	287
Columbus Ave NEB right | right	F	>80.0	0.98	103	#196
Columbus Ave SWB left/thru | thru	D	44.3	0.76	81	124
Stuart Street / Church Street	A	4.5	-	-	-
Stuart St EB left/thru | thru	A	4.5	0.45	96	134
Stuart Street / Charles Street	B	15.2	-	-	-
Stuart St EB left	A	2.5	0.38	0	41
Stuart St EB thru | thru	B	12.6	0.31	88	122
Stuart St WB right | right	A	0.8	0.41	0	0
Charles St NB thru | thru | thru/right	D	45.3	0.80	101	141

95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey shading indicates LOS E or F.

The signalized intersection of **Stuart Street/Columbus Avenue/Arlington Street** currently operates at LOS E during the weekday a.m. Peak Hour and LOS F during the weekday p.m. Peak Hour. During both the a.m. and p.m. peak hours, the Stuart Street eastbound and Columbus Avenue northeastbound approaches operate at LOS F. All other movements at the intersection operate at LOS D or better. The longest queues at the intersection occur along the Stuart Street eastbound approach for both the a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Church Street** currently operates at an overall LOS A during the weekday a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Charles Street** currently operates at LOS B during the weekday a.m. and p.m. peak hours. All movements at the intersection operate at LOS D or better. The longest queues at the intersection occur along the Charles Street northbound approach.

4.3 No-Build (2023) Condition

The No-Build (2023) 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. The No-Build (2023) Condition does not include the Project-related impacts. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

4.3.1 Background Traffic Growth

The methodology to account for future background traffic growth, independent of large development projects, may be affected by changes in demographics, smaller scale development projects, or projects unforeseen at this time. Based on a review of recent traffic studies conducted for nearby projects and historic traffic data, to account for any additional unforeseen traffic growth, a one-half percent per year annual traffic growth rate was used.

4.3.2 Specific Development Traffic Growth

Traffic volumes associated with known, larger or adjacent development projects can affect traffic patterns throughout the study area within the future analysis time horizon. A total of ten development projects were identified in the vicinity of the Project and are shown in Figure 4-10. Traffic volumes associated with three projects were directly incorporated into the future conditions traffic volumes:

- **350 Boylston Street** – This project, located to the west of the Project site, calls for the construction of an approximately 221,230 gross square foot, nine-story office building with ground floor retail, a health club, and 150 below grade parking spaces. This project has been approved by the BRA Board.

- **40 Trinity Place** – This project, located west of the Project site, calls for the construction of a 31-story building with approximately 154 hotel rooms, 146 residential units, and ground floor retail/restaurant space. This project has been approved by the BRA Board.

- **380 Stuart Street** – This project, located west of the Project site, calls for the demolition of the existing 140,000 sf office building on the site and the construction of a new 615,000 sf office building with a 175-space below-grade parking garage and a pedestrian bridge over Stuart Street to 200 Berkeley Street. This project has been approved by the BRA Board.

Traffic volumes for all other nearby development projects, listed in Table 4-5, are included in the general background traffic growth.

Table 4-5 Other Development Projects in the Project Vicinity

Project	Program Description	Status
500 Boylston Street	Approximately 79,300 sf, 6-story retail and office infill of existing courtyard at 500 Boylston Street. Conversion of up to 50,000 sf of office space to retail space.	Under Review
Emerson College – Little Building Renovation Project	Replacing/restoring existing façade, renovations on floors 2-12, construction of a new 13th floor. Add 294 new student beds.	Board-approved
48 Boylston Street	Existing YMCA building will be converted into 46 units of low and moderate income housing. 3,826 sf of retail space. 10,939 sf of office space.	Board-approved
Emerson College – 1-3 Boylston Place	Approximately 89,900 sf 400 bed dormitory.	Under Construction
South End/Back Bay Gateway	Development of approximately 1.26 million sf of mixed-use office, retail, restaurant, commercial, and residential space in and over the existing garage and station.	Under Review
Parcel P-7A	Construction of 23-story, 125,000 sf, 346 room micro hotel.	Board-approved

4.3.3 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, no planned infrastructure improvements in the area are expected.

4.3.4 No-Build (2023) Condition Traffic Volumes

The one-half percent per year annual growth rate was applied to the Existing (2016) Condition traffic volumes, then the traffic volumes associated with the background development project listed above were added to develop the No-Build (2023) Condition traffic volumes. The No-Build (2023) weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown on Figure 4-11 and Figure 4-12, respectively.

212 Street Street Boston, Massachusetts

Figure 4-10
Background Projects

4.3.5 No-Build (2023) Condition Traffic Operations Analysis

The No-Build (2023) Condition capacity analysis uses the same methodology as the Existing (2016) Condition capacity analysis. Table 4-6 and Table 4-7 present the No-Build (2023) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix B.

Table 4-6 No-Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	E	62.5	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~282	#404
Arlington St SB left/thru | thru | thru/right	D	44.6	0.88	274	323
Columbus Ave NEB right | right	F	>80.0	>1.00	~142	#244
Columbus Ave SWB left/thru | thru	C	28.7	0.50	50	92
Stuart Street / Church Street	A	5.9	-	-	-
Stuart St EB left/thru | thru	A	5.9	0.52	106	148
Stuart Street / Charles Street	B	13.8	-	-	-
Stuart St EB left	A	2.3	0.35	0	40
Stuart St EB thru | thru	B	12.1	0.25	67	97
Stuart St WB right | right	A	0.9	0.43	0	0
Charles St NB thru | thru | thru/right	D	42.3	0.75	87	128

\# 95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.

Table 4-7 No-Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

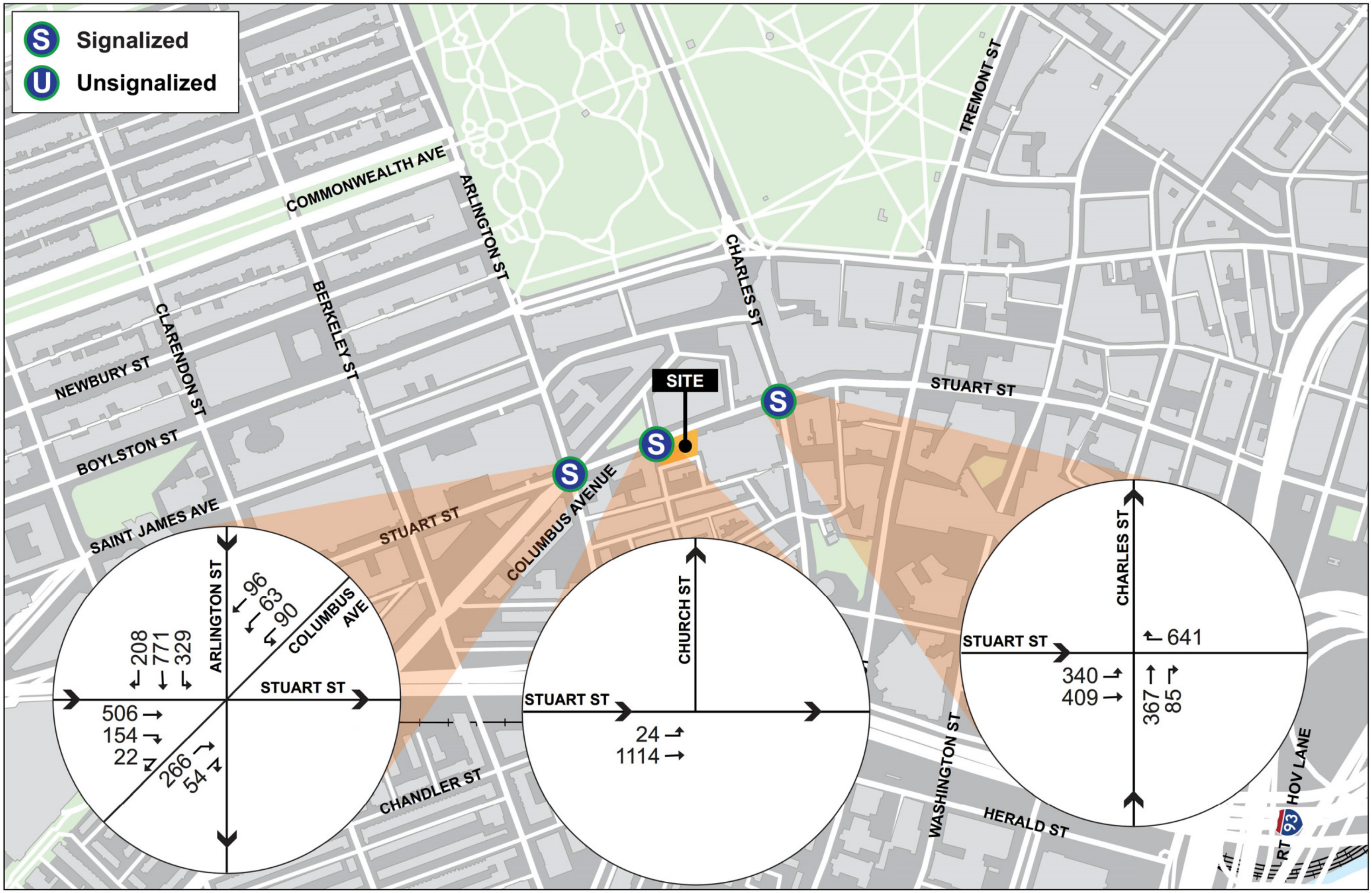
Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	F	>80.0	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~422	#523
Arlington St SB left/thru | thru | thru/right	D	37.2	0.78	262	308
Columbus Ave NEB right | right	F	>80.0	>1.00	~110	#205
Columbus Ave SWB left/thru | thru	D	46.8	0.79	87	#139
Stuart Street / Church Street	A	4.6	-	-	-
Stuart St EB left/thru | thru	A	4.6	0.47	102	143
Stuart Street / Charles Street	B	15.6	-	-	-
Stuart St EB left	A	2.6	0.39	0	42
Stuart St EB thru | thru	B	12.8	0.32	94	128
Stuart St WB right | right	A	0.8	0.43	0	0
Charles St NB thru | thru | thru/right	D	46.6	0.82	106	#156

95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.

The signalized intersection of **Stuart Street/Columbus Avenue/Arlington Street** continues to operate at LOS E during the weekday a.m. Peak Hour and LOS F during the weekday p.m. Peak Hour under the No Build Condition. During both the a.m. and p.m. peak hours, the Stuart Street eastbound and Columbus Avenue northeastbound approaches continue to operate at LOS F. All other movements at the intersection continue operate to at LOS D or better. The longest queues at the intersection continue to occur along the Stuart Street eastbound approach for both the a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Church Street** will continue to operate at an overall LOS A during the weekday a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Charles Street** continues to operate at LOS B during the weekday a.m. and p.m. peak hours under the No-Build (2023) Condition. All movements at the intersection continue to operate at LOS D or better. The longest queues at the intersection continue to occur along the Charles Street northbound approach.



212 Stuart Street   Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-11

2023 No-Build Weekday Morning Peak Hour Traffic Volumes

212 Stuart Street   Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-12

2023 No-Build Weekday Evening Peak Hour Traffic Volumes

4.4 Build (2023) Condition

As previously summarized, the Project site is located at 212-222 Stuart Street along the edge of Boston's Bay Village neighborhood. The Project consists of the construction of a 19-floor building containing approximately 131 residential units with approximately 3,000 sf of retail/restaurant space located on the ground floor. Vehicular parking will not be provided on site. Instead, residents of the building will have the option of renting a parking space at the Revere Hotel garage, located immediately adjacent to the east side of the Project site. The Proponent will have an agreement in place with the Revere Hotel to accommodate the parking needs of the Project. There are also several nearby public garages that residents will have access to, if needed. The Project will include a bicycle storage room on site that will store approximately 131 bicycles (one per unit).

4.4.1 Site Access and Vehicle Circulation

Existing access to the site is provided by a curb cut along the south side of Stuart Street. The Project will not provide parking on site and will not have any vehicular activity with the exception of loading, move-in/move-out, and service vehicles. The Project includes an off-street loading bay. The site plan is shown in Figure 4-13.

4.4.2 Parking

As previously discussed, the site will not provide parking on-site due to the limited size of the Project site. The Proponent has finalized a long-term lease with the 200 Stuart Street parking garage to provide up to 50 parking spaces for residents of the Project. There are also several other nearby garages that will allow residents and visitors to park their vehicles. The Proponent is also proposing to restrict residents of the Project from receiving residential parking permits (RPP) for the Bay Village neighborhood to ensure that the on-street residential parking supply is not impacted by the Project. A total of approximately 131 secure, covered bicycle parking spaces will also be provided as part of the Project.

4.4.3 Loading and Service Accommodations

Loading and service operations for the Project will occur on the site via an enclosed loading dock which will accommodate up to an SU-36 box truck, which is expected to be the largest vehicle traveling to the site. Trash pick-up can also occur on the site without impacting pedestrian and vehicular movements along Stuart Street.

Delivery estimates for the residential element of the Project are 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 likely be SU-36 trucks and smaller delivery

---

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

vehicles. Residential units primarily generate delivery trips related to small packages and prepared food. Based on the CTPS report, the Project is expected to generate three light truck trips per day to the site.

4.4.4 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for residents and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply approximately 131 secure bicycle parking/storage spaces within the site.

4.4.5 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, walk trips, and 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 project 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 used. 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 trip generation for the Project, the following ITE land use code (LUCs) were used:

Land Use Code 220 – Apartment. This land use code refers to dwelling units located within the same building with at least three other dwelling units. Calculation of the number of trips uses ITE's average rate per dwelling unit.

Land Use Code 820 – Shopping Center. This land use code refers to an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Calculation of the number of trips uses ITE's average rate per 1,000 sf.

---

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

212 Stuart Street Boston, Massachusetts

Figure 4-13

Site Access Plan

4.4.6 Mode Share

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located within designated Area 3 – Park Plaza. 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 4-8.

Table 4-8 Travel Mode Shares

Time Period		LUC	Vehicle Occupancy Rate[a]	Walk/Bike Share[b]	Transit Share[b]	Vehicle Share[b]
Daily	In	220	1.13	49%	17%	34%
	Out		1.13	49%	17%	34%
	In	820	1.78	39%	30%	31%
	Out		1.78	39%	30%	31%
a.m. Peak Hour	In	220	1.13	38%	17%	45%
	Out		1.13	65%	13%	22%
	In	820	1.78	26%	40%	34%
	Out		1.78	69%	11%	20%
p.m. Peak Hour	In	220	1.13	65%	13%	22%
	Out		1.13	38%	17%	45%
	In	820	1.78	69%	11%	20%
	Out		1.78	26%	40%	34%

a 2009 National Household Travel Survey.
b Based on rates published by the Boston Transportation Department for Area 3 – Park Plaza.

4.4.7 Existing Trip Generation

A portion of the site contains an existing public parking lot that is currently in operation. This parking lot will be removed as part of the proposed Project. For the Build (2023) Condition, the trips associated with the parking lot have been subtracted from the study area's roadway network.

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

4.4.8 Project Trip Generation

The mode share percentages shown in Table 4-8 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. The trip generation for the Project by mode is shown in Table 4-9. The detailed trip generation information is provided in Appendix B.

Table 4-9 Project Trip Generation

Time Period		Walk/Bike Trips	Transit Trips	Primary Vehicle Trips
Daily				
Apartment [1]	In	243	84	150
	Out	243	84	150
	Total	**486**	**168**	**300**
Retail [2]	In	45	34	20
	Out	45	34	20
	Total	**90**	**68**	**40**
a.m. Peak Hour				
Apartment	In	6	2	6
	Out	40	8	12
	Total	**46**	**10**	**18**
Retail	In	1	2	1
	Out	2	0	0
	Total	**3**	**2**	**1**
p.m. Peak Hour				
Apartment	In	39	8	12
	Out	12	6	13
	Total	**51**	**14**	**25**
Retail	In	6	1	1
	Out	3	4	2
	Total	**9**	**5**	**3**

1. Based on ITE LUC 220 – 131 Apartment units, average rate.
2. Based on ITE LUC 820 – 2,300 sf Shopping Center, average rate.

The net peak-hour vehicle trip generation for the Project was determined by adjusting the Project-generated vehicle trips to account for the removal of the trips associated with the existing parking lot on the site. The existing trips were determined from the traffic counts conducted at the curb cut. The net vehicle trip generation for the Project during the weekday a.m. and p.m. peak hours is shown in Table 4-10.

Table 4-10 Net Vehicle Trip Generation

Direction	Project-Generated Trips[1]	Existing Trips[2]	New Vehicle Trips[3]	Previously Approved Project[4]
a.m. Peak Hour				
In	7	10	**-3**	31
Out	12	2	**+10**	4
Total	19	12	**+7**	35
p.m. Peak Hour				
In	13	6	**+7**	8
Out	15	7	**+8**	45
Total	28	13	**+15**	53

1. Based on ITE Trip Generation.
2. Based on existing counts – these trips were removed from the study area.
3. Net new vehicle trips on study area roadway network.
4. From the April 28, 2008 EPNF filed for the previously approved project.

As shown in Table 4-10, the Project is expected to generate approximately 7 new trips during the weekday a.m. Peak Hour and 15 new trips during the weekday p.m. Peak Hour. This level of increase in traffic volume is minimal when compared to the existing traffic patterns within the study area. The Project is expected to generate approximately 16 fewer trips during the weekday a.m. Peak Hour and 25 fewer trips during the weekday p.m. Peak Hour when compared to the previously approved project.

4.4.9 Trip Distribution

The trip distribution identifies the various travel paths for vehicles arriving and leaving the Project site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 3 – Park Plaza, and trip distribution patterns presented in traffic studies for nearby projects. The vehicle trips associated with the Project were assigned to the Revere Hotel parking garage. The trip distribution patterns for the Project are illustrated in Figure 4-14.

4.4.10 Build (2023) Traffic Volumes

The vehicle trips were distributed through the study area. The Project-generated trips for the weekday a.m. Peak Hour and weekday p.m. Peak Hour are shown in Figure 4-15 and Figure 4-16, respectively. The existing trips currently accessing the 212 Stuart Street parking lot on the Project site were subtracted from the volumes, as the parking lot on site will be eliminated. The trip assignments were added to the No-Build (2023) Condition vehicular traffic volumes to develop the Build (2023) Condition vehicular traffic volumes.

The Build (2023) Condition weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown on Figure 4-17 and Figure 4-18, respectively.

4.4.11 Build (2023) Condition Traffic Operations Analysis

The Build (2023) Condition capacity analysis uses the same methodology as the Existing (2016) Condition capacity analysis and the No-Build (2023) Condition capacity analysis. Table 4-11 and Table 4-12 present the Build (2023) Condition capacity analysis for the weekday a.m. Peak Hour and weekday p.m. Peak Hour, respectively. The detailed analysis sheets are provided in Appendix B.

Table 4-11 Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

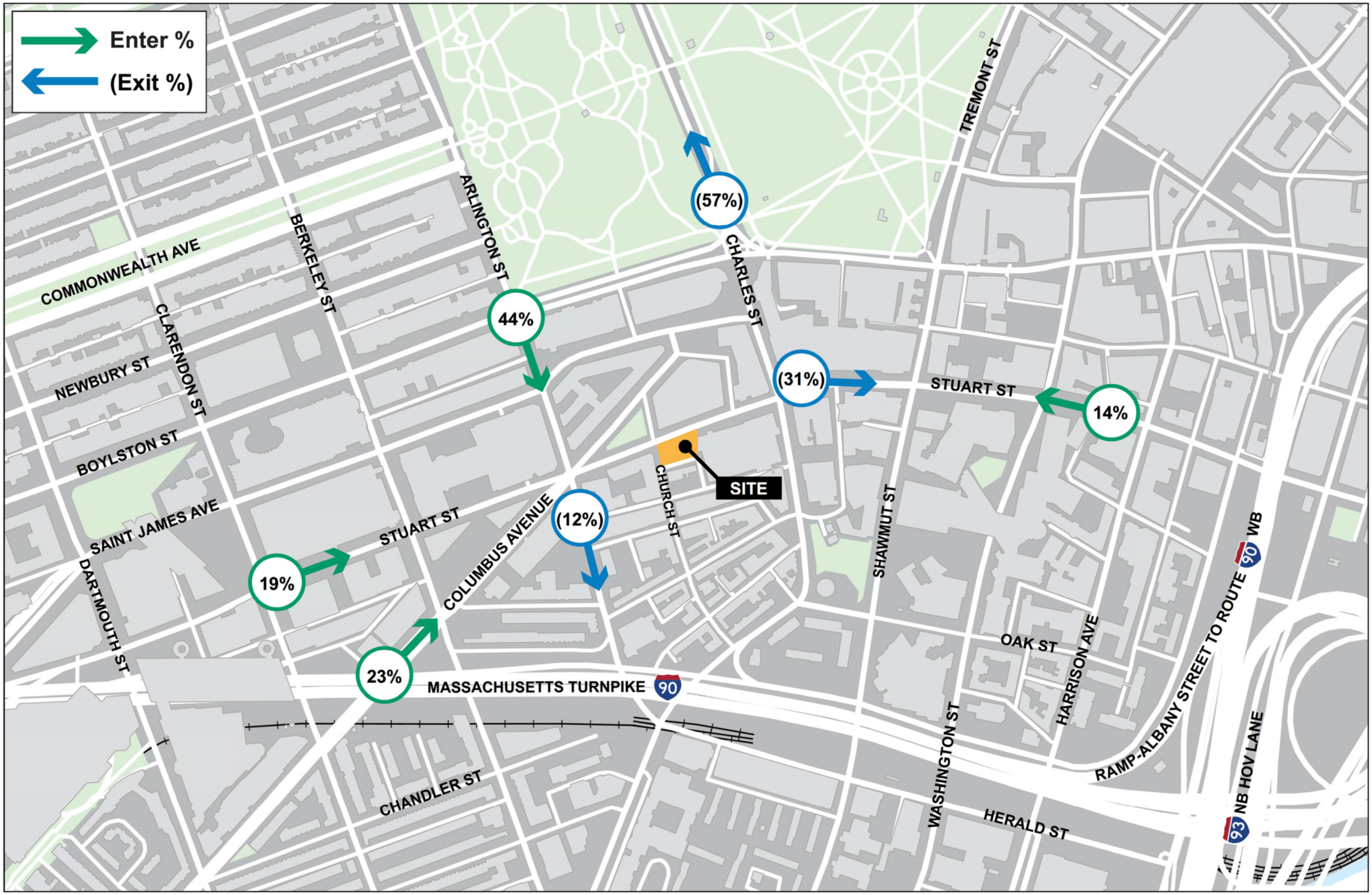
Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	E	62.3	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~281	#403
Arlington St SB left/thru | thru | thru/right	D	44.6	0.88	274	322
Columbus Ave NEB right | right	F	>80.0	>1.00	~142	#244
Columbus Ave SWB left/thru | thru	C	28.8	0.50	51	93
Stuart Street / Church Street	A	5.9	-	-	-
Stuart St EB left/thru | thru	A	5.9	0.52	105	147
Stuart Street / Charles Street	B	13.8	-	-	-
Stuart St EB left	A	2.3	0.36	0	40
Stuart St EB thru | thru	B	12.1	0.26	68	98
Stuart St WB right | right	A	0.9	0.44	0	0
Charles St NB thru | thru | thru/right	D	42.5	0.75	88	128

95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.

Table 4-12 Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Stuart Street / Arlington Street / Columbus Avenue	F	>80.0	-	-	-
Stuart St EB thru | thru/right	F	>80.0	>1.00	~423	#524
Arlington St SB left/thru | thru | thru/right	D	37.3	0.79	263	309
Columbus Ave NEB right | right	F	>80.0	>1.00	~111	#207
Columbus Ave SWB left/thru | thru	D	47.3	0.80	87	#141
Stuart Street / Church Street	A	4.6	-	-	-
Stuart St EB left/thru | thru	A	4.6	0.47	103	144
Stuart Street / Charles Street	B	15.6	-	-	-
Stuart St EB left	A	2.6	0.39	0	42
Stuart St EB thru | thru	B	12.9	0.32	94	129
Stuart St WB right | right	A	0.8	0.43	0	0
Charles St NB thru | thru | thru/right	D	46.6	0.82	106	#156

\# 95th percentile volume exceeds capacity.
~ 50th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.



212 Stuart Street **Boston, Massachusetts**

Figure 4-14

Trip Distribution

212 Stuart Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-15

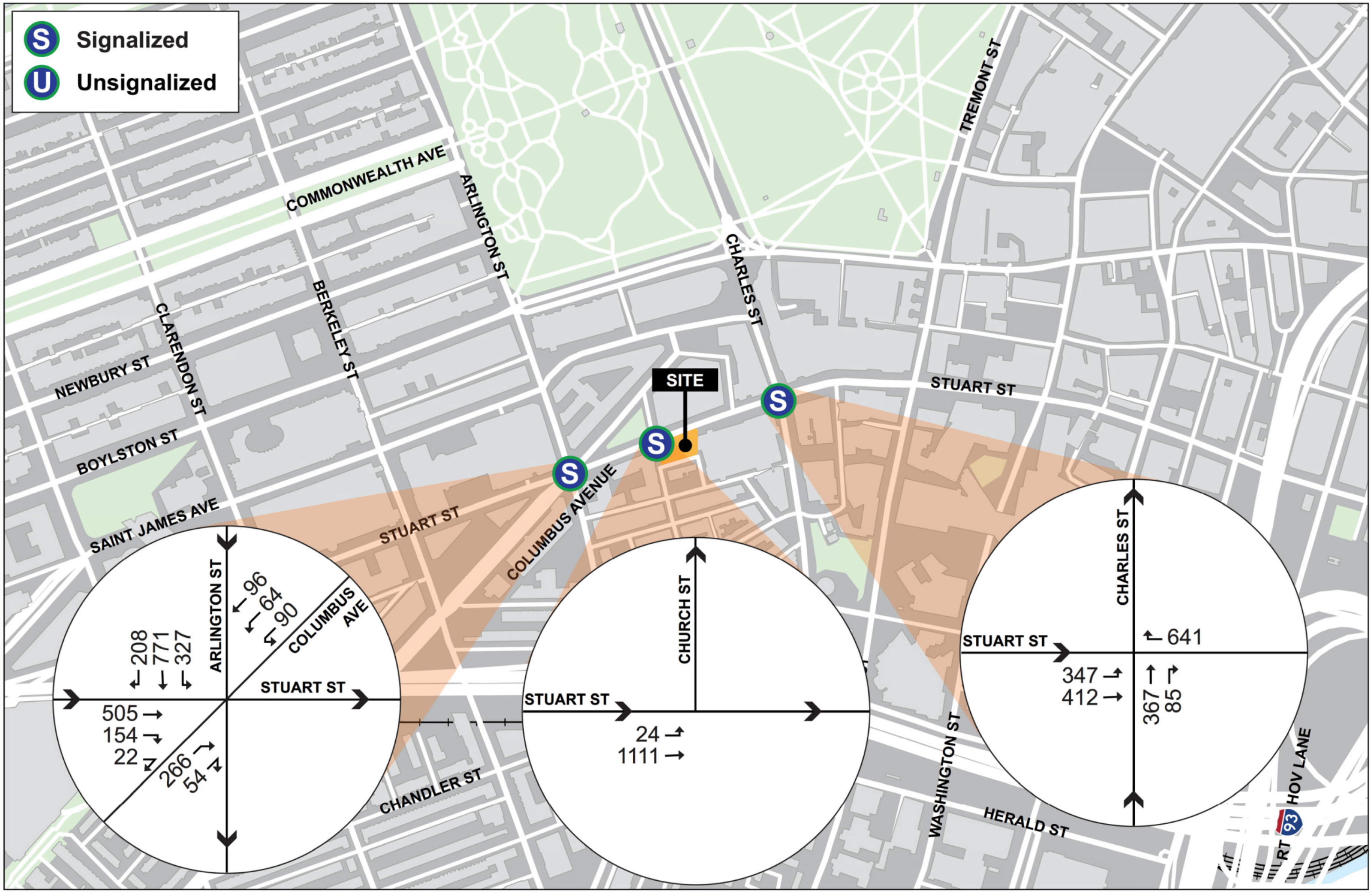
Site-Generated Weekday Morning Peak Hour Traffic Volumes

212 Stuart Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-16

Site-Generated Weekday Morning Peak Hour Traffic Volumes



212 Stuart Street **Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-17
2023 Build Weekday Morning Peak Hour Traffic Volumes

212 Stuart Street **Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

Figure 4-18

2023 Build Weekday Evening Peak Hour Traffic Volumes

The signalized intersection of **Stuart Street/Columbus Avenue/Arlington Street** continues to operate at LOS E during the weekday a.m. Peak Hour and LOS F during the weekday p.m. Peak Hour under the Build (2023) Condition. During both the a.m. and p.m. peak hours, the Stuart Street eastbound and Columbus Avenue northeastbound approaches continue to operate at LOS F. All other movements at the intersection continue operate at LOS D or better. The longest queues at the intersection continue to occur along the Stuart Street eastbound approach for both the a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Church Street** will continue to operate at an overall LOS A during the weekday a.m. and p.m. peak hours.

The signalized intersection of **Stuart Street/Charles Street** continues to operate at LOS B during the weekday a.m. and p.m. peak hours under the Build (2023) Condition. All movements at the intersection continue to operate at LOS D or better. The longest queues at the intersection continue to occur along the Charles Street northbound approach.

Based on the analysis presented in Tables 4-11 and 4-12, the Project is expected to have minimal impact on operations at the study area intersections.

4.5 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 (e.g., schedules, maps, and fare information) to be made available to the residents 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 residents 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:

- Orientation Packets: The Proponent will provide orientation packets to new residents and tenants containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals.

- ♦ Newsletter: The Proponent will provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options.

- ♦ Transportation Coordinator: The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities.

- ♦ Website and Lobby Postings: The Proponent will provide information on travel alternatives for employees and visitors via the Internet and in the building lobby.

4.6 Transportation Mitigation Measures

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. As part of the Project, the Proponent will bring all abutting sidewalks and pedestrian ramps to the City of Boston standards in accordance with the Boston Complete Streets design guidelines. This will include the reconstruction and widening of the sidewalks where possible, the installation of new, accessible ramps, improvements to street lighting where necessary, planting of street trees, and providing bicycle storage racks surrounding the site, where appropriate.

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.

4.7 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 5.0

Environmental Review Component

5.0 ENVIRONMENTAL REVIEW COMPONENT

5.1 Wind

5.1.1 Introduction

A pedestrian wind study was conducted on the proposed 212 Stuart Street project located in Boston, Massachusetts. The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas around the study site, and provide recommendations for minimizing adverse effects.

The study involved wind simulations on a 1:300 scale model of the proposed building and surroundings. These simulations were then conducted in RWDI's boundary-layer wind tunnel at Guelph, Ontario for the purpose of quantifying local wind speed conditions, and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the BPDA were used in this study. This section describes the methods and presents the results of the wind tunnel simulations. The study shows that the Project is not anticipated to have a significant impact on the surrounding pedestrian environment, and wind conditions suitable for walking or better are expected throughout the study area.

5.1.2 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.

5.1.3 Methodology

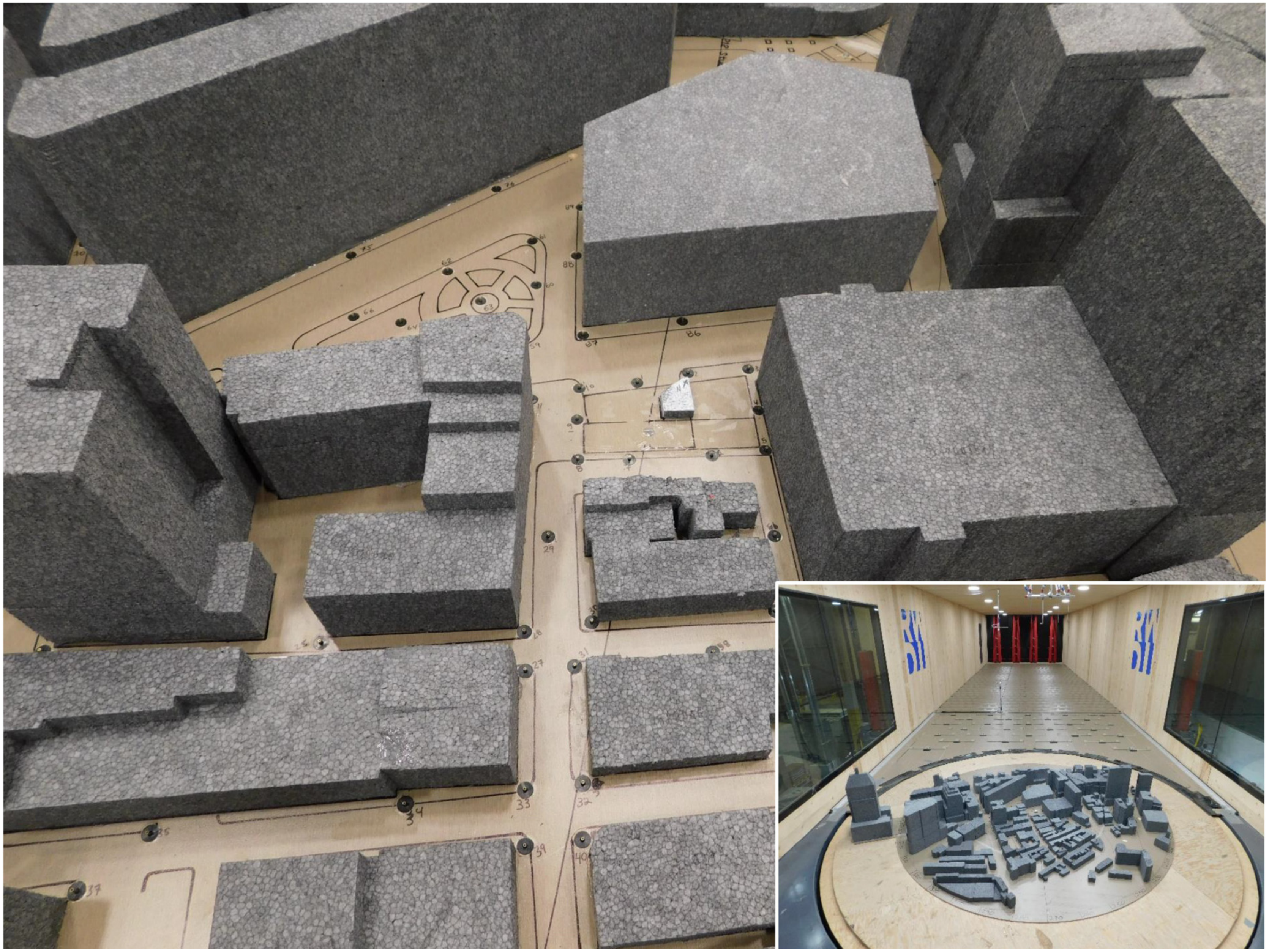
Information concerning the site and surroundings was derived from: site photographs; information on surrounding buildings and terrain; site plans and elevations of the proposed development provided by the design team. The following configurations were simulated:

- No-Build Configuration: includes all existing and approved surrounding buildings
- Build Configuration: includes the proposed Project and all existing surroundings

As shown in Figures 5.1-1 and 5.1-2, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 1,200 foot radius of the study site. 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 95 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 then combined with long term meteorological data, recorded during the years 1990 to 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 5.1-3 to 5.1-5 present "wind roses", summarizing the seasonal and annual wind climates in the Boston area, based on the data from Logan Airport. The first wind rose in Figure 5.1-3, for example, summarizes the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west-northwest, northwest, west, southwest and south-southwest. In the case of strong winds (speeds greater than 20 mph, red bands), however, the most common wind directions are northeast and west-northwest.

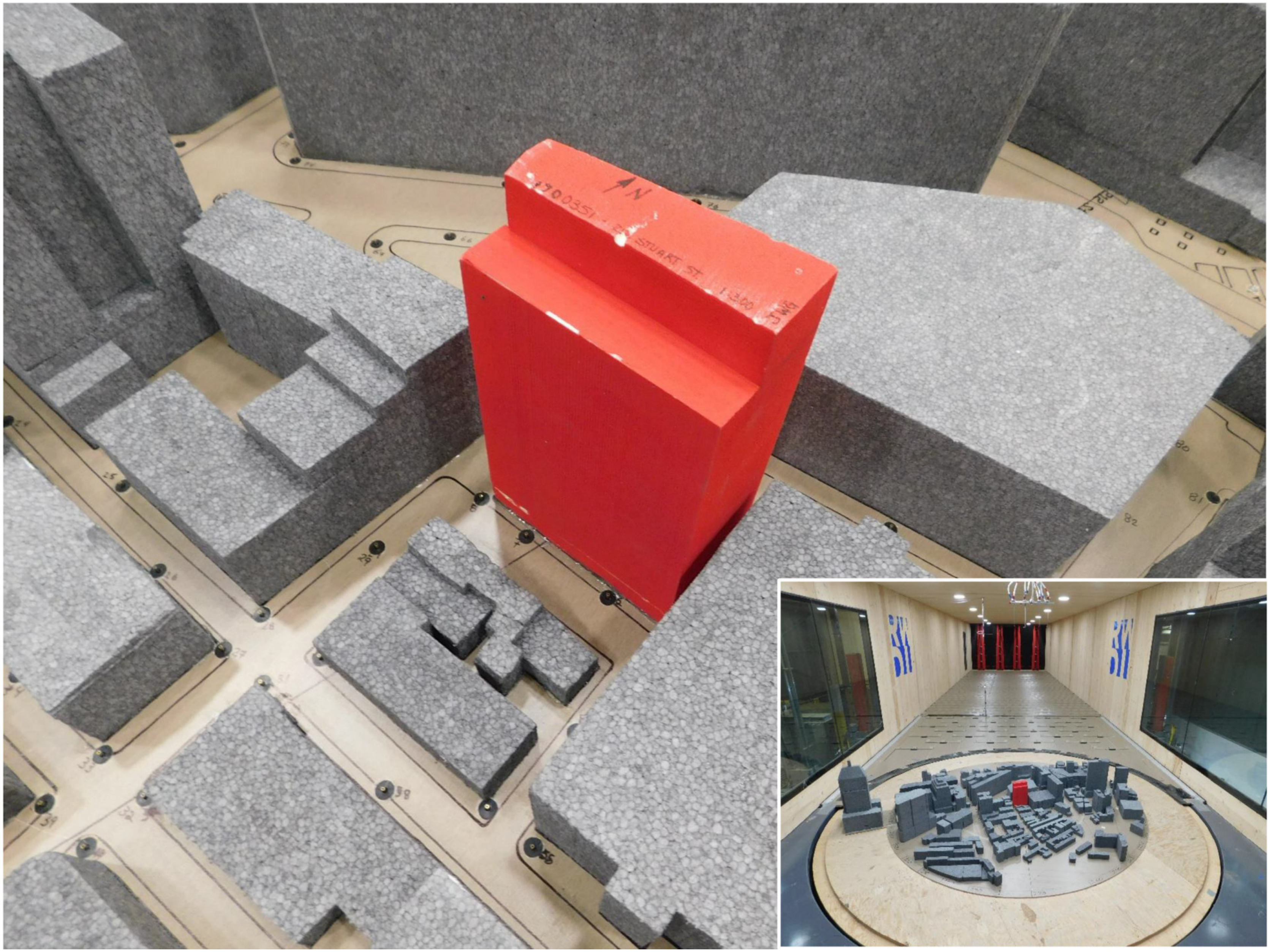
On an annual basis (the last wind rose in Figure 5.1-3) the most common wind directions are those between south-southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.



RWDI

Figure 5.1-1

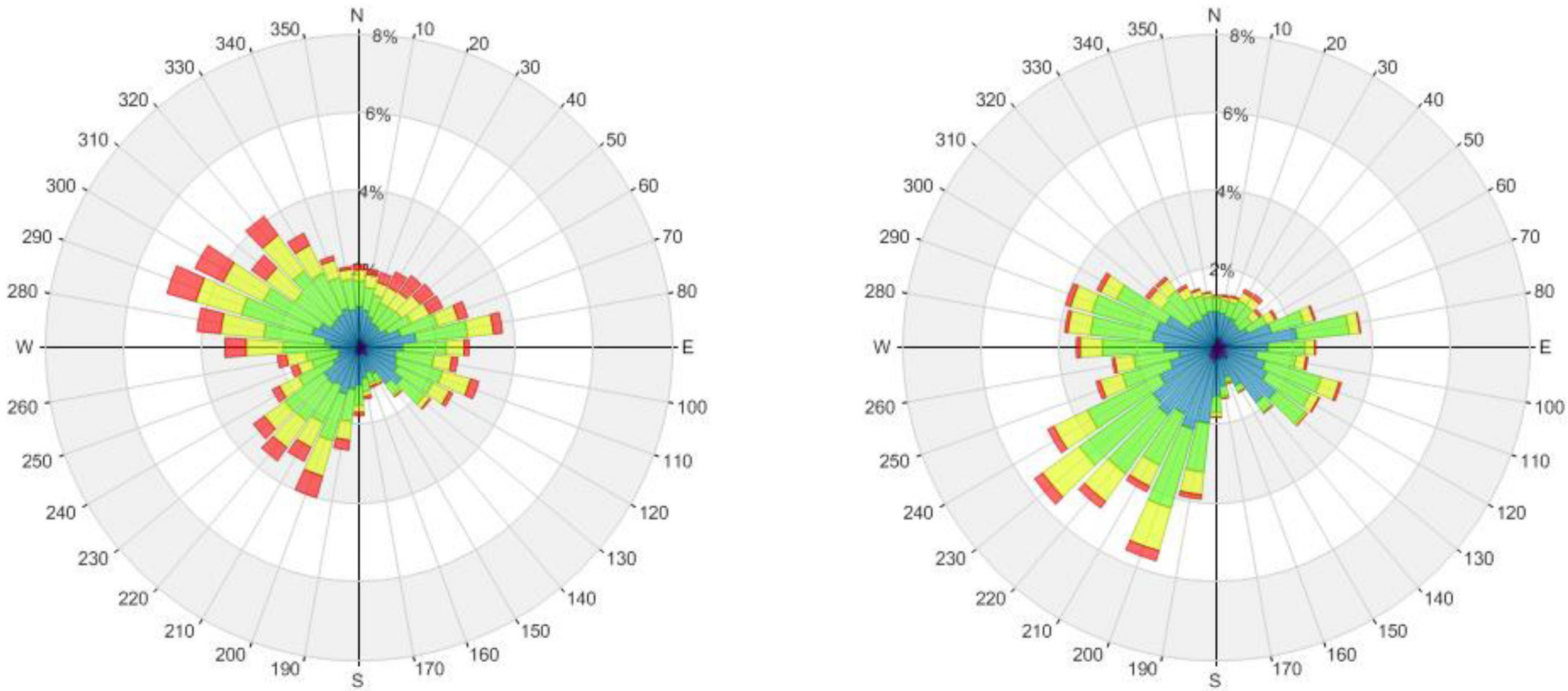
Wind Tunnel Study – No-Build



212 Street Street   Boston, Massachusetts

Figure 5.1-2

Wind Tunnel Study – Build



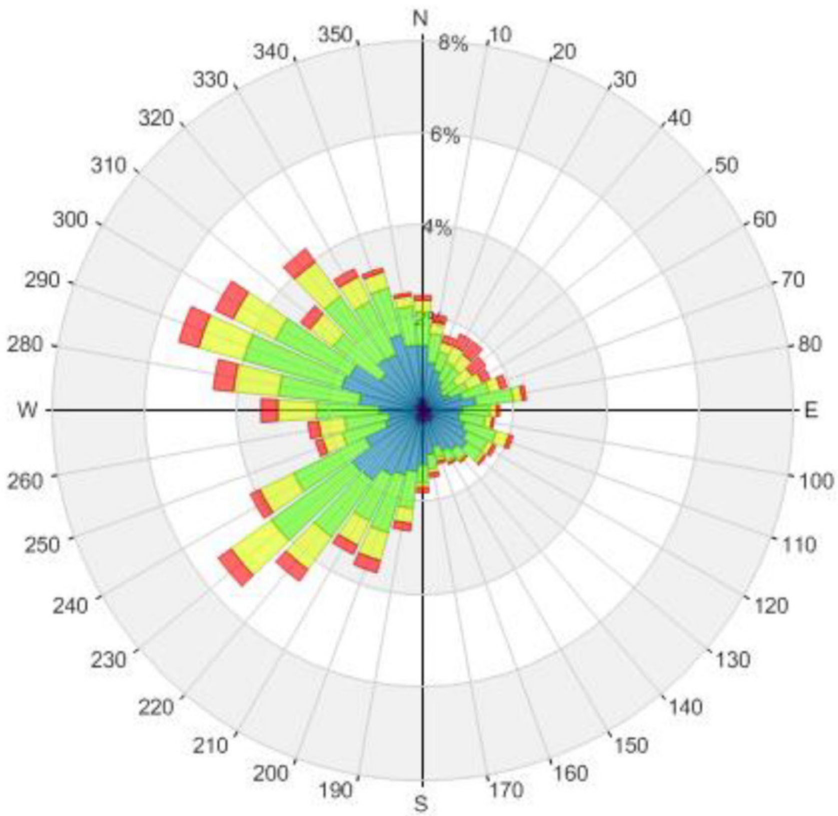
Spring
(March - May)

Summer
(June - August)

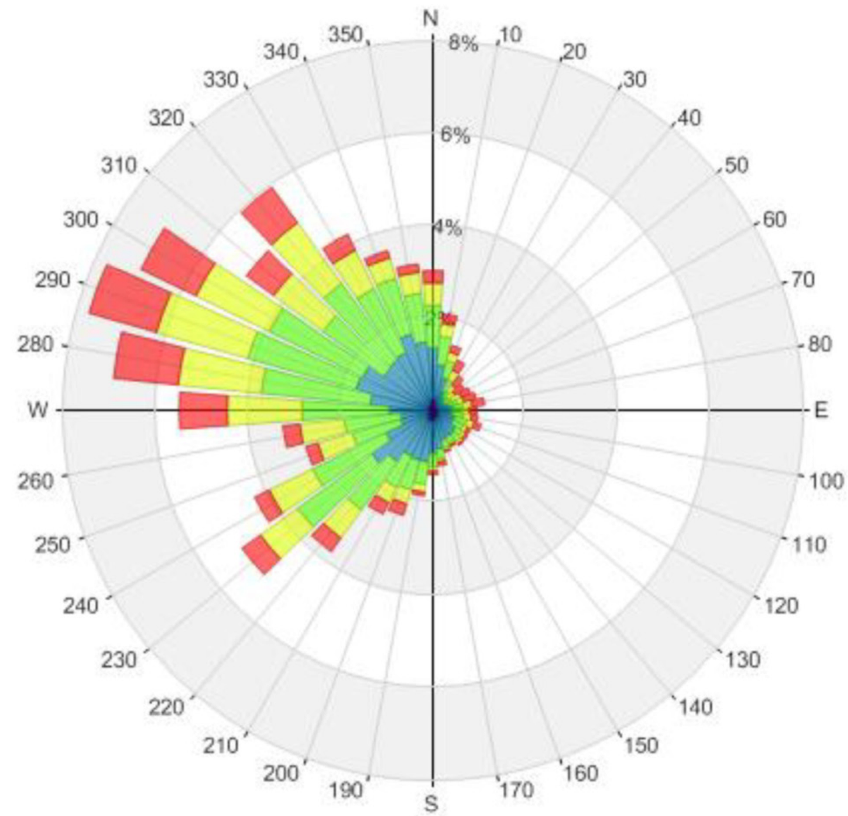
Wind Speed (mph)	Probability (%) Spring	Summer
Calm	2.3	2.6
1-5	6.2	8.5
6-10	28.2	37.9
11-15	32.9	35.2
16-20	19.9	13.0
>20	10.5	2.7

Figure 5.1-3

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990 – 2015)



Fall
(September - November)

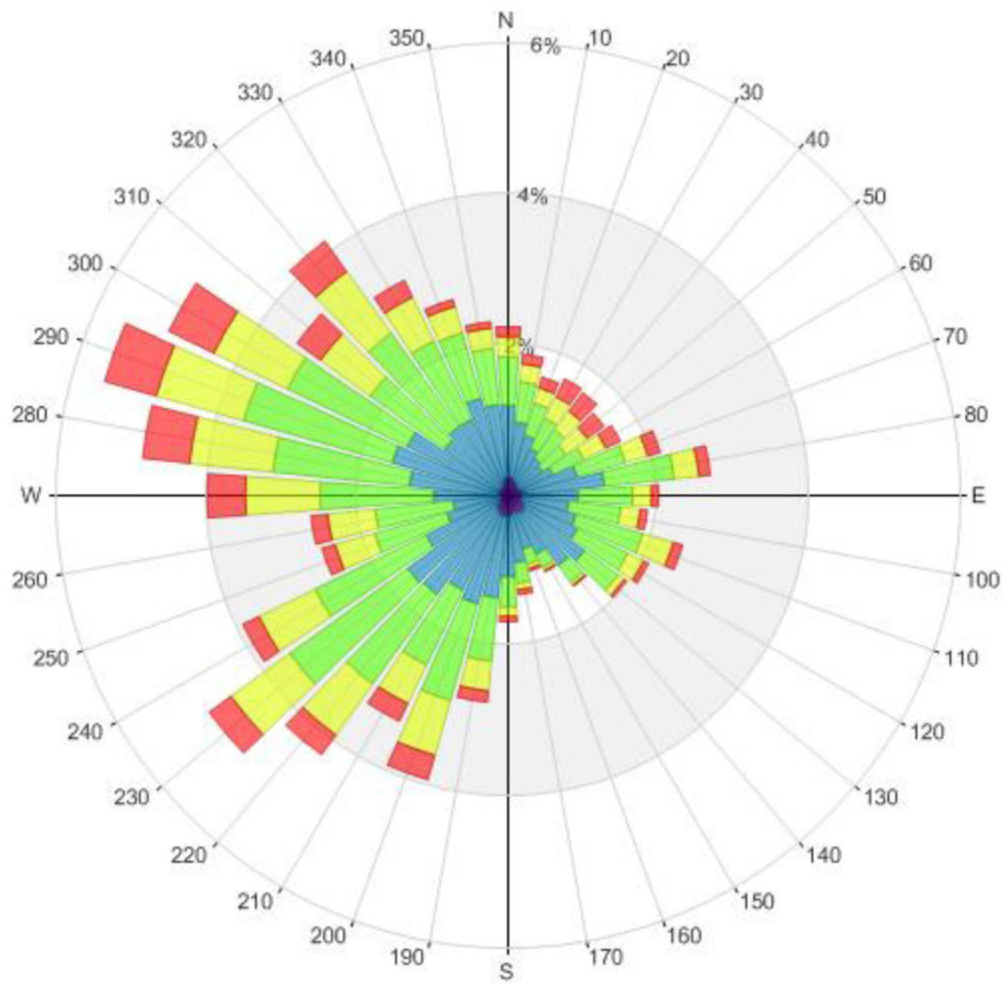


Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	2.8	2.2
1-5	7.8	6.0
6-10	33.9	27.2
11-15	33.0	31.0
16-20	15.6	20.4
>20	7.0	13.1

Figure 5.1-4

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990 – 2015)



Annual Winds

Wind Speed (mph)	Probability (%)
Calm	2.5
1-5	7.1
6-10	31.8
11-15	33.0
16-20	17.2
>20	8.3

Figure 5.1-5

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990 – 2015)

This 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, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report 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.

5.1.4 Pedestrian Wind Comfort Criteria

The BPDA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BPDA 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 BPDA 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). They are presented in Table 5.1-1.

Table 5.1-1 Boston Redevelopment Authority Mean Wind Criteria*

Level of Comfort	Wind Speed
Dangerous	$>$ 27 mph
Uncomfortable for Walking	$>$19 and $\leq$27 mph
Comfortable for Walking	$>$15 and $\leq$19 mph
Comfortable for Standing	$>$12 and $\leq$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 BPDA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently uncomfortable for more passive activities such as sitting.

---

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

5.1.5 Test Results

The table in Appendix C presents the mean and effective gust wind speeds for each season as well as annually. Figures 5.1-3 and 5.1-4 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds. 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 summary of pedestrian wind comfort is based on the annual winds for each configuration tested, except where noted below.

5.1.5.1 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. Wind conditions comfortable for sitting are desired on patios during the summer when the areas would be in use.

No-Build Configuration

As shown in Figure 5.1-6, all locations are projected to be suitable for walking or better annually. Figure 5.1-8 illustrates that the effective gust criterion was met annually at all locations.

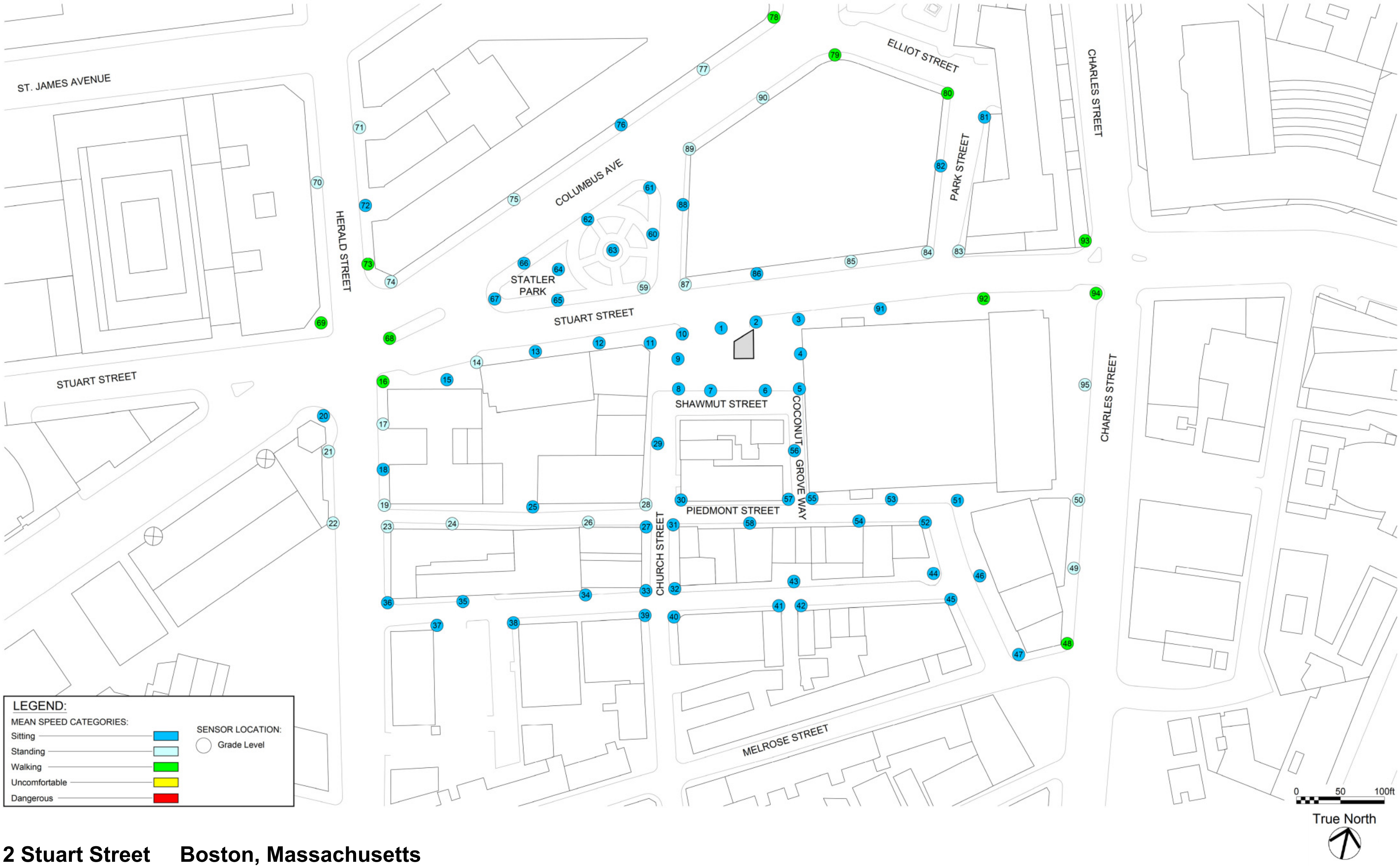
Build Configuration

Figure 5.1-7 illustrates that all locations recorded conditions suitable for walking or better on an annual basis. Furthermore, areas adjacent to entrances of the building recorded conditions that were comfortable for standing or better on an annual basis which is considered appropriate. The effective gust criterion was also met annually at all locations as shown in Figure 5.1-9.

5.1.6 Conclusion

The wind study looked at the existing pedestrian level wind conditions and projects the pedestrian level wind conditions in the surrounding area with the Project. The study shows that the Project does not significantly impact the current wind conditions in the area, and all study locations are projected to be suitable for walking or better. The gust criterion are not projected to be exceeded at any of the study locations.

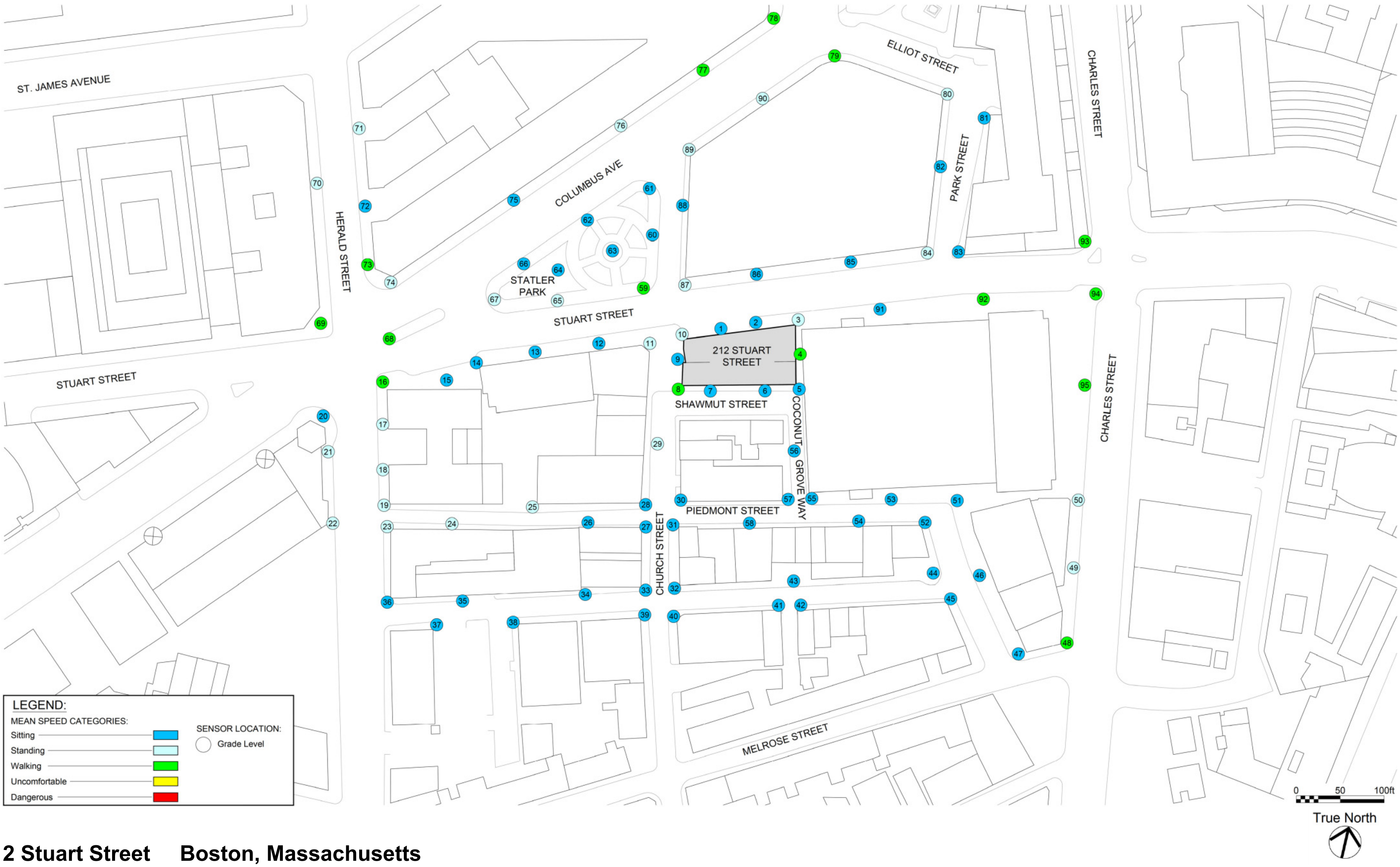
From a wind comfort perspective, the conditions noted above are deemed to be appropriate for the usage of the site and adjacent spaces. For this reason, combined with the fact that the Project has little impact on the current wind conditions, the change in the wind conditions for residents of the area is deemed to be negligible.



212 Street Street   Boston, Massachusetts

Figure 5.1-6

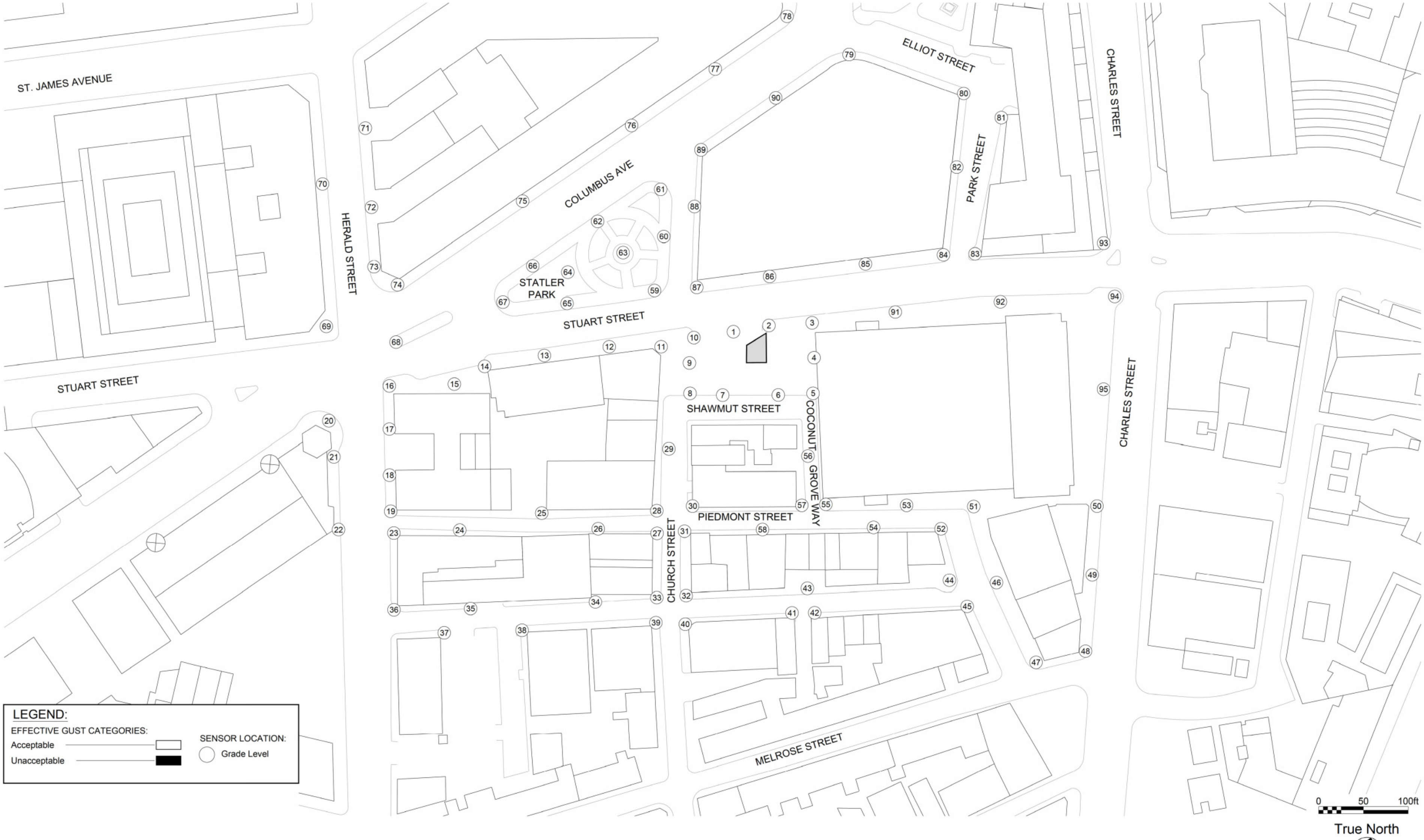
Pedestrian Wind Conditions – Mean Speed – No-Build, Annual



212 Stuart Street Boston, Massachusetts

Figure 5.1-7

Pedestrian Wind Conditions – Mean Speed – Build, Annual

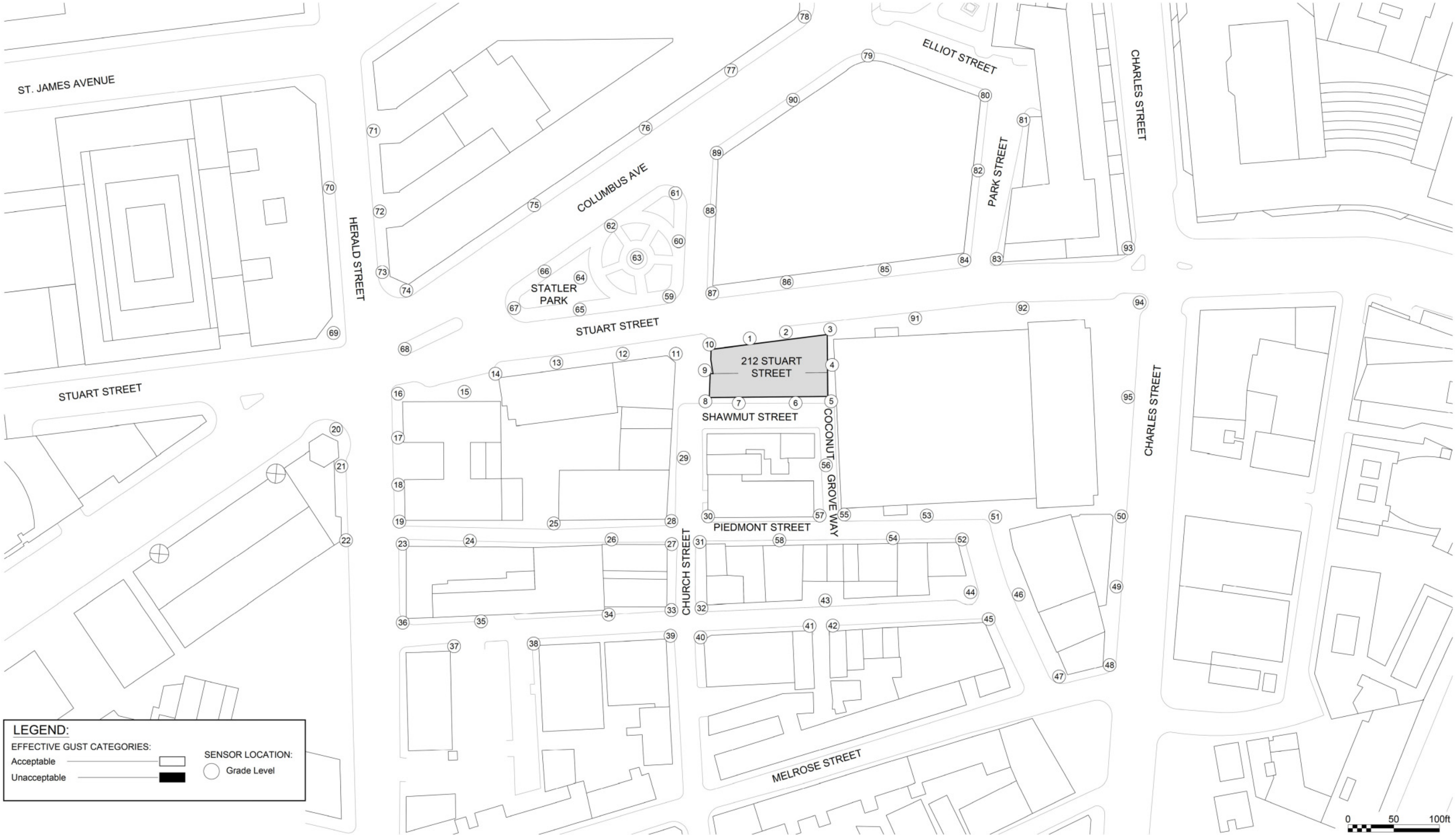


212 Stuart Street Boston, Massachusetts

RWDI

Figure 5.1-8

Pedestrian Wind Conditions – Effective Gust – No-Build, Annual



212 Stuart Street Boston, Massachusetts

Figure 5.1-9

Pedestrian Wind Conditions – Effective Gust – Build , Annual

5.2 Shadow

5.2.1 Introduction and Methodology

As typically required by the BPDA, 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), and at 6:00 p.m. during the summer solstice and autumnal equinox. The shadow analysis presents the existing shadow, the shadow that would have been cast by the previously approved project and new shadow that would be created by the proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, pedestrian areas and bus stops adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. The shadow study shows the incremental impact of new shadow from the Project beyond the shadow that would have been created by the previously approved project for the site, as illustrated in Figures 5.2-1 to 5.2-14 at the end of this section.

The results of the analysis show that new shadow from the Project will generally be limited to nearby streets and sidewalks, as well as Statler Park in the morning hours. Most significantly, and consistent with the previously approved project, the proposed Project will cast virtually no new shadow on any portion of the historic Bay Village neighborhood, and no new shadow on the Public Garden or Boston Common.

5.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, the Project will create only minimal new pedestrian-level shadow on the northern sidewalk of Columbus Avenue beyond what would have been created by the previously approved project.

At 12:00 p.m., the Project will not create new shadow on nearby bus stops or public open space. The incremental new shadow created by the Project will be cast to the north onto a sliver of Church Street and its eastern sidewalk.

At 3:00 p.m., the Project will not create new shadow on nearby bus stops or public open space. The incremental new shadow from the Project will be cast to the northeast onto new increments of Stuart Street and its sidewalks and a minor portion of Park Place and its sidewalks.

5.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, the Project will not create new shadow on nearby bus stops beyond what would have been created by the previously approved project. New shadow from the Project will be cast to the west onto new increments of Stuart Street and its sidewalks, a portion of Columbus Avenue and its eastern sidewalk, and a portion of Statler Park.

At 12:00 p.m., the Project will not create new shadow on nearby bus stops or public open spaces. New shadow will be cast to the north onto a portion of Stuart Street, Church Street and their sidewalks.

At 3:00 p.m., the Project will not create new shadow on nearby bus stops or public open spaces. Minimal new shadow will be cast to the east onto a sliver of Stuart Street's southern sidewalk.

At 6:00 p.m., the Project will not create new shadow on nearby bus stops or public open spaces. New shadow will be cast to the east onto a small portion of Shawmut Street and Cocoanut Grove Lane and their sidewalks.

5.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., during the autumnal equinox, the Project will not create new shadow on nearby bus stops or public open spaces beyond what would have been created by the previously approved project. New incremental shadow from the Project will be cast to the northwest onto Stuart Street and its sidewalks, and Columbus Avenue and its sidewalks.

At 12:00 p.m., new shadow from the Project will be cast to the north. No new shadow will be cast onto nearby bus stops or public open spaces. Consistent with the previously approved project, new shadow will be cast onto Stuart Street and its sidewalks and a portion of Church Street and its eastern sidewalk.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. No new shadow will be cast onto nearby bus stops or public open spaces. New shadow will be cast onto Stuart Street and its sidewalks and a small portion of Park Place and its sidewalks.

At 6:00 p.m., most of the surrounding area is covered by existing shadow. No new shadow from the Project will be cast onto surrounding streets, sidewalks, bus stops or public open spaces.

5.2.5 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., the Project will not create new pedestrian-level shadow beyond what would have been created by the previously approved project.

At 12:00 p.m., the Project will not create new pedestrian-level shadow beyond what would have been created by the previously approved project.

At 3:00 p.m., the Project will not create new pedestrian-level shadow beyond what would have been created by the previously approved project.

5.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during 14 time periods. Most significantly, the Project will cast virtually no new shadow on the historic Bay Village neighborhood, and no new shadow on the Public Garden or Boston Common. Consistent with the previously approved project, new shadow will generally be limited to the immediately surrounding streets and sidewalks, as well as Statler Park in the morning, although only during one of those four morning time periods will new shadow on Statler Park be from the Project beyond what the previously approved project would have created, and even then limited to the southern portion of the park. No new shadow will be cast onto nearby bus stops.

212 Stuart Street Boston, Massachusetts

Figure 5.2-1

Shadow Study, March 21 9:00 a.m.

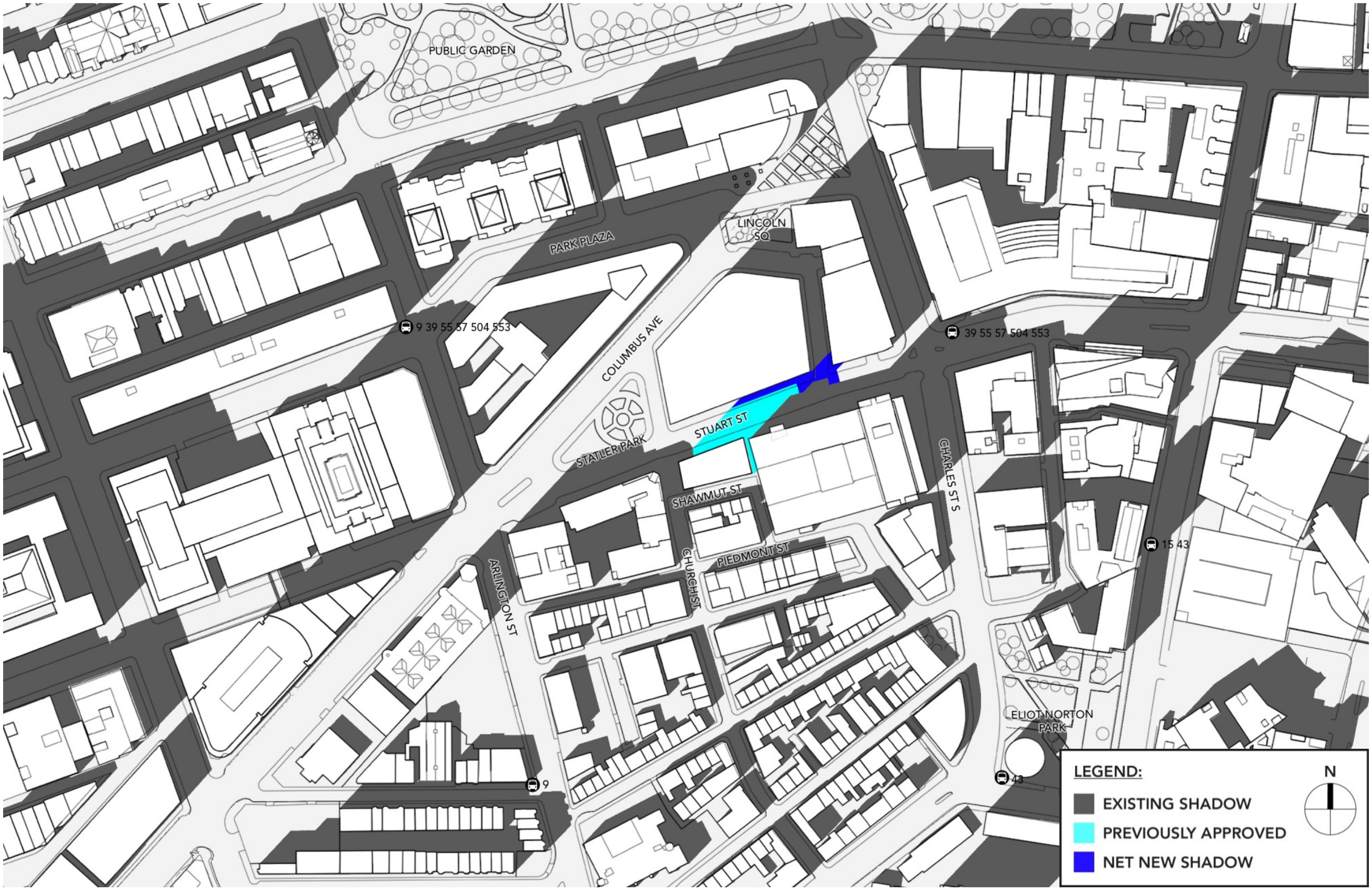
HÖWELER + YOON

212 Stuart Street   Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-2

Shadow Study, March 21 12:00 p.m.

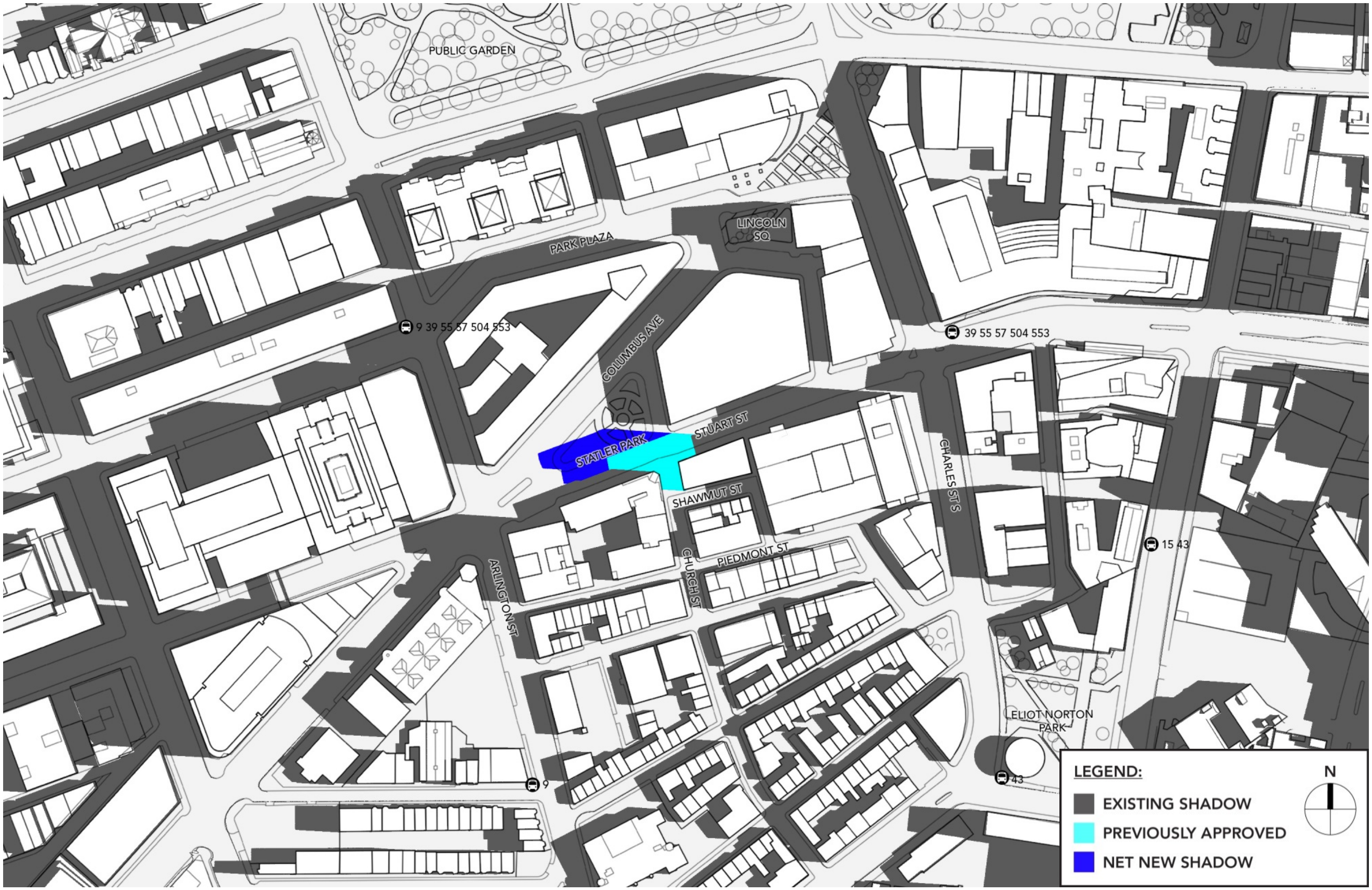


212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-3

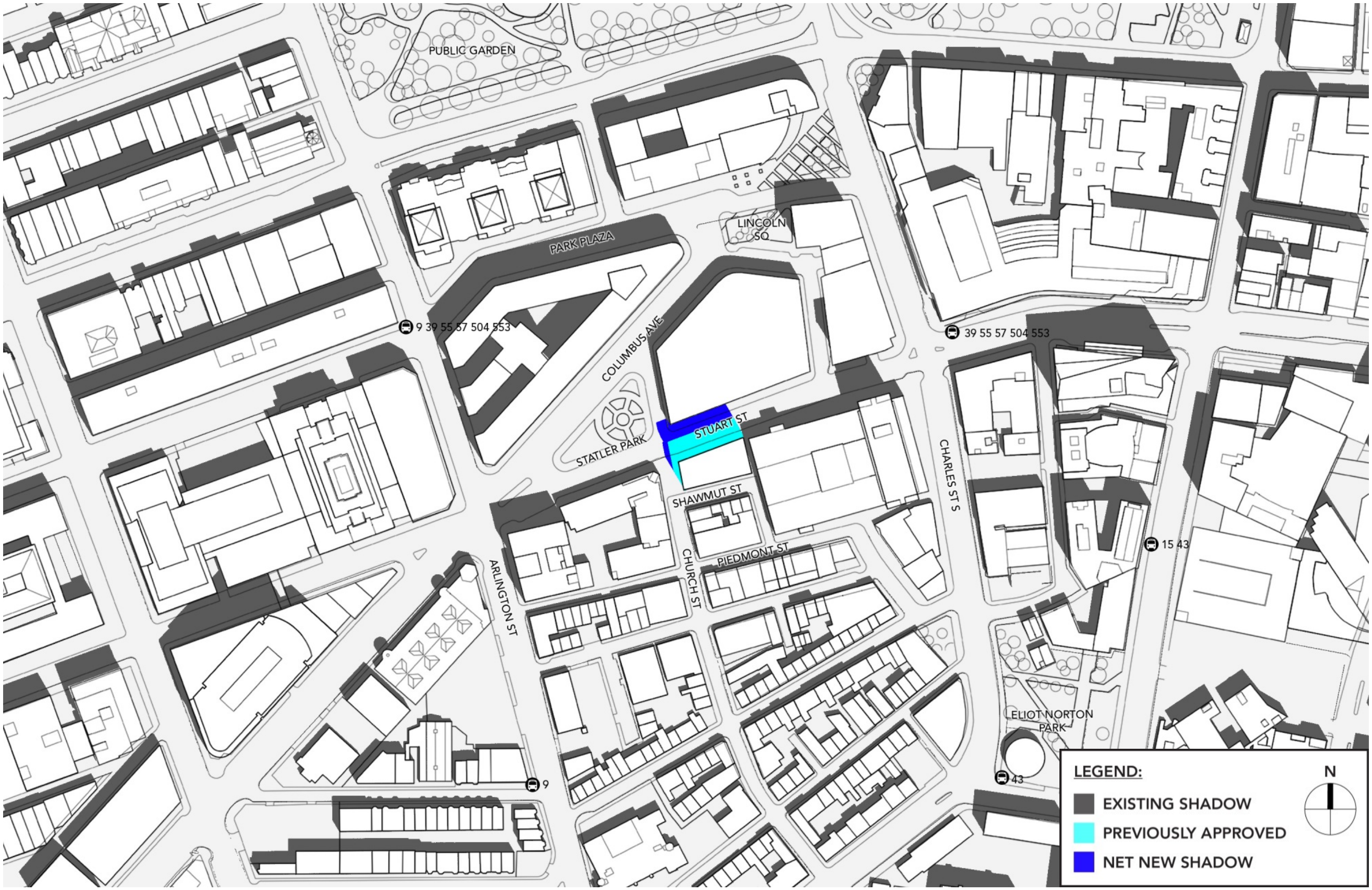
Shadow Study, March 21 3:00 p.m.



HÖWELER + YOON

Figure 5.2-4

Shadow Study, June 21 9:00 a.m.

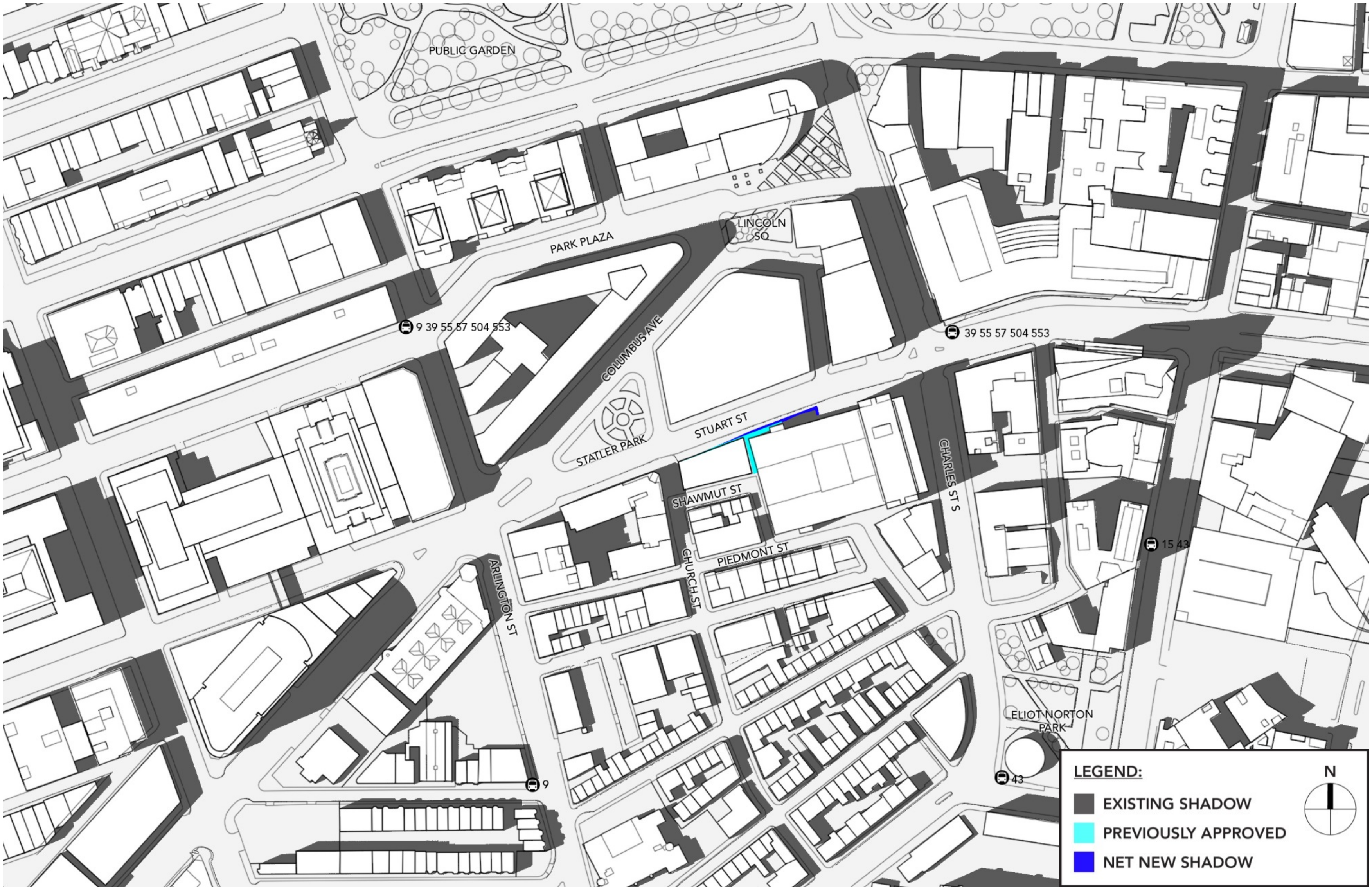


212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 5.2-5

Shadow Study, June 21 12:00 p.m.



212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 5.2-6

Shadow Study, June 21 3:00 p.m.

212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-7

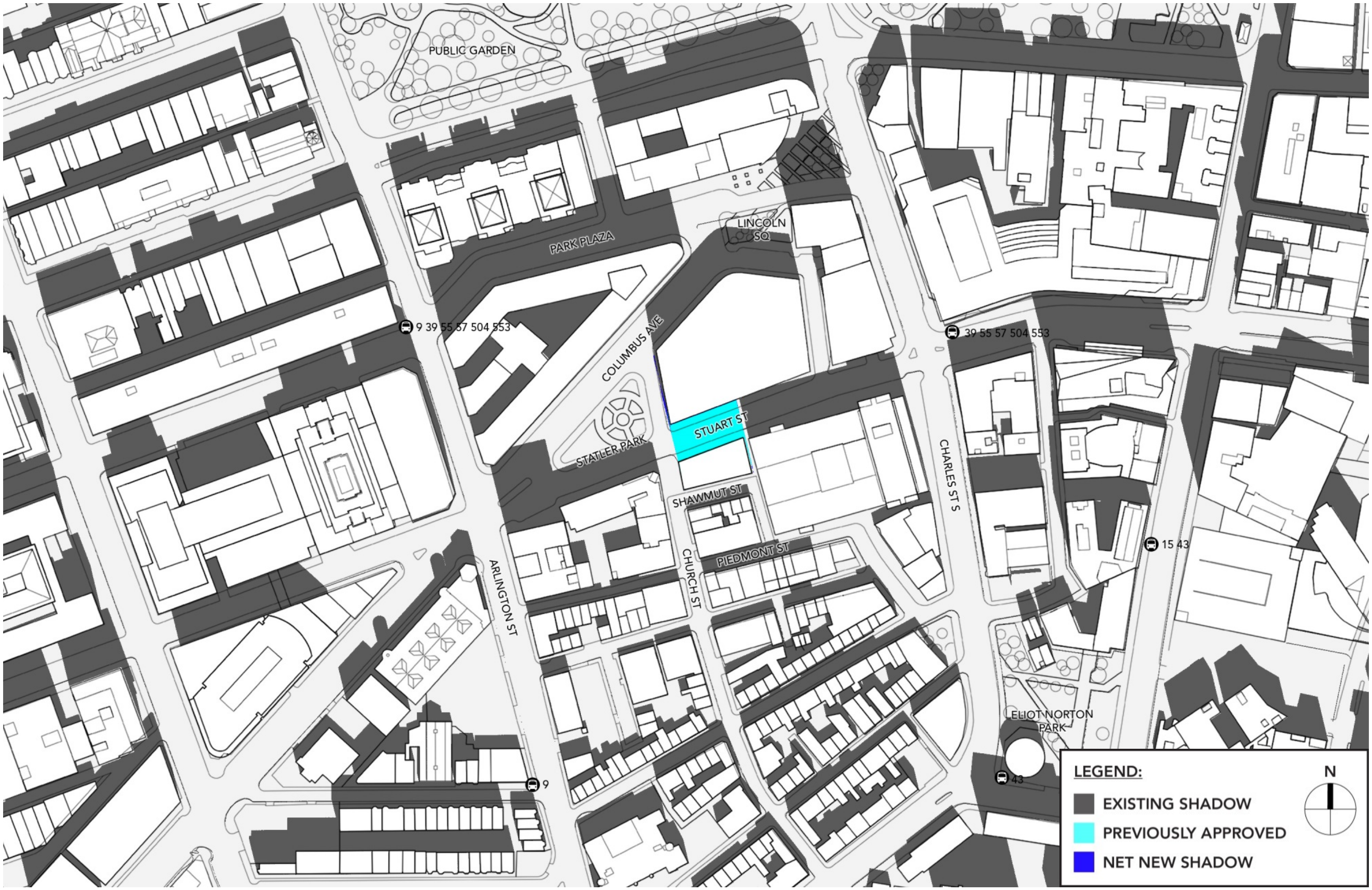
Shadow Study, June 21 6:00 p.m.

212 Street Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 5.2-8

Shadow Study, September 21 9:00 a.m.

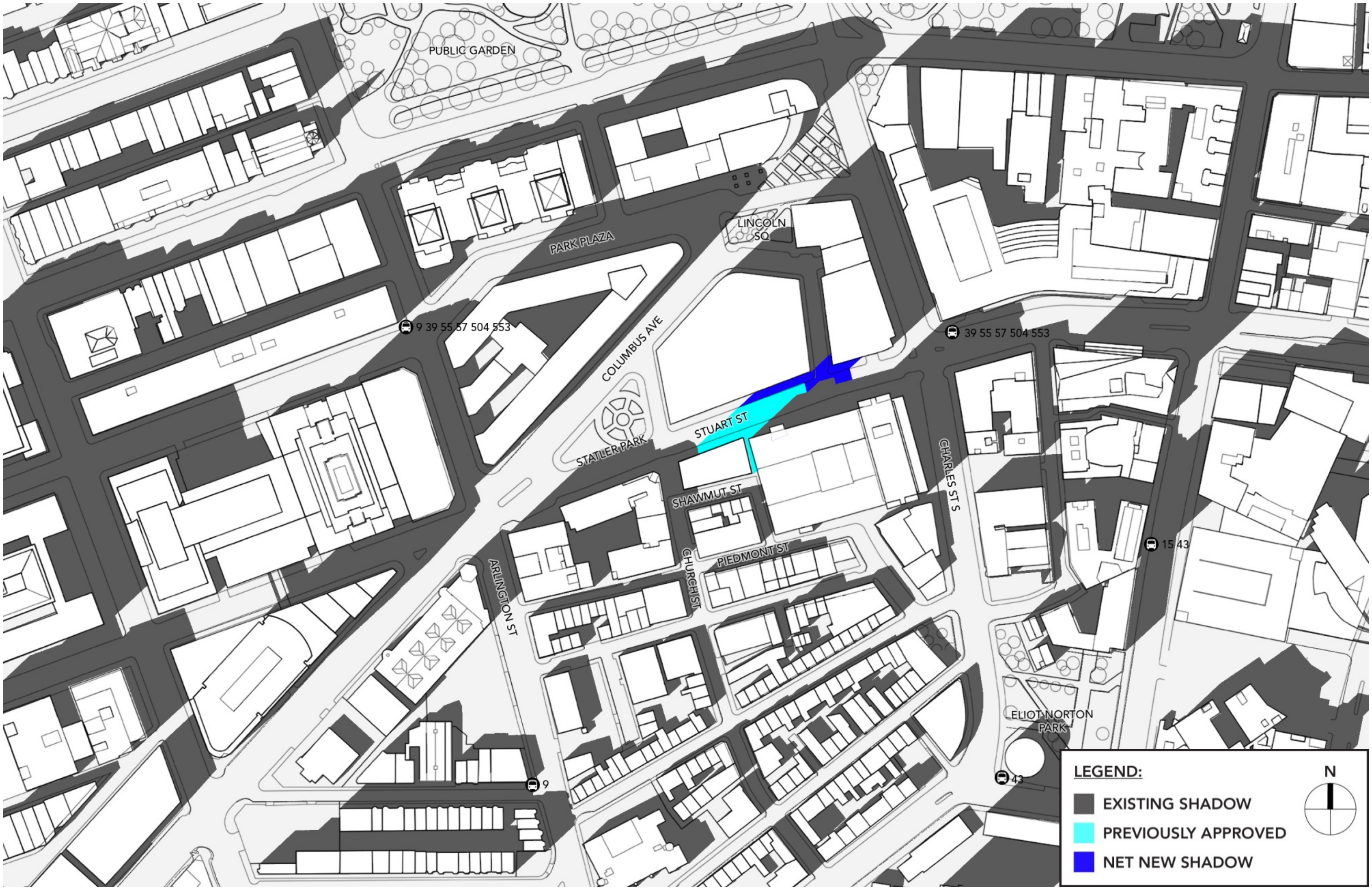


212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 5.2-9

Shadow Study, September 21 12:00 p.m.

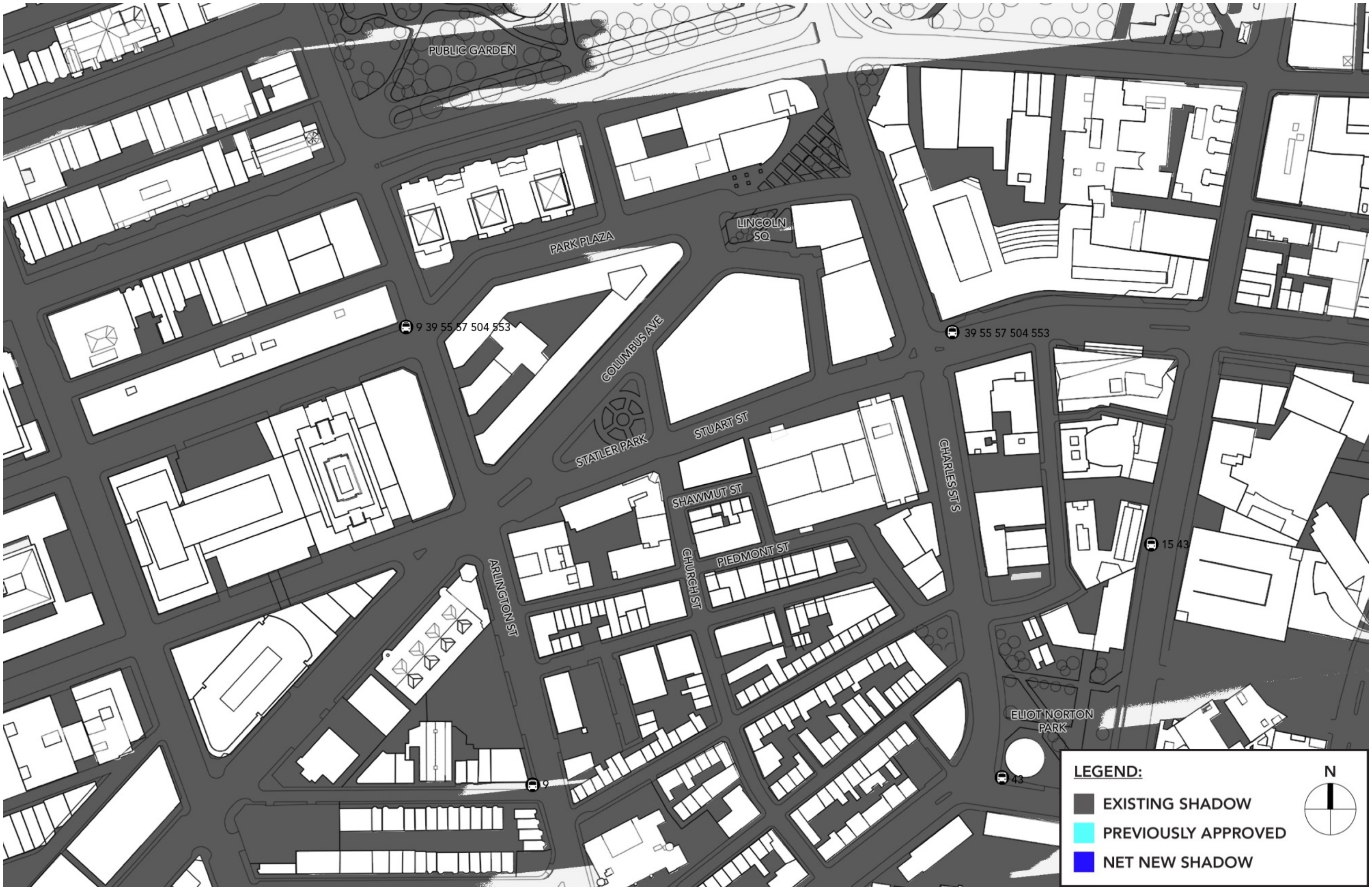


212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-10

Shadow Study, September 21 3:00 p.m.

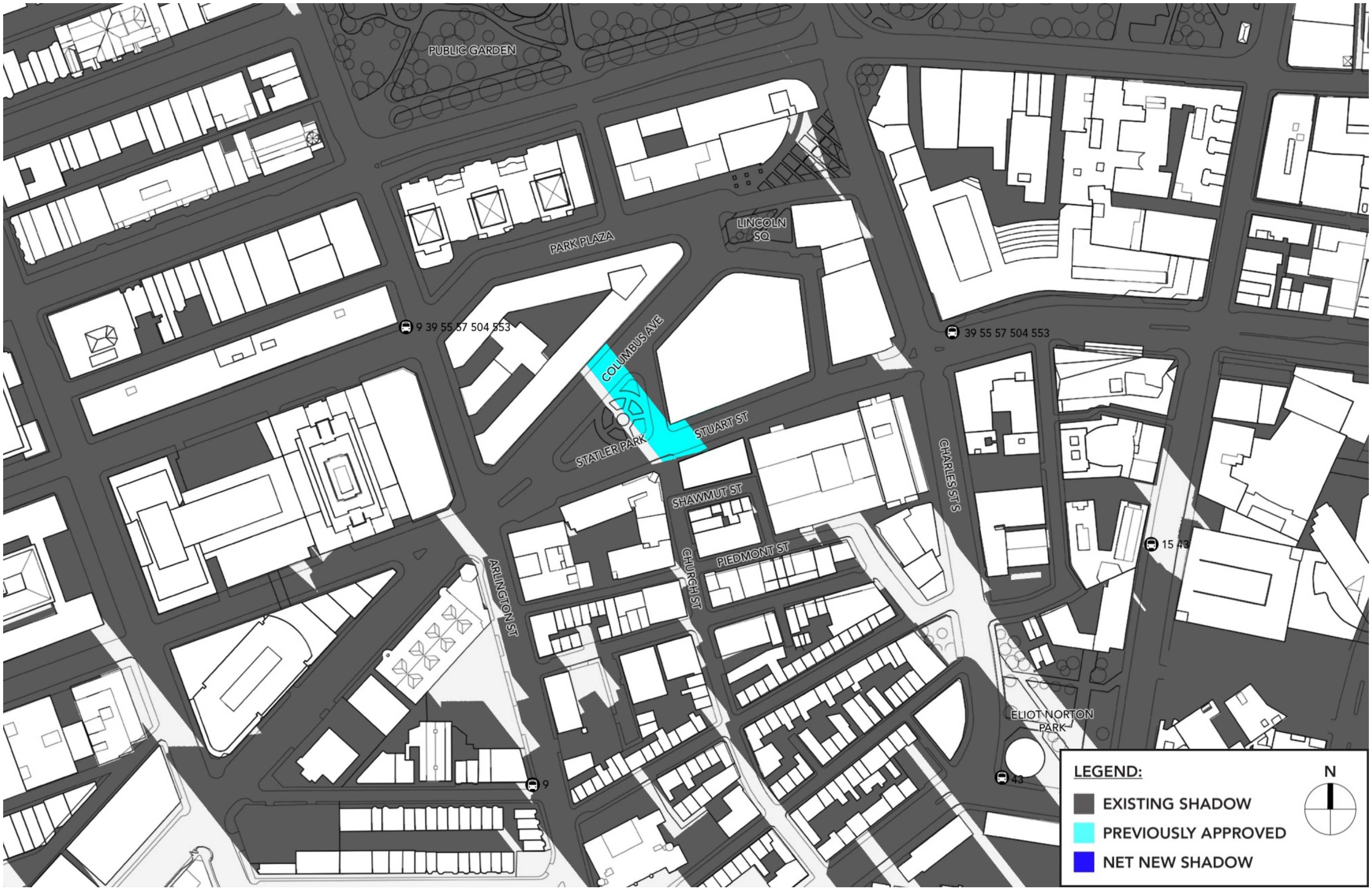


212 Stuart Street   Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-11

Shadow Study, September 21 6:00 p.m.

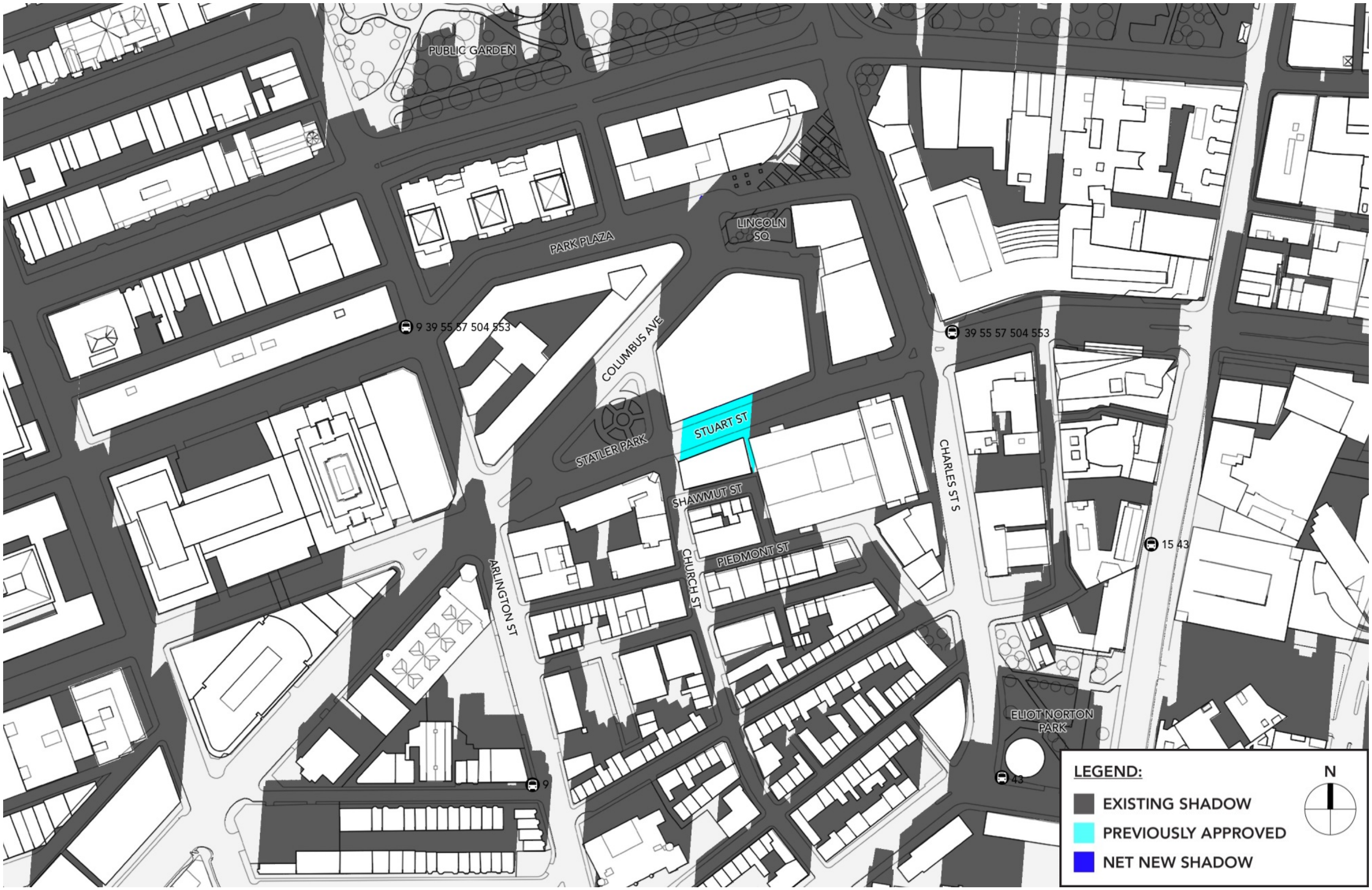


212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Figure 5.2-12

Shadow Study, December 21 9:00 a.m.



212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-13

Shadow Study, December 21 12:00 p.m.

212 Stuart Street   Boston, Massachusetts

HÖWELER + YOON

Figure 5.2-14

Shadow Study December 21 3:00 p.m.

5.3 Daylight Analysis

5.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of sky seen from the streets 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 and the previously proposed project which was approved in 2008.

Because the Project site is currently vacant, the proposed Project will increase daylight obstruction; however, the resulting conditions will be similar to the surrounding area and the previously approved project.

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

The analysis compares four conditions: Existing Conditions; Proposed Conditions; Previously Proposed Project Conditions; and the context of the area. 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 5.3-1.

- **Viewpoint 1:** View from Stuart Street facing south toward the Project site.
- **Viewpoint 2:** View from Shawmut Street facing north toward the Project site.

---

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

- **Area Context Viewpoint 1:** View from Stuart Street facing north toward 201 Stuart Street.
- **Area Context Viewpoint 2:** View from Charles Street facing west toward 200 Stuart Street.
- **Area Context Viewpoint 3:** View from Columbus Avenue facing northwest toward 34 Columbus Avenue.
- **Area Context Viewpoint 4:** View from Charles Street facing east toward 10 Park Plaza.

5.3.3 Results

Table 5.3-1 describes the results for each viewpoint in comparing the existing conditions to the Project, previously approved project and the area context viewpoints. Figures 5.3-2 to 5.3-3 illustrate the BRADA results for each analysis.

Table 5.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Previously Approved Project - 2008[2]	Proposed Conditions
Viewpoint 1	View from Stuart Street facing south toward the Project site	0%[1]	81.3%	81.6%
Viewpoint 2	View from Shawmut Street facing north toward the Project site	0%[1]	83.5%	86.9%
Area Context Points				
AC1	View from Stuart Street facing north towards 201 Stuart Street	76.8%		
AC2	View from Charles Street facing west toward 200 Stuart Street	81.4%		
AC3	View from Columbus Avenue facing northwest toward 34 Columbus Avenue	86.3%		
AC4	View from Charles Street facing east toward 10 Park Plaza	80.7%		

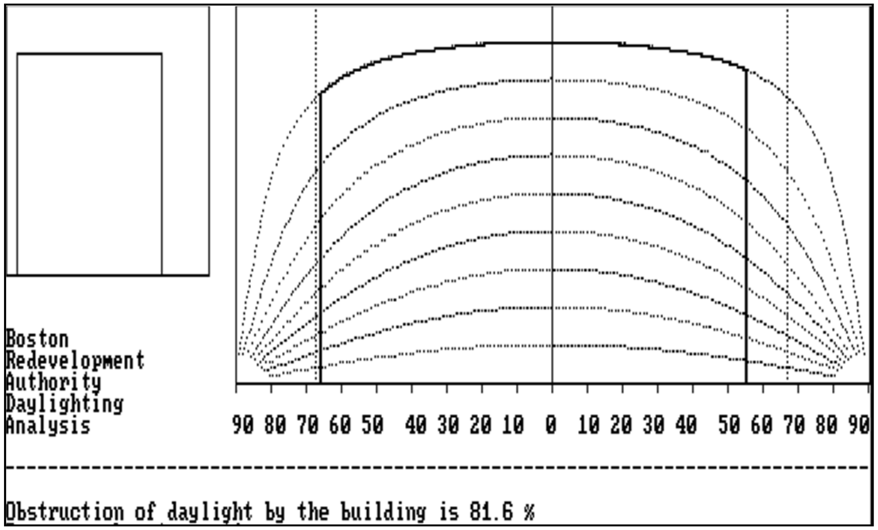
[1] The site includes only one small building that has a negligible impact on daylight obstruction; therefore, for simplicity, this analysis assumes a 0% daylight obstruction for the existing site.

[2] 212-222 Stuart Street Project Notification Form. Prepared by Tetra Tech Rizzo. Submitted April 28, 2008.

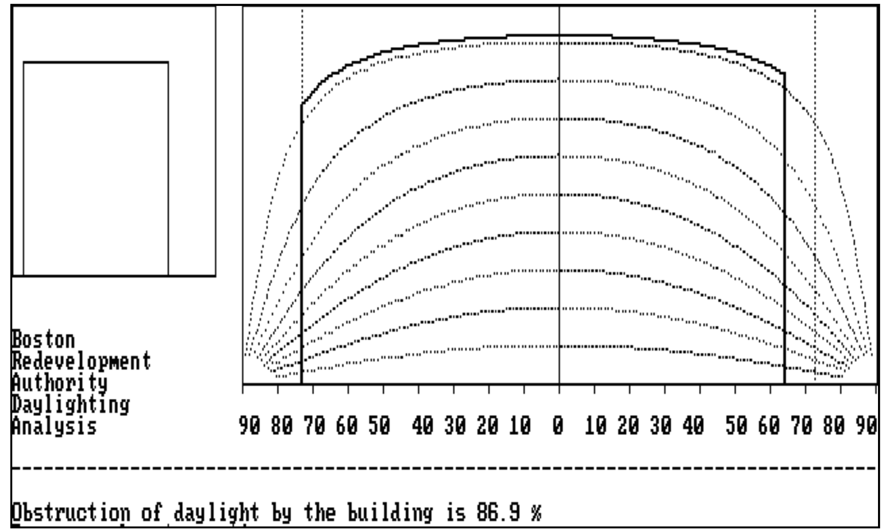
212 Stuart Street   Boston, Massachusetts

Epsilon ASSOCIATES INC.

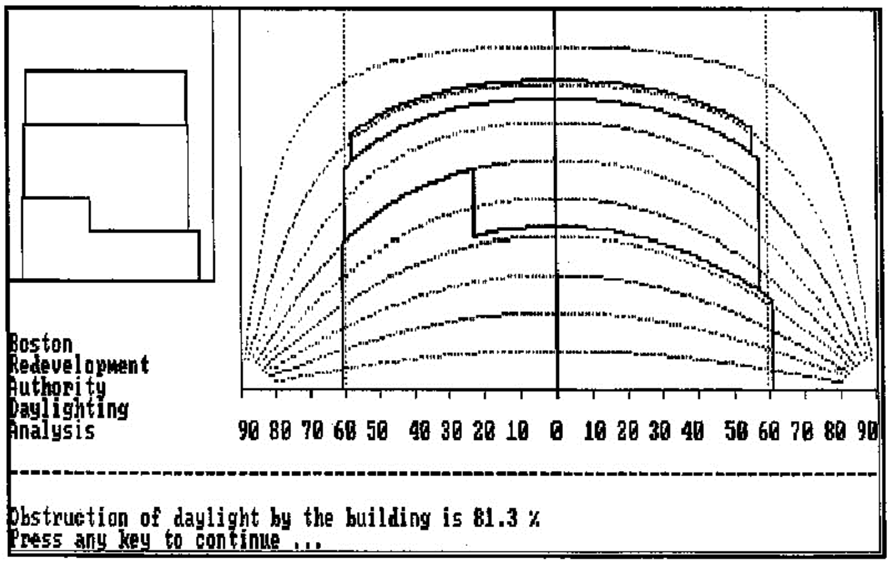
Figure 5.3-1
Viewpoint and Area Context Locations



Viewpoint 1 (Proposed): View from Stuart Street facing south toward Project site

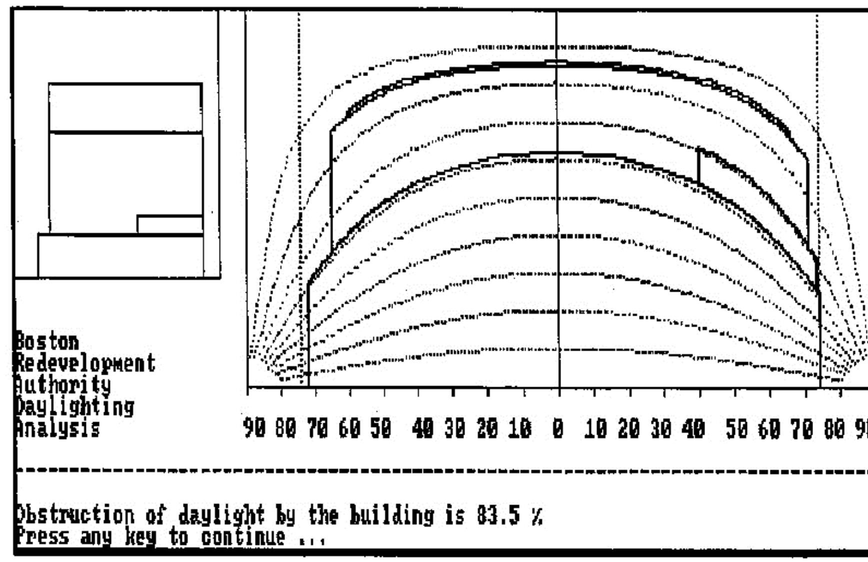


Viewpoint 2 (Proposed): View from Shawmut Street facing north toward Project site



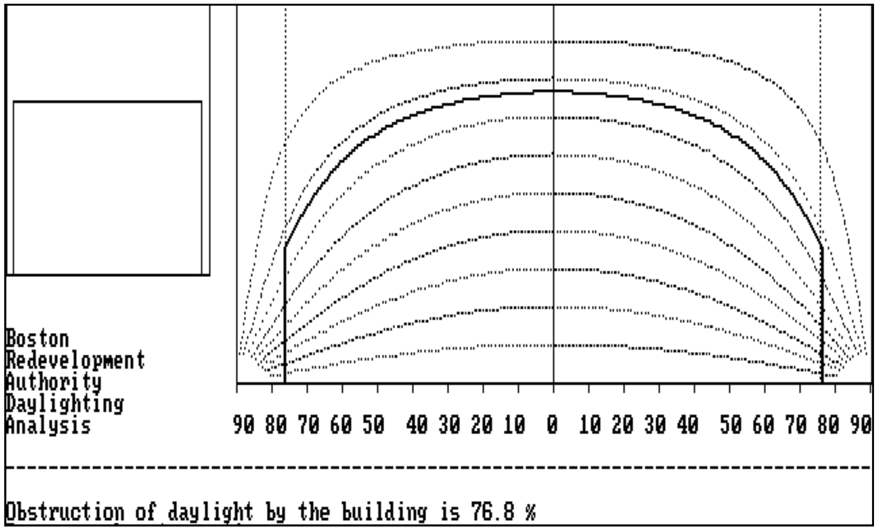
Viewpoint 1 (Previously Approved Project): View from Stuart Street facing south toward Project site

Source: 212-222 Stuart Street Project Notification Form. Prepared by Tetra Tech Rizzo. Submitted April 28, 2008.

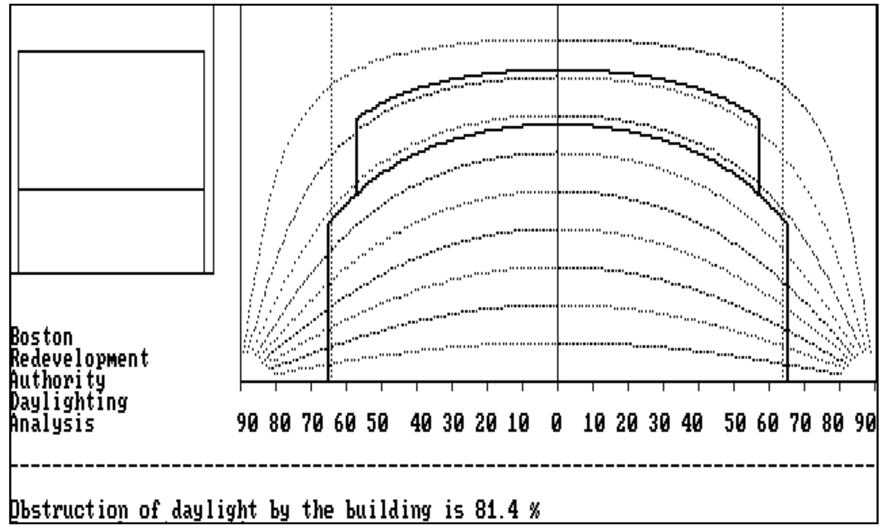


Viewpoint 2 (Previously Approved Project): View from Shawmut Street facing north toward Project site

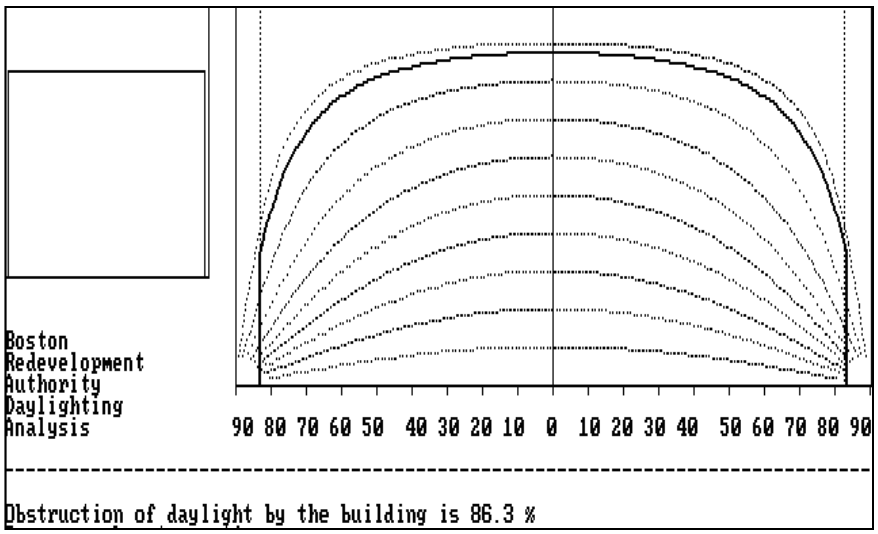
Source: 212-222 Stuart Street Project Notification Form. Prepared by Tetra Tech Rizzo. Submitted April 28, 2008.



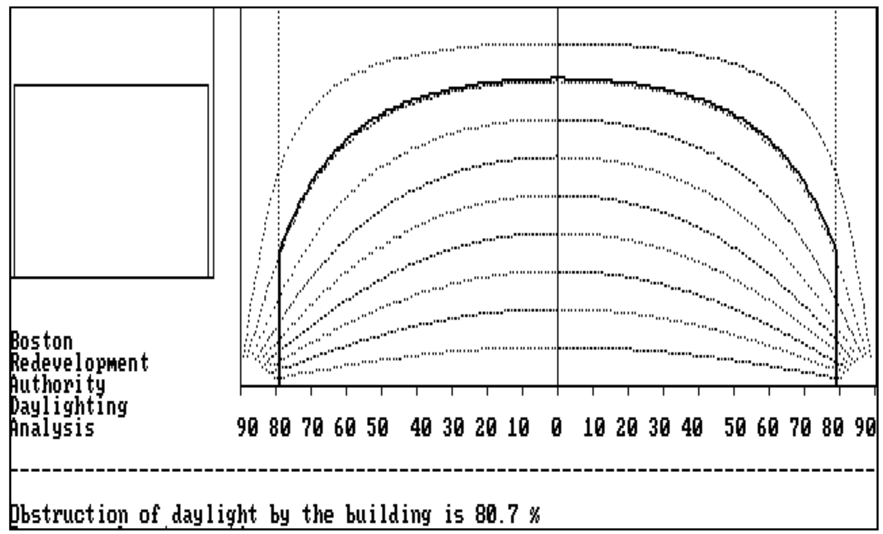
AC1: View from Stuart Street facing north toward 201 Stuart Street



AC2: View from Charles Street facing west toward 200 Stuart Street



AC3: View from Columbus Avenue facing northwest toward 34 Columbus Avenue



AC4: View from Charles Street facing east toward 10 Park Plaza

Figure 5.3-3

Area Context Viewpoints

Stuart Street – Viewpoint 1

Stuart Street runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of Stuart Street facing south toward the Project site. Since the site is currently occupied by a surface parking lot and small building, the existing daylight obstruction is minimal. The previously approved project would have increased the daylight obstruction value to 81.3%. The Project will have a similar level of impact to the previously approved project and area context, with a daylight obstruction value of 81.6%.

Shawmut Street – Viewpoint 2

Shawmut Street runs along the southern edge of the Project site. Viewpoint 2 was taken from the center of Shawmut Street facing north toward the Project site. Similar to viewpoint 1, the existing daylight obstruction from this viewpoint is minimal because of the surface parking lot and small building. The previously approved project would have increased the daylight obstruction value to 83.5%. The Project will have a daylight obstruction similar to the area context, and only slightly higher than the previously approved project.

Area Context Views

The surrounding area around the Project site includes buildings varying in height and density. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the four Area Context Viewpoints described above and shown in Figure 5.3-3. The daylight obstruction values ranged from 76.8% for AC1 to 86.3% for AC3. Daylight obstruction values for the Project site are similar to buildings in the Project vicinity, including the Area Context values.

5.3.4 Conclusion

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site, and compares them to the previously approved project and the surrounding area. The results of the BRADA analysis indicate that the Project will have similar daylight obstruction values as the surrounding area, and similar, or slightly higher, daylight obstruction values compared to the previously approved project.

5.4 Solar Glare

It is not anticipated that the Project will include the use of highly reflective glass or other reflective materials on the building facades that would result in adverse impacts from reflected solar glare from the Project.

5.5 Air Quality

5.5.1 Introduction

An air quality analysis has been conducted to determine the impact of pollutant emissions from mobile sources generated by the proposed Project. Specifically, a microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) resulting from traffic flow around the proposed Project area. Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program (ERP), if required.

5.5.2 National Ambient Air Quality Standards and Background Concentrations

Background air quality concentrations and federal air quality standards were utilized to conduct the above air quality impact analysis. Federal National Ambient Air Quality Standards (NAAQS) were developed by US Environmental Protection Agency (EPA) to protect human health against adverse health effects with a margin of safety. The modeling methodologies were developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[3] The following sections outline the NAAQS standards and detail the sources of background air quality data.

5.5.2.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the US 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) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 5.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are codified in 310 CMR 6.04, and generally follow the NAAQS but are not identical (highlighted in **bold** in Table 5.5-1 below).

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 more stringent of the primary or secondary standards were applied when comparing to the modeling results for this proposed Project.

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

---

3 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

Table 5.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$) Primary	NAAQS ($\mu g/m^3$) Secondary	MAAQS ($\mu g/m^3$) Primary	MAAQS ($\mu g/m^3$) 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
PM2.5	Annual (1)	**12**	**15**	**None**	**None**
	24-hour (5)	**35**	**Same**	**None**	**None**
PM10	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)	**137**	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 PM10 NAAQS on October 17, 2006, Federal Register 71-200, p. 61144.
(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 on June 22, 2010, Federal Register 75-119, p. 35520.

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

5.5.2.2 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.

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 Kenmore Square in Boston, roughly 1.3 miles west of the proposed Project location. However this site samples for all but Lead and Ozone. The next closest site is at Harrison Avenue, roughly 1.4 miles south-southwest of the proposed Project. This site samples for the remaining pollutants. A summary of the background air quality concentrations are presented in Table 5.5-2.

Table 5.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	Averaging Time	2012	2013	2014	Background Concentration (µg/m³)	NAAQS	Percent of NAAQS
SO_2 (1)(6)	1-Hour (5)	34.584	31.44	25.414	30.5	196.0	16%
	3-Hour	27.772	36.418	24.628	36.4	1300.0	3%
	24-Hour	14.148	15.72	13.1	15.7	365.0	4%
	Annual	4.8994	2.62	2.4628	4.9	80.0	6%
PM10	24-Hour	28	50.0	53	53.0	150.0	35%
	Annual	15.7	19.0	14.9	19.0	50.0	38%
PM2.5	24-Hour (5)	22.1	18.0	14.6	18.2	35.0	52%
	Annual (5)	9.03	8.0	6.02	7.7	12.0	64%
NO_2 (3)	1-Hour (5)	92.12	90	92.12	91.5	188.0	49%
	Annual	35.908	33.4	32.2796	35.9	100.0	36%
CO (2)	1-Hour	1489.8	1489.8	1489.8	1489.8	40000.0	4%
	8-Hour	1031.4	1031.4	1031.4	1031.4	10000.0	10%
Ozone (4)	8-Hour	153.114	115.817	106.002	153.1	147.0	104%
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/m³ using factor of 1 ppm = 2.62 µg/m³.
(2) CO reported in ppm. Converted to µg/m³ using factor of 1 ppm = 1146 µg/m³.
(3) NO_2 reported in ppb. Converted to µg/m³ using factor of 1 ppm = 1.88 µg/m³.
(4) O_3 reported in ppm. Converted to µg/m³ using factor of 1 ppm = 1963 µg/m³.
(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 proposed Project site is generally good, with all local background concentrations found to be well below the NAAQS.

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations of CO in ppm were 1.3 ppm (1,490 µg/m³) for one-hour and 0.9 ppm (1,031 µg/m³) for eight-hour.

5.5.3 Methodology

The BPDA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection (including garage entrances/exits) 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. The microscale analysis involves modeling of CO emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles, and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period, and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in EPA's intersection modeling guidance.[4]

The microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations.

Baseline (2016) and future year (2023) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections.

Existing background values of CO at the nearest monitor location at Kenmore Square were obtained from MassDEP. CAL3QHC results were then added to background CO values of 1.3 ppm (one-hour) and 1.1 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the proposed Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[5]

Modeling assumptions and backup data for results presented in this section are provided in the Appendix D.

---

[4] U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections; EPA-454/R-92-005, November 1992.

[5] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

5.5.3.1 Intersection Selection

One signalized intersection included in the traffic study meets the above conditions (see Chapter 4). The traffic volumes and LOS calculations provided in Chapter 4 form the basis of evaluating the traffic data versus the microscale thresholds. The intersection found to meet the criteria for inclusion in the microscale analysis is:

- Columbus Avenue, Arlington Street, and Stuart Street.

Microscale modeling was performed for the intersection based on the aforementioned methodology. The 2016 Existing conditions, and the 2023 No-Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

5.5.3.2 Emissions Calculations (MOVES)

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the existing (2016) and build year (2023) are provided by MassDEP.

All link types for the modeled intersection were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (SYNCHRO) reports. A speed of 30 mph is used for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[6]

Winter CO emission factors are typically higher than summer. Therefore, January weekday emission factors were conservatively used in the microscale analyses.

5.5.3.3 Receptors & Meteorology Inputs

Roughly 220 receptors were placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersection are presented in Figure 5.5-1.

---

6 U.S. EPA, 2010. Using MOVES in Project-Level Carbon Monoxide Analyses. EPA-420-B-10-041

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[7], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected.[8]

5.5.3.4 Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.9 to estimate eight-hour concentrations.[9] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

5.5.4 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 5.5-3 through 5.5-5 for the 2016 and 2023 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[10]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the proposed Project for the modeled conditions (0.5 ppm) plus background (1.3 ppm) is 1.8 ppm for the existing a.m. and p.m. peak cases. The highest eight-hour traffic-related concentration predicted in the area of the proposed Project for the modeled conditions (0.5 ppm) plus background (1.1 ppm) is 1.5 ppm for the same location and scenarios. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

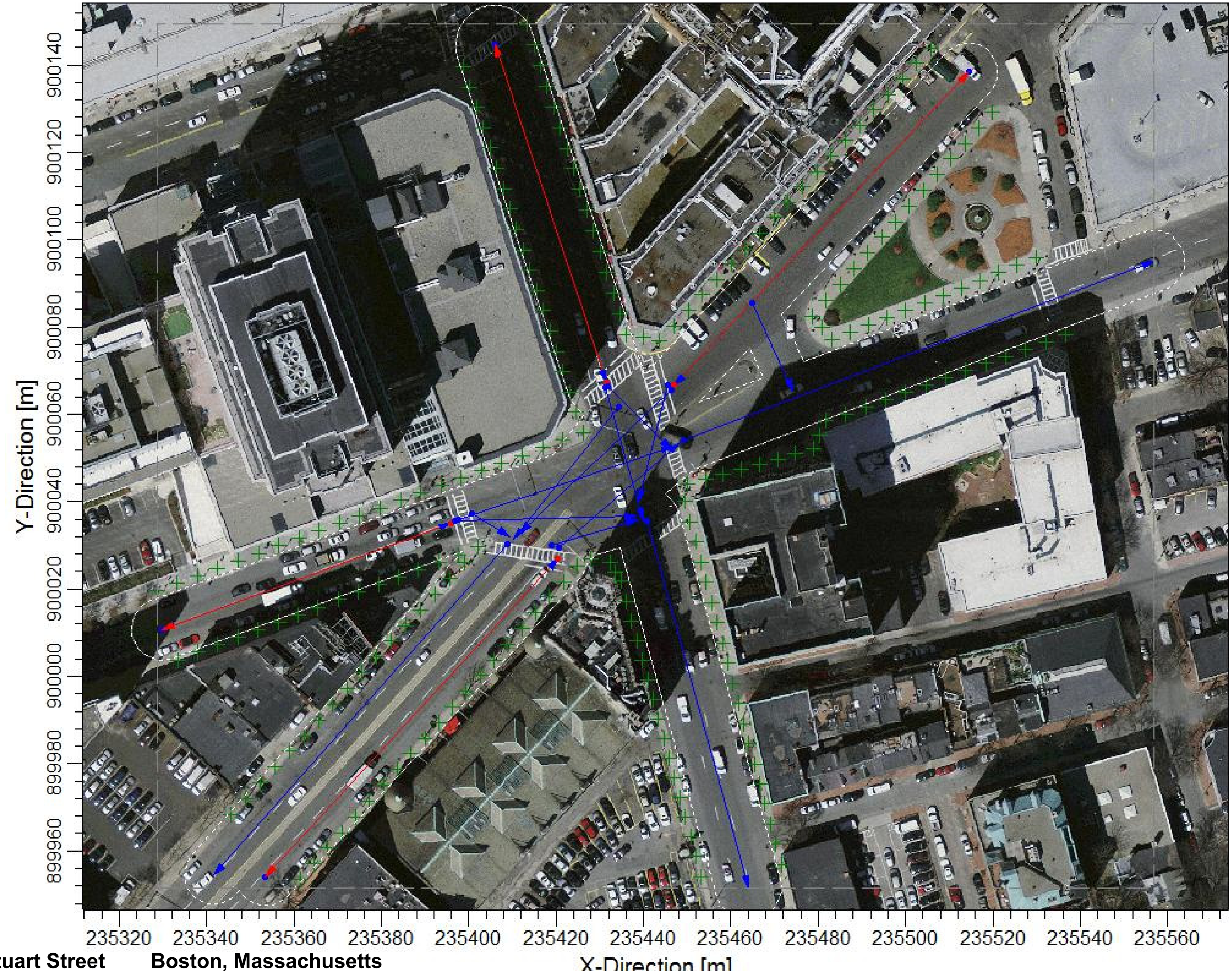
---

7 U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections. EPA-454/R-92-005, November 1992.

8 U.S. EPA, *User's Guide for CAL3QHC Version 2: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA –454/R-92-006 (Revised), September 1995.

9 U.S. EPA, AERSCREEN User's Guide; EPA-454/B-11-001, March 2011.

10 U.S. EPA, AERSCREEN User's Guide; EPA-454/B-11-001, March 2011.



212 Stuart Street **Boston, Massachusetts**

Figure 5.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Columbus Ave., Arlington St., & Stuart St.

5.5.5 *Conclusions*

Results of the microscale analysis show that all predicted CO concentrations are well below one-hour and eight-hour NAAQS. Therefore, it can be concluded that there are no anticipated adverse air quality impacts resulting from increased traffic in the area.

Table 5.5-3 Summary of Microscale Modeling Analysis (Existing 2016)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.5	1.3	1.8	35
	PM	0.5	1.3	1.8	35
8-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.5	1.1	1.6	9
	PM	0.5	1.1	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

Table 5.5-4 Summary of Microscale Modeling Analysis (No-Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
8-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

Table 5.5-5 Summary of Microscale Analysis (Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
8-Hour					
Columbus Avenue, Arlington Street, and Stuart Street	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

5.6 Stormwater/Water Quality

Please see Chapter 8 for information on stormwater and water quality.

5.7 Flood Hazard Zones / Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the Project site - Community Panel Numbered 25025C0077J - effective March 16, 2016 indicate the FEMA Flood Zone Designations for the site area. The FIRMs show that the Project is outside of the 500-year flood zone.

The site does not contain wetlands.

5.8 Geotechnical and Groundwater Conditions

This section describes subsurface soil and groundwater conditions at the site, planned below-grade construction activities, and mitigation measures for the protection of adjacent structures and maintaining groundwater levels in the proposed Project's vicinity during and following completion of foundation and below-grade construction.

5.8.1 Subsurface-Soil and Bedrock Conditions

Based on available data, the general subsurface profile anticipated to be encountered at the Project site consists of man-placed urban fill soils overlying interbedded layers of natural inorganic sand, clay and silt. Relative to existing site grades and in increasing depth below ground surface, the man-placed urban fill soils are anticipated to range from 15 to 20 feet in thickness with the interbedded layers of sand, clay and silt ranging from 100 to 140 feet in thickness. Bedrock is anticipated beneath the sand, clay and silt at depths of up to 120 to 160 feet below existing site grades.

5.8.2 Groundwater

Groundwater level measurements obtained in observation wells installed at the Project site at different times during the past approximately 10 years have ranged from about El. 7 to El. 9 Boston City Base (BCB), which generally corresponds to a depth below ground surface of about 11 feet to 9 feet.

The Project site is located within the Groundwater Conservation Overlay District (GCOD). Water levels measured by the Boston Groundwater Trust at observation wells that are within the GCOD and near the Project site (i.e., within approximately 150 to 200 feet south of the Project site) indicate water levels ranging from about El. 2 to El. 6 BCB during the past 10 years.

The Proponent is committed to working with the Boston Groundwater Trust and neighborhood to ensure that the Project has no adverse impact on nearby groundwater levels. Accordingly, the Project's design will incorporate the required systems to store and recharge stormwater.

5.8.3 Foundation and Below-Grade Construction

Development of the Project site will require demolition of the existing on-site building prior to excavation for foundations and below grade walls. The proposed new building is anticipated to be supported on reinforced concrete footings or mat foundation bearing on the natural, inorganic soils.

Construction of the foundations and below-grade basement will require an excavation generally extending to the limits of the property and to depths of up to 15 to 20 feet below ground surface. The excavation, to be conducted within an engineered lateral earth support system such as a steel sheetpile wall system, will be designed to provide excavation support, limit ground movements outside the excavation to protect adjacent facilities, and maintain groundwater levels outside the excavation by creating a groundwater "cutoff" between the excavation and the surrounding area. The lateral earth support system will be designed to be installed/sealed into the impervious soils below the excavation bottom to isolate the excavation and future below-grade basement from the groundwater table. Due to the depth of excavation, the lateral earth support system will be supported by an internal bracing system. Some pre-excavation will be performed along the building perimeter to remove obstructions prior to installing the excavation support system.

Penetrations through the permanent below-grade walls (such as for utilities) will be permanently sealed.

Temporary dewatering will be required inside the excavation during excavation and foundation construction to remove "free" water from the soils to be excavated as well as precipitation. The essentially watertight excavation support wall will prevent withdrawal of groundwater from outside the excavation. In the unlikely event that leakage occurs through the lateral earth support system walls, it will be promptly sealed by grouting of the wall.

A temporary construction dewatering permit will be obtained from governing agencies prior to discharge of dewatering effluent from the site. Testing of the effluent will be conducted prior to and during discharge to confirm compliance with all permit requirements.

5.9 Solid and Hazardous Waste

5.9.1 Hazardous Waste

Recent analytical data developed for preliminary site characterization and design indicated a 120-day reporting obligation under the Massachusetts Contingency Plan (MCP) for levels of petroleum constituents and polynuclear aromatic hydrocarbons (PAHs) commonly detected in urban fill. A Release Notification Form (RNF), BWSC 103, was submitted to MassDEP on August 31, 2016. MassDEP assigned RTN 3-33788 for these soil constituents. Detected soil quality is defined as "Remediation Waste" under the MCP and is not classified as a RCRA Hazardous Waste.

Additional characterization of the soil and groundwater at the Project site will be conducted by the Proponent at the appropriate stage of the design process to further evaluate Project site environmental conditions. Soil and groundwater management for the Project will be conducted under the MCP framework for a Release Abatement Measure (RAM) Plan to be submitted to MassDEP prior to the start of earthwork operations. A MCP Phase I Initial Site Investigation Report and Tier Classification will also be submitted to MassDEP for RTN 3-33788 at the one-year anniversary of the RNF.

5.9.2 Operation Solid Waste and Recycling

The Project will generate solid waste typical of residential and restaurant 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 155 tons of solid waste per year. With the exception of household hazardous wastes typical of residential and retail developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials.

5.10 Noise Impacts

5.10.1 Introduction

A sound level assessment was conducted which included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project, computer modeling to predict operational sound levels from proposed mechanical equipment, and a comparison of future Project sound levels to applicable City of Boston Zoning District Noise Standards.

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

5.10.2 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. 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.[11] 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

---

[11] *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.

middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies.

Because sounds in the environment vary with time, they are usually described with more than simply a single number. Two methods are used for describing variable sounds, exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment, A-weighted sound-level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value of 0 to 100 in terms of percentage. Several sound level metrics that are commonly reported in community noise studies are described below.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.

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

- L_{10} is the sound level in dBA exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the intrusive sound level because it is caused by occasional louder noises like those from passing motor vehicles.

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

- L_{eq}, the equivalent level, 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. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by occasional loud, intrusive noises.

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 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.

5.10.3 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 (BAPCC) 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, BAPCC Regulation 2 is applicable to the sounds from the Project and is considered in this noise study.

Table 5.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the BAPCC "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 5.10-1 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.

5.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources in the vicinity of the Project site include: vehicle and truck traffic along local streets, rooftop and residential mechanical equipment, pedestrian foot traffic, train whistles, birds, trees, street sweeping (daytime at two locations), and the general city soundscape.

5.10.4.1 Noise Monitoring Methodology

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. Sound level measurements were made on Thursday, September 22, 2016 during the daytime (1:30 p.m. to 4:30 p.m.) and on Friday, September 23, 2016 during nighttime hours (12:30 a.m. to 2:30 a.m.). 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.

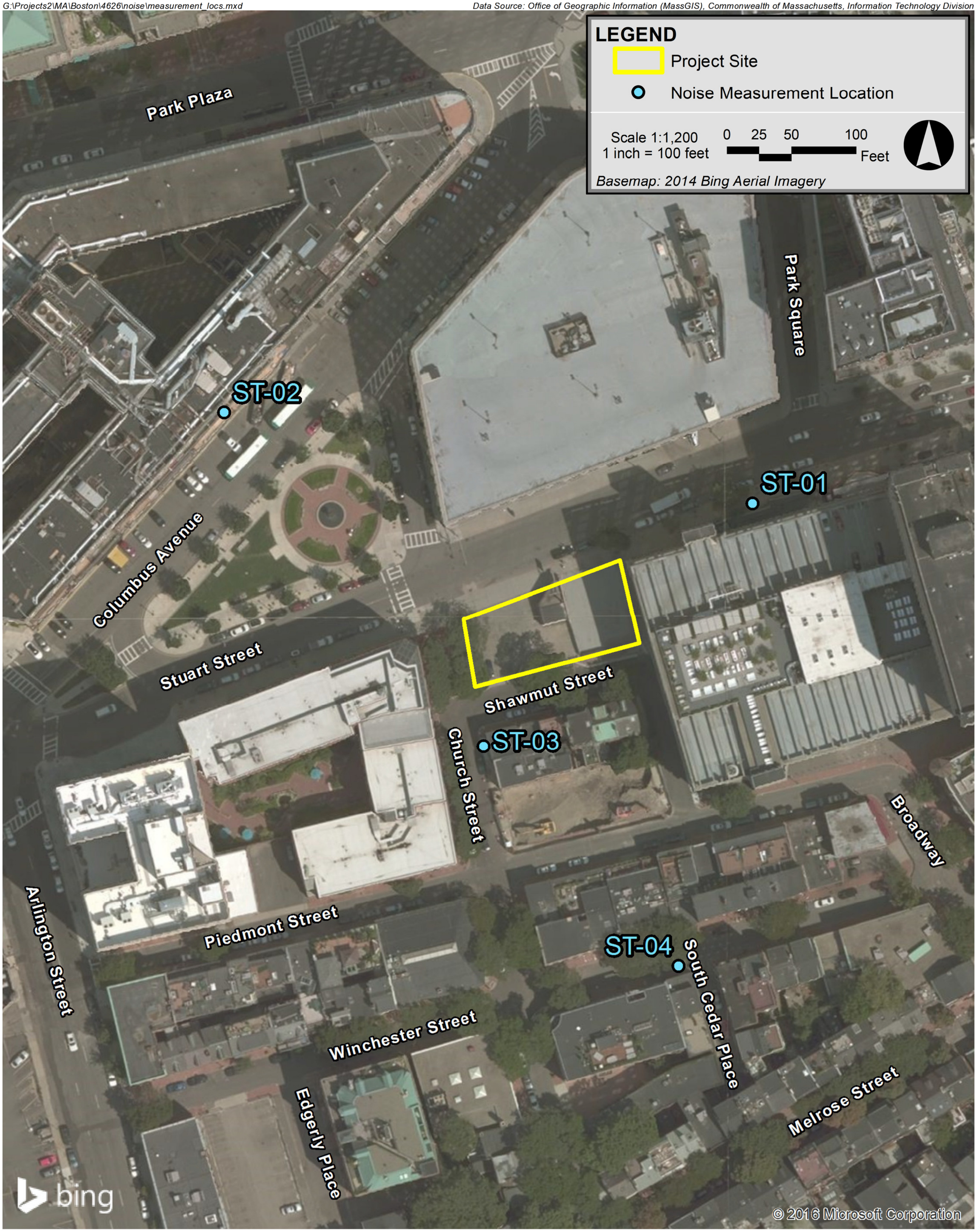
5.10.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning in the Project area. Four noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 5.10-1 and described below.

- **Location 1** is located on the southern side of Stuart Street across from the entrance to the Motor Mart Garage, representative of the closest residential and commercial receptors to the east of the Project along Stuart Street (i.e., the Revere Hotel).

- **Location 2** is located on the northern side of Columbus Avenue, outside the Park Plaza Hotel, between the hotel entrance and M.J. O'Connor's, and across from Statler Park. This location is representative of the closest residential and commercial receptors to the north of the Project.

- **Location 3** is located at the southeast corner of Shawmut Street and Church Street, just south of the entrance of Erbaluce Restaurant. This location is representative of the residential and commercial receptors in the southern vicinity of the Project.



212 Stuart Street Boston, Massachusetts

Figure 5.10-1
Noise Measurement Locations

- **Location 4** is located at 22 Winchester Street, to the west of South Cedar Place, representative of the residential receptors in the Bay Village neighborhood south of the Project.

Noise Monitoring Equipment

A Larson Davis Model 831 sound level meter equipped with a PCB PRM831 preamplifier, a PCB 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 (e.g., L_{eq}, L_{90}, etc.) were measured for each 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 5.10-2 and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 55 to 64 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 52 to 61 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 57 to 75 dBA;
- The nighttime equivalent level (L_{eq}) measurements ranged from 53 to 65 dBA.

Table 5.10-2 Summary of Measured Background Noise Levels – September 22, 2016 (Daytime) & September 23, 2016 (Nighttime)

Location	Period	Start Time	LA_{eq}	LA_{max}	LA_{10}	LA_{50}	LA_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz) 31.5	63	125	250	500	1k	2k	4k	8
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	4:01 PM	71	84	73	69	64	72	69	66	62	60	59	55	49	40
2	Day	1:58 PM	67	88	67	63	60	70	66	61	59	57	55	50	43	34
3	Day	2:50 PM	75	89	79	64	62	66	64	64	62	60	56	51	45	35
4	Day	3:19 PM	57	73	57	55	55	62	61	56	55	52	49	44	35	24
1	Night	2:02 AM	65	76	69	62	58	66	64	62	58	56	53	47	39	27
2	Night	12:40 AM	58	68	60	57	55	63	63	57	56	53	51	45	36	25
3	Night	1:36 AM	62	68	63	61	61	63	61	63	62	59	54	49	44	33
4	Night	1:08 AM	53	61	53	53	52	60	57	54	53	50	47	41	34	26

Note: Sound pressure levels are rounded to the nearest whole decibel.

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Thursday, September 22, 2016	81 °F	37%	Clear	Calm
Nighttime	Friday, September 23, 2016	69 °F	46%	Clear	S @ 1.4 mph

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	1993
Microphone	Larson Davis	377B20	110889
Preamp	Larson Davis	PRM831	015260
Calibrator	Larson Davis	Cal200	7146

5.10.5 Future Conditions

5.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project will consist of ventilation, heating, cooling, and emergency power noise sources. Multiple noise sources will be located on the rooftop and multiple sources (i.e., intake and exhaust fans and vents) will be located on the eastern and southern façades of the Project at the first floor.

Table 5.10-3 provides an anticipated list of the major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 5.10-4. Sound power level data were provided by the respective manufacturer of each piece of equipment except for the emergency generator. The sound power levels for the emergency generator were calculated using the sound pressure levels at a reference distance provided by the manufacturer.

The Project includes various noise-control measures that are necessary to achieve compliance with the applicable noise regulations. As the design progresses, specifications for mechanical equipment may change; however, appropriate measures will be taken to ensure compliance with the City Noise Standards. The kitchen make-up air fan, transformer intake and exhaust fans, occupant energy recovery unit ventilation exhaust and intake, and loading dock exhaust and intake fans will all be attenuated through acoustical louvers. Sound levels from the cooling tower will be mitigated to the north by a noise barrier wall with a 20-foot height and 28-foot length aligned from the northwest corner of the mechanical room to the northwest corner of the Project building. Sound levels from the rooftop energy recovery unit (RTU) will be mitigated to the north by a noise barrier with a 20-foot height and 24-foot length starting from the northeast corner of the mechanical room toward the northeast corner of the Project building. The RTU sound levels will be additionally mitigated to the south by a barrier with a height of 20 feet and length of 30 feet starting from the southeast corner of the mechanical room toward the east end of the Project building. Furthermore, the RTU will be mitigated either through a sound mitigation package supplied by the vendor or through the selection of quieter equipment from an alternate manufacturer. The emergency generator sound levels will be controlled using an enclosure and an exhaust silencer as part of the SA Canopy Level 2 mitigation package. To further limit impacts from the standby generator, required periodic, routine testing will be conducted during daytime hours, when background sound levels are highest. A summary of the noise mitigation proposed for the Project is presented in Table 5.10-5.

Table 5.10-3 Modeled Noise Sources

Noise Source	Quantity	Approximate Location	Size/Capacity
Rooftop ERU (RTU)	1	Roof (199' tier)	18,000 CFM
Cooling Tower (2-cell)	1	Roof (199' tier)	325-ton
Emergency Generator	1	Roof (199' tier)	300 kW
Kitchen Exhaust Fan	1	Roof (199' tier)	5,000 CFM
Kitchen Make-Up Air Unit (MUA)	1	First level southern façade	5,000 CFM
Transformer Intake Fan	1	First level southern façade	7,000 CFM
Transformer Exhaust Fan	1	First level southern façade	7,000 CFM
Occupant Energy Recovery Unit (ERU) Exhaust	1	First level southern façade	4,000 CFM
Occupant Energy Recovery Unit (ERU) Intake	1	First level southern façade	4,000 CFM
Loading Dock Exhaust Fan	1	First level eastern façade	1,000 CFM
Loading Dock Intake Fan	1	First level eastern façade	1,000 CFM

Table 5.10-4 Modeled Sound Power Levels per Noise Source

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz) 31.5	63	125	250	500	1k	2k	4k	8k
Rooftop ERU (RTU)[1]	102	92[9]	92	93	100	100	97	92	88	82
Cooling Tower[2]	89	96[9]	96	94	86	85	83	81	78	80
Emergency Generator[3]	97	108[9]	108	107	100	92	86	85	83	80
Kitchen Exhaust Fan[4]	86	91[9]	91	88	87	82	80	78	72	66
Kitchen Make-Up Air Unit (MUA) [5]	81	85[9]	85	82	80	78	76	72	69	59
Transformer Intake Fan[6]	73	82[9]	82	78	73	70	68	64	58	56
Transformer Exhaust Fan[6]	76	86[9]	86	80	76	74	70	66	60	55
Occupant Energy Recovery Unit (ERU) Exhaust[7]	73	84[9]	84	80	68	67	65	65	66	62
Occupant Energy Recovery Unit (ERU) Intake[7]	73	83[9]	83	80	68	66	65	65	65	61
Loading Dock Exhaust Fan[8]	73	89[9]	89	84	74	67	65	64	57	49
Loading Dock Intake Fan[8]	69	75[9]	75	70	69	66	63	61	56	50
See notes on next page										

Notes: Sound power levels do not include mitigation identified in Table 5.10-5.
1. Valent VPRE-352-70C-120I-1DA, 18,000 CFM unit. Sound levels include supply air discharge, return air intake, and casing.
2. Evapco 325-ton, 2-cell unit. All levels include a +2 dB manufacturer uncertainty.
3. CAT C9 300kW unit including SA Canopy Level 2 mitigation package.
4. Greenheck VEKTOR-H-22, 5,000 CFM fan.
5. Greenheck IGX-115-H32, 5,000 CFM unit.
6. Greenheck EQB-24-20, 7,000 CFM fan.
7. Greenheck ERVe-45-30L, 4,000 CFM unit.
8. Greenheck EQB-9-3, 1,000 CFM fan.
9. No data provided by manufacturer. Octave-band sound level assumed to be equal to the 63 Hz band level.

Table 5.10-5 Attenuation Values Applied to Mitigate Each Noise Source

Noise Source	Form of Mitigation	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Rooftop ERU (RTU)	Alternative/Modified Unit[1]	0	0	0	1	2	4	5	5	3
Kitchen Make-Up Air Unit (MUA)	Louver[2]	0	6	12	15	21	24	27	25	20
Transformer Intake Fan	Louver[3]	0	6	6	8	10	14	18	16	15
Transformer Exhaust Fan	Louver[3]	0	6	6	8	10	14	18	16	15
Occupant Energy Recovery Unit (ERU) Exhaust	Louver[2]	0	6	12	15	21	24	27	25	20
Occupant Energy Recovery Unit (ERU) Intake	Louver[2]	0	6	12	15	21	24	27	25	20
Loading Dock Exhaust Fan	Louver[3]	0	6	6	8	10	14	18	16	15
Loading Dock Intake Fan	Louver[3]	0	6	6	8	10	14	18	16	15

Notes:
1. The Proponent will consult with the manufacturer to identify mitigation options to achieve the minimum attenuation values presented or select a unit from an alternate manufacturer meeting the mitigated modeled sound levels.
2. Assumed IAC Noishield™ Model 2R Acoustic Louver.
3. Assumed IAC Slimshield™ Model SL-6 Acoustic Louver.

5.10.5.2 Noise Modeling Methodology

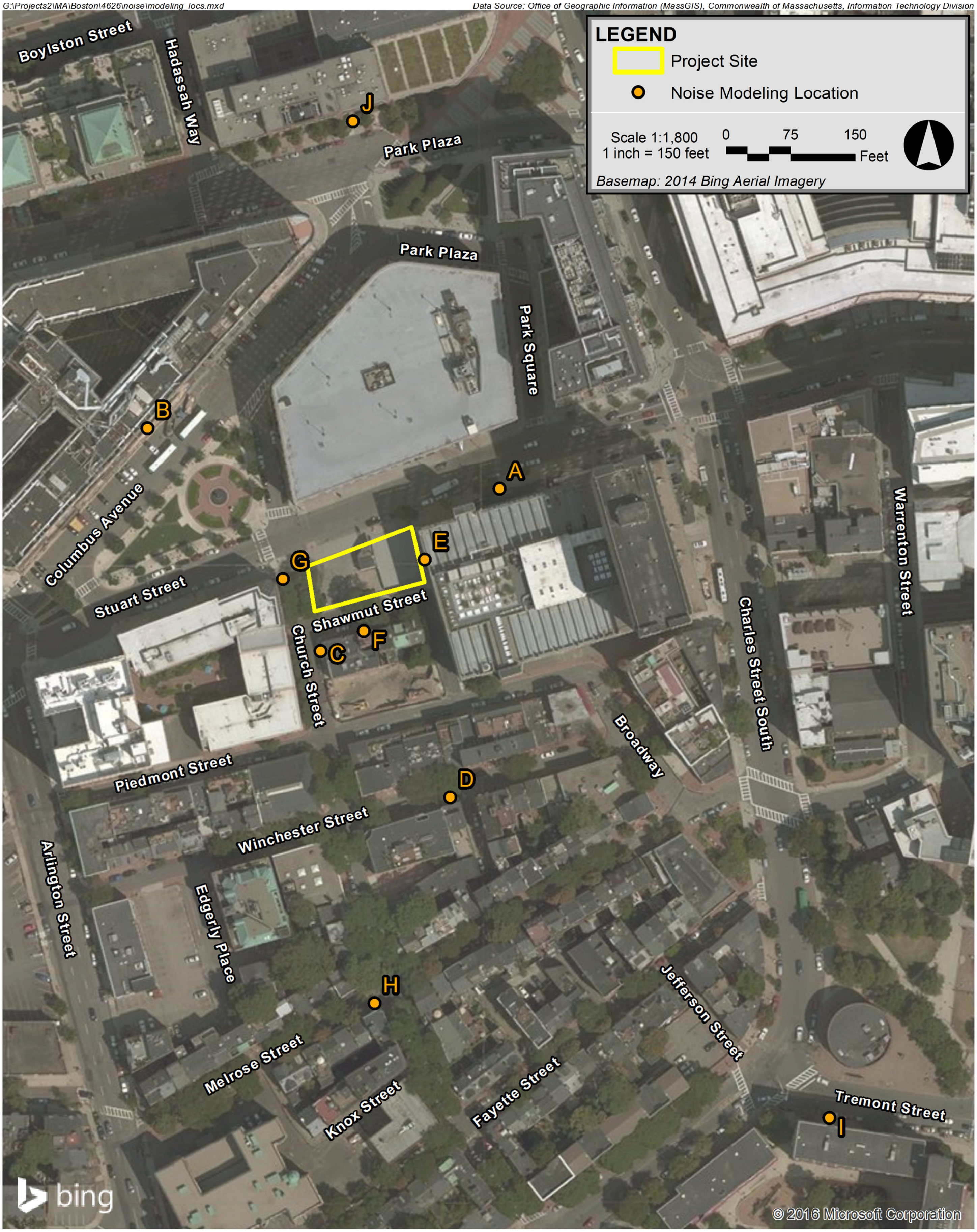
The noise impacts associated with the Project were predicted at the nearest and most representative receptors using the Cadna/A noise calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). The benefits of this software are a more refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections, drop-off with distance, and atmospheric absorption. The Cadna/A software allows for octave-band calculation of noise from multiple noise sources, as well as computation of diffraction around building edges.

5.10.5.3 Future Sound Levels – Nighttime

The analysis of sound levels at night considered all of the mechanical equipment without the emergency generator running to simulate typical nighttime operation conditions at nearby receptors. Ten modeling locations were included in the analysis. Locations A through D are identical to measurement Locations 1 through 4. Six additional modeling locations, E through J, were added for additional residential uses in the vicinity of the Project. The modeling receptors, which correspond to residential and commercial uses in the community, are depicted in Figure 5.10-2. The predicted exterior Project-only sound levels range from 33 to 53 dBA at nearby receptors. The City of Boston Residential and Business limits have been applied to the appropriate locations. Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. The evaluation is presented in Table 5.10-6.

Table 5.10-6 Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	33	44	39	35	35	32	26	19	12	3
B	Residential	33	45	42	39	35	32	25	20	13	3
C	Business	36	57	52	45	38	34	27	21	16	11
D	Residential	35	42	44	40	38	34	29	23	15	4
E	Business	53	76	70	65	54	46	40	35	30	24
F	Residential	44	66	61	53	46	41	35	28	25	22
G	Residential	33	49	44	40	35	31	25	20	14	9
H	Residential	40	46	46	43	39	38	34	30	22	9
I	Residential	38	40	40	39	40	37	31	26	14	0
J	Residential	45	37	41	41	46	45	39	33	23	3
City of Boston Limits	**Residential**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Business	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**



212 Stuart Street **Boston, Massachusetts**

Figure 5.10-2
Noise Modeling Locations

5.10.5.4 Future Sound Levels – Daytime

As noted above, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of power from the electrical grid. A second analysis combined noise from the Project's mechanical equipment and its emergency generator to reflect worst-case conditions. The sound levels were calculated at the same receptors as in the nighttime analysis, and then were evaluated against daytime limits. The predicted exterior Project-only daytime sound levels range from 43 to 53 dBA at nearby receptors. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeling locations. This evaluation is presented in Table 5.10-7.

Table 5.10-7 Comparison of Future Predicted Project-Only Daytime Sound Levels to City Noise Standards

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	46	59	59	57	50	41	34	31	25	13
B	Residential	49	61	61	60	53	45	39	37	32	19
C	Business	43	59	56	53	46	39	32	29	22	11
D	Residential	43	55	55	53	47	39	32	28	20	6
E	Business	53	76	70	66	55	47	41	35	31	24
F	Residential	44	66	61	54	46	41	35	28	25	22
G	Residential	43	58	56	54	47	39	32	30	24	11
H	Residential	45	55	55	54	48	42	36	34	27	11
I	Residential	43	52	52	53	47	41	34	31	22	0
J	Residential	48	52	55	54	50	47	40	35	27	8
City of Boston Limits	**Residential**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**
	Business	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**

5.10.6 Conclusions

Baseline noise levels were measured in the vicinity of the Project during the day and at night. At these and additional locations, future Project-only sound levels were calculated based on information provided by the manufacturers of the expected mechanical equipment. Project-only sound levels were compared to applicable limits.

Predicted mechanical equipment noise levels from the proposed Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, will be at or below the octave-band requirements of the City Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain below 50 dBA at residences; therefore, within the nighttime residential zoning limits for the City of Boston at the nearest residential receptors. The results indicate that the Project can operate without significant impact on the existing acoustical environment.

At this time, while the mechanical equipment and noise controls have been refined, they are still conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave-band limits of the City Noise Standards.

5.11 Construction Impacts

5.11.1 Introduction

A Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to 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 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.

5.11.2 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.

5.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the fourth quarter of 2017, with completion anticipated in 20 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. 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.

5.11.4 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.

5.11.5 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.

5.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 300 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 contractors 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.

5.11.7 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.

5.11.8 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. 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 site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

5.11.9 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.

5.11.10 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.

5.11.11 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.

5.12 Rodent Control

A rodent extermination certificate will be filed with the 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.

5.13 Wildlife Habitat

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

Chapter 6.0

Sustainable Design and Climate Change Resilience

6.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

6.1 Green Building

To comply with Article 37, the Proponent intends to incorporate sustainable design and construction principles and practices into the proposed Project. The Proponent intends to target a LEED Silver rating under LEED-NC version 3 (2009) as the rating system to comply with Article 37, and the Project is registered with the United States Green Building Council (USGBC) under LEED v3. The LEED rating system tracks the suitable features of a project by achieving points in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation and Design.

A LEED checklist is included at the end of this section, and shows the credits the Project anticipates achieving. The checklist will be updated regularly throughout the design process and as construction is completed. Presently, 53 points have been targeted, in addition to 26 maybe points. The maybe points represent credits that will continue to be evaluated as the Project design progresses.

The Proponent and the Project design team has, and will continue to, evaluate and incorporate sustainable design and energy conservation as the design process continues.

Sustainable Sites

<u>Prerequisite 1: Construction Activity Pollution Prevention.</u> The Project construction documents will include a full erosion and sedimentation control program in order to minimize the impact of construction on local environmental resources and surrounding properties. The control program will be implemented by the Construction Manager (CM). The CM is required to implement a compliant erosion and sedimentation control plan that meets local requirements and the U.S. EPA Construction General Permit (Phase I and II) of the National Pollutant Discharge Elimination System (NPDES) Program.

<u>Credit 1: Site Selection.</u> The Project site is a previously developed urban parcel in a densely developed neighborhood. The parcel also meets all the criteria for Site Selection. The site does not impact endangered species habitat, it is not within the setback of a wetland, and was not formerly used as Prime farmland or a public park.

<u>Credit 2: Development Density & Community Connectivity</u>. The Project meets the criteria for Option 2, Community Connectivity. The Project site is in a dense urban area with frontage on Stuart Street. The proposed Project site is on Stuart Street located along the northernmost edge of the Bay Village neighborhood, with proximity to the Chinatown neighborhood to the east, Midtown Cultural District to the north and the Back Bay neighborhood to the west. It is also located within the “High Spine” of Boston, an area of increased development linking Copley Square to the downtown Financial District. The site

is within a 0.5 mile of a dense residential area in Boston and is within 0.5 mile of at least 10 basic services.

Credit 3: Brownfield Redevelopment. The Project meets the criteria for Option 1, Develop on a site documented as contaminated by means of an ASTM E1903-97 Phase II Environmental Site Assessment or a local voluntary cleanup program. The site meets the definition of a brownfield due to the presence of oil and other materials in the soil at levels regulated under the Massachusetts Contingency Plan, 310 CMR 40.0000 (MCP). Furthermore, the Project meets the intent of the Brownfield Redevelopment credit since site redevelopment will be complicated by additional soil management costs and regulatory submissions required for MCP compliance.

Credit 4.1: Alternative Transportation, Public Transportation Access. The Project site is located within a 0.5-mile radius of the MBTA Arlington Station on the Green Line, Tufts Medical Center Station on the Orange Line, and Back Bay Station on the Framingham/ Worcester Line, Franklin Line, Needham Line, and Providence/Stoughton Line. The proximity of the Project to public transportation fulfills the LEED credit to reduce pollution and land development impacts from automobile use.

Credit 4.2: Alternative Transportation, Bicycle Storage and Changing Rooms. The Project will have secure/covered storage facilities for bicycles for 15% or more of building occupants.

Credit 4.3: Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles. The Project will provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity of the site.

Credit 4.4: Alternative Transportation, Parking Capacity. The Project will not provide parking.

Credit 6.1: Stormwater Design, Quantity Control. The Project site currently contains 50% impervious surface; therefore the Project is required to reduce the volume of stormwater runoff by 25% for the two-year, 24-hour storm event (3.2 inches of rainfall). The Project will capture and recharge one-inch of stormwater runoff.

Credit 6.2: Stormwater Design, Quantity Control. The Project will capture and treat runoff from 90% of the average annual rainfall, and will use Best Management Practices to remove 80% of the total suspended solids (TSS). The design will capture and recharge the one-inch rainfall. Presently, 90% of all storm events are one-inch or less.

Credit 7.2: Heat Island Effect, Roof. An SRI-compliant roof membrane product has been specified.

Water Efficiency

Prerequisite 1: Water Use Reduction, 20% Reduction. The Project will specify low-flow and high efficiency plumbing fixtures within residential units to reduce the amount of potable water usage by a minimum of 20%.

Credit 1: Water Efficient Landscaping. The use of potable water for irrigation of landscaping at the Project site will be reduced by 50% over a midsummer baseline case using high efficiency irrigation technology such as efficient drip irrigation systems and selection of plants that are native or adapted.

Credit 3: Water Use Reductions. Approximate low-flow and low consumption plumbing fixtures are anticipated to achieve a reduction in water usage of 30-35% over the baseline.

Energy and Atmosphere

Prerequisite 1: Fundamental Commissioning of the Building Energy Systems. The Project will have the mechanical and electrical building systems commissioned to verify that they are operating as designed.

Prerequisite 2: Minimum Energy Performance. This Project will demonstrate a 10% minimum improvement in the energy rating as compared with the baseline building performance per Appendix G of ASHRAE 90.1-2007.

Prerequisite 3: Fundamental Refrigerant Management. Non-CFC based refrigerants will be utilized for the Project.

Credit 1: Optimize Energy Performance. The Project aims to demonstrate a 20% minimum improvement in the energy rating as compared with the baseline building performance per Appendix G of ASHRAE 90.1-2007. This will be achieved by using high efficiency mechanical and electrical equipment as well as an improved envelope construction.

Credit 5: Measurement and Verification. The Project will comply with Option 1, Energy and Water Data Release Form. The Proponent will register an account in ENERGY STAR's Portfolio Manager tool and share the project file with the USGBC master account.

Credit 6: Green Power. The Proponent will consider engaging in a two-year renewable energy contract to provide at least 35% of the electricity (as estimated by the energy model in EAc1) from renewable sources.

Materials and Resources

Prerequisite 1: Storage and Collection of Recyclables. The Project will provide appropriate recycling areas to serve the entire building for paper cardboard, glass, plastics and metals.

Credit 2: Construction Waste Management. The Project will implement a Construction Waste Management Plan to ensure the minimal amount of construction and demolition debris to be disposed of in landfills and incineration facilities. The Project aims to achieve at least 75% diversion from a landfill.

Credit 4: Recycled Content. The Project will use and specify products and materials with recycled content to achieve 10% recycled content materials based on overall Project materials cost.

Credit 5: Regional Materials. The Project will be constructed using building materials and products manufactured regionally for 10% of the overall materials cost.

Indoor Environmental Quality

Prerequisite 1: Minimum IAQ Performance. The Project will meet the minimum ventilation requirements of ASHRAE 62.1-2007 as required by the Massachusetts Building Code.

Prerequisite 2: Environmental Tobacco Smoke Control. The Project will comply with Option 1. Smoking will not be allowed on the Project site or inside the building at any time. The policy will be outlined in the tenant handbook.

Credit 3.1: Construction IAQ Management Plan, During Construction. Indoor Air Quality Management plans will be implemented during the construction phase per the requirements of this credit.

Credit 4.1: Low-Emitting Materials, Adhesives & Sealants. Low VOC adhesives and sealants will be used for all interior finishes.

Credit 4.2: Low-Emitting Materials, Paints & Coatings. The Project will specify that all paints and coatings applied inside the building envelope will comply with the Green Seal Standard GS-11 for paints and primers; Green Seal Standard GS-03 for anti-corrosive paints; and the South Coast Air Quality Management District (SCAQMD) Rule #1113 for wood finishes, stains, and sealers.

Credit 4.3: Low-Emitting Materials, Flooring Systems. The Project will specify that all flooring systems must comply with the appropriate standard for carpet, carpet cushion, carpet adhesive, hard surface flooring, floor sealers, stains and finishes, and tile setting adhesives and grout.

Credit 5: Indoor Chemical and Pollutant Source Control. The Project will install a permanent entryway system at all high-volume building entrances to prevent air contaminants from entering the building. Housekeeping and laundry areas will be separated and exhausted to the outside to comply with the requirements of this credit. Air handling units will be provided with appropriate filtration to meet the credit.

Credit 6.1: Controllability of Systems, Lighting. The Project will include individual lighting controls to meet the minimum requirements of this credit.

Credit 6.2: Controllability of Systems, Thermal Comfort. The Project will include individual temperature controls to meet the requirements of this credit.

Credit 7.1: Thermal Comfort, Design. The building envelope and HVAC systems will be designed to meet the requirements of ASHRAE 55-2004.

Innovation and Design Process

The Project team has identified several Innovation and Design credits and strategies; the strategies ultimately chosen for implementation will be determined based on final calculations and decisions made by the design team.

Innovation and Design credits may include an educational outreach program for building occupants and visitors, the implementation of green cleaning standards, cooling tower management, low-mercury lamps, and a pilot credit in Assessment and Planning for Resilience. A point will also be earned through the inclusion of a LEED Accredited Professional on the core Project team.

Regional Priority

Regional Priority points are contingent upon meeting the credit requirements of categories deemed especially significant for the Project location. The Project team has identified the following credits as targets:

Sustainable Sites Credit 3: Brownfield Redevelopment;

Sustainable Sites Credit 6.1: Storm water Design - Quantity Control;

Sustainable Sites Credit 7.1: Heat Island Effect – Roof

LEED 2009 for New Construction and Major Renovations

212 Stuart Street Residences

Project Checklist

Sustainable Sites — Possible Points: 26

Y	?	N			Points
22		4		**Sustainable Sites**	26
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
1			Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
		1	Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			Points
5	3	2		**Water Efficiency**	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

Energy and Atmosphere — Possible Points: 35

Y	?	N			Points
8	11	16		**Energy and Atmosphere**	35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5	4	10	Credit 1	Optimize Energy Performance	1 to 19
	1	6	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

Materials and Resources — Possible Points: 14

Y	?	N			Points
4	2	8		**Materials and Resources**	14
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

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

Indoor Environmental Quality — Possible Points: 15

Y	?	N			Points
8	6	1		**Indoor Environmental Quality**	15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
	1		Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
	1		Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
		1	Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	?	N			Points
3	3			**Innovation and Design Process**	6
1			Credit 1.1	Innovation in Design: SSc4.1 Public Transportation Access	1
1			Credit 1.2	Innovation in Design: Education Plan	1
	1		Credit 1.3	Innovation in Design: Green house keeping	1
	1		Credit 1.4	Innovation in Design: TBD	1
	1		Credit 1.5	Innovation in Design: TBD	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	?	N			Points
3	1			**Regional Priority Credits**	4
1			Credit 1.1	Regional Priority: SSc3 Brownfield Redevelopment	1
1			Credit 1.2	Regional Priority: SSc6.1 Stormwater Design Quantity Control	1
1			Credit 1.3	Regional Priority: SSc7.2 Heat Island Effect - Roof	1
	1		Credit 1.4	Regional Priority: TBD	1

Total — Possible Points: 110

Y	?	N		Points
53	26	31	**Total**	110

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

6.2 Climate Change Resilience

6.2.1 Introduction

Projects subject to Article 80B, Large Project Review, are required to complete the Climate Change Preparedness Checklist. Climate change conditions considered by the Project team include sea-level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall evets, and increased wind gusts.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate-related conditions projected 50 years into the future. A copy of the Climate Change Checklist is included in Appendix E.

6.2.2 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 a high performance building envelope;
- Installing operable windows where possible;
- Installing higher performance light and controls, including automatic LED lighting control;
- Incorporating energy recovery ventilation; and
- Specifying high albedo roof tops to minimize the heat island effect.

6.2.3 Sea Level Rise and Future Storms

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

[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.

"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).

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 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 created 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 in 2070, the Project site has up to a 2% chance of flooding annually. With the anticipated 2070 100-year flood (1% chance flooding annually), the site would be impacted with flood levels of up to approximately one foot. Although these impacts are not anticipated until much further in the future, the design team is studying the incorporation of a number of measures to mitigate against flood impacts, including:

- Placing essential mechanical equipment above the future flood level;
- Water-tight utility conduits; and
- Wastewater backflow prevention.

---

[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. The report states that the 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).

6.2.4 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff at the Project site, and protect the Project's mechanical equipment, as necessary. The performance capabilities of the proposed stormwater management system are anticipated to significantly improve the site's infiltration capacity. Stormwater measures will include:

- Decreasing stormwater runoff from the site;
- Water tight utility conduits; and
- Wastewater and stormwater back flow prevention.

6.2.5 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. 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, the building will include aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

6.3 Renewable Energy

The Proponent will evaluate the potential for a roof-mounted solar photovoltaic (PV) system, and the availability of grants and renewables funding. There will be limited space available on the southern portion of the roof, which will be devoted to mechanical and amenity space. With a total of approximately 3,834 sf of available area on the northern portion of the roof, approximately 60% of roof space would be set aside for space around the panels, between panels, etc. This leaves approximately 1,150 sf available for rooftop solar. Assuming 12 watts per square foot, this allows for an approximately 14 kW array. In the location proposed, an installation of this solar array equals an annual generation of approximately 18 MW hours. The Proponent will continue to evaluate the feasibility of installing a solar PV array, including financial incentives and considerations of the electrical network and impacts to aviation, as the design develops.

Chapter 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

7.1 Existing Conditions

The Project site is located on the northernmost edge of the Bay Village Historic District, a Local Historic District designated by the Boston Landmarks Commission (BLC) in 1983. This district is generally bounded by Piedmont and Stuart Streets on the north, Charles Street South on the east, Berkeley Street on the west and Tremont and Cortes Streets on the south.

Red brick single-family rowhouses set on raised basements typify the earliest buildings in the district. Dating from the second quarter of the nineteenth century and Federal or Greek Revival in style, these are clustered on Fayette and Melrose Streets. West of Arlington Street, larger-scaled, later nineteenth-century brick tenements accommodating multiple households predominate along Cortes and Isabella Streets. These reflect the Second Empire, Ruskin Gothic and Queen Anne styles of the Victorian period. As mentioned in Chapter 3, the Project site is immediately adjacent to high-rise buildings to the north, east and west within the High Spine of Boston, an area of increased development linking Copley Square to the downtown Financial District. The High Spine contains a mix of uses, including office, commercial, hospitality, retail and residential within high-rise and mid-rise structures. Materially, these buildings consist of glass curtainwall, limestone with punched windows, precast concrete and/or tan or red brick.

In the early twentieth century, the neighborhood's proximity to downtown theaters and cinemas made it a regional locus of film distribution activities. Two-story commercial and light-industrial buildings from this period are numerous along Church, Piedmont and Winchester Streets. Modestly Art Déco or Art Moderne in style, many of these were occupied by businesses associated with the motion-picture and entertainment industries. Several nightclubs were also active in the district in the past century. Few of these entertainment-related enterprises have survived, however, and buildings formerly occupied by such businesses have generally been converted to residential use.

7.1.1 Historic Resources within the Project Site

Of the four buildings that occupied the Project site as recently as the late 1990s, only one remains in place today: an undistinguished single-story structure at 222 Stuart Street. Apparently built as a gas station in the 1960s, this is now used as an attendant's booth for the surface parking lot operated on the property. Although located within its boundaries, this aesthetically intrusive building is not contributory to the historic visual character of the Bay Village Historic District.

Immediately to the east of this building was a pair of narrow, 2½ story Greek Revival rowhouses at 17 and 19 Shawmut Street. Comparable in appearance to the residential buildings opposite but still smaller in their scale, these houses were taken down by the prior owner in 1999.

Until 2014 when it was demolished by a prior owner of the property because of its dangerously deteriorated condition, the building at 212 Stuart Street was notable for its anomalous appearance. The building featured façades of strikingly different character on its two major street elevations. The buttresses and pointed-arch windows of the red-brick Shawmut Street façade were remnants of a Gothic-style church, built by a German-speaking Lutheran congregation circa 1870. The property was subsequently acquired by the Old South Society which operated it as mission known as the Hope Chapel.

Decades later, the church building was purchased by the Hairenik Association, an Armenian-language publishing company. Also at about this time, Stuart Street was widened prompting the construction of large hotels and office buildings in the vicinity. As a consequence, the building's original rear elevation was removed and a new Stuart Street façade was built to face the broadened corridor. Completed in 1939, this buff-brick elevation was Art Moderne in style, not unlike many of the film-distribution centers of similar vintage which may be found elsewhere in the district. The Shawmut Street elevation was apparently modified at this time as well, losing its Victorian-era gables to a flat roof; its pointed-arch window openings and buttresses were retained, however.

After the Hairenik Association's relocation to Watertown, Massachusetts in the 1980s, the building was occupied by a series of restaurants. When the last of these went out of business, the property lapsed into a period of extreme physical neglect which ultimately resulted in its demolition.

7.1.2 Historic Resources in the Vicinity of the Project Site

The Project site is within the Bay Village Historic District, a locally designated historic district, and in close proximity to a dense cluster of other districts and properties individually listed in the State and National Registers of Historic Places. Among these are the South End Landmark District, the Boston Common, the Boston Public Garden, the Piano Row Historic District, and the Back Bay Historic District. The locally designated Back Bay Architectural District and South End Landmark District are also nearby. These and other resources in the Project vicinity which are included in the State and National Registers of Historic Places are described below.

Table 7-1 lists State and National Register-listed properties and historic districts located within a quarter-mile radius of the Project site. The individually listed properties are assigned numbers, which correspond to Figure 7-1. Figure 7-1 also identifies the locations of the State and National Register-listed historic districts within a quarter mile of the Project site; these are indicated by letters.

Table 7-1 State and National Register Resources in the Vicinity of the Project Area

No.	Historic Resource	Address	Designation
1	Young Men's Christian Union	48 Boylston St.	NR, NRMRA, LL
2	Dill Building	11-25 Stuart St.	NR, NRMRA
3	Jacob Wirth Building	31-39 Stuart St.	NR, NRMR, LL
4	Wilbur Theatre	244-248 Tremont St.	NR, NRMRA, LL
5	Metropolitan Theatre	252-272 Tremont St.	NR, NRMRA, LL
6	Shubert Theatre	263-265 Tremont St.	NR, NRMRA
7	Charles Playhouse	76-78 Warrenton St.	NR, NRMRA
8	First Corps of Cadets Armory	97-105 Arlington St.	NRDOE,LL
9	1 Bay Street	1 Bay St.	NR, LHD
10	Emmanuel Church	15 Newbury St.	NR, LHD, PR
A	South End Landmark District		NRDIS, LHD
B	Boston Common		NRDIS, LL, NHL
C	Boston Common & Public Garden		NRDIS, LL, NHL
D	Boston Public Garden		NRDIS, LL, NHL
E	Piano Row Historic District		NRDIS,NRMRA
F	Back Bay Historic District		NRDIS
G	Park Square/Stuart Street Historic District		NRDOE
H	South End Landmark District		LHD
I	Bay Village Historic District		LHD
J	Back Bay Architectural District		LHD

Designation Legend:

NR	Individually listed on the National Register of Historic Places
NRDIS	National Register of Historic Places historic district
NRDOE	Determined eligible for inclusion in the National Register of Historic Places
NRMRA	National Register Multiple Resources Area
NHL	National Historic Landmark
LHD	Local Historic District
LL	Local Landmark
PR	Preservation Restriction

The **Young Men's Christian Union**, located at 48 Boylston Street near the southeast corner of the Boston Common, is a building in the High Victorian (or Ruskin) Gothic style. Completed in 1875 to the designs of Boston architect Nathaniel Bradlee, it is noteworthy for its ornate sandstone façade and was designated a Boston Landmark in 1877.

The **Dill Building** at 11-25 Stuart Street is a six-story red-brick commercial building completed to the designs of A. S. Drisko between 1886 and 1888. Listed on the National Register of Historic Places in 1980, the Dill Building is now operated as a hostel.

A pair of 3½-story bow-fronted rowhouses dating from 1844, the **Jacob Wirth Building** at 31-39 Stuart Street is unified by a cast-iron storefront added as part of its conversion to a restaurant in 1868. Still in operation today, Jacob Wirth & Co. is the second-oldest continuously operating restaurant in Boston (after the Union Oyster House). Its exterior is distinctive for its painted-brick façade and pedimented dormers, while its interior retains much of its original Victorian-era woodwork and other historic fabric. It was designated a Boston Landmark in 1977 and added to the National Register in 1980.

Designed by the well-known architect Clarence Blackall, the **Wilbur Theater** at 244-250 Tremont Street was completed in 1913. Trimmed with white marble, its symmetrical red-brick façade evokes a transitional Federal-to-Greek Revival idiom often seen on Beacon Hill. This affinity is perhaps most evident at its three recessed entrances, which recall those of 39-40 Beacon Street, designed by Alexander Parris. Accommodating 1,200 patrons, the theatre was designated a Boston Landmark in 1987.

Another Blackall design, the **Metropolitan Theater** at 270 Tremont Street was completed in 1925. Its restrained Classical façade of monochromatic limestone belies the colorful opulence of its vast interior, which has a seating capacity of 3,600. Now operated as the Citi Performing Arts Center, the Metropolitan was designated a Boston Landmark in 1990.

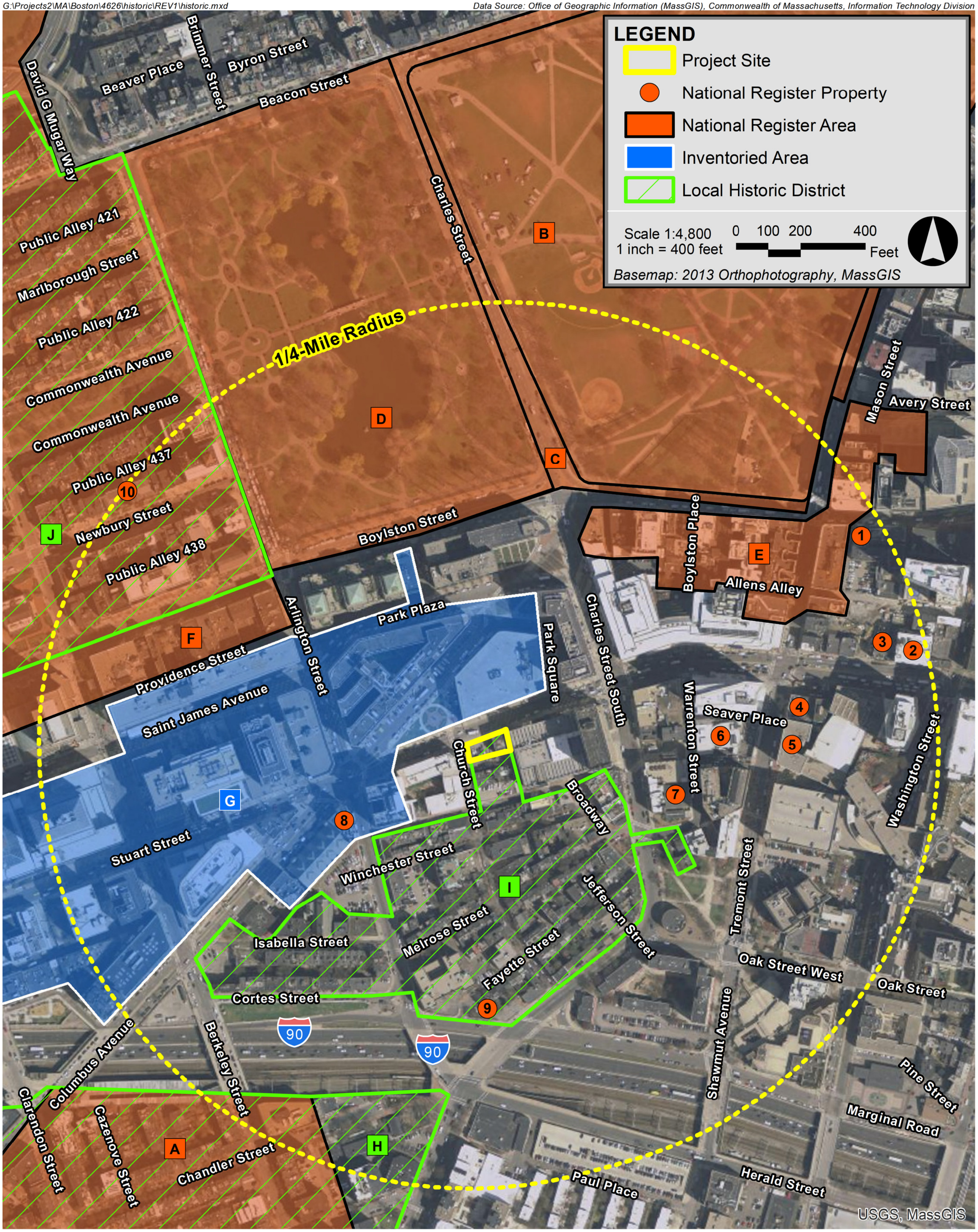
Opposite the Wilbur, at 263-265 Tremont Street, stands the **Shubert Theater**. Opened as the Lyric Theatre in 1910, the building was designed by architect Thomas James of the firm Hill, James & Whitaker. Spanned by an arched marquee of iron and glass, its limestone façade is expressed as a triumphal arch centering a Palladian window. The theater was listed on the National Register in 1980.

The Charles Playhouse at **76-78 Warrenton Street** has enjoyed a vivid history. Its pedimented red-brick façade dominated by a monumental pair of Ionic columns in antis suggests its origin as a house of worship. Erected in 1839 as a Universalist church designed by Asher Benjamin, the building was later used as a synagogue and a speakeasy before its conversion to a theater in 1958. It was included on the National Register in 1980.

The fortress of rock-faced granite at 97-105 Arlington Street was built as the **Armory of the First Corps of Cadets**, an élite militia unit, in 1895. Designed by William Gibbons Preston in a robust Romanesque Revival style, its round-arched window openings and six-story corbeled tower demonstrate the continuing influence of H. H. Richardson. Listed on the National Register in 1973, the building was designated a Boston Landmark in 1977. It is currently operated as a restaurant.

G:\Projects2\MA\Boston\4626\historic\REV1\historic.mxd

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



212 Stuart Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 7-1

Historic Resources Map

The tiny brick house at **1 Bay Street** in the Bay Village Historic District (see below) occupies a footprint of only 650 square feet. Twenty feet wide and 2½ stories tall, its elliptical-arched entry recess identifies its late Federal style. Built circa 1830, it was included in the National Register in 1994.

Built in 1861, **Emmanuel Church** at 15 Newbury Street is both the only Back Bay church to occupy a mid-block site and the only one to lack a steeple. Nevertheless, the building enjoys a major presence on the streetscape, occupying approximately one-third of the block between Arlington and Berkeley Streets. Designed by Alexander Estey in a restrained English rural Gothic style, its principal elevations are of randomly coursed Roxbury puddingstone trimmed with low-contrast sandstone below a steeply pitched roof of gray slate. Its Lindsey Chapel was added in 1924 as a memorial to a parishioner who perished in the sinking of the *Lusitania* during the First World War. As designed by Allen & Collens, this annex is both more delicate and more archaeologically correct in detail than the original church. The chapel's interior is the work of a noted Scottish architect, the Gothic Revivalist Ninian Comper. Included in the locally designated Back Bay Architectural District enacted in 1966 and the Back Bay National Register District designated in 1973, Emmanuel Church is also the subject of a Preservation Restriction instituted in 2014.

Established in 1634 as a public pasture for the grazing of settlers' livestock, the **Boston Common** is the oldest municipal park in the U.S. It is also the oldest link in the so-called Emerald Necklace of contiguous Boston parklands. Bounded by Tremont, Park, Beacon, Charles and Boylston Streets, its footprint encompasses some 50 acres. Used as an encampment by occupying British forces during the Revolutionary War, the Common was also the scene of public executions until the early nineteenth century. Thereafter it came to function more as a modern city park, enhanced by ornamental plantings and pedestrian promenades (or "malls"), as well as decorative fencing, water features and commemorative statuary. Perhaps its most admired work of public art is the memorial to Capt. Robert Gould Shaw and the 54th Massachusetts Regiment, which faces Beacon Street opposite the State House. Unveiled in 1897, this bronze relief by Augustus St. Gaudens depicts the Boston native Shaw on horseback leading his volunteer infantry of African-American freedmen and escaped slaves prior to battle in the Civil War. Consistent with its historic origins as a locus of community engagement, the Common continues to attract civic gatherings, political protests, musical performances and other cultural events. It also affords active and passive recreational opportunities for Bostonians and visitors throughout the year. Following its National Register listing in 1972 and local landmark designation in 1977, the Boston Common attained recognition as a National Historic Landmark in 1987.

Located just west of the Common on a former tidal marsh, the **Boston Public Garden** was initially conceived in 1837 as a formal botanical garden of a type previously known only in Europe. As the first of its kind in the U.S., the Public Garden was designed to include specimen trees and a rotating display of flowering plant materials. Its rectangular footprint of 24 acres is bounded by Charles, Boylston, Arlington and Beacon Streets and contained by ornamental cast-iron fencing. The centerpiece of the landscape is an artificial pond, some four acres in area, which is spanned by a small suspension bridge supported by granite piers. Throughout the warmer months, the shallow waters of this lagoon, as it is called, are traversed by the Swan Boats. A fleet of flat-bottomed, pedal-operated craft first launched in 1877, these have long been among Boston's most famous tourist attractions. As with the Boston Common, commemorative sculpture abounds within the Garden. Notable works include a prominent equestrian statue of General Washington by Thomas Ball, installed at the Arlington Street entrance in 1869, and the "Angel of the Waters" by Daniel Chester French. A memorial to the philanthropist George Robert White was dedicated in 1924 at the Garden's northwest corner. In 1987 a highly popular set of bronzes was introduced near the northeast entrance; based on the avian characters of Robert McCloskey's 1942 children's classic *Make Way for Ducklings*, these are the work of sculptor Nancy Schon. First listed in the National Register in 1972 and designated a Boston Landmark in 1977, the Public Garden was recognized as a National Historic Landmark in 1987.

The **Piano Row Historic District** comprises two blocks of distinguished late nineteenth-century commercial buildings along Tremont and Boylston Streets overlooking the southwest corner of the Boston Common. Its name reflects a historic concentration of music-related business enterprises, including several piano showrooms. Most notable among these is the establishment of M. Steinert & Sons, which has retailed Steinways since 1896. Its location at 162 Boylston Street includes an acoustically superior basement-level concert hall which unfortunately can no longer be used for public performances owing to intractable egress deficiencies. Piano Row was included in the National Register of Historic Places in 1980.

The **Bay Village Historic District** was designated by the BLC in 1983. Located southwest of Downtown Boston, Bay Village was first constructed on landfill in the 1820s. Before acquiring its present name during the so-called urban pioneer movement of the 1960s, the area had been known as the Church Street District. Dating from the second quarter of the nineteenth century, the early dwellings of Bay Village exemplify the late Federal and Greek Revival styles, resembling smaller, more modestly ornamented versions of houses found on Beacon Hill. This phenomenon is explained by the fact that housewrights active in the development of Beacon Hill built their own homes here in the prevailing architectural fashions of the day, though smaller in scale and simpler in detail.

As the nearby South End and Back Bay neighborhoods were developed in the years immediately before and after the Civil War, substantial brick houses and residential hotels went up along Cortes and Isabella Streets, in the area west of Arlington Street (which was known as Ferdinand Street until the turn of the twentieth century). Variously Second Empire, Ruskin Gothic or Queen Anne in style, these buildings mirror the visual character of those residential areas.

In the early 20th century, Bay Village benefited from its proximity to the downtown theater district, becoming a hub for film distribution throughout New England. Though since converted to residential use, a number of former movie warehouses and newsreel studios survive from this era, particularly on Piedmont, Winchester and Church Streets. Modest in size and economical in detail, these vernacular buildings echo the fanciful Art Déco and streamlined Art Moderne idioms associated with the cinemas of the period.

The Project site is immediately south of the **Park Square-Stuart Street** area, which has been determined eligible for listing in the National Register by the Massachusetts Historical Commission (MHC). Although the area failed to achieve this listing owing to the opposition of a majority of property owners, it is included in the Inventory of Historic and Archaeological Assets of the Commonwealth. Roughly bounded by Trinity Place, St. James Avenue, Clarendon, Boylston, and Stuart streets, Columbus Avenue, and Park Plaza, the Park Square-Stuart Street area has been described as an early twentieth-century extension of Boston's downtown business district. Its numerous high-rise structures were constructed on the sixteen-acre site of the former Boston & Providence Railroad yard. This land first became available for redevelopment following the construction of South Station in the late 1890s; hampered initially by the financial panic of 1907 and further delayed by the First World War, construction activity rapidly expanded throughout the booming 1920s. Stylistically, the monumental hotel and office buildings within the area represent variations on the Classical and Italian Renaissance Revival idioms popular at the time.

The Project site is located north of the **South End District and Landmark District**. The South End of Boston was developed predominately between 1848 and 1930. The neighborhood's oldest thoroughfare, Washington Street, was laid out on the original "neck" connecting Boston's originally peninsular landmass with the Roxbury mainland. The City of Boston eventually filled the tidal marshes lining Washington, and in 1848 began to auction off parcels to speculative developers. As a result of this initiative, the South End became one of the most fashionable residential neighborhoods of mid-nineteenth century Boston. Although its earliest buildings are conservative flat-fronted, gable-roofed Greek Revival rowhouses, the South End is better known for its harmonious blocks of speculator-built houses whose bow-fronted façades and mansard roofs reflect the later and more florid Italianate and Second Empire styles. Many of these line ornamental squares of varying proportions feature cast-iron fences and fountains. Despite changes in use and alterations to many of its buildings, the South End is today the largest remaining urban Victorian residential neighborhood in the U.S. East of its residential streets and adjacent to major rail lines, an industrial area dominated by warehouses and factory buildings was developed in the later nineteenth and early twentieth centuries; this is now a designated sub-district known as the South End Protection Area. Included in the National Register of Historic Places in 1973, the 600-acre South End attained local historic district status in 1983.

The Project site lies to the southeast of the **Back Bay Historic District and Architectural District,** which is bounded by Arlington Street to the east and Massachusetts Avenue and Charlesgate East to the west, Boylston Street to the south and the Charles River Esplanade to the north. Beginning in 1857 at Arlington Street, the area of land known as the Back Bay was created by filling in vast spans of tidal flats. Heavily influenced by the contemporary redevelopment of Paris under Napoleon III, the landfill operation was conceived on a rational gridded plan. This incorporated regular setbacks, minimum building heights and a public alley system to ensure a harmonious appearance. By the late 1880s, the marshy flats that once separated Boston and the neighboring town of Brookline had been completely filled in. The result was the creation of approximately 400 acres of dry, developable—and highly desirable–land. Attracting the interest of prosperous private individuals, churches and cultural institutions, the new area's appeal soon eclipsed that of the neighboring South End. Notable among its buildings are major residential, ecclesiastic and civic and institutional works by nationally significant architects, including H. H. Richardson, McKim, Mead & White, and Peabody & Stearns. Other architects of local and regional importance are also well represented. Aesthetically, these designs epitomize the Second Empire, Romanesque Revival, Queen Anne, Colonial Revival, and Classical Revival styles. The Back Bay Historic District is listed in the National Register. Enacted in 1966, the locally designated Back Bay Architectural District has similar boundaries to the National Register district established in 1973, but does not include properties on the south side of Boylston Street.

7.1.3 Archaeological Resources on the Project Site

The Project site is a previously developed urban parcel. As confirmed on October 25, 2016, there are no known archaeological resources listed in the State and National Registers of Historic Places or included in the Inventory within the Project site.

7.2 Impacts to Historic Resources

Potential urban design and shadow impacts of the new construction on nearby historic resources were considered and are summarized below.

7.2.1 Demolition of Historic Resources

In that the Project site is substantially vacant, no demolition of historic resources will be required to execute the Project. The only building to be demolished is an undistinguished and non-contributing gas station dating from the third quarter of the twentieth century. Its removal may be regarded as beneficial to the visual character of the district.

7.2.2 Urban Design

The proposed Project will be a dramatic and distinctive presence on the Back Bay skyline. Enjoying close proximity to the large-scale buildings of Stuart Street and Park Square, which span nearly a century in origin, its design relates to the aesthetic diversity of this evolving context. At the same time, the Project site's location within the boundaries of the Bay Village Historic District demands an approach that is respectful of that diminutively scaled environment. The proposed design addresses and resolves these potentially competing demands by creating a building that participates in the monumental commercial development of the Stuart Street corridor. At the same time, its very massing introduces a strong edge condition that screens the intimacy of Bay Village from the stark dissimilarities of Stuart Street and Park Square, mere footsteps away. Thus, whereas the existing vacant lot presents a visually porous edge condition that does nothing to advance the appearance of either area, the completed Project will provide a clear boundary that will benefit Bay Village and Stuart Street alike.

Accordingly, the design of the proposed Project responds to the large scale, rectilinear expression and monochromatic masonry palette of its Stuart Street neighbors. Moreover, it achieves this result in a re-interpretive, rather than imitative, fashion. In a complementary manner, its height of 199 feet introduces a welcome transition between the 167-foot height of The Arlington, at the southeast corner of Stuart and Arlington Streets, and the 226-foot height of the Revere Hotel, which stands immediately adjacent to the Project site at the southwest corner of Stuart Street and Charles Street South.

The design also takes advantage of a relatively modest building footprint to enhance its elegant and slender profile. Rather than being organized simply by the number of floor levels laid one upon another, the building's elevations are expressed inventively as a succession of horizontal stages or tiers. Numbering six at the north elevation (facing Stuart Street) and seven at the south (facing Shawmut Street), these tiers allow the building to relate to the dissimilar contexts of those streets while remaining a cohesive aesthetic composition. This effect is particularly evident at the south elevation, where the topmost tier (enclosing the mechanical penthouse) is set back to acknowledge the more modest scale of Bay Village. Angled piers occurring at staggered positions along each tier provide a corresponding vertical emphasis as well as a dynamic play of light and shade. This pier treatment serves not only to animate each individual elevation, but also to domesticate the building's overall scale relative to that of Bay Village.

There are no anticipated urban design impacts to any other historic resources within the vicinity of the Project site.

7.3 Shadow Impacts

A shadow impact analysis were conducted to demonstrate the anticipated impacts from the Project. These consisted of standard shadow studies done for March 21, June 21, September 21, and December 21 at 9:00 a.m., 12:00 p.m. and 3:00 p.m., as well as 6:00 p.m. for June 21 and September 21.

As discussed in Section 5.2, consistent with the previously approved project, the shadow analysis for the Project demonstrates that net new shadow is limited in extent and duration, and is typically cast across Stuart Street, Church Street and portions of Statler Park. With the exception of partial and transient patches of shadow cast on Shawmut Street and Cocoanut Grove Lane at 6:00 p.m. on June 21 and on the pedestrian plaza immediately to the west of the Project site, there are no other shadow impacts on the locally designated Bay Village Historic District. Similarly, there are no anticipated shadow impacts on other historic resources within a quarter-mile radius of the Project site.

The results of these shadow studies are included in Section 5.2 and shown in Figures 5.2-1 to 5.2-14.

7.4 Conclusion

The Project has been sensitively designed to be responsive to and harmonious with context. The building will have minimal impacts to the surrounding area, and in fact, will provide significant aesthetic appeal along the Stuart Street corridor and from Bay Village.

Chapter 8.0

Infrastructure

8.0 INFRASTRUCTURE

8.1 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
- Storm Drainage
- Natural gas
- Electricity
- Telecommunications

8.2 Wastewater

8.2.1 Existing Sewer System Infrastructure

The Boston Water and Sewer Commission (BWSC) currently maintains combined sewer mains and separate sewer mains in streets adjacent to the Project site.

There is a 12-inch combined sewer main in Stuart Street which flows in a westerly direction. The combined sewer connects to an existing sewer manhole at the corner of Stuart Street and Church Street, which connects to a large combined sewer flowing north in Church Street. There is an existing 24-inch sanitary sewer main that flows north through Church Street, and connects to the large combined sewer in Church Street. There is an existing 12-inch sanitary sewer main in Shawmut Street which flows west and connects to the 24-inch sanitary sewer main in Church Street, and discharges to the combined sewer flowing north in Church Street. The sewer flows ultimately go to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal.

The existing sewer system is illustrated in Figure 8-1.

8.2.2 Project Generated Sanitary Sewer Flow

The Project's sewage generation rates were estimated using 314 CMR 15.00 for the proposed building program. 314 CMR 15.00 lists typical sewage generation values for the proposed building use, as shown in Table 8-1. Typical generation values are conservative values for estimating the sewage flows from new construction. The proposed site will include one new approximately 190-bedroom apartment building, with an approximately 3,000 sf restaurant with approximately 173 seats. The existing site is comprised of a parking lot with a one bay service station.

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 wastewater flows of approximately 26,955 gallons per day, an increase of approximately 26,505 gallons per day.

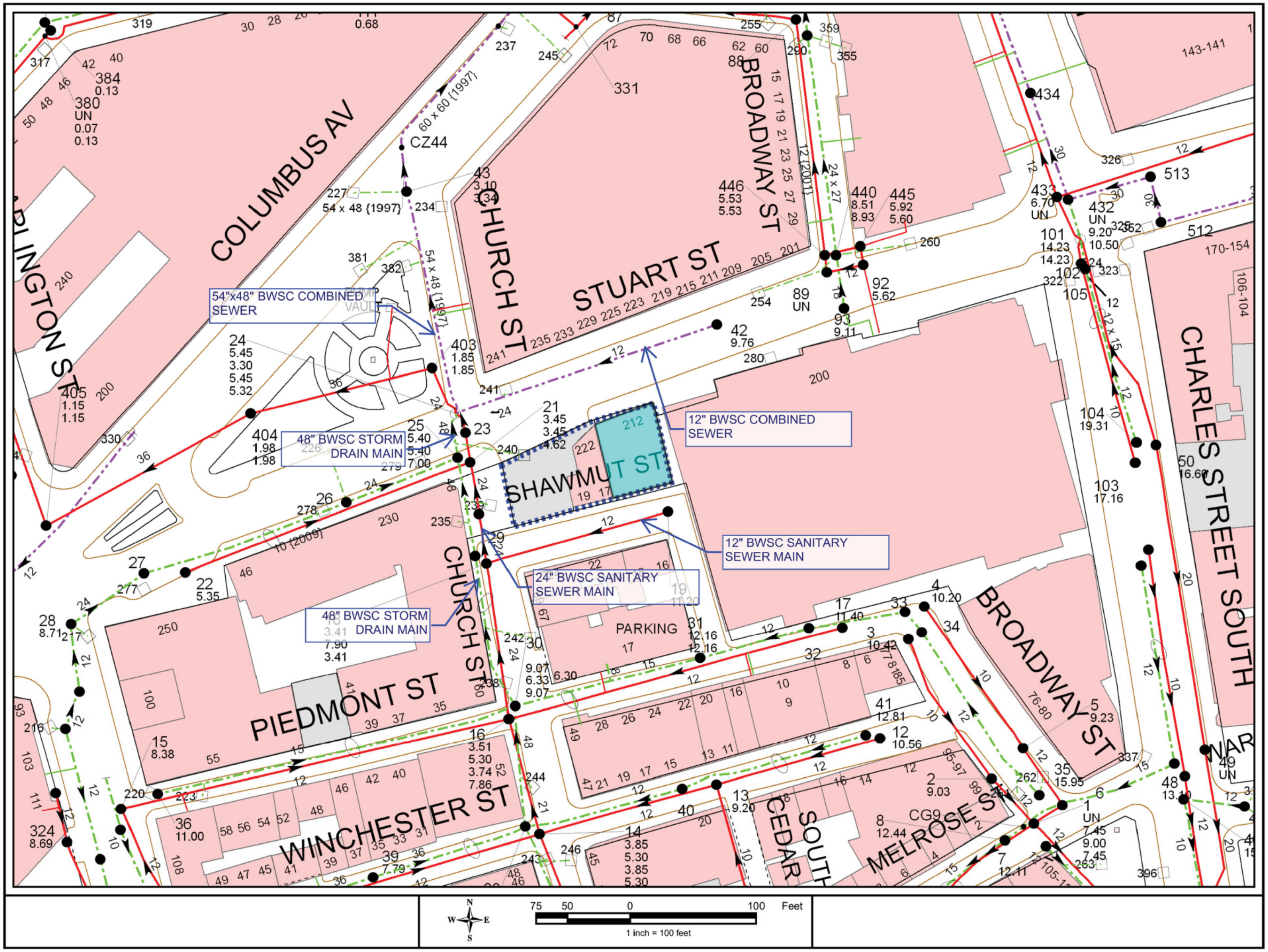
New sewer services resulting from the Project will connect to the existing sanitary sewer mains in Church Street or Shawmut Street, or the combined sewer in Stuart Street.

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 proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

The Project will contribute to MassDEP's Infiltration and Inflow Program. The fee will be based on the final sewer flows in gallons per day and will be paid to the BWSC prior to having their water account activated.

Table 8-1 Projected Wastewater Generation

Use	Size/Unit	314 CMR Value (gpd/unit)	Total Flow (gpd)
Existing Site			
Parking & Service Bay	1	450	450
	Total Existing Sewer Flows		**450**
Proposed Building (using average 314 CMR values)			
Residential Units	190 bedrooms	110/bedroom	20,900
Restaurant	173 Seats	35/Seat	6,055
		Total Proposed Sewer Flows	**26,955**
		Increase in Sewer Flows	**26,505 gpd**
			0.04 cfs



212 Stuart Street   Boston, Massachusetts

Nitsch Engineering

Figure 8-1

Existing Sewer System

8.2.3 *Sewage Capacity and Impacts*

The Project's impact on the existing BWSC systems in Stuart Street, Church Street and Shawmut Street were analyzed. The existing sewer system capacity calculations are presented in Table 8-2.

Table 8-2 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)
Stuart Street								
42 to 24	243	13.2	5.5	3.2%	12	0.013	6.34	4.10
Shawmut Street								
19 to 18	143	11.2	6.1	3.6%	12	0.013	6.73	4.35
Church Street								
18 to 29	39	3.6	3.3	0.8%	24	0.013	19.84	12.82
29 to 21	32	3.3	3.1	0.6%	24	0.013	17.88	11.56
21 to 23	33	3.1	3.0	0.3%	24	0.013	12.45	8.05

Note: 1. Manhole numbers taken from BWSC Sewer system GIS Map and the 'Existing Conditions Plan, 212-222 Stua Shawmut Street, Boston, Mass.' Prepared by Feldman Land Surveyors dated August 8, 2016.
2. Flow Calculations based on Manning's Equation

8.3 Water Supply

8.3.1 *Existing Water System 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 Shawmut Street and Church Street.

There is a 16-inch southern low water main in Church Street, and an 8-inch southern low water main in Shawmut Street.

The existing water system is illustrated in Figure 8-2.

8.3.2 *Anticipated Water Consumption*

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, 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 29,651 gallons per day or 3,964 cubic feet per day.

8.3.3 *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 8-3.

Table 8-3 Existing Hydrant Flow Data

Flow Hydrant Number	Date of Test	Static Pressure (psi)	Residual Pressure (psi)	Total Flow (gpm)
H152	9/21/13	68	66	2004

Note: Data provided by BWSC on November 7, 2016

8.3.4 *Proposed Project*

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

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

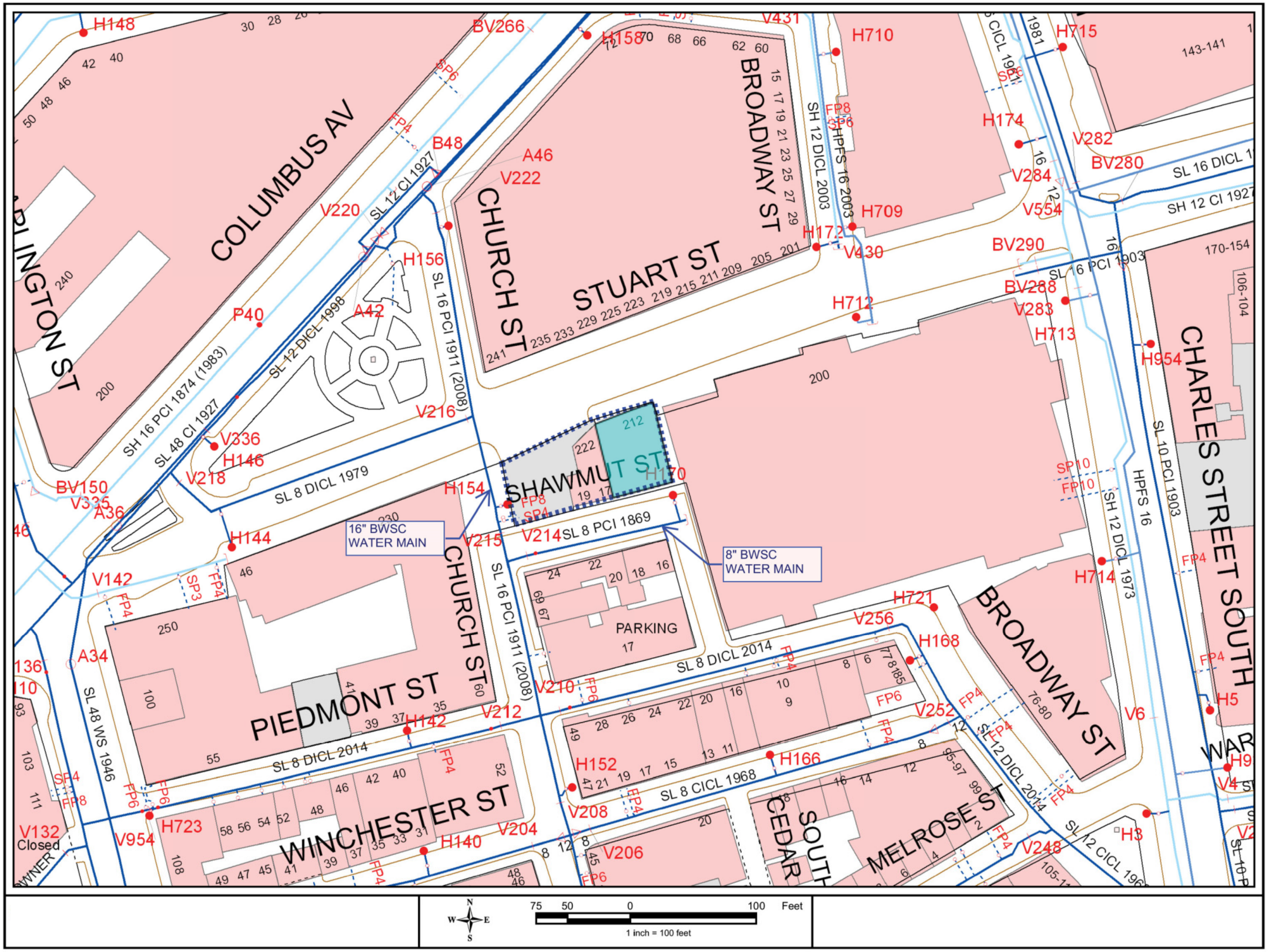
The domestic and fire protection water service connections required for the Project will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's 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 fire department 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 meters will be installed with Meter Transmitter Units (MTU's) as part of the BWSC's Automatic Meter Reading (AMR) system.

8.3.5 *Proposed Impacts*

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



212 Stuart Street Boston, Massachusetts

Nitsch Engineering

Figure 8-2

Existing Water System

8.4 Storm Drainage System

8.4.1 Existing Storm Drainage System

There is an existing combined sewer in Stuart Street as previously described in Section 8.2.1. The combined sewer in Stuart Street connects to an existing sewer manhole at the corner of Stuart Street and Church Street, which connects to the large combined sewer which flows north in Church Street. There is an existing 48-inch separate storm drain in Church Street which flows north and connects to the large combined sewer. The existing catch basins in Shawmut Street and Church Street connect to the existing 48-inch storm drain main in Church Street.

The existing BWSC storm drain system is illustrated in Figure 8-1.

8.4.2 Proposed Storm Drainage System

The existing site is comprised of a bituminous concrete parking lot, drive aisle and parking service station. The Project will meet or reduce the existing peak rates and volumes of runoff from the site, and promote recharge to the greatest extent possible.

The Project will mitigate one-inch of stormwater runoff from impervious areas 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. Recharge wells will also be investigated. 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.

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.

8.4.3 Water Quality Impacts

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.

8.4.4 Groundwater Conservation Overlay District

The BPDA oversees proposed projects within the Groundwater Conservation Overlay District (GCOD) under Article 32. The Project parcel is located within the 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 rainwater into the ground by capturing within a suitably-designed system a volume of rainfall on the lot equivalent to no less than one-inch across that portion of the surface area of the lot to be occupied by the Project. The Project will result in no negative impact on groundwater levels within the lot in question or adjacent lots, subject to the terms of any (i) dewatering permit or (ii) cooperation agreement entered into by the Proponent and the BPDA, to the extent that such agreement provides standards for groundwater protection during construction.

8.4.5 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.

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.

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 environmentally 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.

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.

The proposed design will comply with this standard to the maximum extent practicable. Within the Project's limit of work, there will be mostly building roof. Runoff from roof and other 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.*

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.

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.

The proposed design is a redevelopment. The Project will comply with Standard 2, 3, 4, 5, and 6 to the maximum extent practicable.

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.

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.

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

Standard 10: Illicit discharges to the Stormwater Management System are prohibited.

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

8.5 Electrical Service

Electrical service will be coordinated with the utility company. The estimated electric service is in the range of 1200 KW (1600 to 2000 AMPS) and will be coordinated with Eversource.

8.6 Telecommunications Systems

Telephone and telecommunication services will be provided. Closets will be located on each level. Telephone and telecommunications services, including cable TV will be coordinated with Verizon and Xfinity/Comcast.

8.7 Gas Systems

Natural gas service will be coordinated with the utility company. The gas will be utilized for heating of the building, production of domestic hot water, and possibly for cooking purposes. The estimated gas service will be in the range of 4,000 to 4,500 CFH.

8.8 Utility Protection 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.

Chapter 9.0

Coordination With Other Governmental Agencies

9.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

9.1 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 F for the Accessibility Checklist.

9.2 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.

9.3 Massachusetts Historical Commission

At this time, no state or federal funding, licensing, permits and/or approvals requiring review by the Massachusetts Historical Commission (MHC) are anticipated. However, if a state or federal action is identified as required for the Project, a MHC 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).

9.4 Boston Civic Design Commission

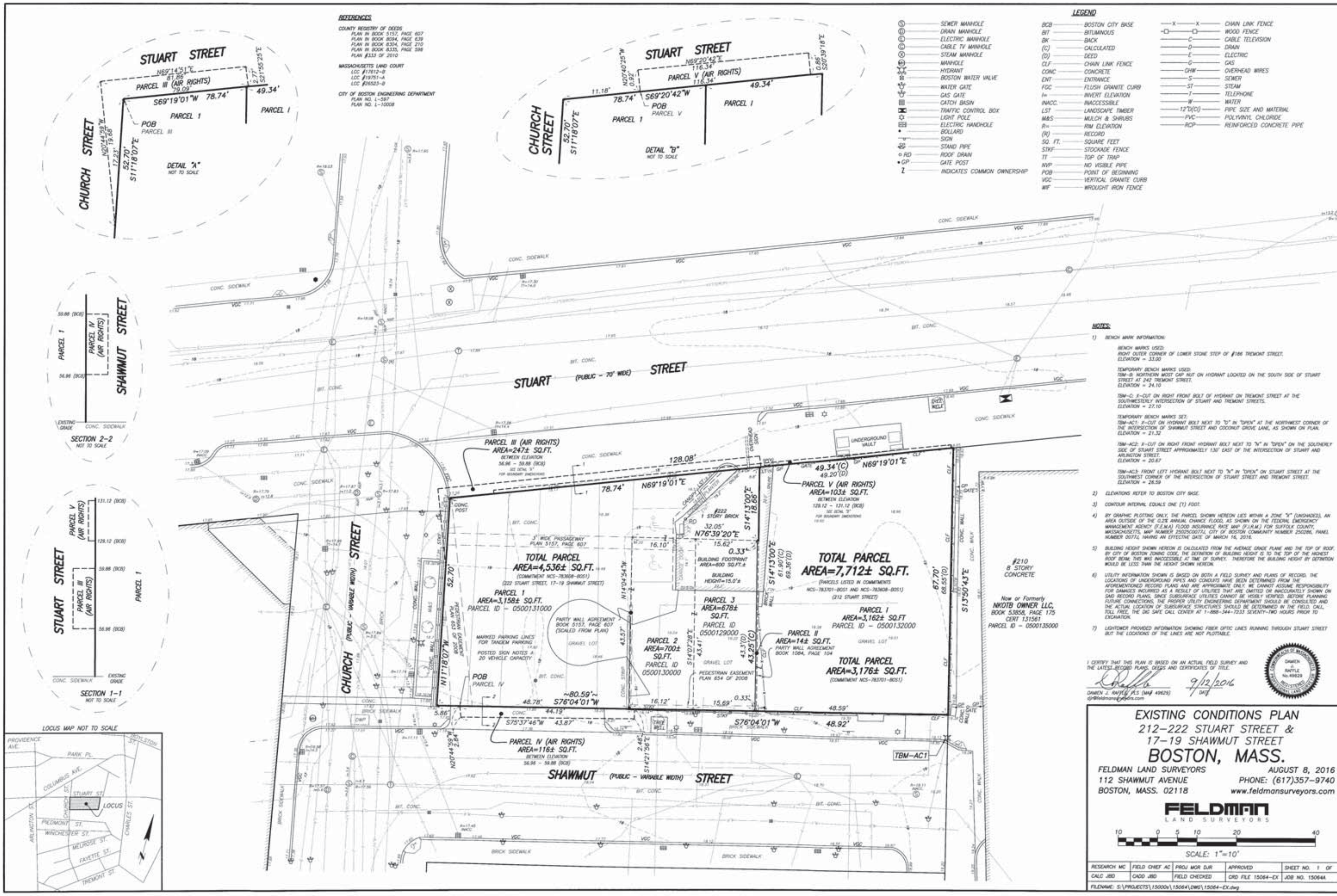
The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BPDA as part of the Article 80 process.

9.5 Bay Village Historic District Commission

The regulatory purview of the Bay Village Historic District Commission (BVHDC) extends to all exterior work within the district which is visible from the public way. Thus, the BVHDC will have jurisdiction over the demolition of the former gas station now in place and design review authority over the new construction proposed for the cleared site. An application for Certificate of Appropriateness will be sought from the BVHDC at the appropriate time.

Appendix A

Site Survey


REFERENCES
COUNTY REGISTRY OF DEEDS
PLAN IN BOOK 5157, PAGE 607
PLAN IN BOOK 8094, PAGE 639
PLAN IN BOOK 8304, PAGE 210
PLAN IN BOOK 8335, PAGE 598
PLAN #333 OF 2010
MASSACHUSETTS LAND COURT
LCC #17612-B
LCC #19751-A
LCC #26523-B
CITY OF BOSTON ENGINEERING DEPARTMENT
PLAN NO. L-597
PLAN NO. L-10008
LEGEND
SEWER MANHOLE
DRAIN MANHOLE
ELECTRIC MANHOLE
CABLE TV MANHOLE
STEAM MANHOLE
MANHOLE
HYDRANT
BOSTON WATER VALVE
WATER GATE
GAS GATE
CATCH BASIN
TRAFFIC CONTROL BOX
LIGHT POLE
ELECTRIC HANDHOLE
BOLLARD
SIGN
STAND PIPE
RD ROOF DRAIN
GP GATE POST
INDICATES COMMON OWNERSHIP
BCB BOSTON CITY BASE
BIT BITUMINOUS
BK BACK
(C) CALCULATED
(D) DEED
CLF CHAIN LINK FENCE
CONC CONCRETE
ENT ENTRANCE
FGC FLUSH GRANITE CURB
I= INVERT ELEVATION
INACC. INACCESSIBLE
LST LANDSCAPE TIMBER
M&S MULCH & SHRUBS
R= RIM ELEVATION
(R) RECORD
SQ. FT. SQUARE FEET
STKF STOCKADE FENCE
TT TOP OF TRAP
NVP NO VISIBLE PIPE
POB POINT OF BEGINNING
VGC VERTICAL GRANITE CURB
WIF WROUGHT IRON FENCE
X X CHAIN LINK FENCE
WOOD FENCE
C CABLE TELEVISION
D DRAIN
E ELECTRIC
G GAS
OHW OVERHEAD WIRES
S SEWER
ST STEAM
T TELEPHONE
W WATER
12"D(CI) PIPE SIZE AND MATERIAL
PVC POLYVINYL CHLORIDE
RCP REINFORCED CONCRETE PIPE
STUART STREET
N69°14'51"E 81.86'
PARCEL III (AIR RIGHTS)
79.09'
S69°19'01"W 78.74'
49.34'
PARCEL 1
PARCEL I
POB PARCEL III
CHURCH STREET
DETAIL "A" NOT TO SCALE
STUART STREET
N69°20'42"E 116.34'
PARCEL V (AIR RIGHTS)
S69°20'42"W
POB PARCEL V
CHURCH STREET
DETAIL "B" NOT TO SCALE
PARCEL IV (AIR RIGHTS)
SHAWMUT STREET
SECTION 2-2 NOT TO SCALE
STUART STREET
PARCEL V (AIR RIGHTS)
PARCEL III (AIR RIGHTS)
SECTION 1-1 NOT TO SCALE
STUART (PUBLIC - 70' WIDE) STREET
CONC. SIDEWALK
BIT. CONC.
PARCEL III (AIR RIGHTS) AREA=247± SQ.FT.
128.08'
N69°19'01"E
PARCEL V (AIR RIGHTS) AREA=103± SQ.FT.
UNDERGROUND VAULT
#222 1 STORY BRICK
32.05' N76°39'20"E
BUILDING FOOTPRINT AREA=800 SQ.FT.±
BUILDING HEIGHT=15.0'±
3' WIDE PASSAGEWAY PLAN 5157, PAGE 607
TOTAL PARCEL AREA=4,536± SQ.FT.
(COMMITMENT NCS-783608-BOS1)
(222 STUART STREET, 17-19 SHAWMUT STREET)
PARCEL 1 AREA=3,158± SQ.FT. PARCEL ID - 0500131000
TOTAL PARCEL AREA=7,712± SQ.FT.
(PARCELS LISTED IN COMMITMENTS NCS-783701-BOS1 AND NCS-783608-BOS1)
(212 STUART STREET)
PARCEL I AREA=3,162± SQ.FT PARCEL ID - 0500132000
PARCEL 2 AREA=700± SQ.FT. PARCEL ID 0500130000
PARCEL 3 AREA=678± SQ.FT. PARCEL ID 0500129000
PARCEL II AREA=14± SQ.FT. PARTY WALL AGREEMENT BOOK 1084, PAGE 104
TOTAL PARCEL AREA=3,176± SQ.FT. (COMMITMENT NCS-783701-BOS1)
PARTY WALL AGREEMENT BOOK 5157, PAGE 607 (SCALED FROM PLAN)
MARKED PARKING LINES FOR TANDEM PARKING
POSTED SIGN NOTES A 20 VEHICLE CAPACITY
GRAVEL LOT
PEDESTRIAN EASEMENT PLAN 654 OF 2008
CHURCH (PUBLIC - VARIABLE WIDTH) STREET
N11°18'07"W 52.70'
POB PARCEL IV
~80.59'~ S76°04'01"W
S75°37'46"W 43.87'
S76°04'01"W 48.92'
#210 8 STORY CONCRETE
Now or Formerly NKOTB OWNER LLC, BOOK 53858, PAGE 175 CERT 131561 PARCEL ID - 0500135000
PARCEL IV (AIR RIGHTS) AREA=116± SQ.FT.
SHAWMUT (PUBLIC - VARIABLE WIDTH) STREET
TBM-AC1
BRICK SIDEWALK
LOCUS MAP NOT TO SCALE
PROVIDENCE AVE.
PARK PL.
COLUMBUS AVE.
STUART ST.
LOCUS
PIEDMONT ST.
WINCHESTER ST.
MELROSE ST.
FAYETTE ST.
TREMONT ST.
ARLINGTON ST.
CHARLES ST.
NOTES:
1) BENCH MARK INFORMATION:
BENCH MARKS USED:
RIGHT OUTER CORNER OF LOWER STONE STEP OF #186 TREMONT STREET.
ELEVATION = 33.00
TEMPORARY BENCH MARKS USED:
TBM-B: NORTHERN MOST CAP NUT ON HYDRANT LOCATED ON THE SOUTH SIDE OF STUART STREET AT 242 TREMONT STREET.
ELEVATION = 24.10
TBM-C: X-CUT ON RIGHT FRONT BOLT OF HYDRANT ON TREMONT STREET AT THE SOUTHWESTERLY INTERSECTION OF STUART AND TREMONT STREETS.
ELEVATION = 27.10
TEMPORARY BENCH MARKS SET:
TBM-AC1: X-CUT ON HYDRANT BOLT NEXT TO "O" IN "OPEN" AT THE NORTHWEST CORNER OF THE INTERSECTION OF SHAWMUT STREET AND COCONUT GROVE LANE, AS SHOWN ON PLAN.
ELEVATION = 21.32
TBM-AC2: X-CUT ON RIGHT FRONT HYDRANT BOLT NEXT TO "N" IN "OPEN" ON THE SOUTHERLY SIDE OF STUART STREET APPROXIMATELY 130' EAST OF THE INTERSECTION OF STUART AND ARLINGTON STREET.
ELEVATION = 20.67
TBM-AC3: FRONT LEFT HYDRANT BOLT NEXT TO "N" IN "OPEN" ON STUART STREET AT THE SOUTHWEST CORNER OF THE INTERSECTION OF STUART STREET AND TREMONT STREET.
ELEVATION = 28.59
2) ELEVATIONS REFER TO BOSTON CITY BASE.
3) CONTOUR INTERVAL EQUALS ONE (1) FOOT.
4) BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0077J, CITY OF BOSTON COMMUNITY NUMBER 250286, PANEL NUMBER 0077J, HAVING AN EFFECTIVE DATE OF MARCH 16, 2016.
5) BUILDING HEIGHT SHOWN HEREON IS CALCULATED FROM THE AVERAGE GRADE PLANE AND THE TOP OF ROOF. BY CITY OF BOSTON ZONING CODE, THE DEFINITION OF BUILDING HEIGHT IS TO THE TOP OF THE HIGHEST ROOF BEAM; THIS WAS INACCESSIBLE AT TIME OF SURVEY. THEREFORE THE BUILDING HEIGHT BY DEFINITION WOULD BE LESS THAN THE HEIGHT SHOWN HEREON.
6) UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS. SINCE SUBSURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1-888-344-7233 SEVENTY-TWO HOURS PRIOR TO EXCAVATION.
7) LIGHTOWER PROVIDED INFORMATION SHOWING FIBER OPTIC LINES RUNNING THROUGH STUART STREET BUT THE LOCATIONS OF THE LINES ARE NOT PLOTTABLE.
I CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY AND THE LATEST RECORD PLANS, DEEDS AND CERTIFICATES OF TITLE.
9/12/2016
DAMEN J. RAFFLE, PLS (MA# 49629)
DATE
DAMEN J. RAFFLE No. 49629
EXISTING CONDITIONS PLAN
212-222 STUART STREET &
17-19 SHAWMUT STREET
BOSTON, MASS.
FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE
BOSTON, MASS. 02118
AUGUST 8, 2016
PHONE: (617)357-9740
www.feldmansurveyors.com
FELDMAN LAND SURVEYORS
10 0 5 10 20 40
SCALE: 1"=10'
RESEARCH MC
FIELD CHIEF AC
PROJ MGR DJR
APPROVED
SHEET NO. 1 OF 1
CALC JBD
CADD JBD
FIELD CHECKED
CRD FILE 15064-EX
JOB NO. 15064A
FILENAME: S:\PROJECTS\15000s\15064\DWG\15064-EX.dwg

Appendix B

Transportation

Transportation Appendix is Available Upon Request

Appendix C

Wind

Table 1: Pedestrian Wind Comfort and Safety 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	9		Sitting	15		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	7	-12%	Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10	11%	Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
2	A	Spring	10		Sitting	17		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	7	-30%	Sitting	12	-29%	Acceptable
		Summer	5	-44%	Sitting	9	-40%	Acceptable
		Fall	7	-30%	Sitting	12	-29%	Acceptable
		Winter	8	-27%	Sitting	13	-28%	Acceptable
		Annual	7	-30%	Sitting	12	-29%	Acceptable
3	A	Spring	12		Sitting	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	21	11%	Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	12		Sitting	20	11%	Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	20		Acceptable
4	A	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	17	89%	Walking	23	53%	Acceptable
		Summer	15	88%	Standing	19	36%	Acceptable
		Fall	16	78%	Walking	21	40%	Acceptable
		Winter	17	70%	Walking	22	38%	Acceptable
		Annual	16	78%	Walking	21	40%	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: Pedestrian Wind Comfort and Safety 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	7		Sitting	12		Acceptable
		Summer	6		Sitting	11		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	12	71%	Sitting	18	50%	Acceptable
		Summer	9	50%	Sitting	14	27%	Acceptable
		Fall	11	57%	Sitting	17	42%	Acceptable
		Winter	13	62%	Standing	19	46%	Acceptable
		Annual	12	71%	Sitting	17	42%	Acceptable
6	A	Spring	11		Sitting	18		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	7	-36%	Sitting	11	-39%	Acceptable
		Summer	6	-45%	Sitting	10	-41%	Acceptable
		Fall	7	-36%	Sitting	11	-39%	Acceptable
		Winter	7	-42%	Sitting	12	-37%	Acceptable
		Annual	7	-36%	Sitting	11	-39%	Acceptable
7	A	Spring	12		Sitting	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	8	-33%	Sitting	13	-32%	Acceptable
		Summer	7	-36%	Sitting	12	-29%	Acceptable
		Fall	8	-33%	Sitting	12	-33%	Acceptable
		Winter	8	-33%	Sitting	13	-32%	Acceptable
		Annual	8	-33%	Sitting	13	-28%	Acceptable
8	A	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	17	89%	Walking	24	60%	Acceptable
		Summer	13	62%	Standing	18	38%	Acceptable
		Fall	17	89%	Walking	23	64%	Acceptable
		Winter	18	100%	Walking	26	73%	Acceptable
		Annual	17	89%	Walking	24	71%	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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety 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	11		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	13	18%	Standing	21	17%	Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13	18%	Standing	20	18%	Acceptable
		Winter	14	27%	Standing	22	22%	Acceptable
		Annual	12		Sitting	20	18%	Acceptable
10	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	14		Standing	21	11%	Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	20	18%	Acceptable
		Winter	14	17%	Standing	21	17%	Acceptable
		Annual	14	17%	Standing	20	11%	Acceptable
11	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	21	11%	Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20	11%	Acceptable
		Winter	14		Standing	22	16%	Acceptable
		Annual	13		Standing	20	11%	Acceptable
12	A	Spring	8		Sitting	13		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	13		Acceptable
	B	Spring	10	25%	Sitting	16	23%	Acceptable
		Summer	7		Sitting	13	18%	Acceptable
		Fall	9	29%	Sitting	15	25%	Acceptable
		Winter	11	38%	Sitting	18	38%	Acceptable
		Annual	10	43%	Sitting	16	23%	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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety 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	9		Sitting	14		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	8		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	10	11%	Sitting	16	14%	Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	10	25%	Sitting	15	15%	Acceptable
		Winter	11	38%	Sitting	17	21%	Acceptable
		Annual	10	25%	Sitting	15	15%	Acceptable
14	A	Spring	13		Standing	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
15	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	14		Acceptable
	B	Spring	8	-11%	Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	13		Acceptable
16	A	Spring	18		Walking	25		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	17		Walking	23		Acceptable
	B	Spring	20	11%	Uncomfortable	26		Acceptable
		Summer	17	13%	Walking	21		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	18		Walking	24		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety 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	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
18	A	Spring	13		Standing	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
19	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
20	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		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.

<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: Pedestrian Wind Comfort and Safety 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	16		Walking	24		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	21		Acceptable
22	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
23	A	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
24	A	Spring	15		Standing	22		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		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.

<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: Pedestrian Wind Comfort and Safety 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	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
26	A	Spring	14		Standing	20		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	11	-21%	Sitting	19		Acceptable
		Summer	10	-17%	Sitting	15	-12%	Acceptable
		Fall	10	-17%	Sitting	17	-11%	Acceptable
		Winter	10	-17%	Sitting	17	-11%	Acceptable
		Annual	10	-23%	Sitting	17	-11%	Acceptable
27	A	Spring	8		Sitting	14		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	8		Sitting	14		Acceptable
		Summer	7	17%	Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	14		Acceptable
28	A	Spring	15		Standing	21		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	11	-27%	Sitting	17	-19%	Acceptable
		Summer	9	-31%	Sitting	14	-22%	Acceptable
		Fall	10	-29%	Sitting	16	-16%	Acceptable
		Winter	11	-21%	Sitting	17	-15%	Acceptable
		Annual	10	-29%	Sitting	16	-20%	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: Pedestrian Wind Comfort and Safety 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	10		Sitting	16		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	14	40%	Standing	21	31%	Acceptable
		Summer	10	11%	Sitting	15	15%	Acceptable
		Fall	14	40%	Standing	20	33%	Acceptable
		Winter	16	60%	Walking	23	44%	Acceptable
		Annual	14	40%	Standing	20	33%	Acceptable
30	A	Spring	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	11		Sitting	17	13%	Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10	11%	Sitting	16	14%	Acceptable
		Winter	12	33%	Sitting	18	20%	Acceptable
		Annual	11	22%	Sitting	16	14%	Acceptable
31	A	Spring	8		Sitting	13		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	8		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	8		Sitting	12		Acceptable
	B	Spring	10	25%	Sitting	16	23%	Acceptable
		Summer	7	17%	Sitting	12	20%	Acceptable
		Fall	10	25%	Sitting	15	25%	Acceptable
		Winter	11	38%	Sitting	17	31%	Acceptable
		Annual	10	25%	Sitting	15	25%	Acceptable
32	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	7	-22%	Sitting	12	-14%	Acceptable
		Summer	6	-14%	Sitting	9	-18%	Acceptable
		Fall	7	-22%	Sitting	12	-14%	Acceptable
		Winter	8	-20%	Sitting	13	-13%	Acceptable
		Annual	7	-22%	Sitting	12	-14%	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: Pedestrian Wind Comfort and Safety 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	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	7	-30%	Sitting	12	-20%	Acceptable
		Summer	6	-25%	Sitting	9	-25%	Acceptable
		Fall	7	-22%	Sitting	11	-27%	Acceptable
		Winter	7	-30%	Sitting	12	-25%	Acceptable
		Annual	7	-22%	Sitting	11	-27%	Acceptable
34	A	Spring	8		Sitting	14		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	7	-12%	Sitting	13		Acceptable
		Summer	6	-14%	Sitting	11		Acceptable
		Fall	7	-12%	Sitting	12		Acceptable
		Winter	7	-12%	Sitting	12		Acceptable
		Annual	7	-12%	Sitting	12		Acceptable
35	A	Spring	12		Sitting	19		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	18		Acceptable
36	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	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.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety 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	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	15		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
38	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	19		Acceptable
		Annual	10		Sitting	17		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	16		Acceptable
39	A	Spring	8		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	7	-12%	Sitting	12		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
40	A	Spring	8		Sitting	13		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	6	-25%	Sitting	11	-15%	Acceptable
		Summer	5	-17%	Sitting	9		Acceptable
		Fall	6	-14%	Sitting	10	-17%	Acceptable
		Winter	7	-12%	Sitting	11	-15%	Acceptable
		Annual	6	-14%	Sitting	10	-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.

<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: Pedestrian Wind Comfort and Safety 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	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	8	-11%	Sitting	13	-13%	Acceptable
		Summer	6	-14%	Sitting	11		Acceptable
		Fall	7	-12%	Sitting	13		Acceptable
		Winter	8	-11%	Sitting	14	-12%	Acceptable
		Annual	8	-11%	Sitting	13	-13%	Acceptable
42	A	Spring	8		Sitting	13		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	7	-12%	Sitting	11	-15%	Acceptable
		Summer	5	-17%	Sitting	9		Acceptable
		Fall	6	-14%	Sitting	11		Acceptable
		Winter	7	-12%	Sitting	12		Acceptable
		Annual	7		Sitting	11		Acceptable
43	A	Spring	9		Sitting	13		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	6	-33%	Sitting	11	-15%	Acceptable
		Summer	5	-29%	Sitting	9	-18%	Acceptable
		Fall	6	-25%	Sitting	11	-15%	Acceptable
		Winter	7	-22%	Sitting	12	-20%	Acceptable
		Annual	6	-25%	Sitting	11	-15%	Acceptable
44	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	8	-20%	Sitting	13	-19%	Acceptable
		Summer	7	-12%	Sitting	11	-15%	Acceptable
		Fall	8	-11%	Sitting	13	-13%	Acceptable
		Winter	8	-20%	Sitting	14	-18%	Acceptable
		Annual	8	-20%	Sitting	13	-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.

<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: Pedestrian Wind Comfort and Safety 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	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
46	A	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	8	-11%	Sitting	14		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	8	-11%	Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8	-11%	Sitting	14		Acceptable
47	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	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
48	A	Spring	18		Walking	26		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		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: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
49	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
50	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
51	A	Spring	10		Sitting	17		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	10		Sitting	17		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	16		Acceptable
52	A	Spring	8		Sitting	13		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	7	-12%	Sitting	12		Acceptable
		Summer	6	-14%	Sitting	10		Acceptable
		Fall	7	-12%	Sitting	11		Acceptable
		Winter	7	-12%	Sitting	12		Acceptable
		Annual	7	-12%	Sitting	12		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
53	A	Spring	8		Sitting	13		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	7	-12%	Sitting	11	-15%	Acceptable
		Summer	5	-29%	Sitting	9	-18%	Acceptable
		Fall	6	-14%	Sitting	11		Acceptable
		Winter	7	-12%	Sitting	11	-15%	Acceptable
		Annual	6	-14%	Sitting	11		Acceptable
54	A	Spring	10		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	9		Sitting	16		Acceptable
		Summer	8		Sitting	14	17%	Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	9		Sitting	16	14%	Acceptable
		Annual	9		Sitting	15		Acceptable
55	A	Spring	9		Sitting	15		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	7	-22%	Sitting	13	-13%	Acceptable
		Summer	6	-25%	Sitting	11		Acceptable
		Fall	7	-22%	Sitting	12	-14%	Acceptable
		Winter	8	-11%	Sitting	13	-13%	Acceptable
		Annual	7	-22%	Sitting	12	-14%	Acceptable
56	A	Spring	10		Sitting	16		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	10		Sitting	15		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	11		Sitting	19	19%	Acceptable
		Summer	9		Sitting	16	23%	Acceptable
		Fall	11		Sitting	18	20%	Acceptable
		Winter	12	20%	Sitting	19	27%	Acceptable
		Annual	11		Sitting	18	20%	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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
57	A	Spring	8		Sitting	14		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	14		Acceptable
	B	Spring	10	25%	Sitting	17	21%	Acceptable
		Summer	9	29%	Sitting	15	25%	Acceptable
		Fall	10	25%	Sitting	16	23%	Acceptable
		Winter	11	22%	Sitting	17	21%	Acceptable
		Annual	10	25%	Sitting	16	14%	Acceptable
58	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	8	14%	Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10	11%	Sitting	16	14%	Acceptable
		Annual	9		Sitting	15		Acceptable
59	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	16	14%	Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15	15%	Standing	22	16%	Acceptable
		Winter	18	29%	Walking	25	25%	Acceptable
		Annual	16	14%	Walking	23	15%	Acceptable
60	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		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: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
61	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10	11%	Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable
62	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
63	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	12	33%	Sitting	19	27%	Acceptable
		Summer	10	43%	Sitting	15	25%	Acceptable
		Fall	12	33%	Sitting	18	29%	Acceptable
		Winter	13	44%	Standing	20	33%	Acceptable
		Annual	12	33%	Sitting	19	36%	Acceptable
64	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10	11%	Sitting	15		Acceptable
		Fall	12	20%	Sitting	19	19%	Acceptable
		Winter	13	18%	Standing	20	11%	Acceptable
		Annual	12		Sitting	19	12%	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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
65	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	13	18%	Standing	20	11%	Acceptable
		Summer	10	11%	Sitting	15		Acceptable
		Fall	13	18%	Standing	19	12%	Acceptable
		Winter	14	17%	Standing	21	17%	Acceptable
		Annual	13	18%	Standing	19	12%	Acceptable
66	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19	12%	Acceptable
		Winter	13	18%	Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
67	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
68	A	Spring	18		Walking	25		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	17		Walking	23		Acceptable
	B	Spring	20	11%	Uncomfortable	26		Acceptable
		Summer	17		Walking	22		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	19	12%	Walking	25		Acceptable
		Annual	18		Walking	24		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
69	A	Spring	19		Walking	26		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	20		Uncomfortable	26		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	18		Walking	25		Acceptable
70	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	19		Acceptable
71	A	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
72	A	Spring	13		Standing	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		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.

<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: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
73	A	Spring	20		Uncomfortable	26		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	18		Walking	24		Acceptable
74	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
75	A	Spring	14		Standing	22		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
76	A	Spring	13		Standing	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10	11%	Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
77	A	Spring	16		Walking	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	17		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	22		Acceptable
78	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	17		Walking	23		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	22		Acceptable
79	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
80	A	Spring	17		Walking	24		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	13	-24%	Standing	21	-12%	Acceptable
		Summer	12	-20%	Sitting	17	-19%	Acceptable
		Fall	13	-19%	Standing	20	-13%	Acceptable
		Winter	14	-18%	Standing	23		Acceptable
		Annual	13	-19%	Standing	21		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
85	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12		Sitting	18	-14%	Acceptable
		Summer	10		Sitting	15	-12%	Acceptable
		Fall	11	-15%	Sitting	17	-11%	Acceptable
		Winter	12	-14%	Sitting	18	-14%	Acceptable
		Annual	12		Sitting	17	-15%	Acceptable
86	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	9	-18%	Sitting	15		Acceptable
		Winter	10	-23%	Sitting	17	-11%	Acceptable
		Annual	9	-18%	Sitting	15	-12%	Acceptable
87	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	15	15%	Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	15	25%	Standing	21	11%	Acceptable
		Winter	17	21%	Walking	24	20%	Acceptable
		Annual	15	15%	Standing	22	16%	Acceptable
88	A	Spring	7		Sitting	12		Acceptable
		Summer	6		Sitting	9		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	7		Sitting	12		Acceptable
		Annual	7		Sitting	11		Acceptable
	B	Spring	6	-14%	Sitting	11		Acceptable
		Summer	5	-17%	Sitting	9		Acceptable
		Fall	6	-14%	Sitting	10		Acceptable
		Winter	6	-14%	Sitting	11		Acceptable
		Annual	6	-14%	Sitting	10		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

CONSULTING ENGINEERS & SCIENTISTS

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
89	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	15	15%	Standing	22		Acceptable
		Summer	12	20%	Sitting	17	13%	Acceptable
		Fall	15	15%	Standing	21	11%	Acceptable
		Winter	15	15%	Standing	22		Acceptable
		Annual	14		Standing	21	11%	Acceptable
90	A	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
91	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	10	-17%	Sitting	17		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	19		Acceptable
		Annual	10		Sitting	17		Acceptable
92	A	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	18		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		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	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
93	A	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	17	-11%	Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	17		Walking	23		Acceptable
94	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	24		Acceptable
95	A	Spring	15		Standing	22		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	15		Standing	20		Acceptable
		Winter	16		Walking	22		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	17	13%	Walking	24		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	23		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.

<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

Appendix D

Air Quality

APPENDIX D AIR QUALITY

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2016 and 2023 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2016	2023
Free Flow	30 mph	2.697	1.844
Right Turns	10 mph	4.447	2.956
Left Turns	15 mph	3.823	2.586
Queues	Idle	9.997	4.102

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 321 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 30 mph were used for right turn, left turn, and free flow links, respectively.

Harvard Science Building
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2013	2014	2015	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2013-2015 Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(5)	1-Hour (4)	99th %	12.2	9.7	5.5	ppb	2.62	23.9	Kenmore Sq., Boston
	3-Hour (6)	H2H	13.9	9.4	4.4	ppb	2.62	36.4	Kenmore Sq., Boston
	24-Hour	H2H	6	5	2.9	ppb	2.62	15.7	Kenmore Sq., Boston
	Annual	H	1.0	0.9	0.5	ppb	2.62	2.7	Kenmore Sq., Boston
PM-10	24-Hour	H2H	50	53	30	$\mu g/m^3$	1	53	Kenmore Sq., Boston
	Annual	H	19.3	15.0	14.9	$\mu g/m^3$	1	19.3	Kenmore Sq., Boston
PM-2.5	24-Hour (4)	98th %	17.5	14.6	14.5	$\mu g/m^3$	1	15.5	Kenmore Sq., Boston
	Annual (4)	H	8.0	6.1	6.5	$\mu g/m^3$	1	6.8	Kenmore Sq., Boston
NO_2 (3)	1-Hour (4)	98th %	49	49	56	ppb	1.88	96.5	Kenmore Sq., Boston
	Annual	H	17.8	17.2	17.3	ppb	1.88	33.4	Kenmore Sq., Boston
CO (2)	1-Hour	H2H	1.3	1.3	0.4	ppm	1146	1489.8	Kenmore Sq., Boston
	8-Hour	H2H	1.0	1.1	0.3	ppm	1146	1260.6	Kenmore Sq., Boston
Ozone	8-Hour	H4H	0.059	0.054	0.056	ppm	1963	115.8	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.007	0.014	0.016	$\mu g/m^3$	1	0.016	Harrison Ave., Boston

Notes:
From 2013-2015 EPA's AirData Website
[1] SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
[2] CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
[3] NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
[4] Background level is the average concentration of the three years.
[5] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

Model Input/Output Files

Due to excessive size CAL3QHC, and MOVES input and output files are available on digital media upon request.

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:	212 Stuart Street
Project Address Primary:	212-222 Stuart Street, Bay Village, Boston MA
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Neal Howard, Principal, Transom Real Estate, nhoward@transomrealestate.com, (617) 504-4995

A.2 - Team Description

Owner / Developer:	Transom Real Estate, LLC on behalf of Stuart Acquisition 12, LLC and Stuart Acquisition 22, LLC
Architect:	Sasaki Associates, Inc. (Executive Architect), Höweler + Yoon Architecture (Design Architect)
Engineer (building systems):	AHA Engineers
Sustainability / LEED:	Sasaki Associates, Inc.
Permitting:	Epsilon Associates, Inc.
Construction Management:	TBD
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:	Residential, Retail
List the First Floor Uses:	*Retail, Lobby, Loading*

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

☐ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*7,712 SF*	Building Area:	*146,000 SF*
Building Height:	*199 Ft.*	Number of Stories:	*19 Flrs.*
First Floor Elevation	*18.12 BCB Elev.*	Are there below grade	*Yes, 1 floor below*

(reference Boston City Base):		spaces/levels, if yes how many:	*grade*

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*	Certified:	*TBD*

A.6 - Building Energy-

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

Electric:	*1200 peak/700 base (kW)*	Heating:	*4.0 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*80 kbtu/SF*	Cooling:	*325 (Tons/hr)*

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

Electric:	*300 (kW)*	Heating:	*0 (MMBtu/hr)*
		Cooling:	*0 (Tons/hr)*

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

Electrical Generation:	*300 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*1 (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?

9/91 Deg.

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

90 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	*Hours*	*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:	*TBD*
How is performance determined:	

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:	Automatic LED lighting control			

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

Roof:	*R =*	Walls / Curtain Wall Assembly:	*R =*
Foundation:	*R =*	Basement / Slab:	*R =*
Windows:	*R = / U =*	Doors:	*R = / U =*

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:	**TBD**

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?

	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

Describe site conditions?

Site Elevation – Low/High Points:	*+/- 17.59 – 19.38 BCB*
Building Proximity to Water:	*Ft.*

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

Coastal Zone:	*No*	Velocity Zone:	*No*
Flood Zone:	*No*	Area Prone to Flooding:	*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:	*No*	Future floodplain delineation updates:	*No*

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

	>2,100 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:	*TBD*	First Floor Elevation:	*TBD*

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:			

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:

No

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

TBD	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

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

No

If Yes, describe:

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

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 [methods TBD]*	☐ 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:	*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

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:	212 Stuart Street
Project Address Primary:	212-222 Stuart Street, Boston, MA
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Neal Howard, Principal, Transom Real Estate, nhoward@transomrealestate.com, (617) 504-4995

Team Description

Owner / Developer:	Transom Real Estate, LLC on behalf of Stuart Acquisition 12, LLC and Stuart Acquisition 22, LLC
Architect:	Sasaki Associates, Inc. (Executive Architect), Howeler + Yoon Architecture (Design Architect)
Engineer (building systems):	AHA Engineers
Sustainability / LEED:	Sasaki Associates, Inc.
Permitting:	Epsilon Associates, Inc.
Construction Management:	TBD

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:

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)	*First Floor Uses include building lobby, retail, bicycle amenity spaces, loading areas and MEP/FP spaces*

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	**Concrete**

Describe the building?

Site Area:	*7,712 +/- SF*	Building Area:	*146,000 SF*
Building Height:	*199 Ft.*	Number of Stories:	*19 Flrs.*
First Floor Elevation:	*18.12 BCB 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 Project site is located along the northernmost edge of the Bay Village neighborhood, with close proximity to the Chinatown neighborhood to the east, Midtown Cultural District to the north, and the Back Bay neighborhood to the west. The Project site's location fronting Stuart Street positions it within the "High Spine" of Boston, an area of increased development linking Copley Square to the downtown Financial District. The High Spine contains a mix of uses, including office, commercial, hospitality and residential within high-rise and mid-rise structures. The nature of the surrounding context shifts moving south from Stuart Street and the High Spine towards the Bay Village neighborhood. This residential neighborhood consists of predominately brick row houses with periodic larger scale multi-unit buildings. The neighborhood is defined by small scale streets

	punctuated with old-growth trees and lined with red brick buildings featuring rich architectural detailing. A number of public space amenities are located within close proximity to the Project site. Directly adjacent to the northwest of the site is the quarter acre Statler Park. The Bay Village community garden is located to the south of the site along Church Street, and the Bay Village Neighborhood Park to the southeast at the intersection of Melrose and Charles. The Boston Public Garden and Boston Common fall within the larger context of the Project site to the north.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	**Commuter Rail** – Back Bay Station .04 mi to the west. Serves the Amtrak, Franklin Line, Needham Line, Providence/Stoughton Line, and Framingham/Worcester Line. Accessible Station. **MBTA Subway** – Green Line: Arlington. 0.2 mi away to the northwest. Accessible stop. **MBTA Subway** – Orange Line: Tufts Medical Center. 0.4 mi away to the northeast. Accessible stop. **MBTA Bus Lines** – Routes 9, 39, 55, 57, 504, and 553 connect at the intersection of Arlington St. and St. James Ave. which is 0.2 mi away from the site. Routes 39, 55, 57, 504, and 533 connect at the intersection of Stuart St. and Charles St. which is 0.1 mi away from the site. All MBTA routes are accessible.
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	Tufts Medical Center, South Cove Plaza, Mass Pike Towers, Tremont Village Apartments, Quincy Towers, Josiah Quincy Upper School, Tufts Medical School, Tufts Dental School, New England Law, Emmerson College and Boston Center for Adult Education.
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.	No

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.	The existing sidewalk material to the north is concrete with granite curbing. There is a pedestrian walkway to the west of the site that is composed of brick unit pavers. The walkway to the south of the site is composed of red brick with granite curbing. The pedestrian passage to the east of the site is concrete. The physical condition of the sidewalks and pedestrian areas is inconsistent. The sidewalk to the south of the site contains multiple obstacles and irregular paving.
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 sidewalks that are in good condition and those not disturbed by construction will remain. Where modifications are made, the final conditions will be brought into compliance. The existing sidewalks and pedestrian ways have not been verified as being in compliance, but will be verified during the Project design.
Is the development site within a historic district? If yes, please identify.	Yes, Bay Village Historic 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
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Stuart St: Downtown Mixed-Use Church St (pedestrian walkway to West): Neighborhood Connector Shawmut St: Neighborhood Residential Alley to East: Industrial
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	Stuart St: 13’-6” (existing) Greenspace/Furnishing Zone + Curb: 2’-0” Crosswalk extension zone: 8’-6” (including curb) The width of the pedestrian crosswalk bump out is about 80’ Pedestrian Zone: 10’-0” Frontage Zone: 1’-6”

	Church St Walkway: 38'-0" (varies) Greenscape: 8'-0" (each side of walkway) Pedestrian Zone: 20'-0" Frontage Zone: 2'-0" (each side of walkway) **Shawmut St.**: 5'-6" (widening not feasible) Curb Zone: 0'-6" Pedestrian Zone: 5'-0" **Eastern Alley**: 6'-6" – 8'-10" (varies) Furnishing Zone/Curb Zone: N/A Pedestrian Zone: 6'-6" – 8'-10"
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?	**Curb Zone:** stone curbs, typical **Greenscape:** varies Landscaped tree beds alternating with poured-in-place scored concrete and/or permeable unit pavers and/or unit pavers. Street furniture, City of Boston signage, street lights, bicycle parking, etc. Final configuration yet to be determined, final configuration to be in compliance with Boston City Streets. **Pedestrian Zone:** varies Poured-in-place scored concrete and/or unit pavers. Final configuration yet to be determined, final configuration to be in compliance with Boston City Streets. **Frontage Zone:** varies Poured-in-place scored concrete and/or unit pavers. Final configuration yet to be determined, final configuration to be in compliance with Boston City Streets.
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?	N/A
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	To be determined, dependent on retail tenant.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	Final configuration yet to be determined, final configuration to be in compliance with Boston City Streets and applicable codes. This pertains to the Church St pedestrian walkway to the west of the site.

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?	All parking for the new development will be provided off-site. Final number and location to be determined and will be in proportion to the availability of parking in the area.
What is the total number of accessible spaces provided at the development site?	All parking for the new development will be provided off-site. Final number and location to be determined and will be in proportion to the availability of parking in the area.
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?	All parking for the new development will be provided off-site. Final number and location to be determined and will be in proportion to the availability of parking in the area.
Has a drop-off area been identified? **If yes,** will it be accessible?	Drop-off area has yet to be determined
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.	See Attachments 1 to 3 for the plans noting accessible routes.

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.	See Attachment 1 noting the accessible route.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Main entries for the building will be Flush Condition.
Are the accessible entrance and the standard entrance integrated?	Yes, the main building entrance will be for standard and accessible entry.
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.	Roof deck will be accessible. See Attachment 3 noting the accessible route.
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	No, signage has not been developed. All future way-finding signage will be developed to meet Building Code and Accessibility Board Requirements.

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.

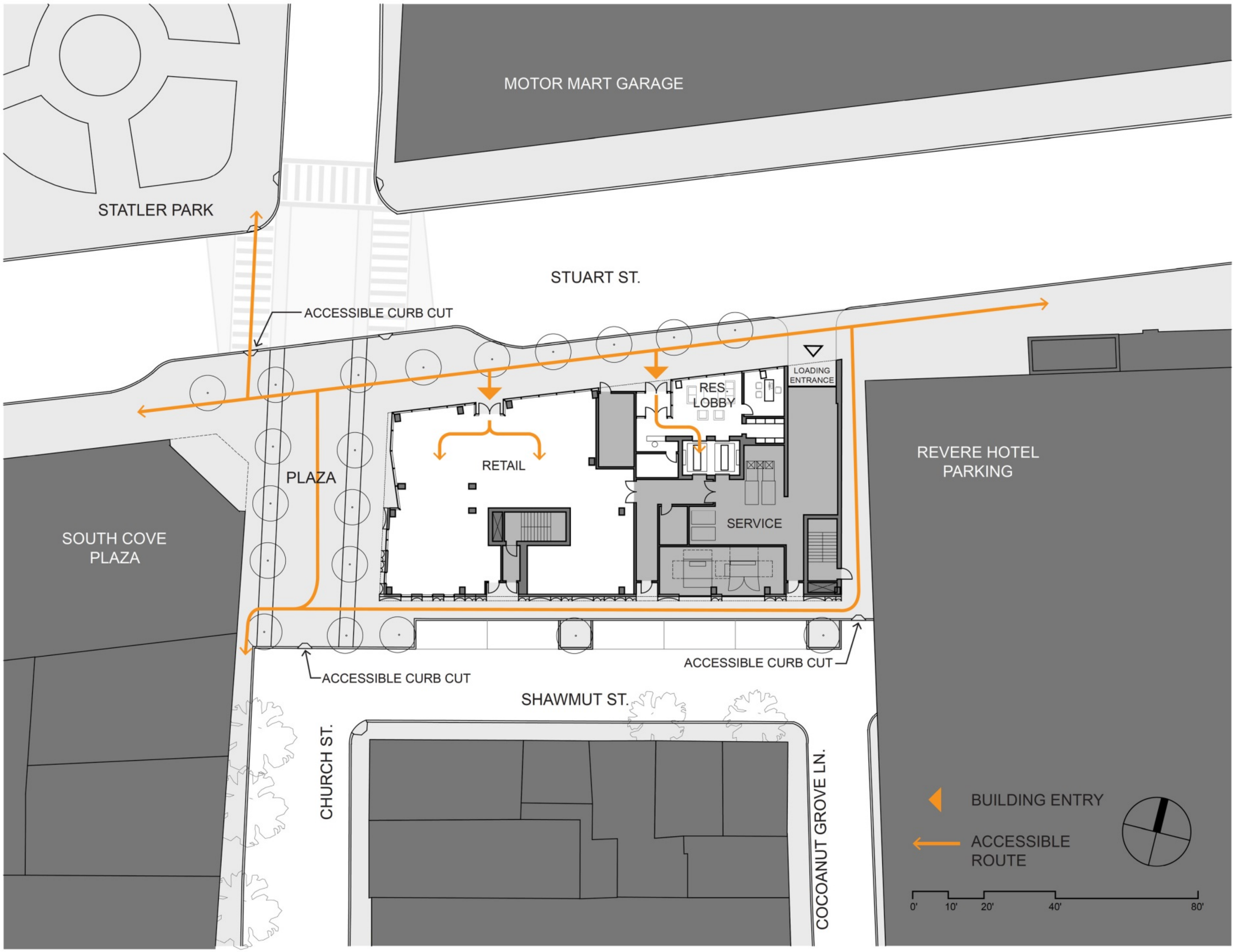
What is the total number of proposed units for the development?	131 +/- units. Final unit count to de determined during final design phases and will be dependent on market analysis.
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	All units will be rental apartments. The development will include affordable units in compliance with the City of Boston's Inclusionary Development Policy.
How many accessible units are being proposed?	The number of accessible units will meet the requirements set forth in 521 CMR 9.00 and all if these units will be provided in compliance with MAAB Group-2A regulations.

Please provide plan and diagram of the accessible units.	Please refer to Attachments 1 to 3.
How many accessible units will also be affordable? If none, please describe reason.	Accessible units will include a mix of affordable and market rate units, in a proportion similar to the overall composition of units. Final breakdown to be determined.
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.	No
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	No
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

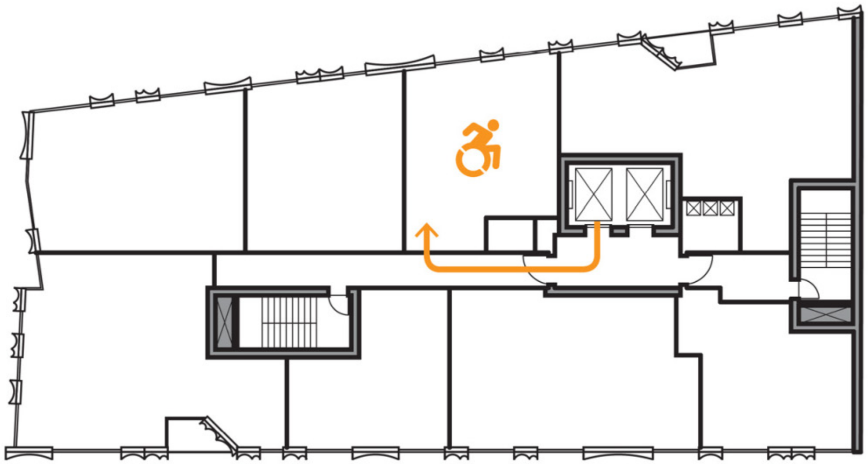


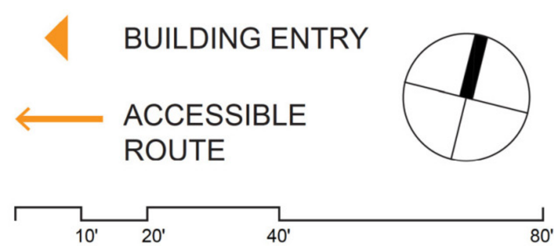
212 Stuart Street Boston, Massachusetts

HÖWELER + YOON

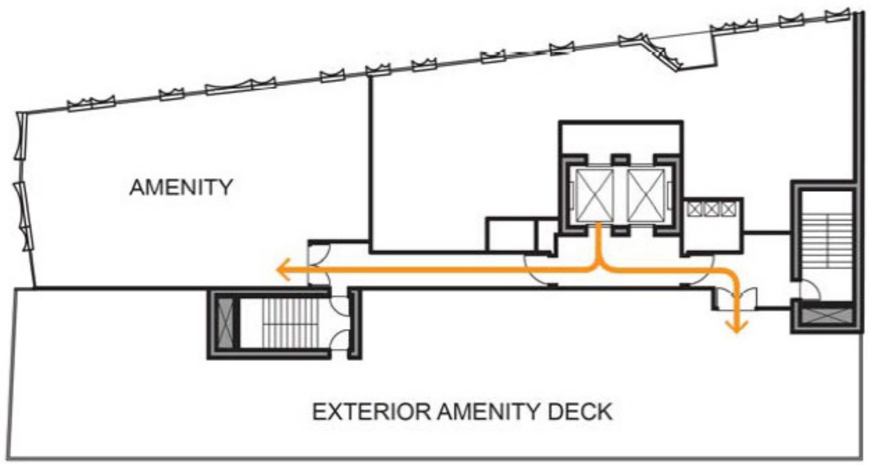
Attachment 1

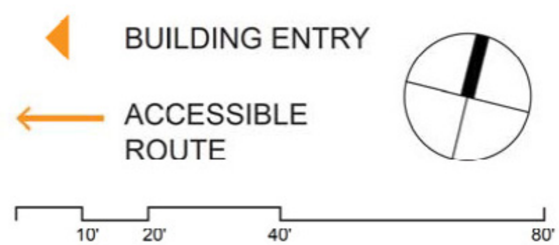
Accessible Routes – Level 1





BUILDING ENTRY
ACCESSIBLE ROUTE
10'
20'
40'
80'





212 Stuart Street **Boston, Massachusetts**

HÖWELER + YOON

Attachment 3

Accessible Route – Roof Deck