EXPANDED PROJECT NOTIFICATION FORM

55 India Street

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

Submitted by:
Boston Residential Development LLC
20 Park Plaza, Suite 1104
Boston, MA 02116

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

In Association with:
Hacin + Associates
Goulston & Storrs
Howard/Stein Hudson Associates, Inc.
Nitsch Engineering
McPhail Associates, LLC
RWDI

June 16, 2014

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Introduction/ Project Description

1.0 INTRODUCTION/ PROJECT DESCRIPTION

1.1 Introduction

Boston Residential Development LLC (the Proponent), proposes to develop an approximately 7,100 square foot (sf) site (the Project site) at 55 India Street in Downtown Boston (the Project). The existing site at the southwest corner of India Street and John F. Fitzgerald Surface Artery consists of a surface parking lot. The site will be developed into an approximately 67,000 sf building with ground floor commercial space and 44 residential units above.

The Project site, adjacent to the previous raised Central Artery, has been a paved parking lot since the 1950s. The removal of the raised highway and improvements to the surrounding area, including the creation of the Rose Fitzgerald Kennedy Greenway (the Greenway) in place of the removed highway, have raised the profile of this now very visible, underutilized parcel. The Project will continue the improvement of the area by filling in a gap along the Greenway, and enlivening the area and enhancing the pedestrian experience by creating new commercial space, possibly with an outdoor café sheltered by a building overhang, fronting Surface Artery and the Greenway. The pedestrian realm adjacent to the site will complement the experience on the opposite side of the Greenway, including wider sidewalks—a benefit of setting back the building from the lot line at ground level, new lighting and decorative paving. Together, these improvements will connect the site to the Greenway, the harbor beyond, and the entire pedestrian environment in the nearby area. See Figures 1-1 and 1-2.

In addition to the benefits to the public realm, and a design that complements the existing architecture of the area, the Project also provides much-needed downtown housing, including new affordable housing, construction and permanent jobs, and improved tax revenues for the City.

Because the proposed Project exceeds 50,000 square feet of gross floor area, the Project is subject to the requirements of Large Project Review pursuant to Article 80 of the Boston Zoning Code (the Code). Based on a comprehensive approach to addressing potential impacts and mitigation equivalent to the level of information normally presented in a Draft Project Impact Report (DPIR), it is the desire of the Project team that the BRA, after reviewing public and agency comments on this expanded PNF and any further responses to comments made by the Project team, issue a Scoping Determination Waiving Further Review pursuant to the Article 80B process.

55 India Street Boston, Massachusetts

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112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 1-1

Aerial View from the East

55 India Street Boston, Massachusetts

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Figure 1-2

View on Greenway from North

1.2 Project Identification

Address/Location:	55 India Street
Developer:	Boston Residential Development LLC 20 Park Plaza, Suite 1104 Boston, MA 02116 (617) 267-3500 Mike Durand Lara Rosenburgh
Architect:	Hacin + Associates 112 Shawmut Avenue Boston, MA 02118 (617) 426-0077 David J. Hacin, FAIA Scott Thomson, AIA
Legal Counsel:	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110 Matthew Kiefer Michael Flannery
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Talya Moked David Hewett
Transportation and Parking Consultant	Howard/Stein Hudson Associates, Inc 38 Chauncy Street, 9th Floor Boston, MA 02111 (617) 482-7080 Guy Busa Mike Santos

Civil Engineer	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 John Schmid
Geotechnical Consultant:	McPhail Associates, LLC 2269 Massachusetts Avenue Cambridge, MA 02140 (617) 868-1420 Chris Erikson, P.E.
MEP:	R.G. Vanderweil Engineers, LLP 274 Summer Street Boston, MA 02210 (617) 423-7423 Chad Wisler, PE, LEED AP BD+C Alfonso Hernandez Sarah Forrest, PE, LEED AP BD+C
Structural Engineer:	McNamara/Salvia, Inc 160 Federal Street, 5th Floor Boston, MA 02110 (617) 737-0040 Adam C. McCarthy, P.E.

1.3 Project Description

1.3.1 Project Site

The Project site is an approximately 7,100 sf site located in downtown Boston, and is bound by India Street to the north, Franklin Street to the west, Well Street to the south, and the John F. Fitzgerald Surface Artery facing the Rose Fitzgerald Kennedy Greenway to the east. The site is currently comprised of three parcels, which will be consolidated as described in Appendix A. The site currently includes surface parking and occupies the entire block. See Figure 1-3 for an aerial locus map and Figures 1-4 and 1-5 for photographs of the existing conditions on the Project site.

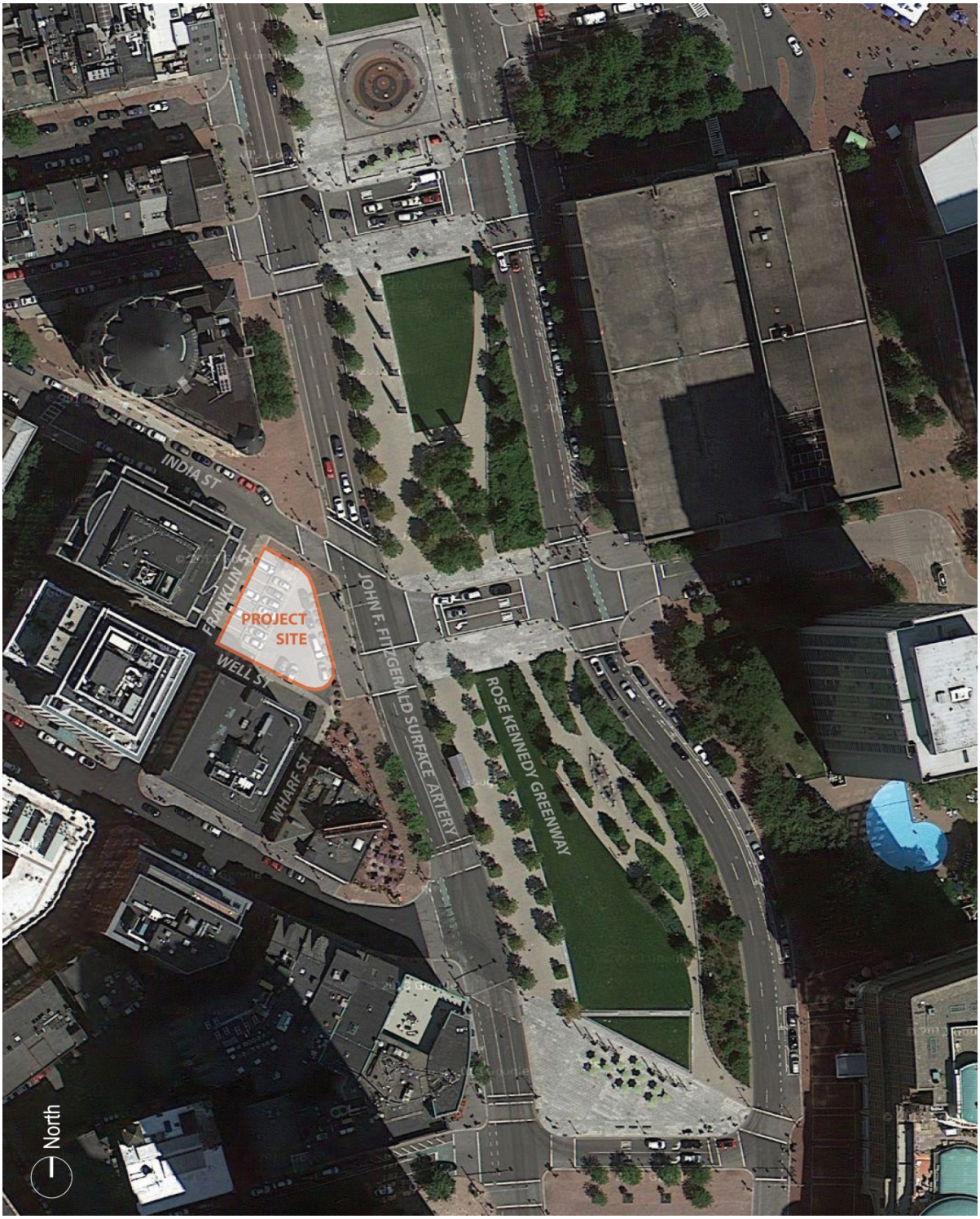

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Figure 1-3
Aerial Locus Map

VIEW ON GREENWAY LOOKING NORTH

VIEW ON GREENWAY LOOKING SOUTH

55 India Street Boston, Massachusetts

AERIAL VIEW ON GREENWAY LOOKING WEST

VIEW ON EAST INDIA ROW LOOKING WEST

55 India Street Boston, Massachusetts

1.3.2 Area Context

The Project site is located in downtown Boston in a prominent location along the Rose Fitzgerald Kennedy Greenway. The surrounding area includes high-rise commercial and residential buildings and structured parking garages. The eastern portion of the site faces the Greenway and the Boston Harbor beyond. In the immediately surrounding area, buildings range in height from eight to fourteen stories. Immediately south of the Project is another site at the corner of Surface Artery and Broad Street that has been identified by the Greenway District Planning Study Use and Development Guidelines as a potential development site. The site is being considered for a mixed-use development that would include restaurant and residential space.

The site is located within one half mile of several Massachusetts Bay Transportation Authority (MBTA) (Red, Orange, Green and Blue line) Stations, South Station (Amtrak, MBTA's commuter rail), the MBTA's South Station Bus Terminal (the main gateway for interstate buses into Boston), several Zipcar sites and several Hubway bike sharing stations along the harbor, and MBTA Harbor Express and water taxi service to Logan Airport and coastal communities beyond. See Figure 1-6 for a context map. This proximity to public transit makes the area an ideal location for transit-oriented development.

1.3.3 Proposed Development

The Project, as shown in Table 1-1, is an approximately 67,000 sf, twelve-story residential building that includes approximately 44 residential units and approximately 4,000 sf of commercial space on the ground floor and mezzanine level that is anticipated to consist of either a retail or restaurant use. The Project has no below-grade space. The residential units will be a variety of sizes to meet a number of different needs, including one bedroom, two bedroom and three bedroom units. On-site parking is not required by zoning, and due to the proximity to public transportation and the small site area, no on-site parking will be provided. It is anticipated that limited parking will be provided in one or more parking garages in proximity to the site. Secure bicycle storage for residents (one per residential unit) will be included within the building. See Figures 1-7 and 1-8 for existing and proposed site plans, and Appendix B for floor plans.

Table 1-1 Project Program

Project Element	Approximate Dimension
Residential	**63,000**
1-bedroom	24
2-bedroom	11
3-bedroom	9
Total Units	44
Total Bedrooms	73
Commercial	4,000 square feet/150 seats
Total Square Footage	**67,000**

Table 1-1 Project Program (Continued)

Project Element	Approximate Dimension
Parking	No on-site parking is provided
Zoning Height	12 stories/117 feet
Parcel Area	7,100 square feet
FAR	9.4

The Project will transform a site currently used for surface parking into a distinctive building with approximately 44 units of housing, ground-level and mezzanine commercial space, and related sidewalk improvements and landscaping. Landscape improvements will be coordinated with abutters to the site in order to maintain consistency along the Greenway.

The Project will provide much-needed downtown housing, improve the pedestrian environment, activate the Greenway and add to the urban design and architectural character of this area of downtown Boston. The commercial space will activate and enliven the entire frontage along the Rose Kennedy Greenway. The main residential entry lobby will be situated at the corner of Well and Franklin streets. Pick up/drop off and loading activities for the Project are anticipated to occur on Well Street in a designated zone by the main entrance. The loading zone will handle all move-in activity and deliveries to the commercial space.

The Project will improve the surrounding streetscape with wider sidewalks, new lighting and decorative paving. The existing specialty paving marking the historic India Wharf location along the Rose Kennedy Greenway will be retained and integrated into the Project.

1.3.4 Consistency with the Greenway District Planning Study

The Project site is located within the boundaries of the Greenway District Planning Study Use and Development Guidelines (the Guidelines), which was adopted by the BRA Board in July of 2010. The BRA is currently undergoing a public process to codify the Guidelines into the Boston Zoning Code. The Guidelines are made of up seven sub-districts, with the Project site falling in the Town Cove sub-district. The Guidelines call for future development in this area to focus on repairing the eastern edges that were damaged by the elevated highway, while "preserving the scale, character and historic street patterns that mark Town Cove as a distinct and legible Boston neighborhood." (page 22).

The Project is consistent with the goals stated in the Guidelines by achieving the following:

- Aligning in height with the adjacent buildings;
- Repairing and filling in an unfinished edge along the Greenway;

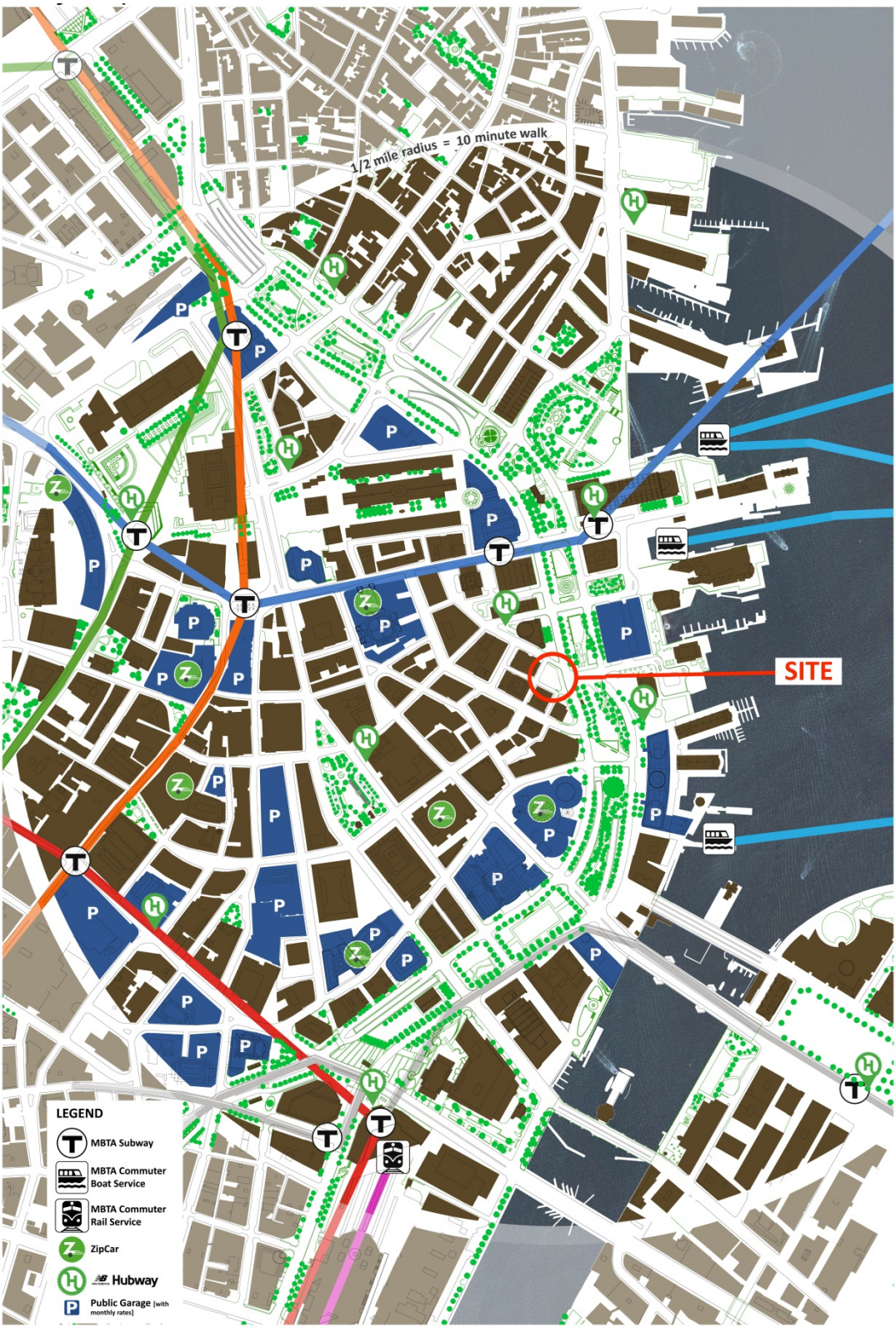

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Figure 1-6
Context Map

55 India Street Boston, Massachusetts

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Figure 1-7

Existing Site Plan

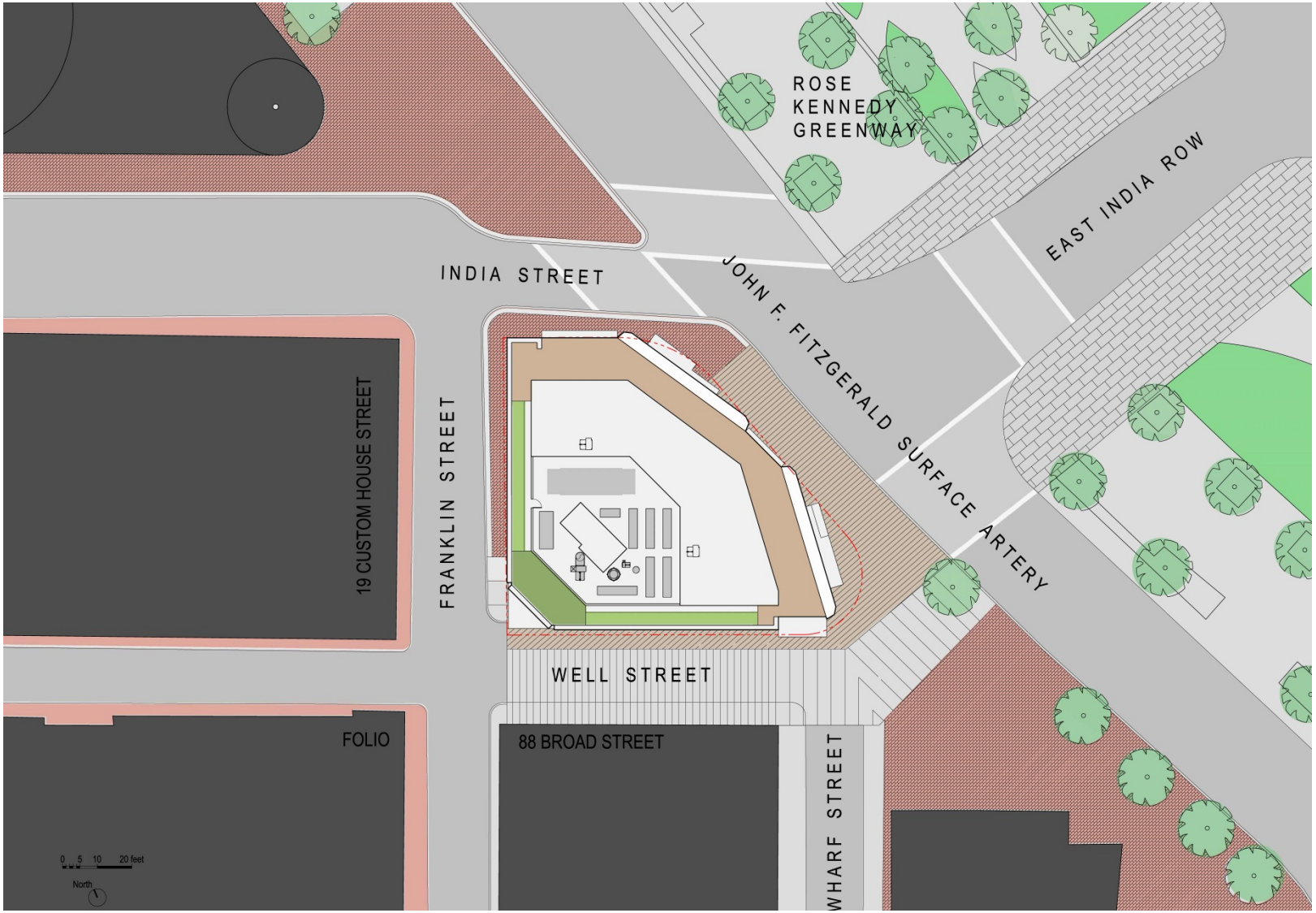

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Figure 1-8

Proposed Site Plan

- Preserving and integrating the decorative paving representing India Wharf into the design of the Project;
- Providing active, publicly accessible programming directly along the Greenway edge;
- Complementing the area's existing architectural features; and
- Retaining and enhancing the small scale street connections.

See Section 5.2 for further details on the Project's consistency with the Greenway Guidelines.

1.4 Public Benefits

The Project will transform a surface parking lot into an architecturally distinctive mixed-use building that will provide several public benefits. These benefits include housing creation, urban design and public realm improvements, job opportunities, expanded retail or restaurant options, and additional tax revenues. By transforming an underutilized site along the Rose Fitzgerald Kennedy Greenway into a vibrant mixed-use residential and retail location, the Project will contribute substantially to the improvement of the pedestrian environment, the retail and service vitality of the neighborhood, and the urban design and architectural character of this area of Downtown Boston. Specific public benefits include:

Urban Design Benefits

New Retail and Service Development – Provide approximately 4,000 square feet of ground-floor and mezzanine-level retail or restaurant space, which will both create pedestrian activity around the site and the Greenway and provide amenities to the neighbors and building residents.

Enhanced Streetscape and Public Realm – Enhance the streetscape and the pedestrian experience through the use of lighting, landscaping, sidewalk and potential outdoor seating area for possible restaurant occupancy.

High Quality Architecture - Improve the urban design characteristics and aesthetic character of the Project surroundings through the introduction of high-quality architecture to the site.

Sustainable Development – Comply with Article 37 of the Boston Zoning Code by being Leadership in Energy and Environmental Design (LEED) certifiable.

Economic and Community Benefits

New Housing Units - Provide approximately 44 new units of ownership housing in Downtown Boston located within one half mile of the MBTA Red, Orange, Green and Blue lines, South Station and bus routes as well as several Zipcar and Hubway stations, the MBTA Harbor Express, and water taxi service to Logan Airport and coastal communities beyond.

Increase of the City's Affordable Housing Stock - The Project will be consistent with the Mayor's Executive Order Relative to Affordable Housing.

New Job Creation- Enhance the economy within the Downtown area by providing new job opportunities and a source of customers for local retail and/or restaurant establishments.

Create approximately 90 construction jobs in a variety of trades.

Create approximately 20 new transit-accessible employment opportunities (permanent part-time and full-time jobs).

Increased Tax Revenues - Provide property tax revenues to the City of Boston by increasing the assessed value of the Property.

1.5 City of Boston Zoning

The Project site is located within the recently-adopted Wharf Street Restricted Growth Area of the Government Center/Markets District, which imposes height and FAR limits of 120 feet and 12.0, respectively, for projects undergoing Large Project Review. These limits are consistent with the Greenway District Guidelines adopted by the BRA in July 2010. The Project site is also located within the Restricted Parking Overlay District and the Greenway Overlay District. The Project has been designed to comply with applicable zoning requirements.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

There are no legal judgments adverse to the proposed Project.

1.6.2 History of Tax Arrears on Property

The Proponent does not have a history of tax arrears on property that it owns in the City of Boston.

1.6.3 Site Control/ Public Easements

The Project site is comprised of three parcels. The Proponent has acquired fee title to one of the three parcels from the Massachusetts Department of Transportation. The other two parcels are held in private ownership, and the Proponent has entered agreements to purchase both. There are two easements to the public affecting the Project site: a sewer easement to the Boston Water and Sewer Commission over which the Proponent has obtained permission to build, and an easement to the City of Boston for sidewalk purposes across a portion of the Project site adjacent to Surface Artery, within which the Proponent enjoys the right to locate one building column.

1.7 Anticipated Permits

Table 1-2 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project, based on currently available information. It is possible that only some of these permits or actions will be required, or that additional permits or actions will be required.

Table 1-2 Anticipated Permits and Approvals

Agency	Approval
Local	
Boston Civic Design Commission	Design Review
Boston Employment Commission	Construction Employment Plan
Boston Inspectional Services Department	Building Permit; Other construction-related permits; Certificates of Occupancy
Boston Parks and Recreation	Approval of Construction Within 100 feet of a Park
Boston Public Works Department	Curb Cut Permit(s); Sidewalk Occupancy Permit (as required)
Boston Redevelopment Authority	Article 80B Large Project Review; Cooperation Agreement; Affordable Housing Agreement;
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Agreement
Boston Water and Sewer Commission	Site Plan Review; Water and Sewer connection permits;
Office of Jobs and Community Services	Permanent Employment Agreement (as required)
Public Improvement Commission	Air and Subsurface Discontinuances; Permits/Canopy Licenses for signs and awnings (as required); Specific Repair Plan
State	
Massachusetts Historical Commission	State Register Review
Federal	
Environmental Protection Agency	NPDES General Construction Permit
Federal Aviation Authority	Determination of No Hazard to Air Navigation

1.8 Public Participation

As part of its planning efforts, the Proponent has reached out to nearby residents and representatives of numerous neighborhood groups including the Boards of Trustees of the abutting and nearby condominium developments, as well as advocacy organizations and businesses in the area for initial meetings. The formal community outreach begins with the filing of this Expanded PNF.

The Proponent continues to be committed to a comprehensive and effective community outreach and will continue to engage the community to ensure public input on the Project. The Proponent looks forward to working with the BRA and city agencies, local officials, neighbors, and others as the design and review processes move forward.

1.9 Schedule

Construction is anticipated to begin in the first quarter of 2015 and will occur over approximately 16 months.

Chapter 2.0

Transportation Component

2.0 TRANSPORTATION

2.1 Introduction

Howard/Stein-Hudson Associates, Inc. (HSH) has conducted an evaluation of the transportation impacts of a proposed mixed-use development containing residential and commercial uses to be located at 55 India Street in downtown Boston. This transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Article 80 development review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. The intersections studied will continue to operate at the same Level of Service as under the No-Build conditions during both the a.m. and p.m. peak hours. The Project will have minimal impact on the study area intersections or on public transportation or pedestrian facilities in the area.

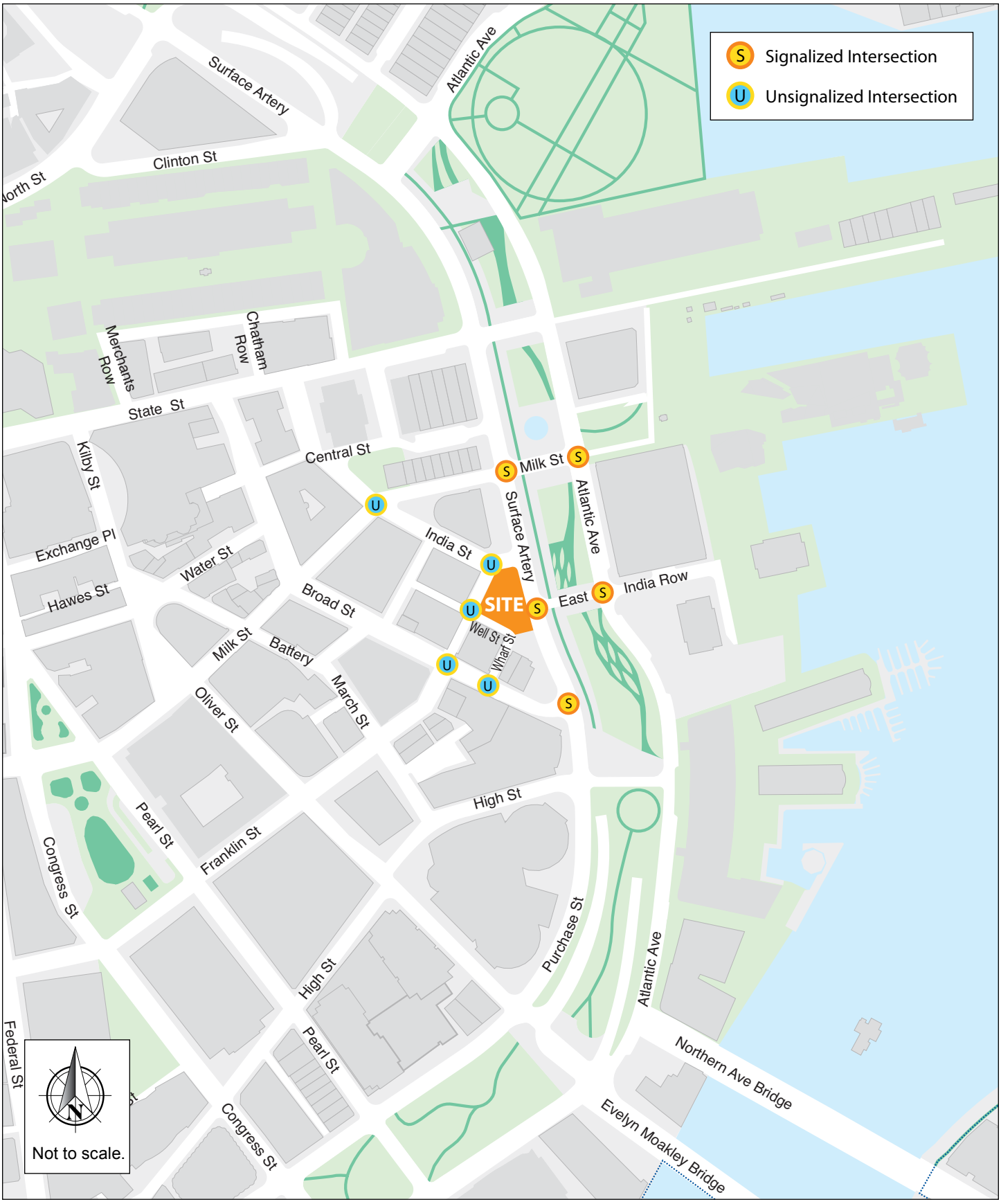
2.1.1 Project Description

The Project site is located at 55 India Street in downtown Boston, as shown in Figure 2-1. The site is bounded by India Street to the north, Well Street to the south, Franklin Street to the west, and Surface Artery/Rose Kennedy Greenway to the east. The Project site currently contains an approximate 15-space public parking lot accessed from Well Street and 10 Zipcar spaces along the Franklin Street frontage. The Project is a proposed mixed-use development consisting of the construction of a 12-story building containing 44 residential condominium units and approximately 4,000 square feet (sf) of ground floor retail/restaurant space that will replace the public parking and Zipcar spaces. No parking will be provided on the Project site. The Proponent will work with nearby garages to secure parking spaces for the residents of the Project.

2.1.2 Study Area

The study area is generally bounded by Milk Street to the north, India Street and Franklin Street to the west, Broad Street to the south, and Atlantic Avenue to the east. It includes the following 10 intersections, also shown on Figure 2-1:

- Surface Artery/Milk Street;
- Atlantic Avenue/Milk Street
- Surface Artery/India Street;
- Atlantic Avenue/East India Row;
- Purchase Street/Broad Street;



55 India Street Boston, Massachusetts

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Figure 2-1
Study Area Intersections

- Milk Street/India Street;
- India Street/Franklin Street;
- Franklin Street/Well Street
- Franklin Street/Broad Street; and
- Broad Street/Wharf Street.

2.1.3 Study Methodology

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

The existing conditions analysis includes an inventory of the existing (2014) transportation conditions such as traffic characteristics, parking and curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected on Thursday July 18, 2013 at the study intersections. To represent 2014 traffic volume conditions, an adjustment to the traffic data was necessary to account for the estimated traffic growth over the past year; therefore a background traffic growth rate of 1.0 percent per year was applied to the 2013 counts. A more detailed discussion of the background traffic growth rate is provided in Section 2.3.1.1. The traffic counts form the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2019, based on a five-year horizon from the year of the filing of this traffic study. Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capabilities and deficiencies are identified. This section includes the following scenarios:

- The 2019 No Build conditions scenario includes both general background traffic growth and traffic growth associated with specific developments and transportation improvements that are planned in the vicinity of the Project site.
- The 2019 Build conditions scenario includes Project-generated traffic volume estimates added to the traffic volumes developed as part of the 2019 No Build conditions scenario.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address 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.

2.2 Existing Conditions

2.2.1 Existing Roadway Conditions

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

India Street

- Is adjacent to the north side of the Project site and classified as an urban collector west of Surface Artery and a local roadway east of Surface Artery.
- Runs in a northwest-southeast direction between State Street to the north and Surface Artery/Rose Kennedy Greenway to the southeast.
- Is one-way in the northwestbound direction and consists of a single travel lane.
- Sidewalks are provided along both sides of India Street.

Franklin Street

- Is adjacent to the west side of the Project site and classified as an urban collector south of Broad Street and a local roadway north of Broad Street.
- Runs in a northeast-southwest direction between India Street to the north and Washington Street to the west.
- Is one-way in the southbound direction south of Broad Street and one-way in the northbound direction north of Broad Street.
- Sidewalks are provided along both sides of Franklin Street.

Surface Artery Southbound/Purchase Street

- Is adjacent to the east side of the Project site and classified as an urban minor arterial.
- Runs in a north-south direction between New Chardon Street to the north and the South Station Connector roadway to the south.
- Runs adjacent to the westerly side of the Rose Kennedy Greenway.
- The roadway is named John F. Fitzgerald Surface Artery north of Broad Street and Purchase Street south of Broad Street.

- Is one-way in the southbound direction and generally consists of three travel lanes and an exclusive bicycle lane.
- Sidewalks are provided along both sides of the roadway.

Well Street

- Is adjacent to the south side of the Project site and classified as a local roadway.
- Accommodates two-way travel. However, Well Street is only wide enough to allow passage of a single vehicle in either direction.
- Runs in an east-west direction between Custom House Road to the west and Wharf Street to the east.
- Sidewalks are provided along both sides of Well Street.

Wharf Street

- Is located directly south of the Project site and classified as a local roadway.
- Accommodates two-way travel.
- Runs in a north-south direction between Well Street/the Project site and Broad Street.
- Sidewalks are provided along both sides of Wharf Street.

Atlantic Avenue

- Is located east of the Project site and classified as an urban minor arterial.
- Runs in a north-south direction between Kneeland Street to the south and New Chardon Street to the north.
- Is one-way in the northbound direction and generally consists of two to three travel lanes and an exclusive bicycle lane.
- Sidewalks are provided along both sides of Atlantic Avenue.

Milk Street

- Is located north of the Project site and classified as an urban collector west of Atlantic Avenue and a local roadway east of Atlantic Avenue.
- Runs in an east-west direction between Washington Street to the west and Central Wharf to the east.

- Is one-way in the eastbound direction east of Devonshire Street and two-way west of Devonshire Street.
- Sidewalks are provided along both sides of Milk Street.

Broad Street

- Is located south of the Project site and classified as an urban collector.
- Runs in a northwest-southeast direction between State Street to the north and Purchase Street to the east.
- Consists of a single lane in each direction of travel.
- Is currently being reconstructed in accordance with the Boston Complete Streets design guidelines.
- Sidewalks are provided along both sides of Broad Street.

2.2.2 Existing Intersection Conditions

Existing conditions at each of the study area intersections are described below.

Surface Artery/Milk Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- Milk Street is one-way eastbound and consists of a through lane and a shared through/right-turn lane.
- Surface Artery is one-way southbound and consists of a shared left-turn/through lane and two through lanes. A five-foot wide bicycle lane is also provided.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across all legs of the intersection.

Atlantic Avenue/Milk Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- Milk Street is one-way eastbound west of the intersection and consists of two exclusive left-turn lanes and a through lane.
- Milk Street westbound consists of a single exclusive right-turn lane.
- Atlantic Avenue is one-way northbound and consists of a shared left-turn/through lane and a through lane. A five-foot wide bicycle lane is also provided.

- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across all legs of the intersection.

Surface Artery/India Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- India Street is one-way westbound and consists of two exclusive left-turn lanes and a through lane.
- Surface Artery is one-way southbound and consists of two through lanes and a shared through/right-turn lane. A five-foot wide bicycle lane is also provided.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across all legs of the intersection.

Atlantic Avenue/East India Row

- Is a four-legged, signalized intersection under BTD jurisdiction.
- East India Row westbound consists of a shared through/right-turn lane.
- East India Row is one-way westbound west of the intersection.
- Atlantic Avenue is one-way northbound and consists of a shared left-turn/through lane and a shared through/right-turn lane. A five-foot wide bicycle lane is also provided.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across all legs of the intersection.

Purchase Street/Broad Street

- Is a three-legged, signalized intersection under BTD jurisdiction.
- Broad Street eastbound consists of an exclusive right-turn lane.
- Purchase Street is one-way southbound and consists of two through lanes and a shared through/right-turn lane. A five-foot wide bicycle lane is also provided.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across all legs of the intersection.

Milk Street/India Street

- Is a four-legged, unsignalized intersection under BTD jurisdiction.
- India Street is one-way westbound and consists of a single travel lane.
- Milk Street is one-way northbound and consists of a single travel lane under STOP-sign control.
- Crosswalks with handicap-accessible ramps are provided across all legs of the intersection.

India Street/Franklin Street

- Is a three-legged, unsignalized intersection under BTD jurisdiction.
- India Street is one-way westbound and consists of a single travel lane.
- Franklin Street is one-way northbound and consists of a single travel lane under STOP-sign control.
- Crosswalks are not provided at the intersection.

Franklin Street/Well Street

- Is a three-legged, unsignalized intersection under BTD jurisdiction.
- Well Street consists of a shared through/right-turn lane that accommodates two-way travel. Due to the limited width of Well Street, two vehicles cannot pass each other in opposite directions of travel.
- Franklin Street is one-way northbound and consists of a shared left-turn/ through/right-turn lane.
- Traffic control is not provided at the intersection.
- Crosswalks are not provided at the intersection.

Franklin Street/Broad Street

- Is a four-legged, unsignalized intersection under BTD jurisdiction.
- Broad Street eastbound and westbound both consist of single travel lanes separated by a double-yellow centerline.
- Franklin Street is one-way southbound south of the intersection and one-way northbound north of the intersection.

- Crosswalks with handicap-accessible ramps are provided across both Franklin Street legs and the Broad Street eastbound leg of the intersection.

Broad Street/Wharf Street

- Is a three-legged, unsignalized intersection under BTD jurisdiction.
- Broad Street eastbound and westbound both consist of single travel lanes separated by a double-yellow centerline.
- Wharf Street southbound operates under STOP control and consists of a shared left-turn/right-turn lane that accommodates two-way travel. Due to the width of Wharf Street, two vehicles cannot pass each other in opposite directions of travel.
- Crosswalks are not provided at the intersection.

2.2.3 Existing Traffic Conditions

Traffic movement data was collected at the study area intersections in July 2013. Manual turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and p.m. peak periods (7:00-9:00 a.m. and 4:00-6:00 p.m., respectively) for the following six intersections:

- Surface Artery/Milk Street;
- Atlantic Avenue/Milk Street;
- Surface Artery/India Street;
- Atlantic Avenue/East India Row;
- Purchase Street/Broad Street; and
- Milk Street/India Street.

The vehicle classification counts included car, truck, pedestrian, and bicycle movements. Based on the TMCs, the peak hours of vehicular traffic throughout the study area are 8:00-9:00 a.m. and 4:15-5:15 p.m.

Additional vehicular, pedestrian, and bicycle counts were conducted during the a.m. and p.m. peak hours (8:00-9:00 a.m. and 4:15-5:15 p.m., respectively) at the remaining four study area intersections, including the following:

- India Street/Franklin Street;
- Franklin Street/Well Street;

- Franklin Street/Broad Street; and
- Broad Street/Wharf Street.

The detailed traffic counts are provided in the Appendix C.

Seasonal Adjustment

In order to account for seasonal variation in traffic volumes throughout the year, data provided by the Massachusetts Department of Transportation (MassDOT) were reviewed. Typically, nearby continuous traffic count stations are used to determine monthly fluctuations in traffic volumes. However, monthly traffic counts for the nearby continuous count stations located on Interstate 93 were not available at the time of this study. Therefore, the most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the July 2013 TMCs. The 2011 seasonal adjustment factor for July for roadways similar to the study area is 0.92, which indicates that average month traffic volumes are approximately 92 percent of typical July traffic volumes. To provide a conservative analysis, the July counts were not adjusted downward to reflect average month conditions. To account for traffic growth over the past year, a one percent annual growth rate was applied to the 2013 counts to reflect the 2014 existing traffic conditions. A discussion on the annual traffic growth rate is provided in Section 2.3.1.1. The 2014 Existing weekday a.m. and p.m. peak hour traffic volumes are shown in Figure 2-2 and Figure 2-3, respectively.

2.2.4 Existing Traffic Operations

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 6) 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).

The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. 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.

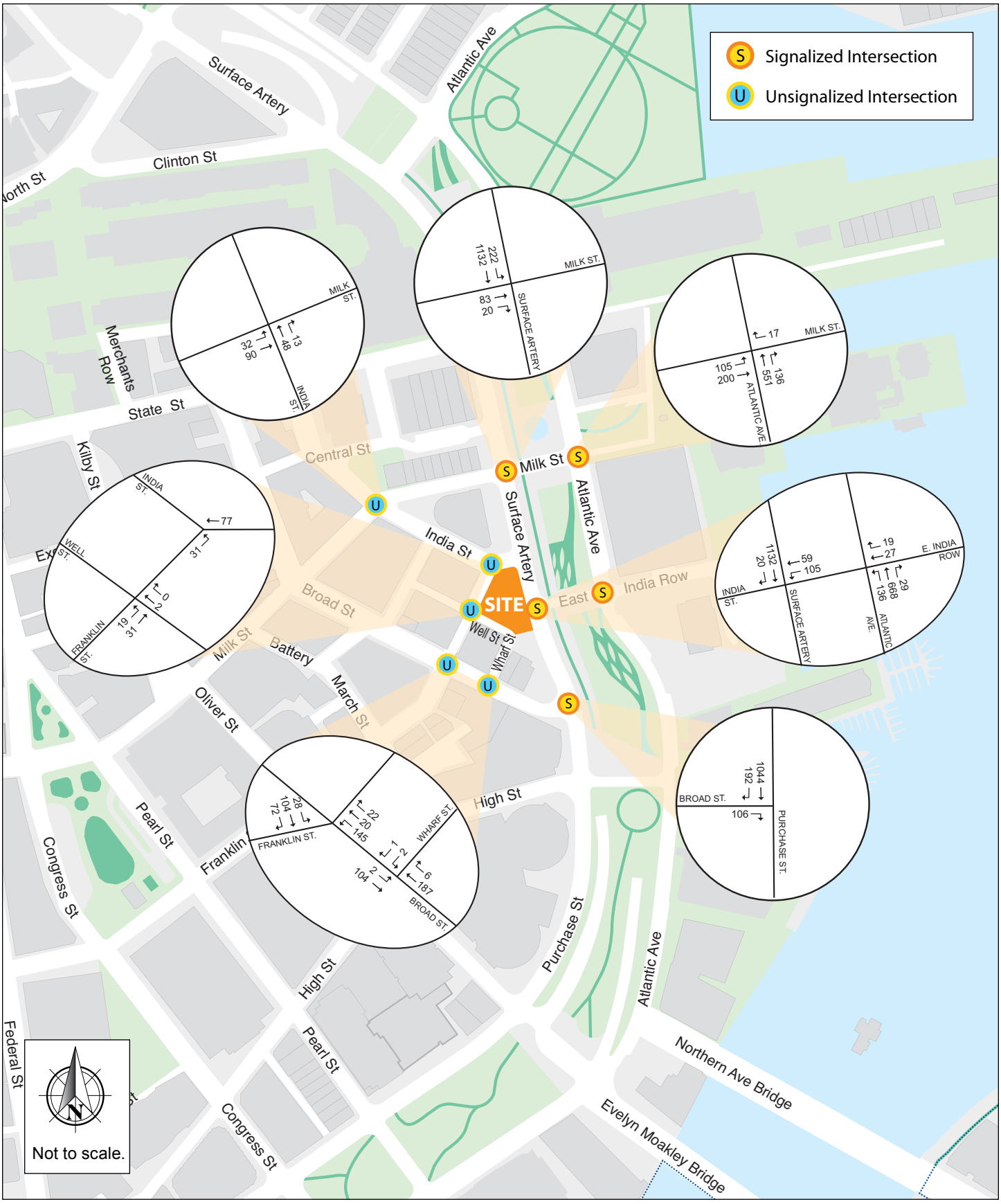

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Figure 2-2
Existing Conditions (2014) Turning Movement Volumes, a.m. Peak Hour (8:00-9:00 a.m.)

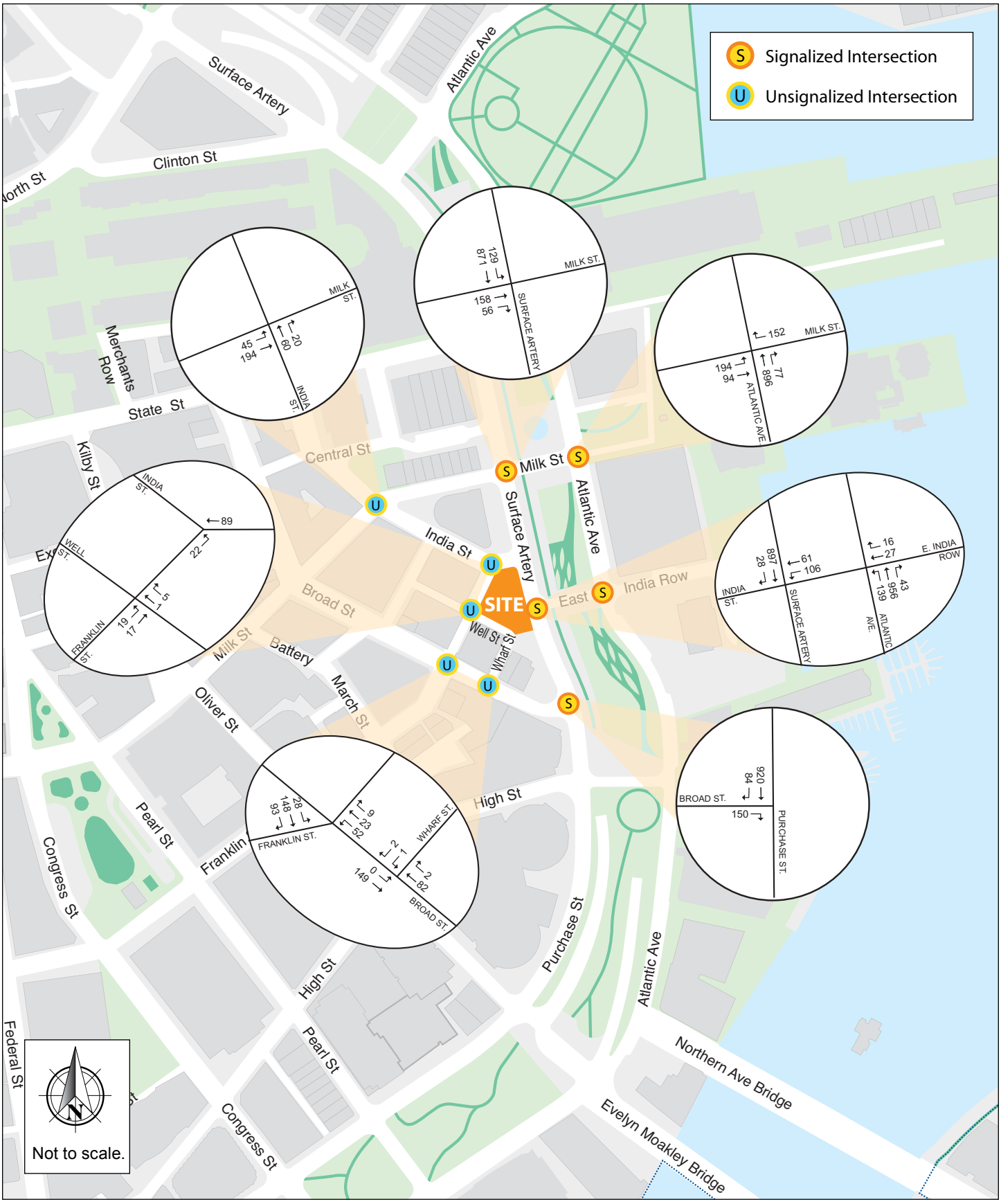

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Figure 2-3
Existing Conditions (2014) Turning Movement Volumes, p.m. Peak Hour (4:15-5:15 p.m.)

Field observations were performed by HSH to collect intersection geometry such as number of turning lanes, lane length, and lane width. Signal timing and phasing used in this analysis were obtained from the BTD and through the field observations conducted by HSH.

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-1 displays the intersection level of service criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst (unacceptable) 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 2-1 Level of Service Criteria

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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

Table 2-2 and Table 2-3 present the 2013 Existing conditions capacity analysis for the study area intersections during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

As shown in Table 2-2, during the a.m. peak hour, the signalized intersections operate at an overall LOS D or better. All movements at the unsignalized intersections operate at LOS B or better during the a.m. peak hour.

As shown in Table 2-3, during the p.m. peak hour, the majority of the signalized intersections operate at LOS D or better. The intersection of Atlantic Avenue/Milk Street operates at LOS F during the p.m. peak hour. All movements at the unsignalized intersections operate at LOS B or better during the p.m. peak hour.

Table 2-2 Existing Conditions (2014), Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**22.5**	—	—	—
Milk EB thru | thru/right	C	22.9	0.15	23	47
Surface Artery SB left/thru | thru | thru	C	22.5	0.71	263	318
Atlantic Avenue/Milk Street	**D**	**37.1**	—	—	—
Milk EB left l left	C	24.5	0.21	19	m30
Milk EB thru	F	>80.0	0.74	102	153
Milk WB right	A	0.2	0.05	0	0
Atlantic NB thru l thru/right	C	23.4	0.73	80	#201
Surface Artery/India Street	**A**	**8.4**	—	—	—
India WB left l left	D	39.3	0.32	35	62
India WB thru	D	41.2	0.32	40	78
Surface Artery SB thru l thru l thru/right	A	3.7	0.40	65	90
Atlantic Avenue/East India Row	**A**	**9.2**	—	—	—
East India Row WB thru/right	C	20.9	0.18	19	40
Atlantic NB left/thru l thru/right	A	8.3	0.49	126	167
Purchase Street/Broad Street	**A**	**1.2**	—	—	—
Broad EB right	A	1.1	0.24	0	0
Purchase SB thru l thru l thru/right	A	1.2	0.44	26	30
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.05	—	0
Milk NB left/thru	B	10.4	0.20	—	18
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.05	—	0
Franklin NB left	A	9.2	0.04	—	3
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	9.9	0.01	—	1
Franklin NB left/thru	A	3.3	0.02	—	2
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.6	0.03	—	2
Broad WB left/thru/right	A	6.7	0.15	—	13
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	0.3	0.00	—	0
Broad WB thru/right	A	0.0	0.14	—	0
Wharf SB left/right	B	11.2	0.02	—	2

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates unacceptable level of service.

Table 2-3 Existing Conditions (2014), Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**21.0**	—	—	—
Milk EB thru | thru/right	D	38.1	0.44	80	83
Surface Artery SB left/thru | thru | thru	B	16.1	0.50	156	194
Atlantic Avenue/Milk Street	**F**	**>80.0**	—	—	—
Milk EB left l left	F	>80.0	0.70	96	105
Milk EB thru	F	>80.0	0.50	71	120
Milk WB right	A	2.0	0.34	0	0
Atlantic NB thru l thru/right	C	26.7	0.86	165	#326
Surface Artery/India Street	**A**	**7.4**	—	—	—
India WB left l left	C	34.1	0.30	34	53
India WB thru	D	37.6	0.39	47	67
Surface Artery SB thru l thru l thru/right	A	1.6	0.33	15	35
Atlantic Avenue/East India Row	**B**	**10.4**	—	—	—
East India Row WB thru/right	C	21.7	0.16	17	44
Atlantic NB left/thru l thru/right	A	9.9	0.61	190	248
Purchase Street/Broad Street	**A**	**2.3**	—	—	—
Broad EB right	A	1.8	0.34	0	0
Purchase SB thru l thru l thru/right	A	2.4	0.35	1	71
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.07	—	0
Milk NB left/thru	B	12.5	0.40	—	48
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.07	—	0
Franklin NB left	A	9.6	0.03	—	3
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	6.7	0.01	—	0
Franklin NB left/thru	A	7.5	0.08	—	0
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.1	0.03	—	2
Broad WB left/thru/right	A	4.9	0.05	—	4
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	0.0	0.00	—	0
Broad WB thru/right	A	0.0	0.07	—	0
Wharf SB left/right	B	10.9	0.01	—	1

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates unacceptable level of service.

2.2.5 Existing Parking and Curb Usage

On-street parking regulations in the study area consist of a mixture of no parking, commercial parking, metered parking, loading zones, cabstands, and handicapped-designated spaces. A significant number of metered parking spaces lie within the immediate area of the site, mostly on Broad Street, Franklin Street, India Street, Milk Street and Atlantic Avenue. Parking is prohibited on Wharf Street, Well Street, Franklin Street between Broad Street and India Street, and Surface Artery/Purchase Street within the study area. The on-street parking regulations are shown in Figure 2-4.

Approximately 6,830 off-street parking spaces are located in lots and garages within a quarter-mile radius of the Project: 141 lot spaces and 6,689 garage spaces. Of these off-street spaces, 2,525 are in private facilities and 4,305 are open to the public. These parking facilities and associated capacities are identified in Figure 2-5 and Table 2-4 and Table 2-5, respectively, for lots and garages.

Table 2-4 Off-Street Parking Lots within a Quarter-Mile of the Site

Map #	Address	Parking Lot Facility	Private Capacity	Public Capacity
1	53–59 India Street [1]	53–59 India Street	0	14
2	51 India Street [1]	51 India Street	10	0
3	Wendell Street	Wendell Street Lot	15	0
4	47–49 Broad Street	Broad & Water Street Lot	0	21
5	15–17 Northern Avenue	James Hook & Co. Lot	20	0
6	49–51 Chatham Street	Chatham Street Lot A	0	31
7	57 Chatham Street	Chatham Street Lot B	0	30
Lots—Subtotal			**45**	**96**

1 Will be eliminated with the construction of the Project.

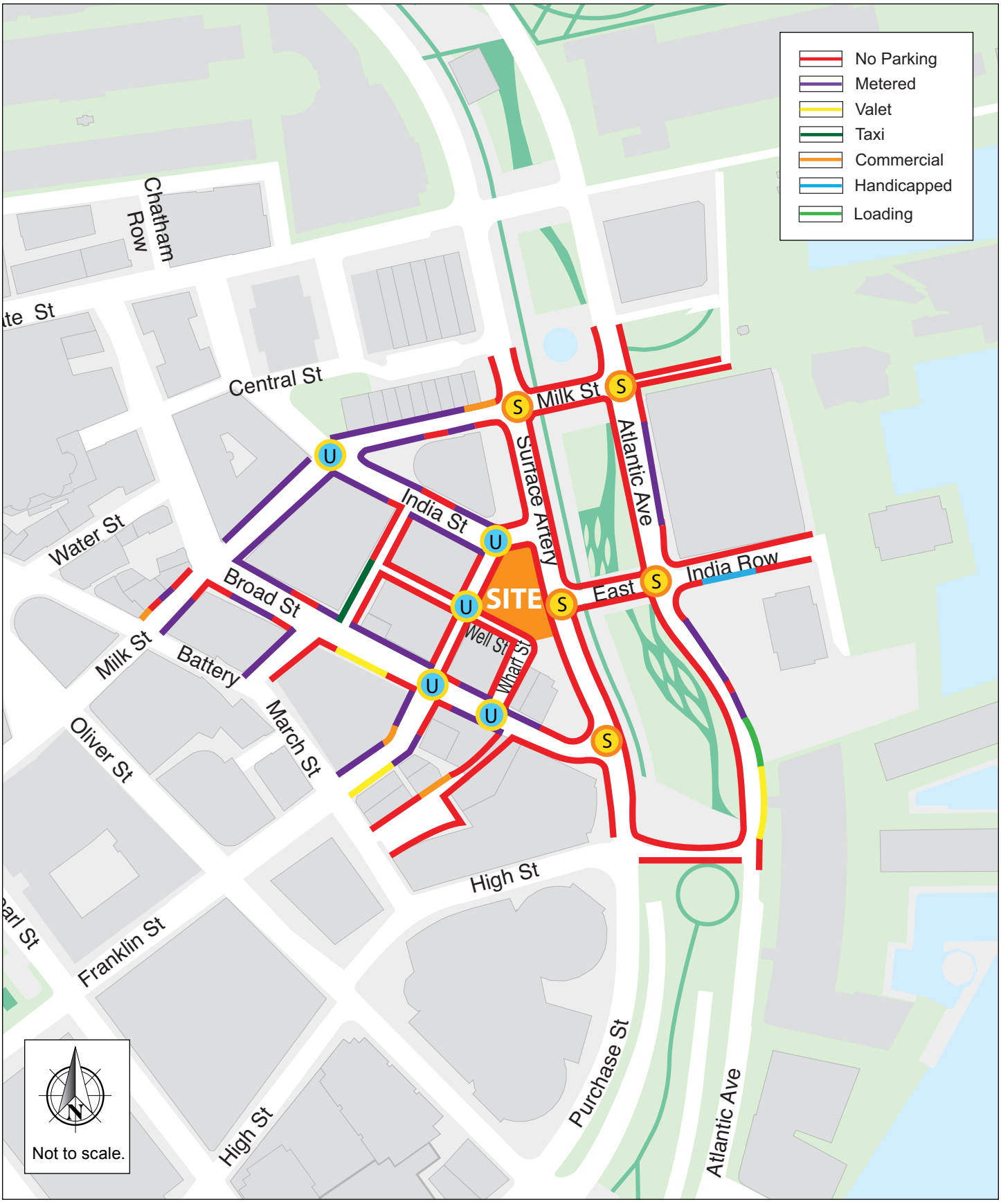

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Figure 2-4
On-street Parking in the Study Area

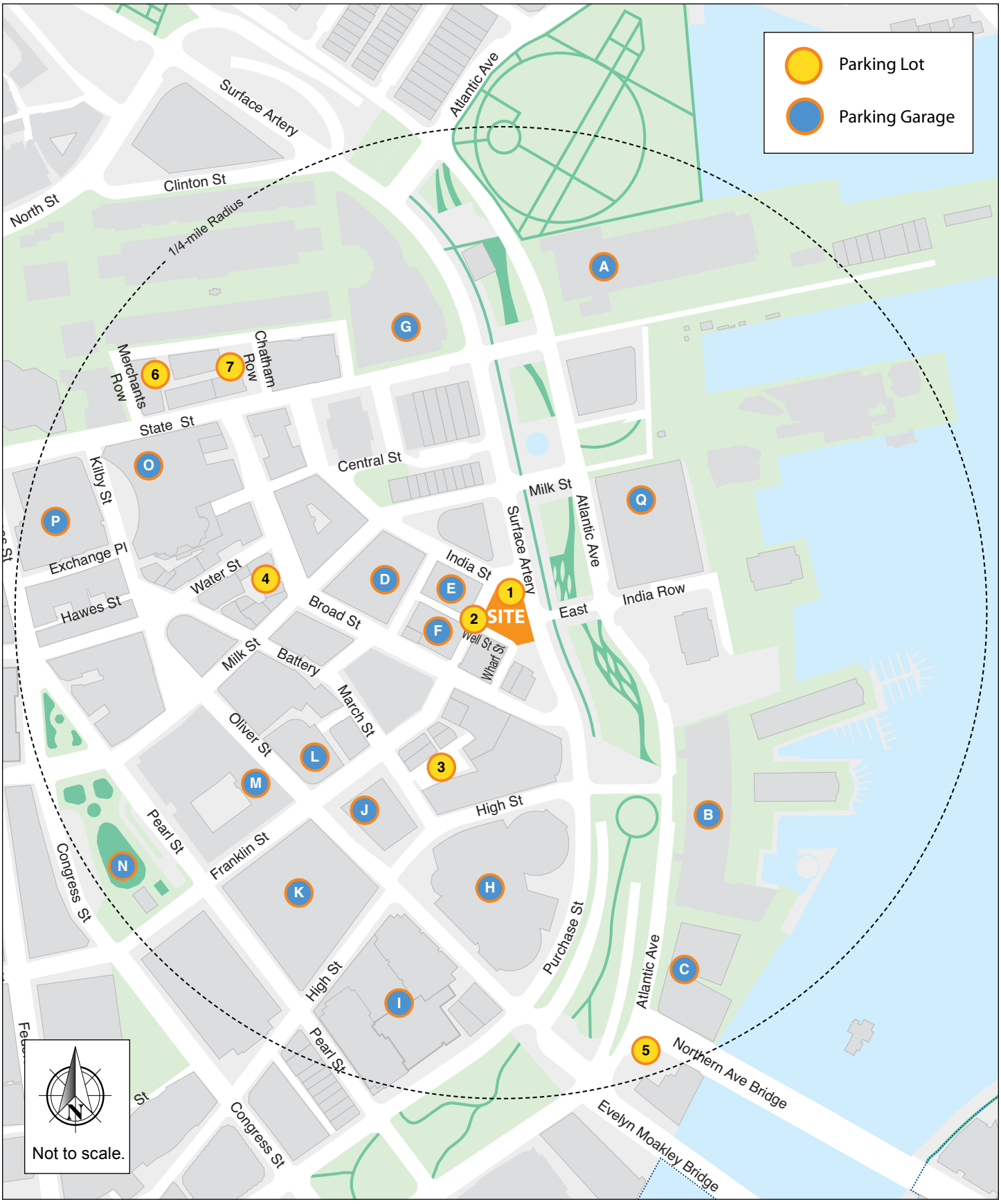

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Figure 2-5
Off-street Parking in the Study Area

Table 2-5 Off-Street Parking Garages within a Quarter-Mile of the Site

Map #	Address	Parking Garage Facility	Private Capacity	Public Capacity
A	New Atlantic Ave. @ State St.	Long Wharf Hotel	190	0
B	10–30 Rowes Wharf	Rowes Wharf Garage	420	280
C	470 Atlantic Avenue	470 Atlantic Avenue	119	0
D	20 Custom House Street	20 Custom House Street Garage	62	0
E	21 Custom House Street	21 Custom House Street Garage	42	0
F	80 Broad Street	Folio	88	30
G	200 State Street	Marketplace Center Garage	0	120
H	High Street	International Place	0	827
I	125 High Street	125 High St Garage	700	150
J	265 Franklin Street	Paine Webber Building	128	0
K	225 Franklin Street	State Street Bank Building	0	200
L	260 Franklin Street	Franklin Street Garage	83	0
M	1 Post Office Square	One Post Office Sq. Garage	318	82
N	Post Office Square	New Post Office Sq. Garage	0	900
O	75 State Street	75 State Street Garage	0	700
P	53 State Street	Exchange Place	93	0
Q	70 East India Row	Aquarium Garage	300	1,175
Garage Subtotal			**2,450**	**4,239**
Quarter-mile Radius Lots + Garages			**2,495**	**4,335**
Quarter-mile Radius Total Capacity			**6,830**	

Source: Boston Air Pollution Control Commission.

2.2.6 Existing Public Transportation

The Project site is well served by public transportation. The MBTA public transportation services are shown in Figure 2-6 and summarized in Table 2-6.

Within a quarter-mile of the Project site are the MBTA Aquarium and State Street stations, which provide access to both the Orange Line and the Blue Line. MBTA Bus Route 4, Route 92, and Route 93 also operate near the Project site, with stops located about one-third mile west of the Project site near the intersection of State Street and Congress Street.

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Figure 2-6
Public Transportation in the Study Area

Also, in proximity to the Project site are three MBTA commuter ferries: the Hingham-Boston route running between Rowes Wharf and Hingham; the Hull-Boston-Logan Airport route running between Long Wharf, Logan Airport, Hingham, and Hull; and the Charlestown-Boston route running between Long Wharf and the Charlestown Navy Yard. South Station, which provides connections to the MBTA Red Line, South Side commuter rail service, and AMTRAK service is approximately a half-mile from the Project site and is within easy walking distance along the Rose Kennedy Greenway.

Table 2-6 MBTA Transit Service in the Study Area

Transit Service	Description	Peak-hour Headway (in minutes) [1]
Rapid Transit Routes		
Blue Line	Bowdoin – Wonderland	5
Orange Line	Forest Hills – Oak Grove	6
Local Bus Routes		
4	North Station-World Trade Center via Federal Courthouse and South Station	~12
92	Assembly Square Mall – Downtown	~15
93	Sullivan Square Station – Downtown	~7
Commuter Ferry Routes [2]		
Hingham - Boston		~15-30
Hull – Boston – Logan Airport		~20-35
Charlestown – Boston		~15

1 Headway is the scheduled time between trains, buses, or boats, as applicable. Source: MBTA.com, August 2013.

2.2.7 Existing Pedestrian Conditions

The Project site is conveniently located adjacent to the Rose Kennedy Greenway, which provides approximately 1.5 miles of biking, walking, and jogging paths between South Station and the North End.

Currently, sidewalks in the study area are generally in good condition and supply more than adequate capacity. In addition, Broad Street is currently being reconstructed as a part of Boston's Crossroads Initiative. The Broad Street design will consist of a wider, tree-lined pedestrian area connecting the Rose Kennedy Greenway to State Street, Government Center, and the Faneuil Hall marketplace. The design will also improve the street for multi-modal transportation including improved accessibility and bicycle accommodations including new bicycle storage racks.

Pedestrian counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-7 for the a.m. and p.m. peak hours. As shown, pedestrian volumes are heaviest along the roadways adjacent to the Rose Kennedy Greenway.

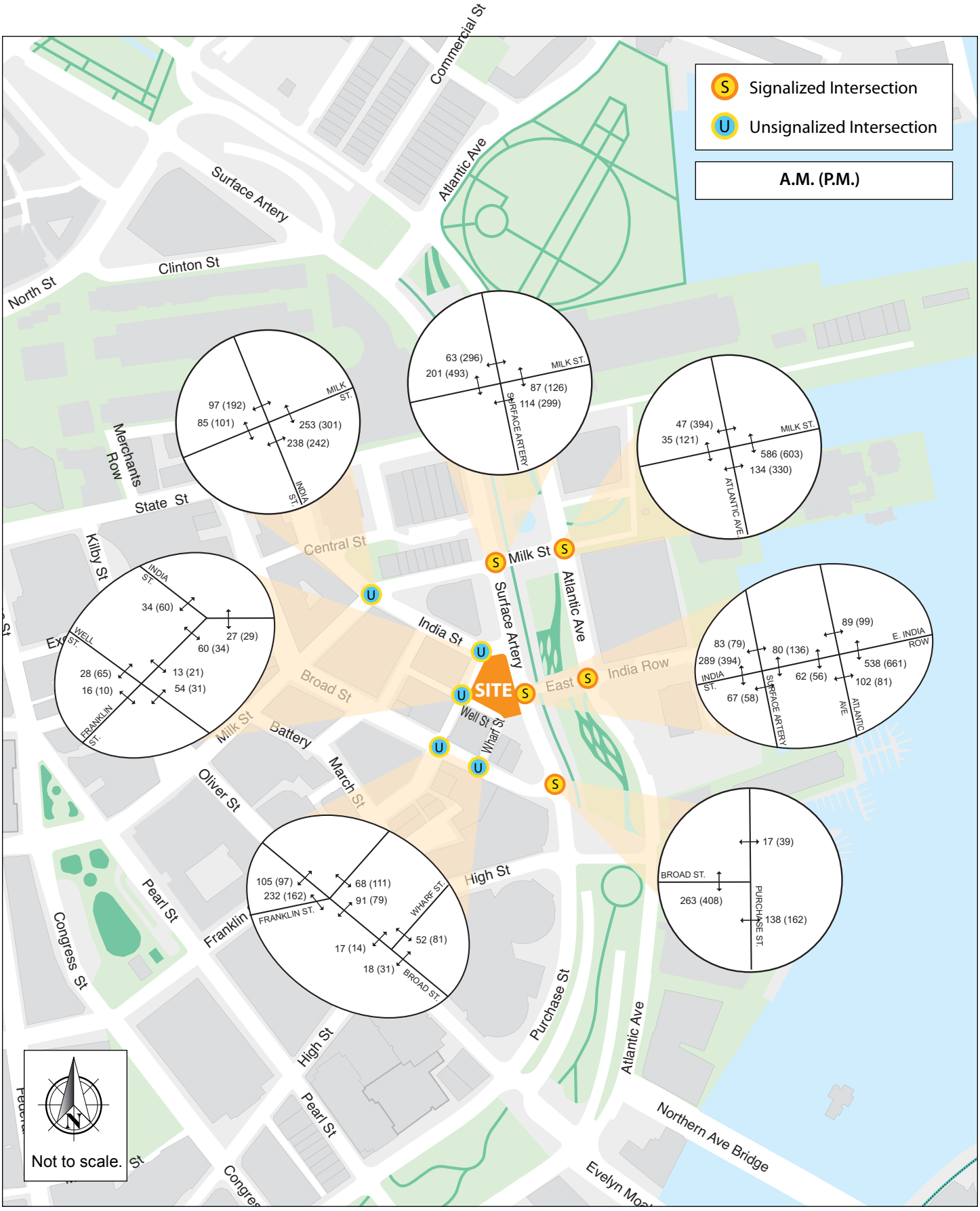

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Figure 2-7

Existing Conditions (2014) Pedestrian Volumes, a.m. and p.m. Peak Hours

2.2.8 Existing Bicycle Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is located adjacent to the Rose Kennedy Greenway, which follows Atlantic Avenue, Surface Artery, and Purchase Street between Chinatown and the North End. Bicycle lanes are provided on Atlantic Avenue in the northbound direction and Surface Artery/Purchase Street in the southbound direction along the Greenway. Sharrows are provided along Milk Street and a faded bicycle lane is provided along Franklin Street in the southbound direction, south of Broad Street. The following roadways within the study area are designated bicycle routes on the City of Boston's "Bike Routes of Boston" map:

- Atlantic Avenue is designated as an intermediate route suitable for riders with some on-road experience. Atlantic Avenue has an exclusive bicycle lane.

- Milk Street is designated as an intermediate route suitable for riders with some on-road experience.

Hubway is a bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 100 stations and 1,000 bicycles. As shown in Figure 2-8, there are three Hubway stations in close proximity to the Project site:

- Aquarium Station – Located at the intersection of Atlantic Avenue and State Street, this Hubway station has an overall capacity of 19 bicycles.

- Post Office Square – Located at the intersection of Milk Street and Pearl Street, this Hubway station has an overall capacity of 18 bicycles.

- Rowes Wharf – Located at Rowes Wharf along Atlantic Avenue, this Hubway station has an overall capacity of 15 bicycles.

- Milk Street at India Street – Located along Milk Street, this Hubway station has an overall capacity of 19 bicycles.

Bicycle counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-9 for the a.m. and p.m. peak hours. As shown in Figure 2-9, bicycle volumes are heaviest along Surface Artery/Purchase Street and Atlantic Avenue.

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Figure 2-8
Shared Bicycle/Cars in the Study Area

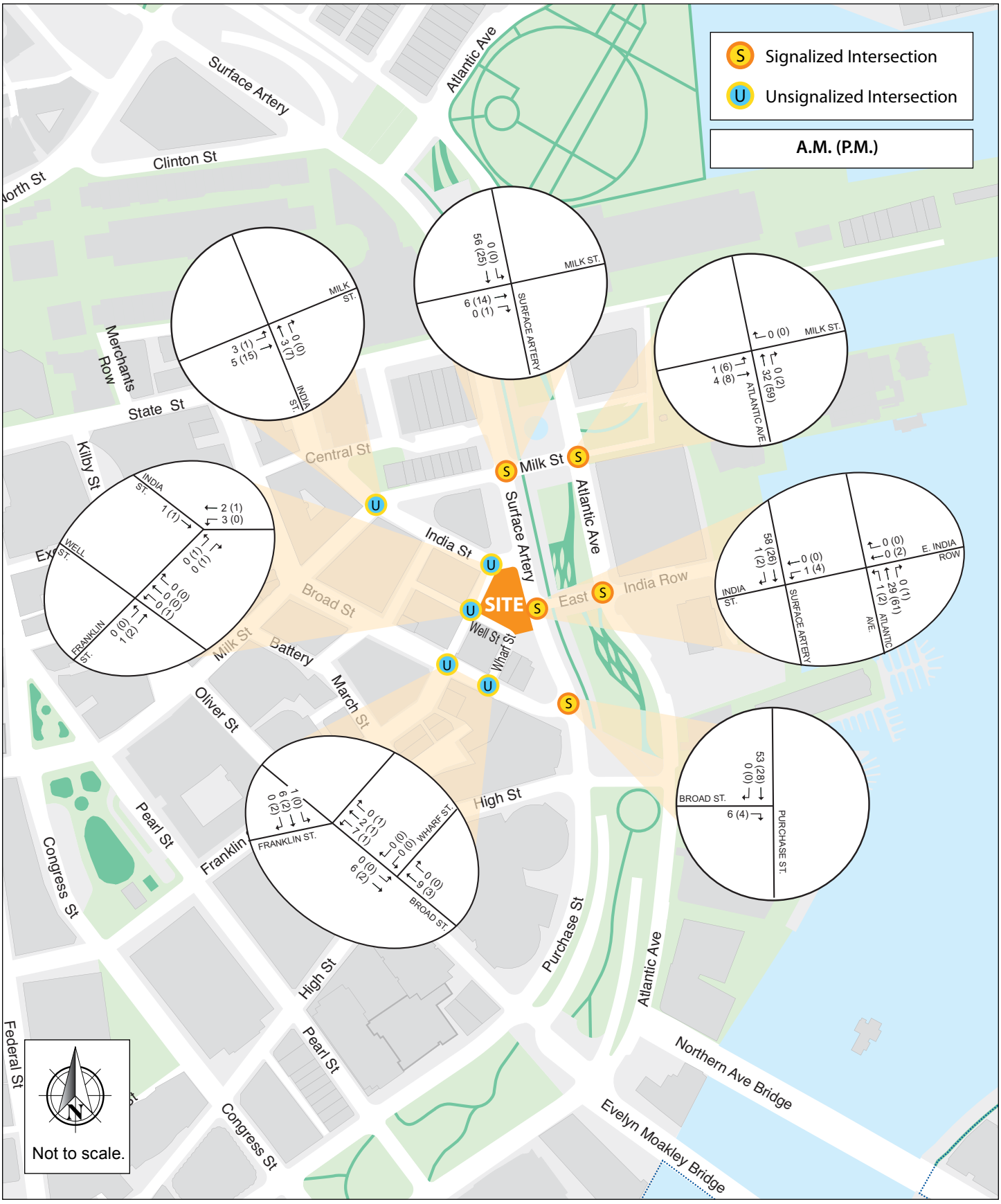

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Figure 2-9
Existing Conditions (2014) Bicycle Volumes, a.m. and p.m. Peak Hours

2.2.9 Car Sharing Services

Car sharing, predominantly served by Zipcar in the Boston area, provides easy access to vehicular transportation for those who want short term access to a vehicle. 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.

There are six car sharing locations within a quarter-mile of the Project site, including the ten spaces located at the Project site. The nearby Zipcar locations are shown in Figure 2-8.

2.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No-Build conditions (without the proposed project) and Build conditions (with the proposed project). In accordance with BTD guidelines, these conditions are projected to a future date five years from the Existing conditions year. For this evaluation of this Project, 2019 was selected as the horizon year for the future conditions analyses.

This section presents a description of the 2019 future conditions scenarios and includes an evaluation of the transportation facilities under the No-Build and Build conditions.

2.3.1 No-Build Conditions

The No-Build conditions reflect a future scenario that incorporates any anticipated traffic volume changes independent of the Project and any planned infrastructure improvements that will affect travel patterns throughout the study area. Infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements. Traffic volume changes are based on two factors: annual background growth and growth associated with specific developments near the project.

2.3.1.1 Background Traffic Growth

Two methodologies are used to account for future traffic growth, independent of the Project. The first methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. The second methodology accounts for specific developments proposed in the vicinity of the Project site. Based on a review of recent traffic studies conducted for nearby projects and to account for any additional unforeseen traffic growth, a one-percent per year annual traffic growth rate was used to develop the future conditions traffic volumes.

The second methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. Currently, there are no proposed projects within the vicinity of the Project site that will have a significant impact at the study area intersections. However, there is a potential for future

development at the adjacent parcel immediately south of the Project site at the corner of Surface Artery and Broad Street. To account for any future development on this parcel, it was assumed that a development similar in size and use to the Project could be built. Additional trips associated with the development of the adjacent parcel at the corner of Surface Road and Broad Street were estimated and included in the future conditions traffic volumes.

The one-percent per year annual growth rate was applied to the 2014 Existing conditions traffic volumes, then the traffic volumes associated with the potential background development project listed above were added to develop the 2019 No-Build conditions traffic volumes. The 2019 No-Build a.m. and p.m. peak hour traffic volumes are shown on Figure 2-10 and Figure 2-11, respectively.

2.3.1.2 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any projects in the vicinity of the study area. The following project is currently under construction:

- **Broad Street – Crossroads Initiative** – This project is being undertaken by the BRA and is currently under construction. The project entails improvements along Broad Street between State Street and Surface Artery/Rose Kennedy Greenway including the widening of sidewalks, new street lighting, improved handicap accessibility, and the addition of new trees to the streetscape.

2.3.1.3 No-Build Conditions Traffic Operations

The 2019 No-Build conditions scenario analysis uses the same methodology as the 2014 Existing conditions scenario analysis. Table 2-7 and Table 2-8 present the 2019 No-Build conditions operations analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the 2014 Existing conditions and the 2019 No-Build conditions. The detailed analysis sheets are provided in Appendix C.

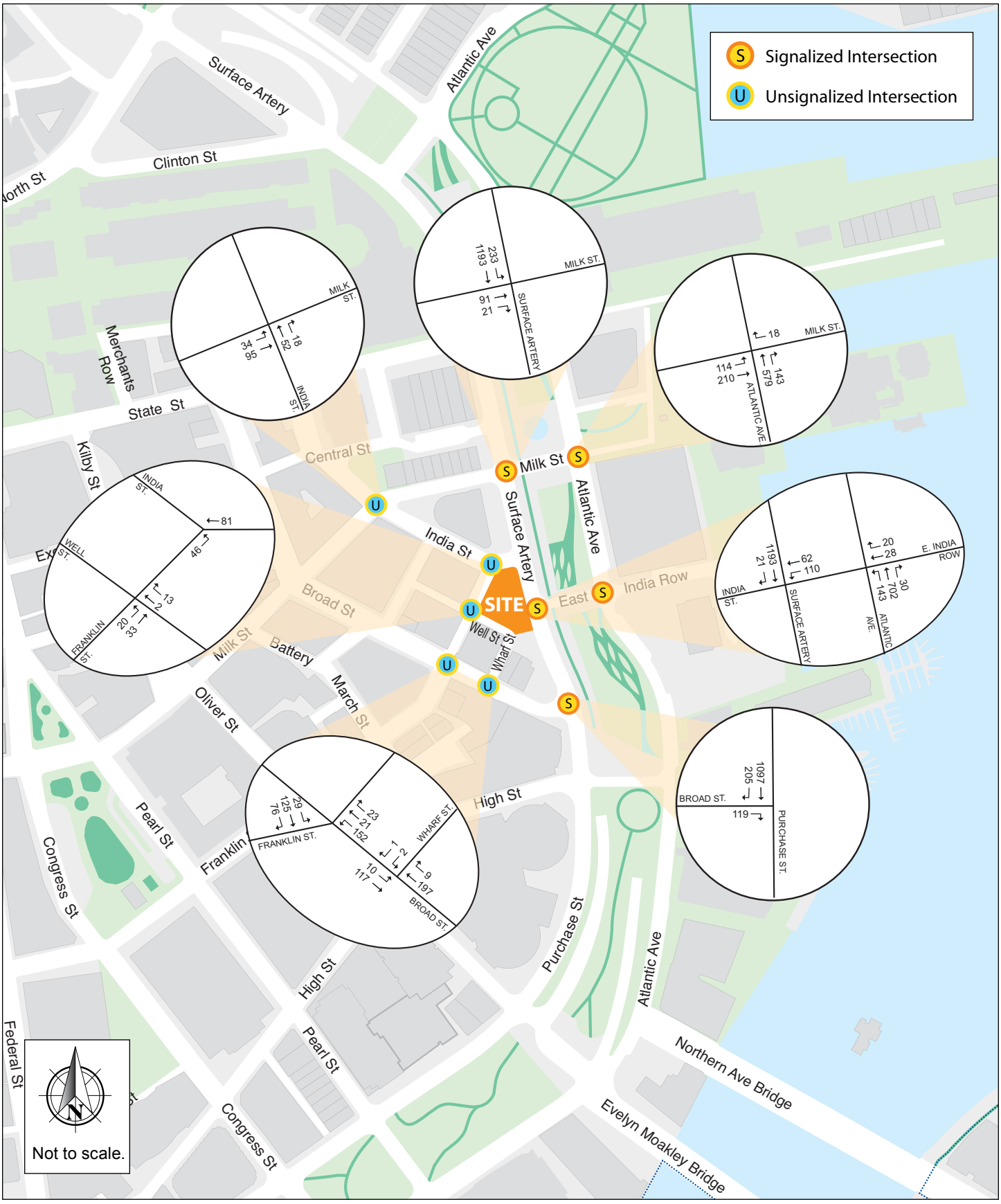

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Figure 2-10
No-Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

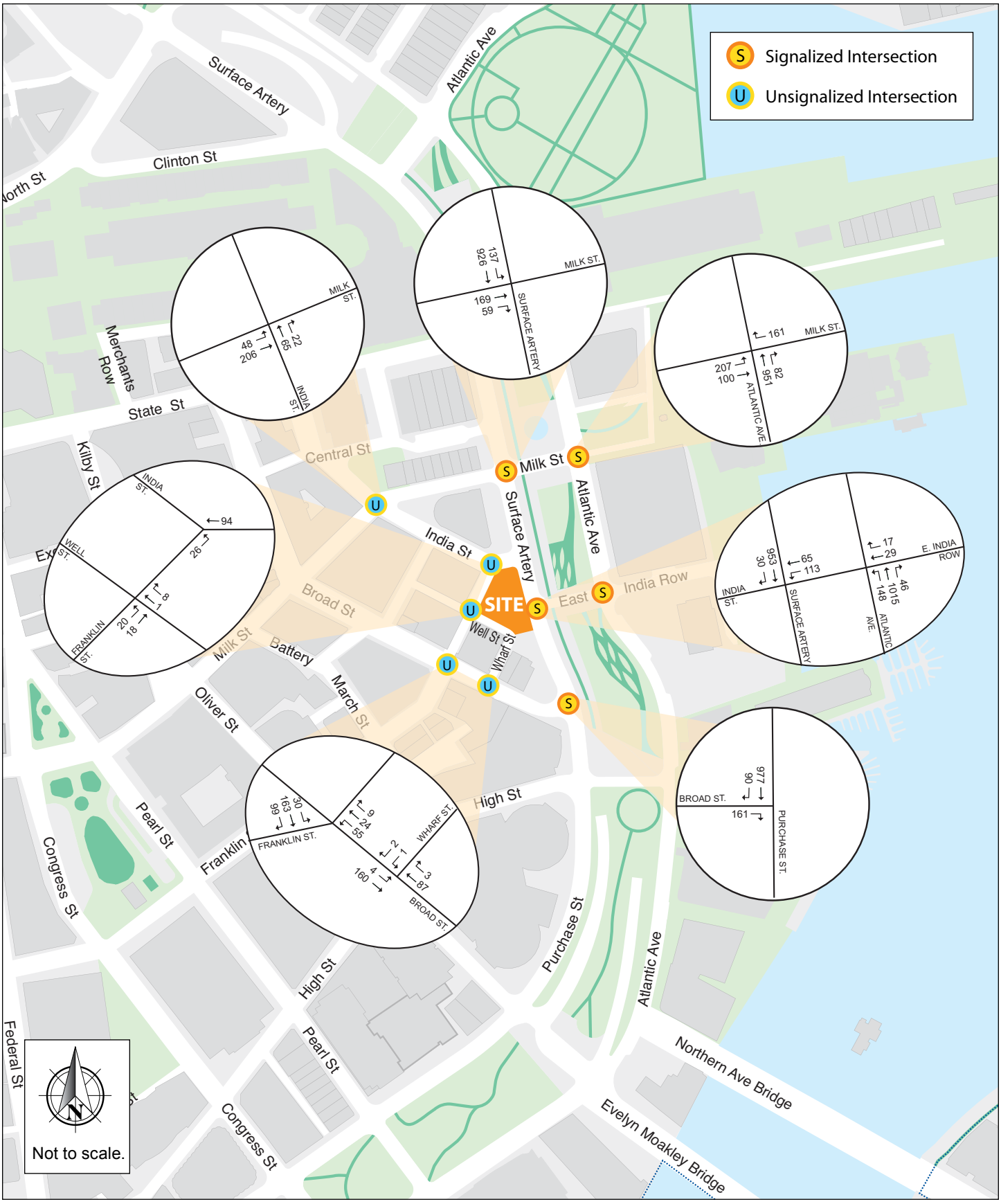

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Figure 2-11
No-Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Table 2-7 No-Build Conditions (2019), Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**23.6**	—	—	—
Milk EB thru | thru/right	C	23.2	0.17	26	51
Surface Artery SB left/thru | thru | thru	C	23.7	0.74	284	344
Atlantic Avenue/Milk Street	**D**	**45.6**	—	—	—
Milk EB left l left	C	26.2	0.22	22	m34
Milk EB thru	F	>80.0	0.75	112	m169
Milk WB right	A	0.2	0.05	0	0
Atlantic NB thru l thru/right	C	25.6	0.78	88	#310
Surface Artery/India Street	**A**	**8.4**	—	—	—
India WB left l left	D	39.1	0.34	36	64
India WB thru	D	41.1	0.34	42	81
Surface Artery SB thru l thru l thru/right	A	3.8	0.43	65	94
Atlantic Avenue/East India Row	**A**	**9.4**	—	—	—
India WB thru/right	C	20.8	0.19	20	41
Atlantic NB left/thru l thru/right	A	8.6	0.52	136	181
Purchase Street/Broad Street	**A**	**1.3**	—	—	—
Broad EB right	A	1.4	0.27	0	0
Purchase SB thru l thru l thru/right	A	1.3	0.46	27	31
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.06	—	0
Milk NB left/thru	B	10.6	0.21	—	20
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.06	—	0
Franklin NB left	A	9.3	0.06	—	5
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	9.1	0.02	—	2
Franklin NB left/thru	A	3.3	0.02	—	2
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.5	0.03	—	2
Broad WB left/thru/right	A	6.9	0.16	—	14
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	1.3	0.00	—	1
Broad WB thru/right	A	0.0	0.15	—	0
Wharf SB left/right	B	11.7	0.02	—	2

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates that LOS has worsened from Existing Conditions.

Table 2-8 No-Build Conditions (2019), Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**22.2**	—	—	—
Milk EB thru | thru/right	D	42.1	0.47	87	89
Surface Artery SB left/thru | thru | thru	B	16.6	0.53	170	210
Atlantic Avenue/Milk Street	**F**	**>80.0**	—	—	—
Milk EB left l left	F	>80.0	0.74	104	110
Milk EB thru	F	>80.0	0.54	76	127
Milk WB right	A	2.3	0.37	0	0
Atlantic NB thru l thru/right	C	33.2	0.91	221	#463
Surface Artery/India Street	**A**	**7.5**	—	—	—
India WB left l left	C	34.1	0.32	36	m55
India WB thru	D	37.7	0.42	49	70
Surface Artery SB thru l thru l thru/right	A	1.6	0.35	15	37
Atlantic Avenue/East India Row	**B**	**11.1**	—	—	—
India WB thru/right	C	22.0	0.17	18	46
Atlantic NB left/thru l thru/right	B	10.6	0.64	212	276
Purchase Street/Broad Street	**A**	**2.4**	—	—	—
Broad EB right	A	2.1	0.38	0	0
Purchase SB thru l thru l thru/right	A	2.5	0.37	1	75
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.08	—	0
Milk NB left/thru	B	13.0	0.43	—	54
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.08	—	0
Franklin NB left	A	9.7	0.04	—	3
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	6.7	0.02	—	0
Franklin NB left/thru	A	7.5	0.08	—	0
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.1	0.03	—	2
Broad WB left/thru/right	A	5.0	0.05	—	4
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	0.5	0.01	—	1
Broad WB thru/right	A	0.0	0.08	—	0
Wharf SB left/right	B	11.1	0.01	—	1

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

As shown in Table 2-7, the signalized intersections will continue to operate at an overall LOS D or better during the a.m. peak hour under the 2019 No-Build conditions, with all movements at the unsignalized intersections continuing to operate at LOS B or better.

As shown in Table 2-8, the majority of the signalized intersections will continue to operate at an overall LOS D or better during the p.m. peak hour under the 2019 No-Build conditions. The intersection of Atlantic Avenue/Milk Street will continue to operate at an overall LOS F. All movements at the unsignalized intersections will continue to operate at LOS B or better.

2.3.2 Build Conditions

As previously summarized, the Project will consist of 44 residential condominium units and 4,000 sf of restaurant/retail space. No vehicular parking will be provided on the Project site. Secure storage for approximately 44 bicycles will also be provided on site. The 2019 Build conditions reflect a future scenario that adds anticipated Project-generated trips to the 2019 No-Build conditions traffic volumes.

2.3.2.1 Site Access and Circulation

As shown in the Site Access Plan in Figure 2-12, no parking will be provided at the Project site. Vehicular access to the site will be provided curbside along Well Street. There will be minimal vehicular activity destined to and from the Project site. The majority of vehicular activity will be for pick-up/drop-offs, move-in/move-out, service, and delivery vehicles.

In addition, the Proponent will reconstruct the segments of Wharf Street and Well Street between Broad Street and Franklin Street to be at-grade with the existing sidewalk. By bringing the roadway at-grade with the existing sidewalk, a shared space will be created to be used by pedestrians, bicycles, and vehicles. It will also allow easier two-way travel along Well Street, which is currently only wide enough to accommodate a single vehicle in one direction. It will also allow for easier unloading and loading of delivery vehicles and better access for emergency vehicles.

Pedestrian access to the residences will be provided from Well Street, with doors opening to the residential lobby of the building and to the stairwell providing access to the upper levels. Pedestrian access to the commercial space will be provided along Surface Artery and at the corner of the intersection of Surface Artery and India Street.

2.3.2.2 Trip Generation

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

55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 2-12

Site Access Plan

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*[1] 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 unadjusted number of vehicular trips for the Project, the following ITE land use codes (LUCs) were used:

LUC 230 – Residential Condominium/Townhouse. The residential condominium/ townhouse land use is defined as an ownership unit with at least one other owned unit within the same building structure. Trip generation estimates are based on average vehicular rates per unit.

LUC 932 – High-Turnover (Sit-Down) Restaurant. The high-turnover (sit-down) restaurant land use is defined as a full-service eating establishment with a typical stay duration of approximately one hour. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross floor area. Restaurant use rather than retail use was chosen to be conservative as it is a higher trip generator than retail use.

2.3.2.3 Mode Share

The BTD publishes vehicle, transit, and walking/bicycling mode split rates for different areas of Boston. The Project site is located within BTD's designated Area 2. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The BTD's travel mode share data for Area 2 are shown in Table 2-9.

Table 2-9 Travel Mode Shares

Land Use	Direction	Walk/ Bicycle Share	Transit Share	Auto Share	Local Vehicle Occupancy Rate
Daily					
Condominium	In	42%	30%	28%	1.13
	Out	42%	30%	28%	1.13
Restaurant	In	59%	20%	21%	2.20
	Out	59%	20%	21%	2.20

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

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

Table 2-9 Travel Mode Shares (Continued)

Land Use	Direction	Walk/ Bicycle Share	Transit Share	Auto Share	Local Vehicle Occupancy Rate
a.m. Peak Hour					
Condominium	In	7%	52%	41%	1.13
	Out	51%	18%	31%	1.13
Restaurant	In	14%	46%	40%	2.20
	Out	58%	10%	32%	2.20
p.m. Peak Hour					
Condominium	In	51%	18%	31%	1.13
	Out	7%	52%	41%	1.13
Restaurant	In	58%	10%	32%	2.20
	Out	14%	46%	40%	2.20

2.3.2.4 Vehicle Trip Generation

To develop the overall trip generation characteristics of the Project, the adjusted vehicular trips associated with the Project were estimated. The Project-generated new vehicle trips are summarized in Table 2-10, with the detailed trip generation information provided in Appendix C.

Table 2-10 Project Vehicle Trip Generation

Time Period	Direction	Condominium [1]	Restaurant [2]	Total
Daily	In	36	53	89
	Out	36	53	89
	Total	**72**	**106**	**178**
a.m. Peak Hour	In	1	10	11
	Out	5	6	11
	Total	**6**	**16**	**22**
p.m. Peak Hour	In	5	7	12
	Out	3	6	10
	Total	**8**	**13**	**22**

1 Based on ITE LUC 230 – Residential Condominium/Townhouse for 44 units.
2 Based on ITE LUC 932 – High-Turnover (Sit-Down) Restaurant for 4,000 sf.

As shown in Table 2-10, the Project is expected to generate approximately 178 new daily vehicle trips (89 entering and 89 exiting), with 22 new vehicle trips (11 entering and 11 exiting) during the a.m. peak hour and 22 new vehicle trips (12 entering and 10 exiting) during the p.m. peak hour.

2.3.2.5 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 2 and trip distribution patterns presented in a traffic study conducted for a nearby project[3]. The trip distribution patterns for the Project are illustrated in Figure 2-13 and Figure 2-14 for the entering and exiting trips, respectively. The trip distribution patterns assume that all vehicular related trips will travel to the Project site. The actual trip distribution patterns may vary slightly from what is shown in the figures based on the location of the garages that will be used by the residents of the Project.

The Project-generated vehicle trips were assigned to the study area roadway network based on the trip distribution patterns shown in Figures 2-13 and 2-14 and are shown in Figure 2-15 and Figure 2-16 for the a.m. and p.m. peak hours, respectively. The Project-generated trips were added to the 2019 No-Build conditions traffic volumes to develop the 2019 Build conditions peak hour traffic volume networks and are shown in Figure 2-17 and Figure 2-18 for the a.m. and p.m. peak hours, respectively.

2.3.2.6 Build Conditions Traffic Operations

The 2019 Build conditions scenario analyses use the same methodology as the 2014 Existing and 2019 No-Build conditions scenario analyses. The results of the 2019 Build condition traffic analysis at study area intersections are presented in Table 2-11 and Table 2-12 for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

[3] *Harbor Garage Redevelopment – Project Notification Form*; Boston, Massachusetts; Howard/Stein-Hudson Associates; April 16, 2009.

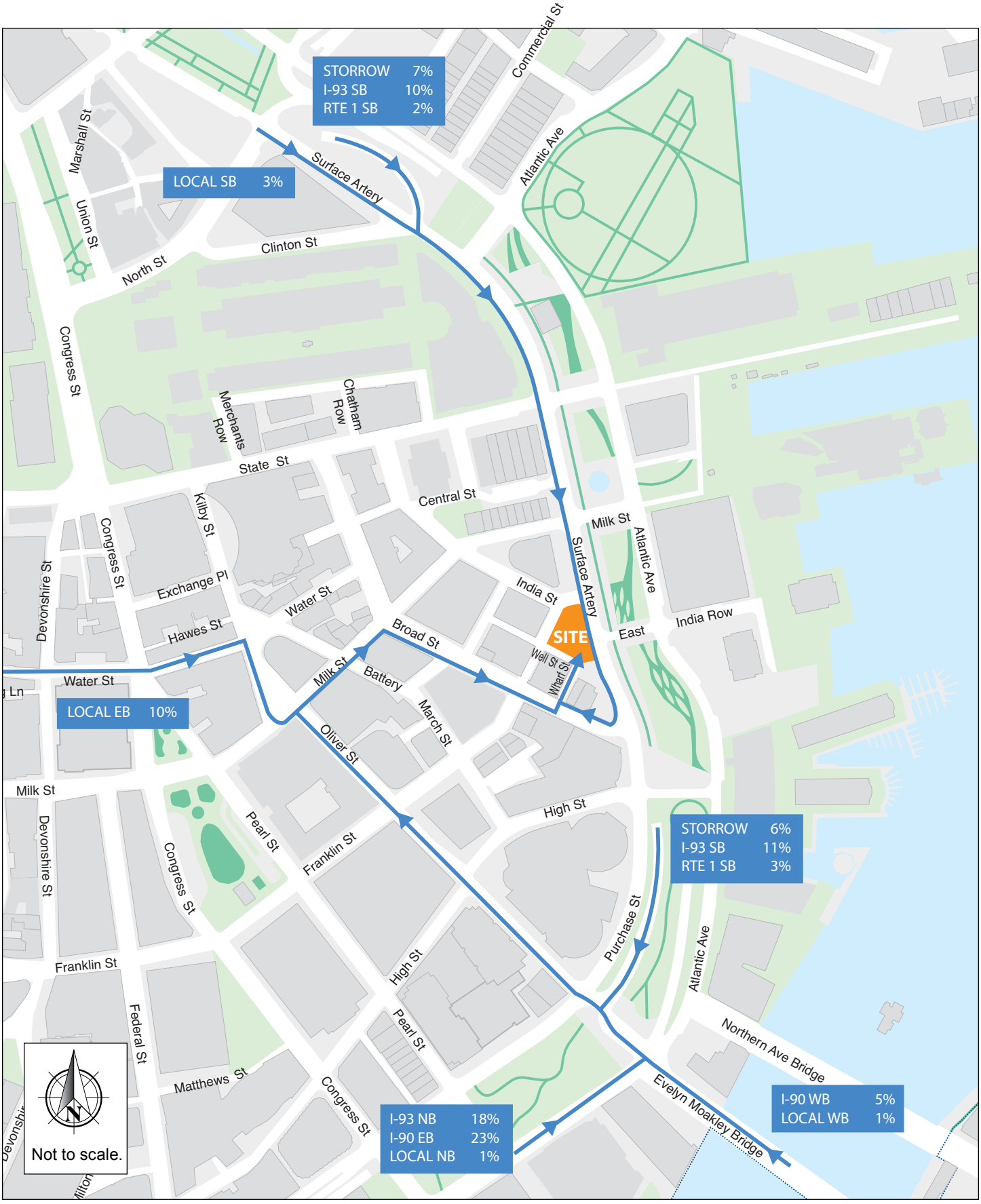

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Figure 2-13
Vehicle Trip Distribution: Entering

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Figure 2-14
Vehicle Trip Distribution: Exiting

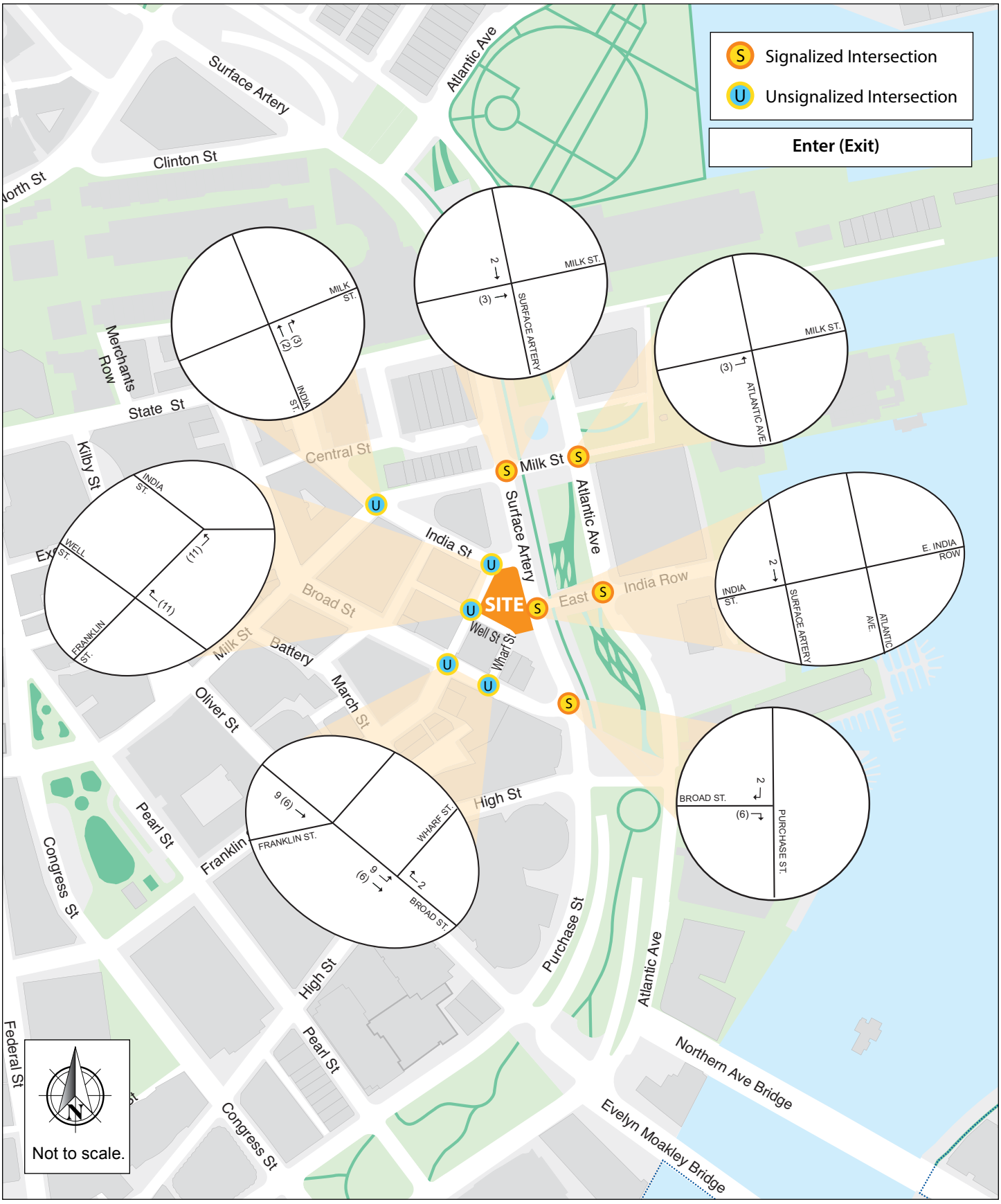

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Figure 2-15
Project-generated Trips, a.m. Peak Hour

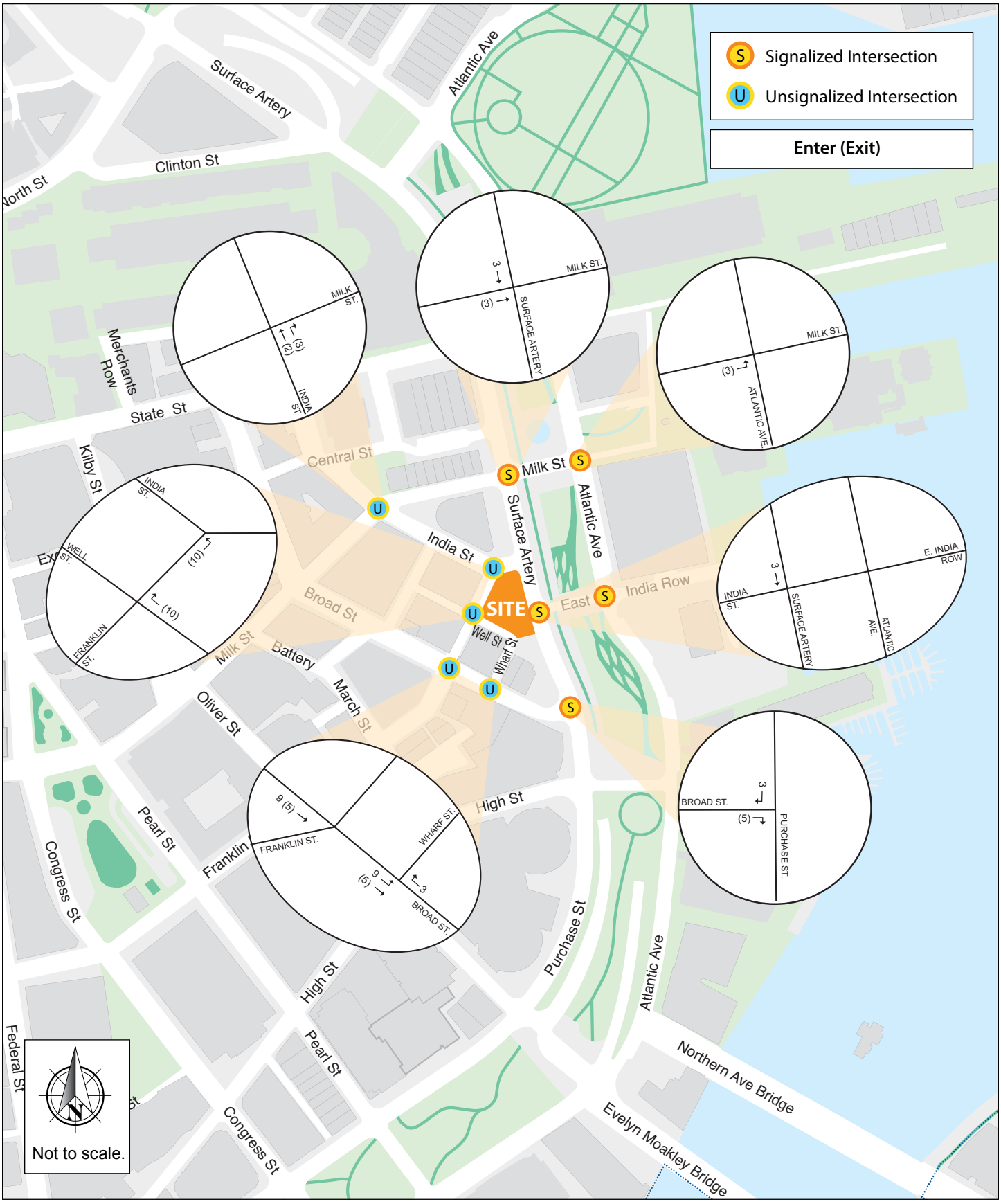

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Figure 2-16
Project-generated Trips, p.m. Peak Hour

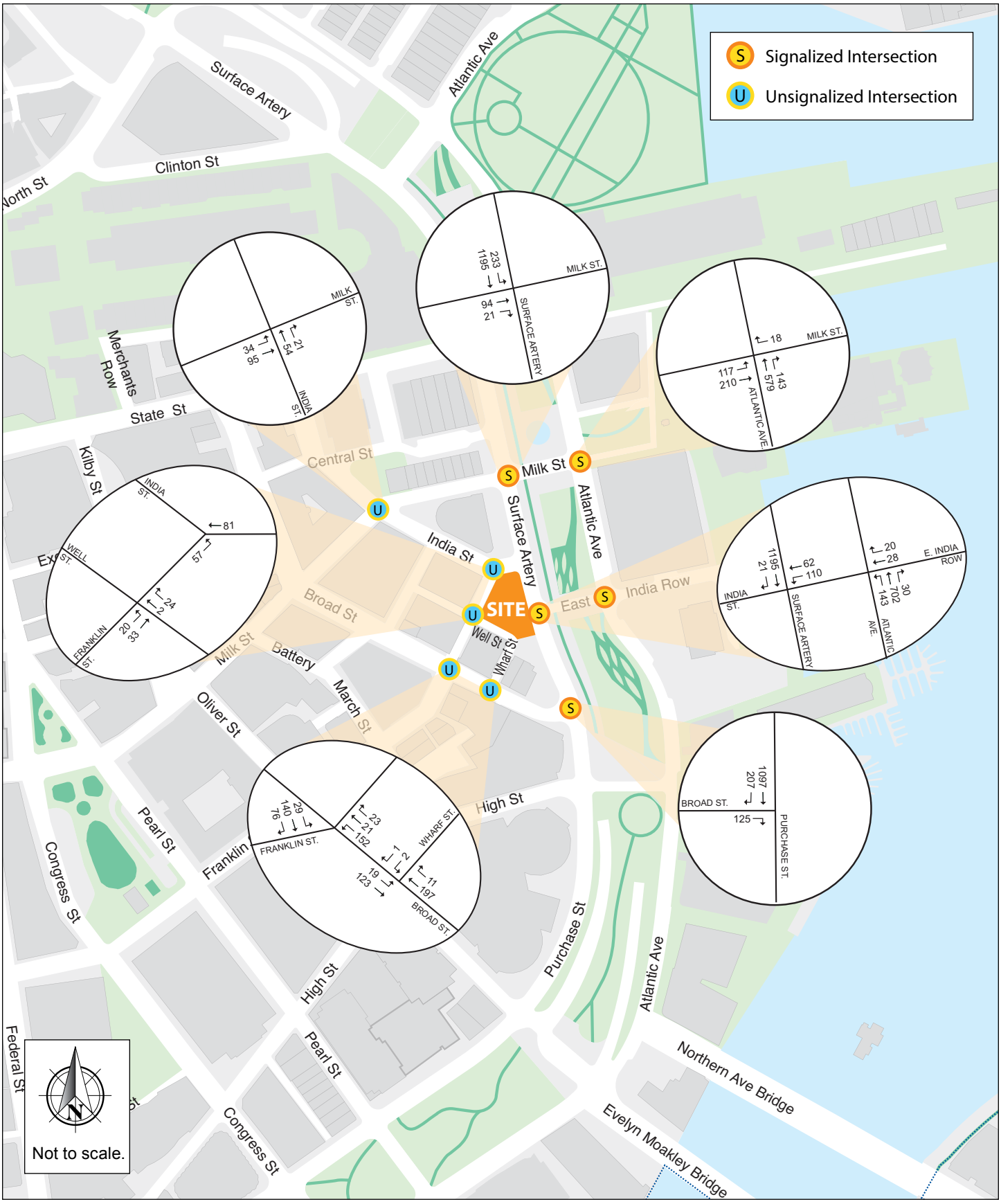

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Figure 2-17
Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

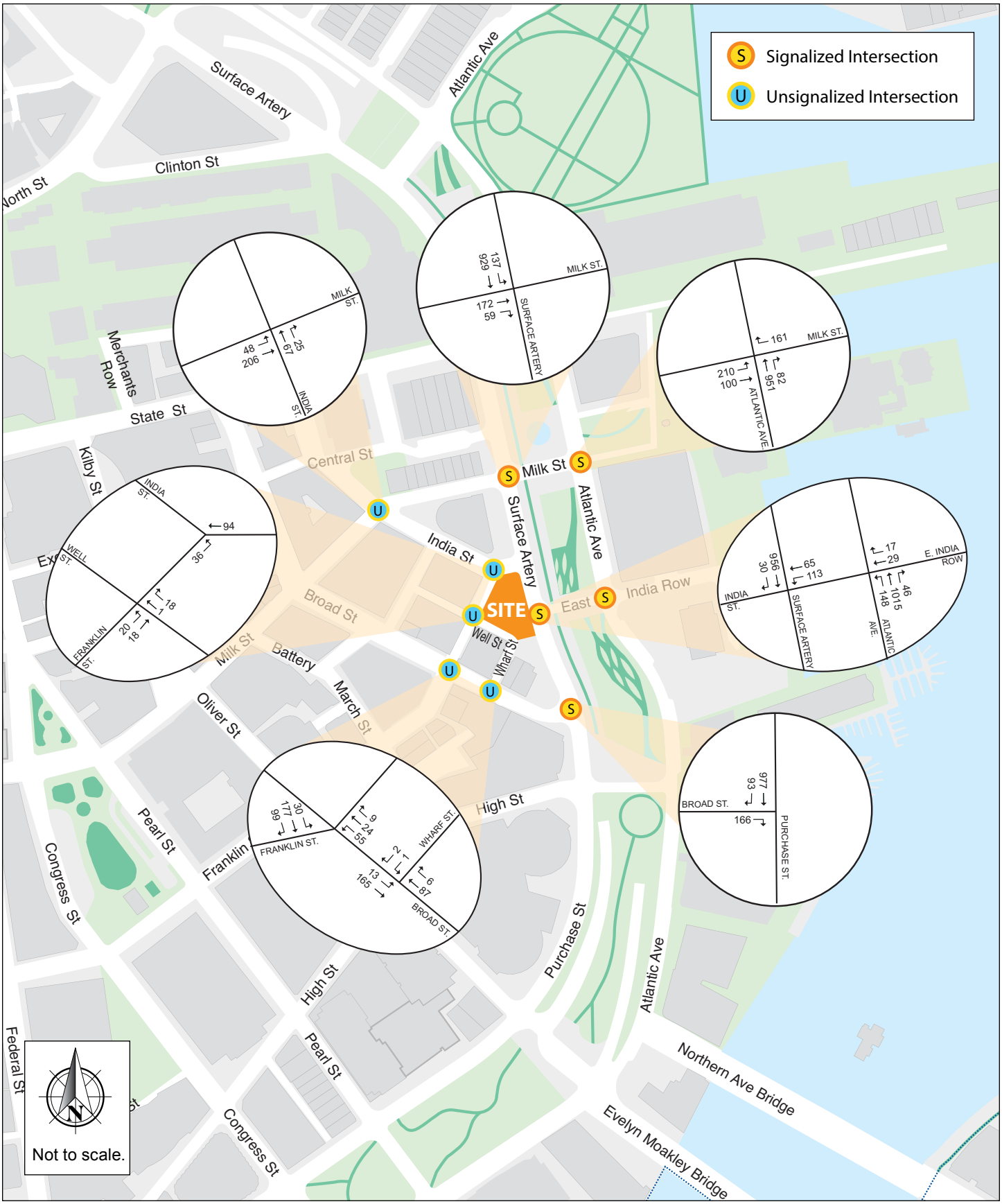

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Figure 2-18
Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Table 2-11 Build Conditions (2019), Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**23.7**	—	—	—
Milk EB thru | thru/right	C	23.4	0.17	27	52
Surface Artery SB left/thru | thru | thru	C	23.7	0.75	285	345
Atlantic Avenue/Milk Street	**D**	**45.6**	—	—	—
Milk EB left | left	C	26.4	0.23	22	m35
Milk EB thru	F	>80.0	0.75	112	m170
Milk WB right	A	0.2	0.05	0	0
Atlantic NB thru | thru/right	C	25.6	0.78	84	#310
Surface Artery/India Street	**A**	**8.4**	—	—	—
India WB left | left	D	39.1	0.34	36	64
India WB thru	D	41.1	0.34	42	81
Surface Artery SB thru | thru | thru/right	A	3.8	0.43	66	94
Atlantic Avenue/East India Row	**A**	**9.4**	—	—	—
India WB thru/right	C	20.8	0.19	20	41
Atlantic NB left/thru | thru/right	A	8.6	0.52	136	181
Purchase Street/Broad Street	**A**	**1.3**	—	—	—
Broad EB right	A	1.5	0.28	0	0
Purchase SB thru | thru | thru/right	A	1.3	0.46	27	31
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.06	—	0
Milk NB left/thru	B	10.7	0.22	—	20
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.06	—	0
Franklin NB left	A	9.4	0.08	—	6
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	8.9	0.04	—	3
Franklin NB left/thru	A	3.3	0.02	—	2
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.4	0.03	—	2
Broad WB left/thru/right	A	6.9	0.16	—	15
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	2.0	0.03	—	2
Broad WB thru/right	A	0.0	0.15	—	0
Wharf SB left/right	B	12.0	0.02	—	2

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

Table 2-12 Build Conditions (2019), Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50% Queue Length (ft)	95% Queue Length (ft)
Signalized Intersections					
Surface Artery/Milk Street	**C**	**22.7**	—	—	—
Milk EB thru | thru/right	D	43.8	0.48	89	91
Surface Artery SB left/thru | thru | thru	B	16.6	0.53	171	211
Atlantic Avenue/Milk Street	**F**	**>80.0**	—	—	—
Milk EB left | left	F	>80.0	0.76	105	111
Milk EB thru	F	>80.0	0.54	76	127
Milk WB right	A	2.3	0.37	0	0
Atlantic NB thru | thru/right	C	33.2	0.91	221	#463
Surface Artery/India Street	**A**	**7.5**	—	—	—
India WB left | left	C	34.1	0.32	36	m55
India WB thru	D	38.0	0.42	49	70
Surface Artery SB thru | thru | thru/right	A	1.6	0.35	16	38
Atlantic Avenue/East India Row	**B**	**11.1**	—	—	—
India WB thru/right	C	22.0	0.17	18	46
Atlantic NB left/thru | thru/right	B	10.6	0.64	212	276
Purchase Street/Broad Street	**A**	**2.4**	—	—	—
Broad EB right	A	2.2	0.39	0	0
Purchase SB thru | thru | thru/right	A	2.5	0.38	1	75
Unsignalized Intersections					
Milk Street/India Street	—	—	—	—	—
India WB thru/right	A	0.0	0.08	—	0
Milk NB left/thru	B	13.2	0.43	—	55
India Street/Franklin Street	—	—	—	—	—
India WB thru	A	0.0	0.08	—	0
Franklin NB left	A	9.8	0.06	—	5
Franklin Street/Well Street	—	—	—	—	—
Well WB thru/right	A	6.7	0.03	—	0
Franklin NB left/thru	A	7.6	0.08	—	0
Franklin Street/Broad Street	—	—	—	—	—
Broad EB left/thru/right	A	1.1	0.03	—	2
Broad WB left/thru/right	A	5.0	0.05	—	4
Broad Street/Wharf Street	—	—	—	—	—
Broad EB left/thru	A	1.4	0.03	—	2
Broad WB thru/right	A	0.0	0.09	—	0
Wharf SB left/right	B	11.5	0.01	—	1

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

As shown in Table 2-11 and Table 2-12, the intersections will continue to operate at the same LOS as under the No-Build conditions during both the a.m. and p.m. peak hours. The Project will have minimal impact on the study area intersections.

2.3.2.7 Parking

The Project will not provide parking on site. The Proponent anticipates entering into an agreement with one or more parking garages in proximity to the site in order to accommodate the parking demand for the residential condominium units. The Proponent will reserve parking spaces at one or more nearby garages and allow the residents to rent or purchase them.

BTD has established parking space guidelines throughout the City to ensure that the proper parking capacity is provided with new developments. The Project site, however, cannot accommodate new parking due to the small building footprint. The recommended BTD parking ratio for residences in this area of Boston is 0.5 – 1.0 parking spaces per unit. However, parking ratios lower than 0.5 spaces per unit are common for residential developments in this area of Boston.

No additional parking will be provided for the commercial use on the Project site. Patrons of the restaurant or retail space that arrive by vehicle will use the nearby public lots or garages.

2.3.2.8 Public Transportation

Based on the transit mode shares presented earlier, the future transit trips associated with the Project were estimated and are summarized in Table 2-13.

Table 2-13 Project Transit Trips

Time Period	Direction	Condominium	Restaurant	Total
Daily	In	43	112	155
	Out	43	112	155
	Total	**86**	**224**	**310**
a.m. Peak Hour	In	2	24	26
	Out	3	4	7
	Total	**5**	**28**	**33**
p.m. Peak Hour	In	3	5	8
	Out	5	16	21
	Total	**8**	**21**	**29**

As shown in Table 2-13, the Project will generate an estimated 310 new transit trips on a daily basis. Approximately 33 new transit trips (26 alighting and 7 boarding) will occur during the a.m. peak hour and 29 new trips (8 alighting and 21 boarding) will occur during the p.m. peak hour.

The transit trips will be mostly dispersed between the Blue Line station at the Aquarium, the Orange Line/Blue Line Station at State Street, and the nearby MBTA bus routes. The additional transit trips will be accommodated by the existing public transportation facilities that serve the Project study area.

2.3.2.9 Pedestrians

Based on the walk mode shares presented earlier, the future walk trips were estimated and are summarized in Table 2-14.

Table 2-14 Project Pedestrian Trips

Time Period	Direction	Condominium	Restaurant	Total
Daily	In	61	330	391
	Out	61	330	391
	Total	**122**	**660**	**782**
a.m. Peak Hour	In	0	7	7
	Out	9	24	33
	Total	**9**	**31**	**40**
p.m. Peak Hour	In	9	29	38
	Out	1	5	6
	Total	**10**	**34**	**44**

Over the course of a day, the Project will generate an estimated 782 new pedestrian trips and an additional 310 new transit trips that will require a walk to or from the site. This results in an additional 1,092 new pedestrian trips per day. Approximately 40 new pedestrian trips will occur during the a.m. peak hour and 44 new pedestrian trips will occur during the p.m. peak hour in addition to the new transit trips that will also require a walk to or from the site. The Project site is located in proximity to the Rose Kennedy Greenway, which provides pedestrian access to the North End, the financial district, South Station, and Chinatown. The existing pedestrian facilities that serve the Project site will accommodate all additional pedestrian trips generated by the Project.

2.3.2.10 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for residents and employees and short-term bicycle racks for visitors. The Project will provide a total of approximately 44 covered and secure bicycle storage spaces on-site for residents and employees of the site.

All bicycle racks, signs, and parking areas will conform to BTD guidelines and will be located in safe, secure locations.

2.3.2.11 Build Conditions Loading and Service Activity

Loading and service operations will occur along the Well Street curbside. Vehicles will access the loading area via Wharf Street and Broad Street. All trash truck activity will also take place along Well Street.

A summary of anticipated loading/service activity by land use is presented in Table 2-15; the sources of the assumptions are presented below. Delivery trip estimates were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[4]. Deliveries to the Project site will be mostly limited to SU-36 trucks and smaller delivery vehicles.

Restaurant. Restaurants depend on frequent food deliveries from smaller trucks. Based on the CTPS report, restaurant uses generate approximately 0.70 light truck trips per 1,000 sf of floor area and 0.07 medium/heavy truck trips per 1,000 sf of gross floor area. Again, restaurant use was considered to be more conservative as it generates more deliveries than retail space.

Residential. Residential units primarily generate delivery trips related to small packages and prepared food. Based on the CTPS report, residential uses generate approximately 0.01 light truck trips per 1,000 sf of gross floor area and 0.001 medium/heavy truck trips per 1,000 sf of gross floor area.

Table 2-15 Delivery Activity by Land Use

Land Use	Number of Deliveries			General Delivery Times
	SU-30 or smaller	*Larger than SU-30*	*Total*	
Restaurant	3	0	3	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.
Residential	1	0	1	
Total	**4**	**0**	**4**	

The Project is expected to generate approximately four deliveries per day. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. These numbers do not include trash truck trips. The low number of anticipated deliveries will have minimal impact on the vehicular operations along Well Street and Wharf Street, which are both very low-volume roadways.

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

2.4 Transportation Mitigation Measures

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

In addition, the Proponent will reconstruct the segments of Wharf Street and Well Street between Broad Street and Franklin Street to be at-grade with the existing sidewalk. By bringing the roadway at-grade with the existing sidewalk, a shared space will be created to be used by pedestrians, bicycles, and vehicles. It will also allow easier two-way travel along Well Street, which is currently only wide enough to accommodate a single vehicle in one direction. It will also allow for easier unloading and loading of delivery vehicles and improved access for emergency vehicles. Wharf Street and Well Street are both low volume and low speed roadways, allowing for a shared spaced that will be more efficient at accommodating all modes of transportation.

The Proponent is responsible for preparation of the 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, travel demand management 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 Proponent will work closely with BTD to determine the level of transportation mitigation that will be necessary to accommodate the Project. Any transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

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

2.5 Transportation Demand Management

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

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the 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 demand management 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 Zipcar locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals.

- **Bicycle Accommodation**: The Proponent will provide bicycle storage in secure, sheltered areas for residents. Secure bicycle storage will also be made available to employees to encourage bicycling as an alternative mode of transportation.

- **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.

- **Project Web Site**: The web site will include transportation-related information for residents, workers, and visitors.

2.6 Evaluation of Short-term Construction Impacts

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 the CMP to be filed with BTD in accordance with the City's transportation maintenance plan requirements. The CMP will also address the need for pedestrian detours, lane closures, and/or parking restrictions, if necessary to accommodate a safe and secure work zone.

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

- Construction workers will be encouraged to use public transportation and/or carpool;

- A subsidy for MBTA passes will be considered for full-time employees; and

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

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

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

A pedestrian wind study was conducted for the Project by Rowan Williams Davies & Irwin Inc. (RWDI) to assess the effect of the proposed Project on local conditions in pedestrian areas around the study site and provide recommendations for minimizing adverse effects. Three conditions were studied by placing specially designed wind sensors at 99 locations, chosen in consultation with the BRA, surrounding the Project site on a scaled model of the Project area as described more fully in Section 3.1.3. The No Build condition is the present condition including approved, but not yet built projects in the area, the Build condition includes the Project in the presence of existing and approved surroundings, and the Build with Broad Street condition includes the potential development at 110 Broad Street (for which a Letter of Intent has been filed with the BRA), the Project, and existing and approved surroundings. The BRA requested that the Proponent include the proposed 110 Broad Street project in the wind analysis because of the potential for the combined projects to impact the wind patterns differently than would the Project by itself.

The wind analysis indicates that the overall wind conditions expected in the surrounding area are anticipated to be largely similar in the No Build, Build and Build with Broad Street conditions, and are generally suitable for the intended uses. In fact, of the locations studied in the Build condition, 14 locations are projected to have improved wind conditions as compared to the No Build condition. All 9 locations that are projected to have worsened wind conditions in the Build condition as compared to the No Build condition will continue to be suitable for walking or better. The Build with Broad Street condition does not result in substantially different wind conditions than does the Build condition. Neither the Build nor Build with Broad Street configurations are anticipated to result in new uncomfortable wind conditions, and the effective gust criterion was met annually at all locations under both conditions.

3.1.1 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.

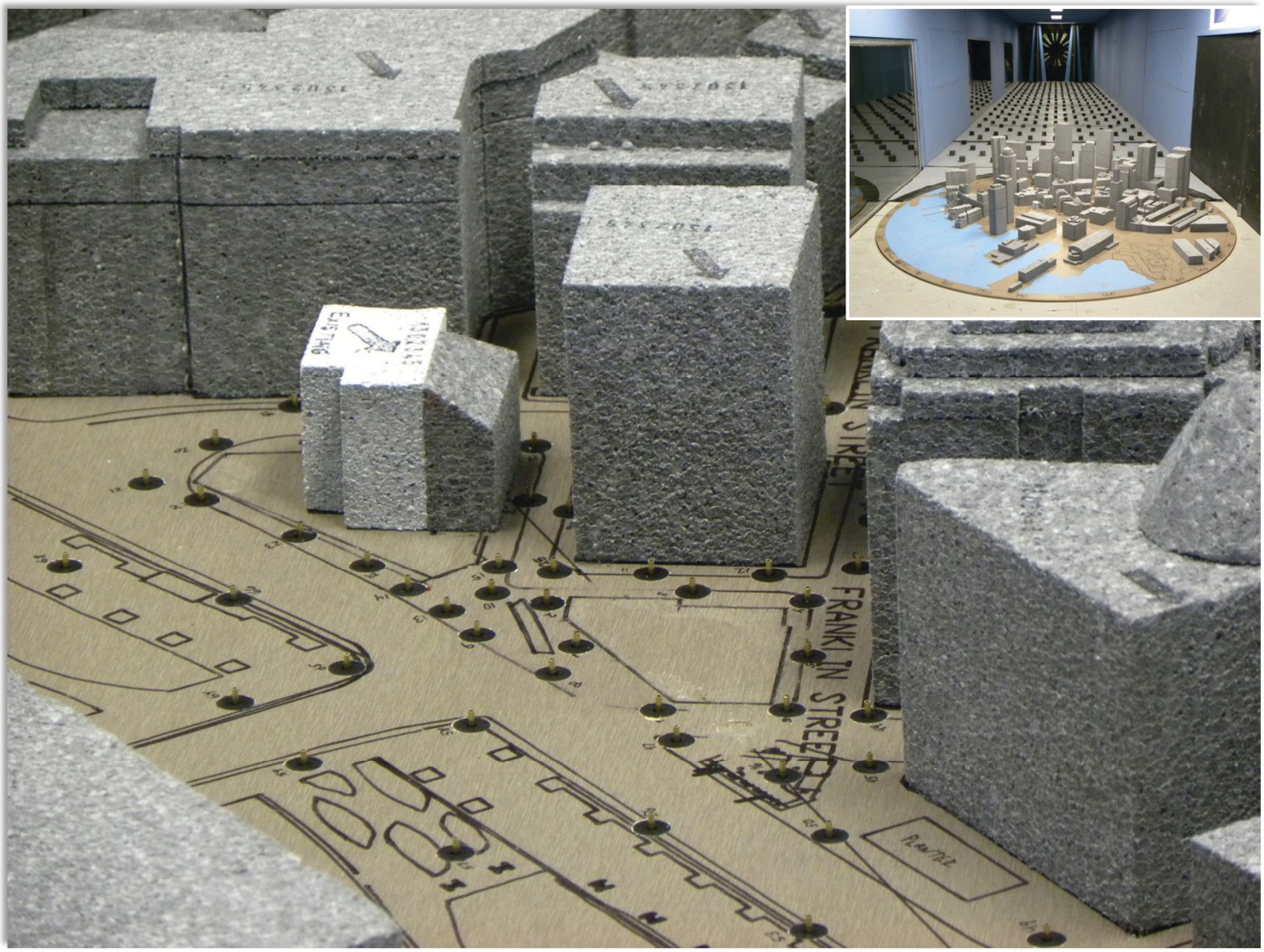
The consideration of wind in planning outdoor activity areas is important as high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where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

3.1.2 Methodology

The study involved wind simulations on a 1:400 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. Information concerning the site and surroundings was derived from site photographs; information on surrounding buildings and terrain; and site plans and elevations of the proposed Project provided by the Proponent and the architect Hacin + Associates. The criteria recommended by the BRA were used in this study. The following section includes a discussion of the methods and the results of the wind tunnel simulations. The following configurations were simulated:

- No Build Configuration: existing site, in the presence of existing and approved surroundings;
- Build Configuration: the proposed Project, in the presence of existing and approved surroundings; and,
- Build with Broad Street Configuration: the proposed Project, in the presence of the potential development at 110 Broad Street and existing and approved surroundings.

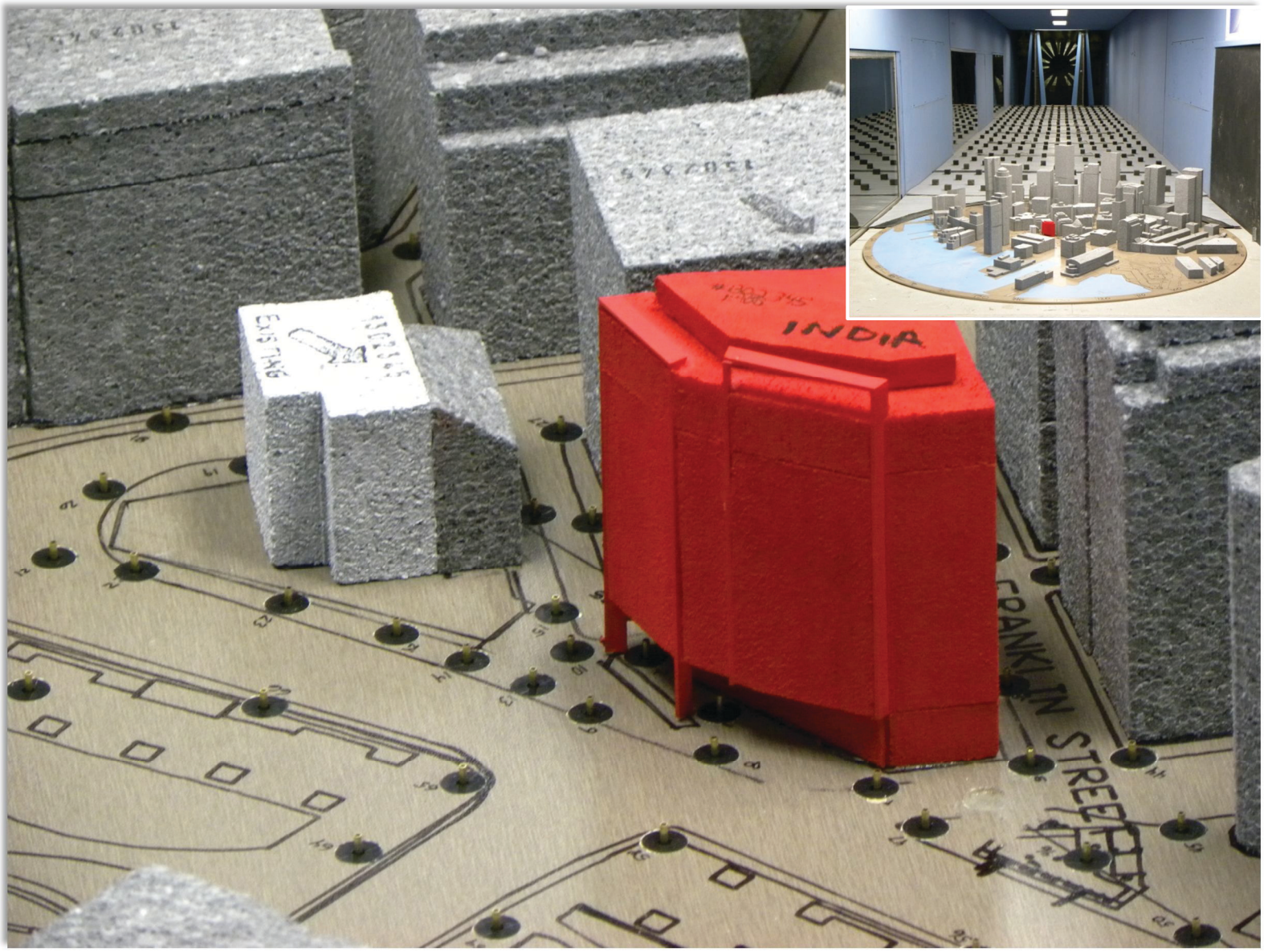
As shown in Figures 3.1-1 through 3.1-3, the wind tunnel model included the proposed Project and all relevant surrounding buildings and topography within a 1,600 foot radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modeled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 99 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. The locations of the 99 wind speed sensors were determined in consultation with the BRA. 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



55 India Street Boston, Massachusetts

RWDI

Figure 3.1-1
Wind Tunnel Study - No Build Configuration



55 India Street Boston, Massachusetts

RWDI

Figure 3.1-2
Wind Tunnel Study - Build Configuration

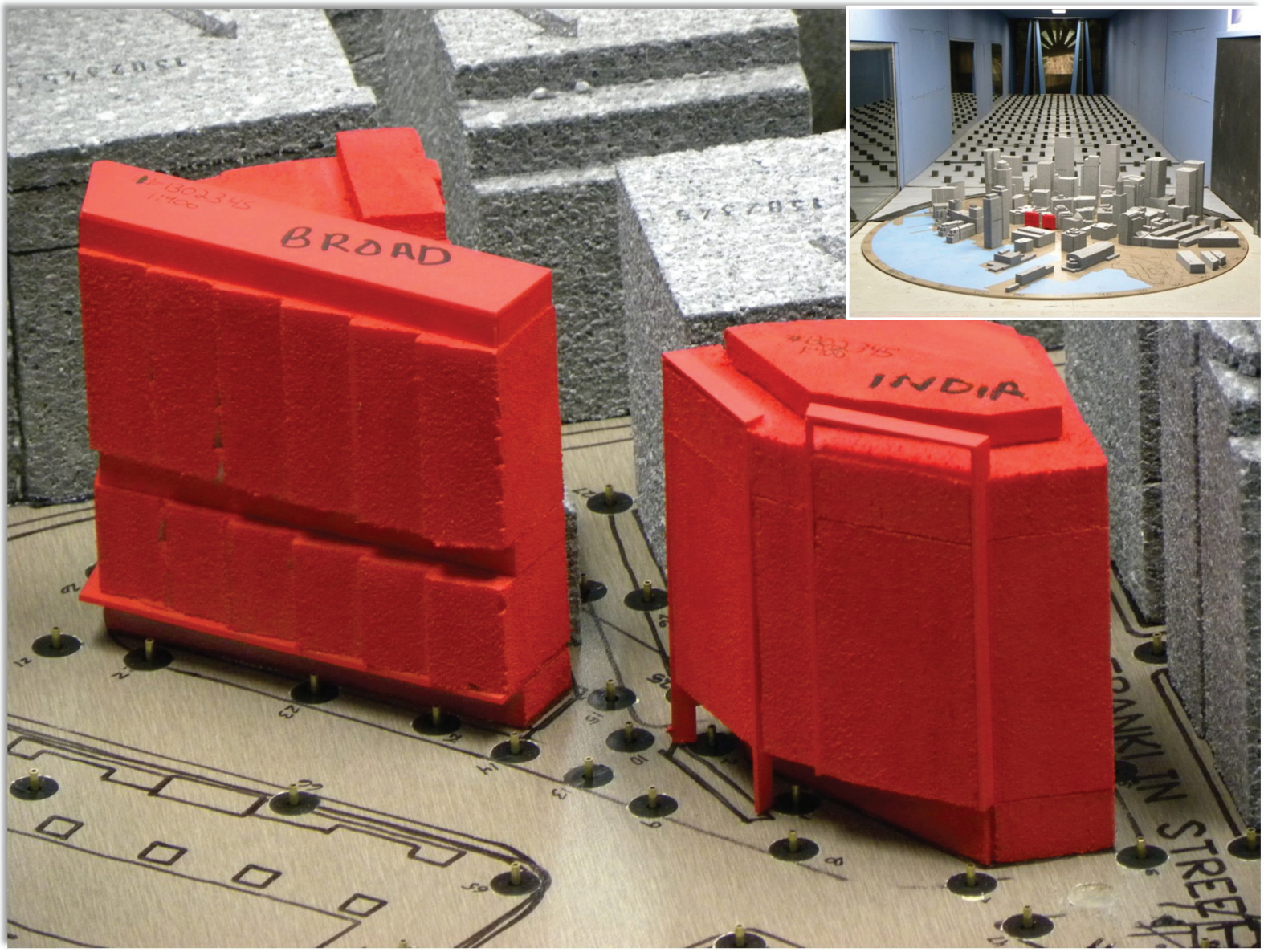


Figure 3.1-3
Wind Tunnel Study - Build with Broad Street Configuration

meteorological data, recorded during the years 1973 to 2011 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 3.1-4 through 3.1-6 present "wind roses", summarizing the annual and seasonal wind climates in the Boston area, based on the data from Logan Airport. The left side wind rose in Figure 3.1-4, 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, south-southwest and southwest. In addition to these directions, strong winds are also prevalent from the northeast direction as indicated by the red and yellow color bands on the wind rose.

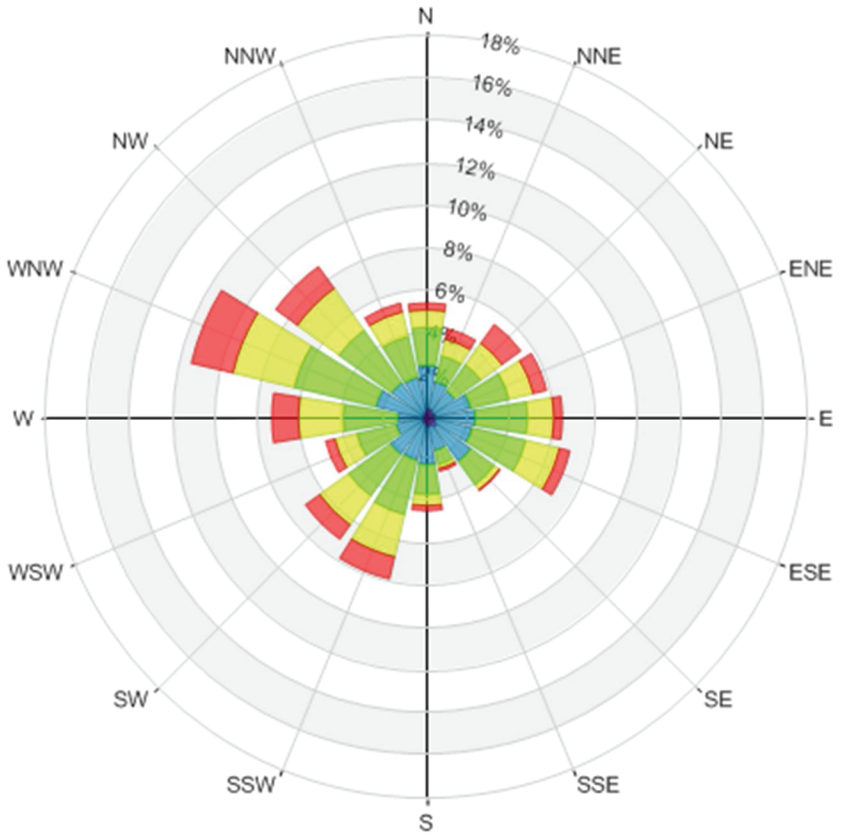
On an annual basis (Figure 3.1-6) the most common wind directions are those between southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. However, some uncertainty remains in predicting wind comfort. 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.

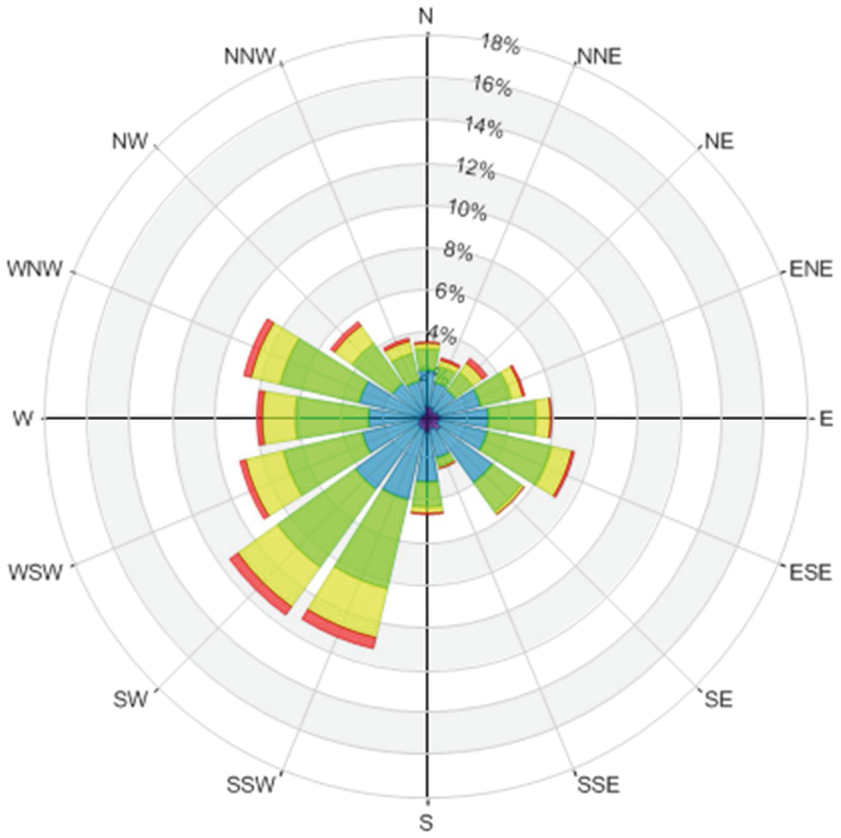
3.1.3 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed + 1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[1]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the one-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed). They are shown in table 3.1-1 below:

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

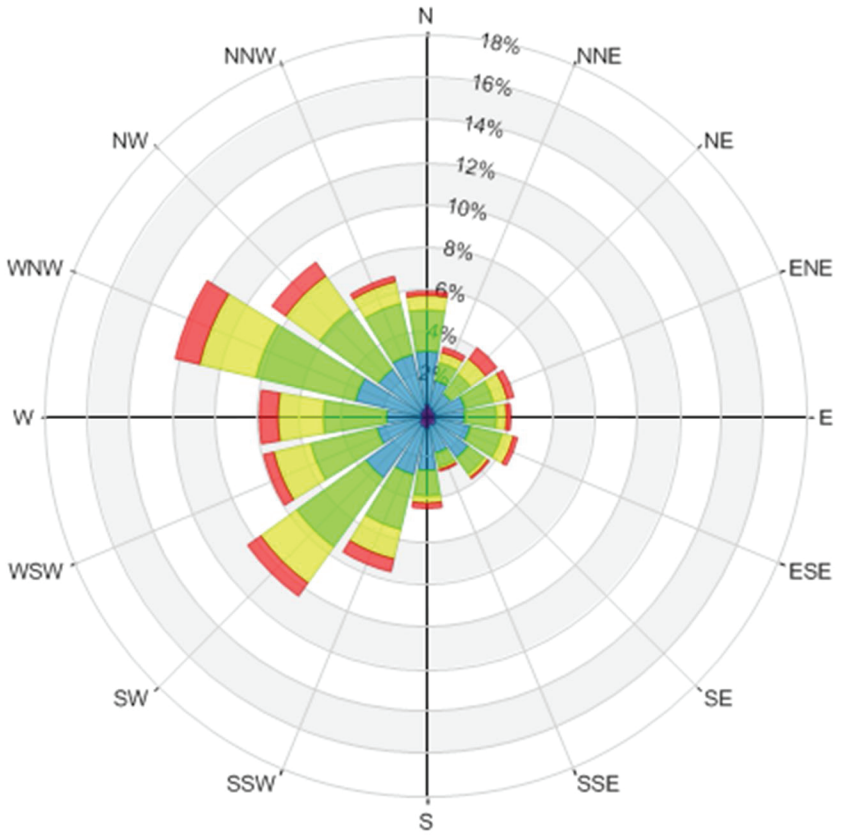


Spring
(March - May)

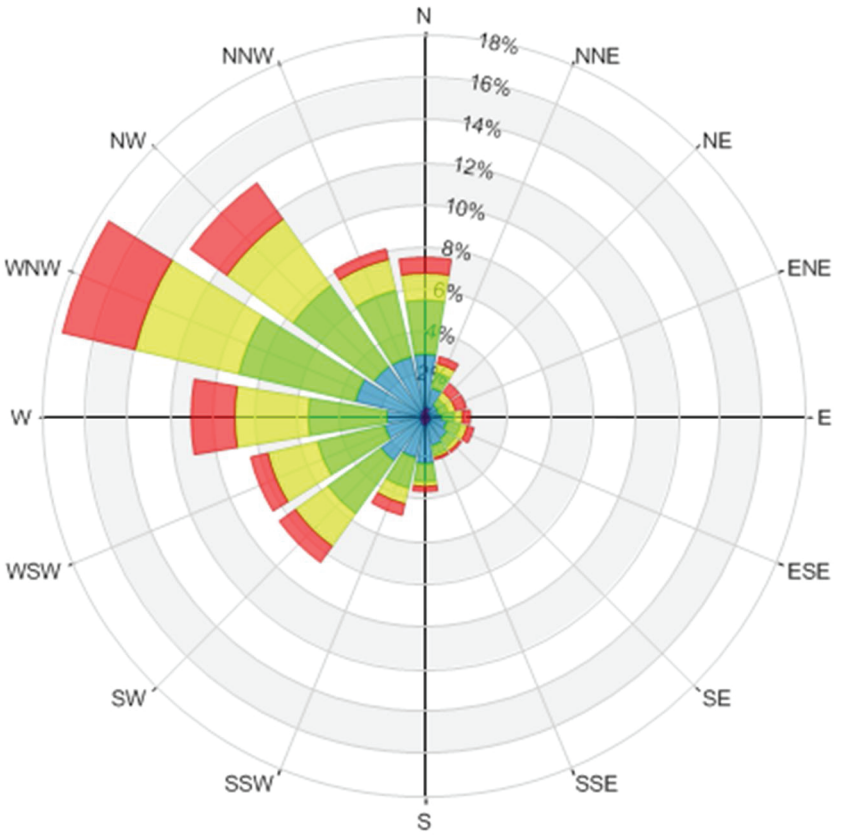


Summer
(June - August)

Wind Speed (mph)	Probability (%) Spring	Summer
Calm	1.4	1.5
1-5	5.7	8.0
6-10	26.8	36.1
11-15	33.5	36.4
16-20	21.4	15.0
>20	11.3	2.9

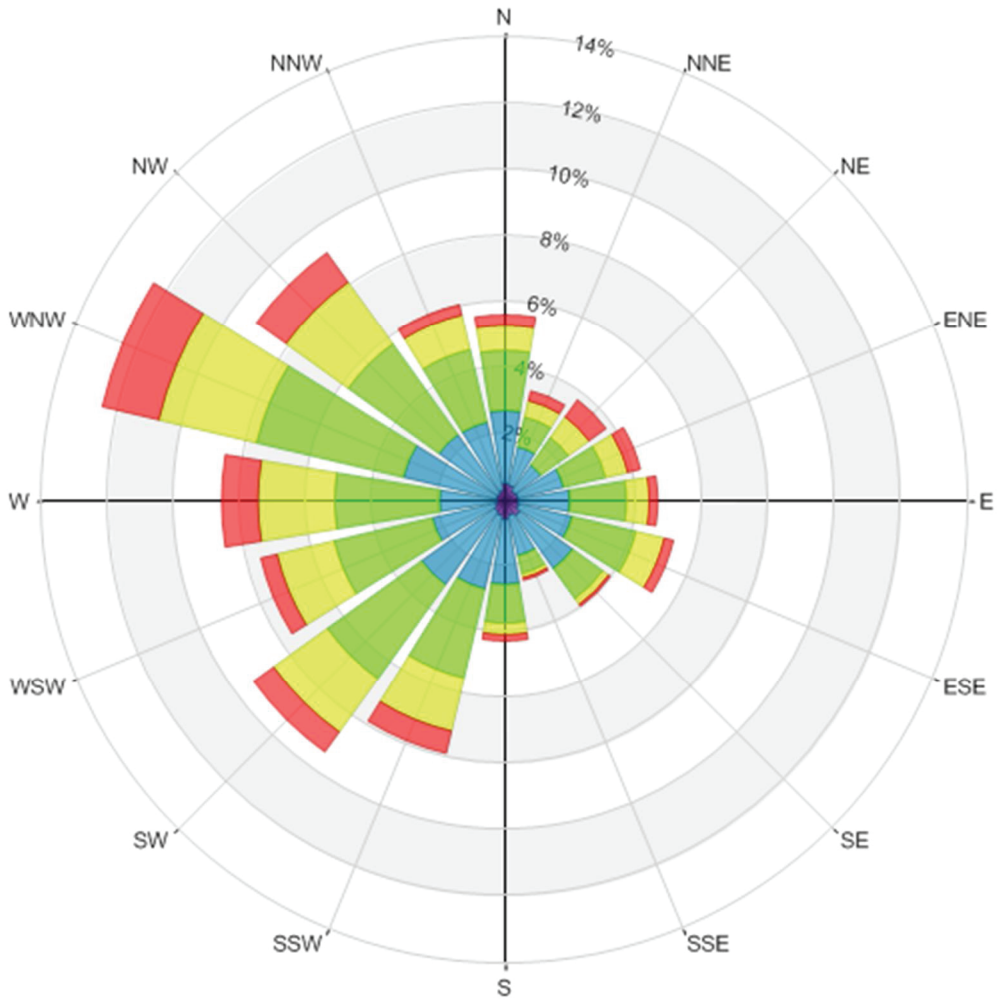


Fall
(September - November)



Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	1.6	1.2
1-5	6.9	5.2
6-10	32.0	25.1
11-15	34.7	32.1
16-20	17.7	22.6
>20	7.2	13.7



Annual Winds

Wind Speed (mph)	Probability (%)
Calm	1.4
1-5	6.4
6-10	30.0
11-15	34.2
16-20	19.2
>20	8.8

Table 3.1-1 Boston Redevelopment Authority Mean Wind Criteria*

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

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

3.1.4 Test Results

Appendix D presents the mean and effective gust wind speeds for each season as well as annually. Figures 3.1-7 through 3.1-9 graphically depict the mean wind speed conditions at each wind measurement location based on the annual winds. Figures 3.1-10 through 3.1-12 depict the effective gust wind speed conditions. 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 in the text.

In general, wind conditions suitable for walking are appropriate for sidewalks, and lower wind speeds conducive to standing are preferred at building entrances.

3.1.4.1 No Build Configuration

On-Site Building Entrances and Sidewalks

As shown in Figure 3.1-7, under the No Build configuration, all locations are predicted to be suitable for sitting or standing annually.

In addition, the effective gust criterion was met annually at all locations (see Appendix D and Figure 3.1-10).

Off-Site Walkways

For the majority of test locations, wind conditions are predicted to be suitable for walking or better on an annual basis. Uncomfortable wind conditions were predicted on an annual basis at six locations to the south of the Project site, near the intersection of Purchase Street and Broad Street, and along High Street (Locations 70, 72, 74, 78, 79 and 80 on Figure 3.1-7).

The effective gust criterion was met annually at all locations (Figure 3.1-10).

3.1.4.2 Build Configuration

On-Site Building Entrances and Sidewalks

Under the Build configuration, all on-site locations are predicted to have conditions suitable for sitting or standing on an annual basis (Figure 3.1-8). Additionally, the effective gust criterion was met annually at all locations (Figure 3.1-11).

Off-Site Walkways

Under the Build configuration, wind conditions at the off-site walkways are predicted to remain suitable for walking or better in most locations. Compared to the No Build configuration, one location improved from uncomfortable to suitable for walking (Location 72), while the other five locations in the areas of the intersection of Purchase and Broad Street and High Street remained uncomfortable on an annual basis (Figure 3.1-8).

The effective gust criterion was met annually at all locations (Figure 3.1-11).

3.1.4.3 Build with Broad Street Configuration

On-Site Building Entrances and Sidewalks

Under the Build with Broad Street configuration, all locations are predicted to be suitable for sitting or standing on an annual basis (Figure 3.1-9). The effective gust criterion was met seasonally and annually at all locations (Figure 3.1-12).

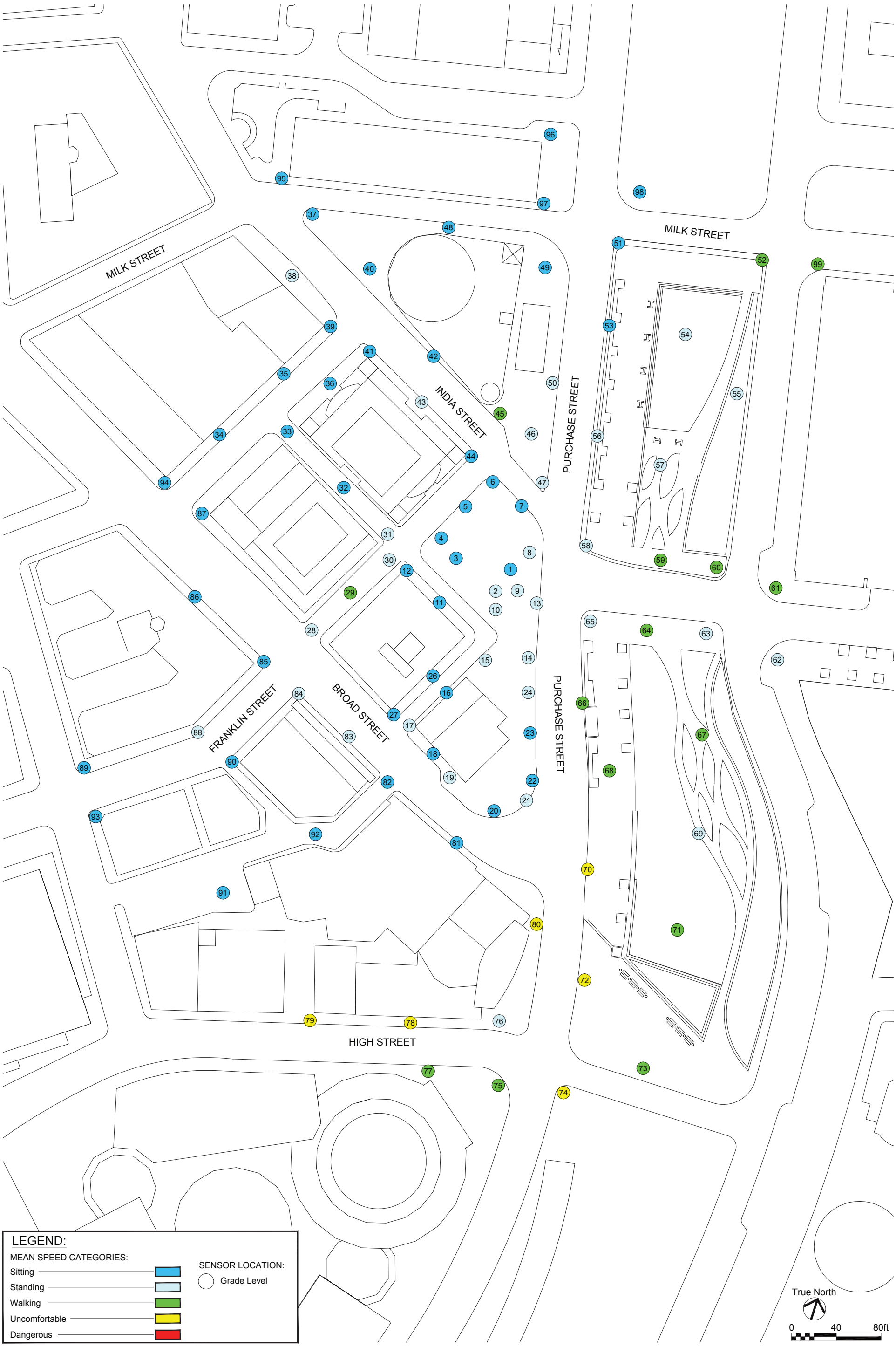
Off-Site Walkways

Under the Build with Broad Street configuration, wind conditions at the off-site walkways are predicted to remain suitable for walking or better in most locations. The existing uncomfortable wind conditions in the No Build configuration remained in the areas of the intersection of Purchase Street and Broad Street and High Street on an annual basis (Figure 3.1-9).

The effective gust criterion was met annually at all locations (Figure 3.1-12).

3.1.4.4 Conclusion

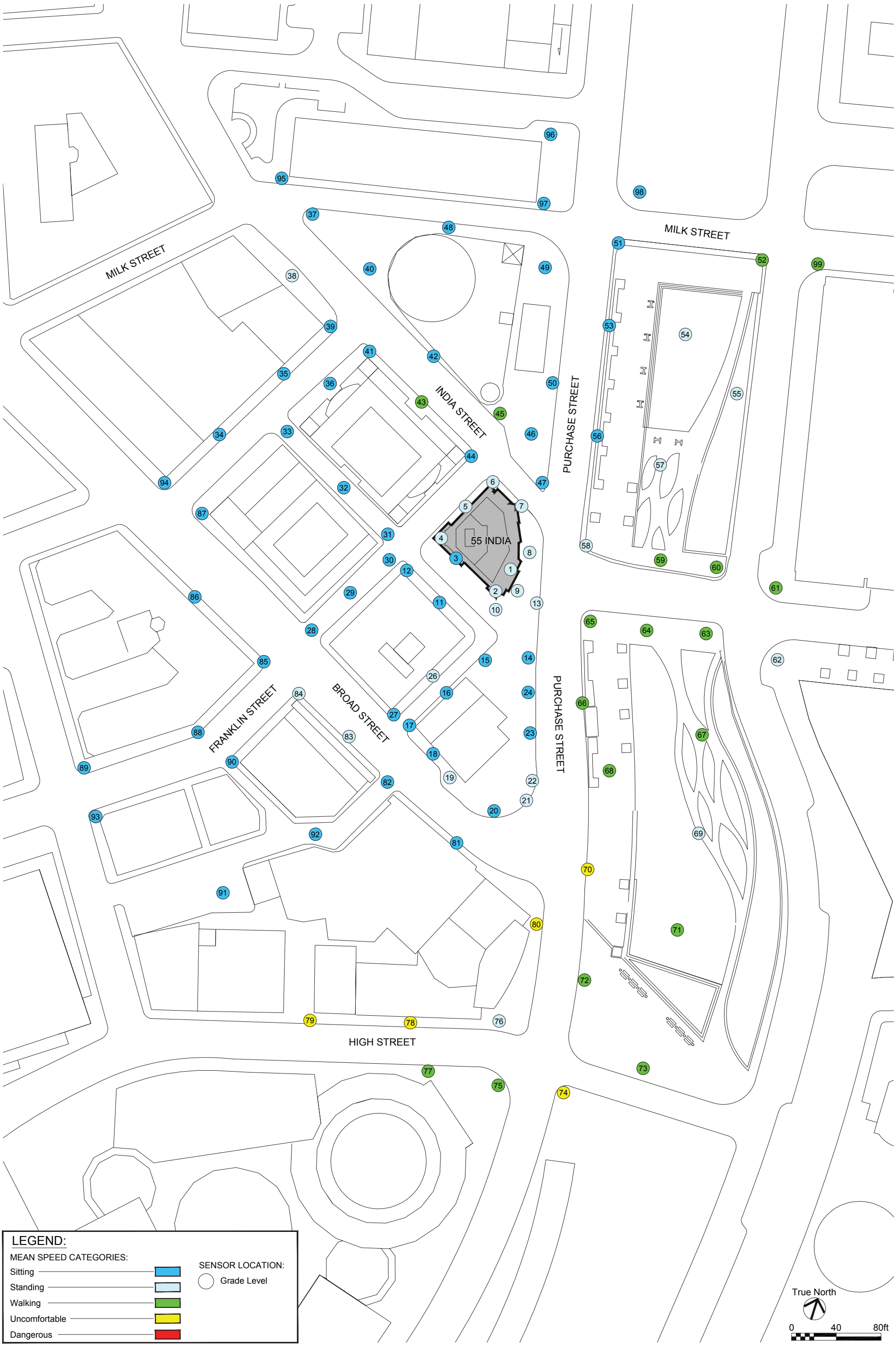
The wind analysis shows that the overall wind conditions expected in the surrounding area are largely similar in the No Build, Build and Build with Broad Street conditions. Neither the Build nor the Build with Broad Street configurations are predicted to result in additional uncomfortable annual wind conditions. Additionally, under both the Build and Build with Broad Street configurations the effective gust criterion was met annually at all locations.



55 India Street Boston, Massachusetts

Figure 3.1-7

Pedestrian Wind Conditions - Mean Speed - No Build, Annual



55 India Street Boston, Massachusetts

RWDI

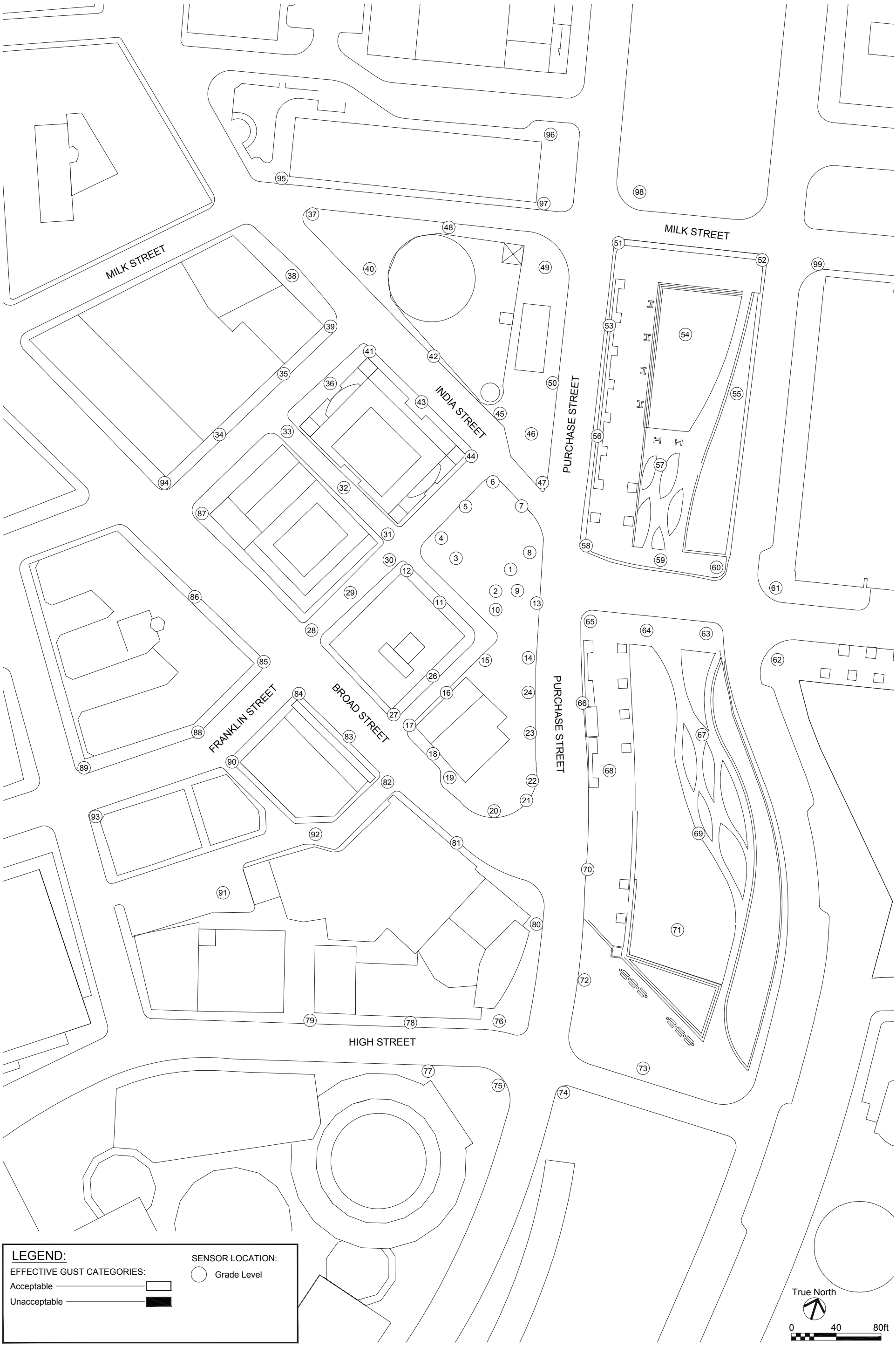
Figure 3.1-8

Pedestrian Wind Conditions - Mean Speed - Build, Annual

55 India Street Boston, Massachusetts

Figure 3.1-9

Pedestrian Wind Conditions - Mean Speed - Build with Broad Street, Annual

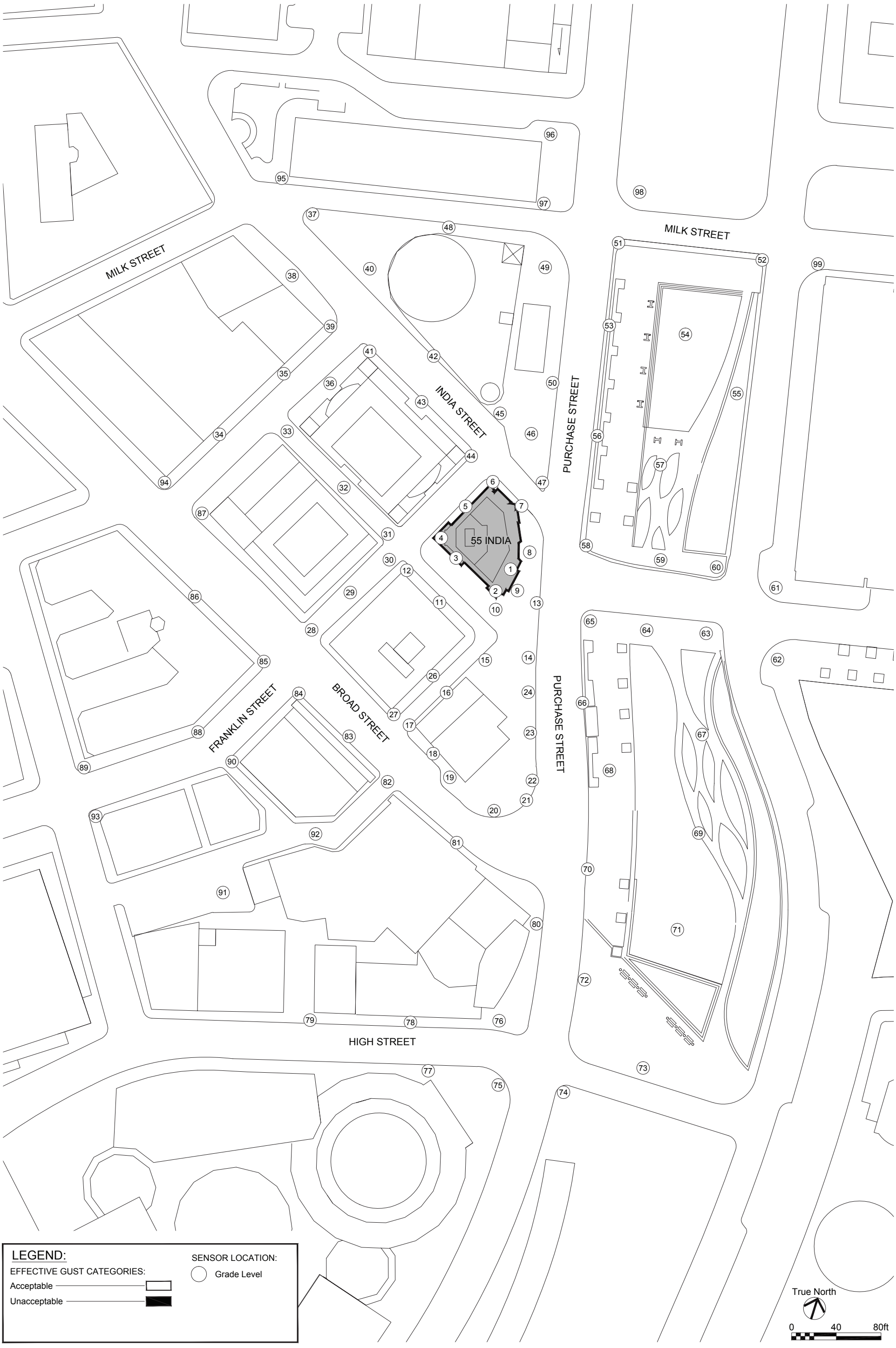


55 India Street Boston, Massachusetts

RWDI

Figure 3.1-10

Pedestrian Wind Conditions - Effective Gust Speed - No Build, Annual (January to December, 0:00 to 23:00)

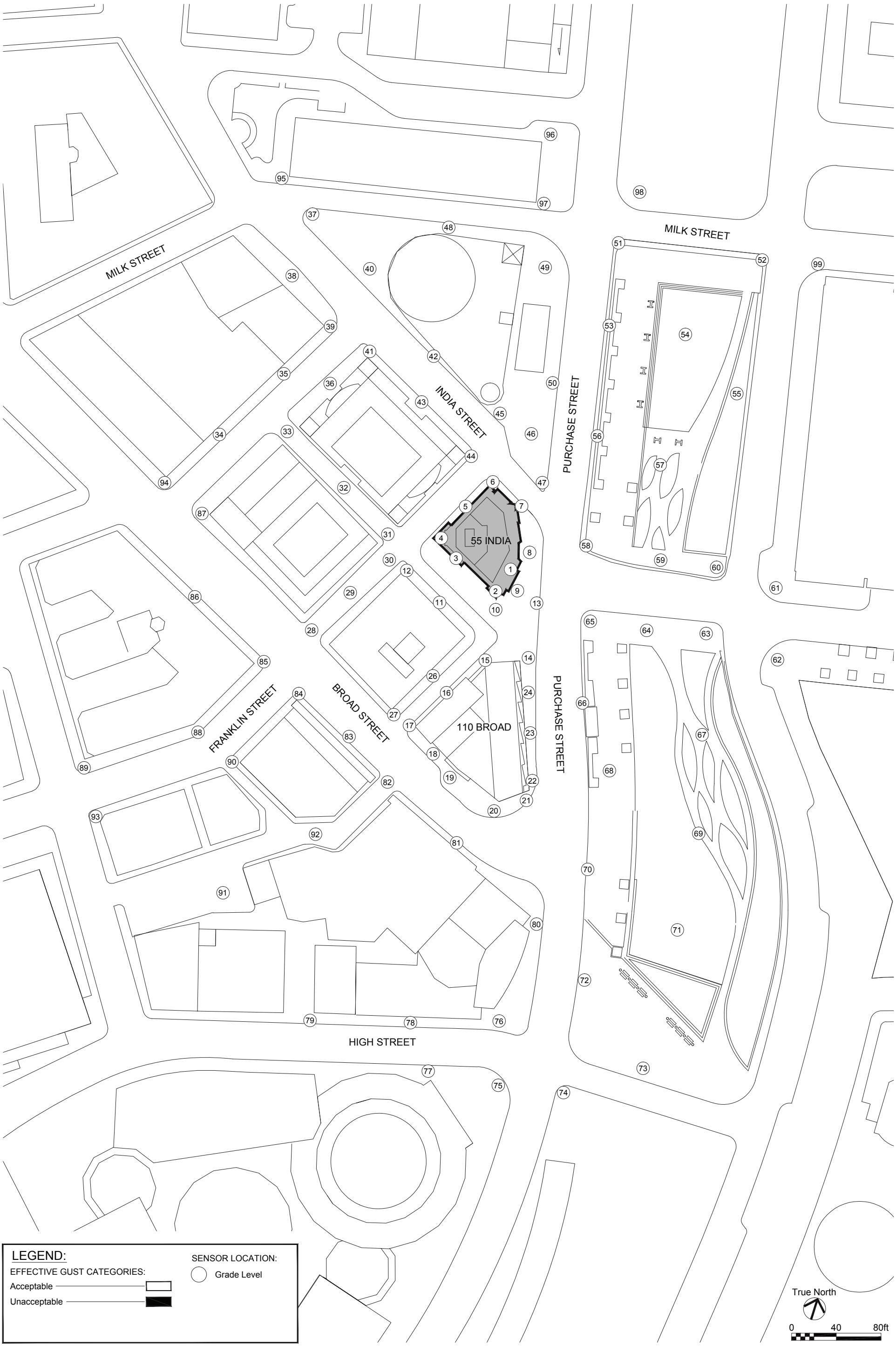


55 India Street Boston, Massachusetts

RWDI

Figure 3.1-11

Pedestrian Wind Conditions - Effective Gust Speed - Build, Annual (January to December, 0:00 to 23:00)



55 India Street Boston, Massachusetts

RWDI

Figure 3.1-12

Pedestrian Wind Conditions - Effective Gust Speed - Build with Broad Street, Annual (January to December, 0:00 to 23:00)

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BRA, 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). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

The Greenway District Planning Study Use and Development Guidelines state that "New development along the Greenway will be required to minimize any shadow impacts over and above those shadows that might be cast by an as-of-right development scheme in conformance with current zoning". The shadow analysis has been prepared in compliance with the Guidelines, and shows the anticipated impacts from the Project in comparison to the existing condition and as-of-right alternative, illustrating that the proposed Project's impact will be less than the as-of-right alternative. The analysis focuses on nearby open spaces, sidewalks 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. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14 at the end of this section.

The results of the analysis show that new shadow from the Project results in similar shadow as would be generated by the as-of-right alternative, with the shadow from both generally limited to nearby streets and sidewalks. Of the 14 time periods studied, no new shadow is cast onto any bus stops in the vicinity of the Project and no new shadow will be cast onto any open space during nine of the time periods studied. New shadow will be cast on to the open space adjacent to the Flour and Grain Exchange building during only two time periods studied (March 21 at 12:00 p.m. and September 21 at 12:00 p.m.), and onto the Greenway only during three time periods studied (March 21 as 3:00 p.m., June 21 at 3:00 p.m., and September 21 at 3:00 p.m.). No new shadow is cast onto other open spaces or any bus stops in the vicinity of the Project.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the as-of-right alternative and the Project will be cast to the northwest onto Franklin Street and its eastern and western sidewalks, onto a portion of Well Street, and a small portion of Custom House Street and its western sidewalk. New shadow from the as-of-right alternative would extend beyond the Project shadow onto an additional portion of the Franklin Street western sidewalk and onto a slightly larger portion of Well and Custom House streets. No new Project shadow is cast onto open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto a portion of Franklin Street and its eastern and western sidewalks, onto a portion of India Street and its northern and southern sidewalks, and onto a portion of the open space adjacent to the Flour and Grain Exchange building. Additional new shadow from the-as-of-right alternative would extend beyond the Project shadow on India Street and its northern sidewalk and on the open space adjacent to the Flour and Grain Exchange. No Project shadow is cast onto other open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast onto a portion of India Street and its northern and southern sidewalks, a portion of John F. Fitzgerald Surface Artery and its western sidewalk, and onto a portion of the Greenway. Additional new shadow from the as-of-right alternative would extend the Greenway shadow slightly. No Project shadow is cast onto other open spaces or bus stops in the vicinity of the Project.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the as-of-right alternative and the Project are very similar and will be cast to the west onto portions of Franklin Street and its eastern and western sidewalks, and onto a portion of Well Street and its southern sidewalk. No new Project shadow will be cast onto other nearby sidewalks, open spaces or bus stops.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto Franklin Street and its eastern sidewalk, and onto a small portion of India Street and its southern sidewalk. Additional new shadow from the as-of-right alternative would extend the Project shadow on Franklin Street and its eastern and western sidewalk and slightly on India Street and its southern sidewalk. No new Project shadow is cast onto open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast onto a portion of India Street and its northern and southern sidewalks, onto John F. Fitzgerald Surface Artery and its eastern sidewalk, and into a small portion of the Greenway. Additional shadow from the as-of-right alternative would extend slightly further onto John F. Fitzgerald Surface Artery, India Street and onto the Greenway. No Project shadow is cast onto other open spaces or bus stops in the vicinity of the Project.

At 6:00 p.m., most of the area is under existing shadow. No new shadows would be cast onto nearby streets, sidewalks, open spaces or bus stops from either the Project or the as-of-right alternative.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., during the autumnal equinox, new shadow from the as-of-right alternative and the Project will be cast to the northwest onto Franklin Street and its eastern and western sidewalks, and onto a portion of Well and Custom House streets. Additional shadow from the as-of-right alternative would be limited to slivers of shadow on Well and Custom House streets. No new Project shadow is cast onto open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto a portion of Franklin Street and its eastern and western sidewalks, onto a portion of India Street and its northern and southern sidewalks, and onto a portion of the open space adjacent to the Flour and Grain Exchange building. Additional shadow from the as-of-right alternative would extend on the open space adjacent to the Flour and Grain Exchange. No Project shadow is cast onto other open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast onto a portion of India Street and its northern sidewalk, a portion of John F. Fitzgerald Surface Artery and its western sidewalk, and onto a portion of the Greenway. Additional shadow from the as-of-right alternative would slightly extend the shadow on the Greenway. No Project shadow is cast onto other open spaces or bus stops in the vicinity of the Project.

At 6:00 p.m., most of the area is under existing shadow. No new shadow from the Project or the as-of-right alternative will be cast onto nearby streets, sidewalks, open spaces or bus stops.

3.2.5 Winter Solstice (December 21)

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

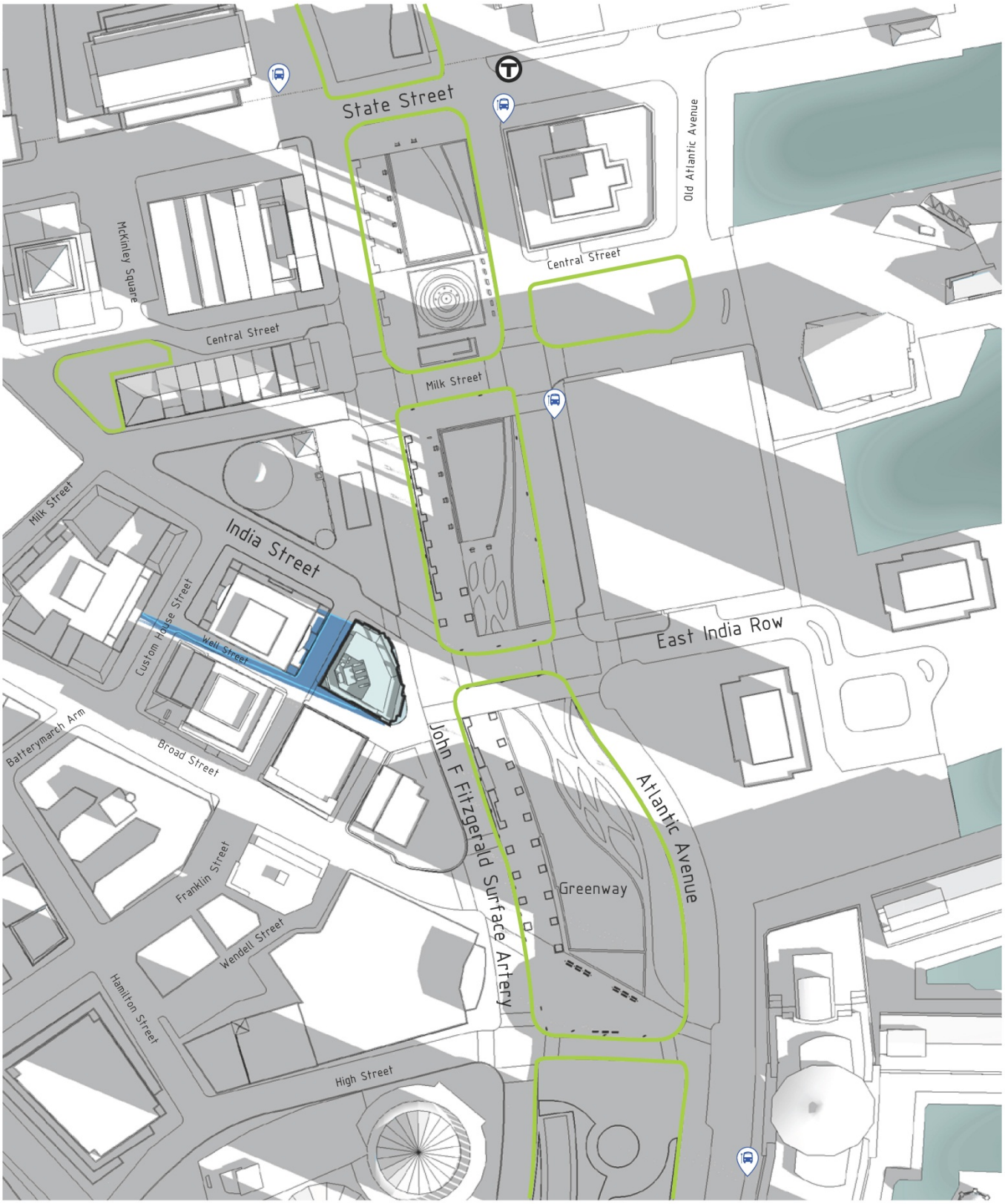
At 9:00 a.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto a portion of the Franklin Street western sidewalk. Shadow from the as-of-right alternative would extend onto an additional portion of the Franklin Street western sidewalk. No new Project shadow is cast onto open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., most of the area is under existing shadow cast to the northeast. No new shadow from the as-of-right alternative or the Project will be cast onto nearby streets, sidewalks, open spaces or bus stops.

At 3:00 p.m., most of the area is under existing shadow. No new shadow from the as-of-right alternative or the Project will be cast onto nearby streets, sidewalks, open spaces or bus stops.

3.2.6 Conclusions

Shadow impacts from the Project were compared to the as-of-right alternative in accordance with the Greenway District Planning Study Use and Development Guidelines. Because the proposed Project is slightly shorter than the as-of-right alternative, the shadow impacts from the Project will be less than that of the as-of-right alternative. New shadow from the as-of-right alternative and the Project will generally be limited to the immediately surrounding streets and sidewalks. New Project shadow will be cast onto the open space adjacent to the Flour and Grain Exchange building during two time periods studied (March 21 at 12:00 p.m. and September 21 at 12:00 p.m.), and onto the Greenway during three time periods studied (March 21 as 3:00 p.m., June 21 at 3:00 p.m., and September 21 at 3:00 p.m.). No new Project shadow is cast onto other open spaces or any bus stops in the vicinity of the Project.



55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 3.2-1
Shadow Study: March 21, 9:00 a.m.

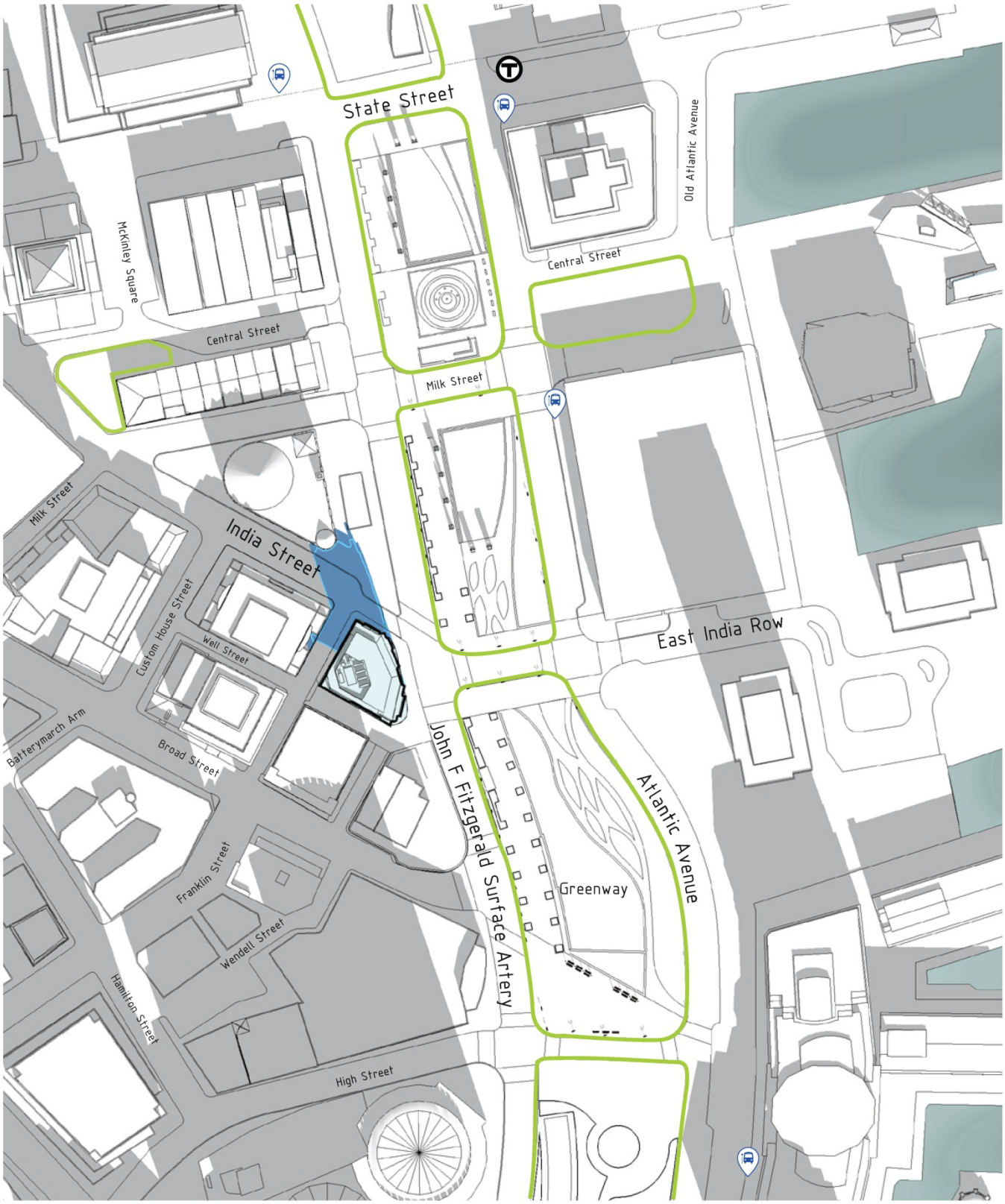


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Figure 3.2-2
Shadow Study: March 21, 12:00 p.m.

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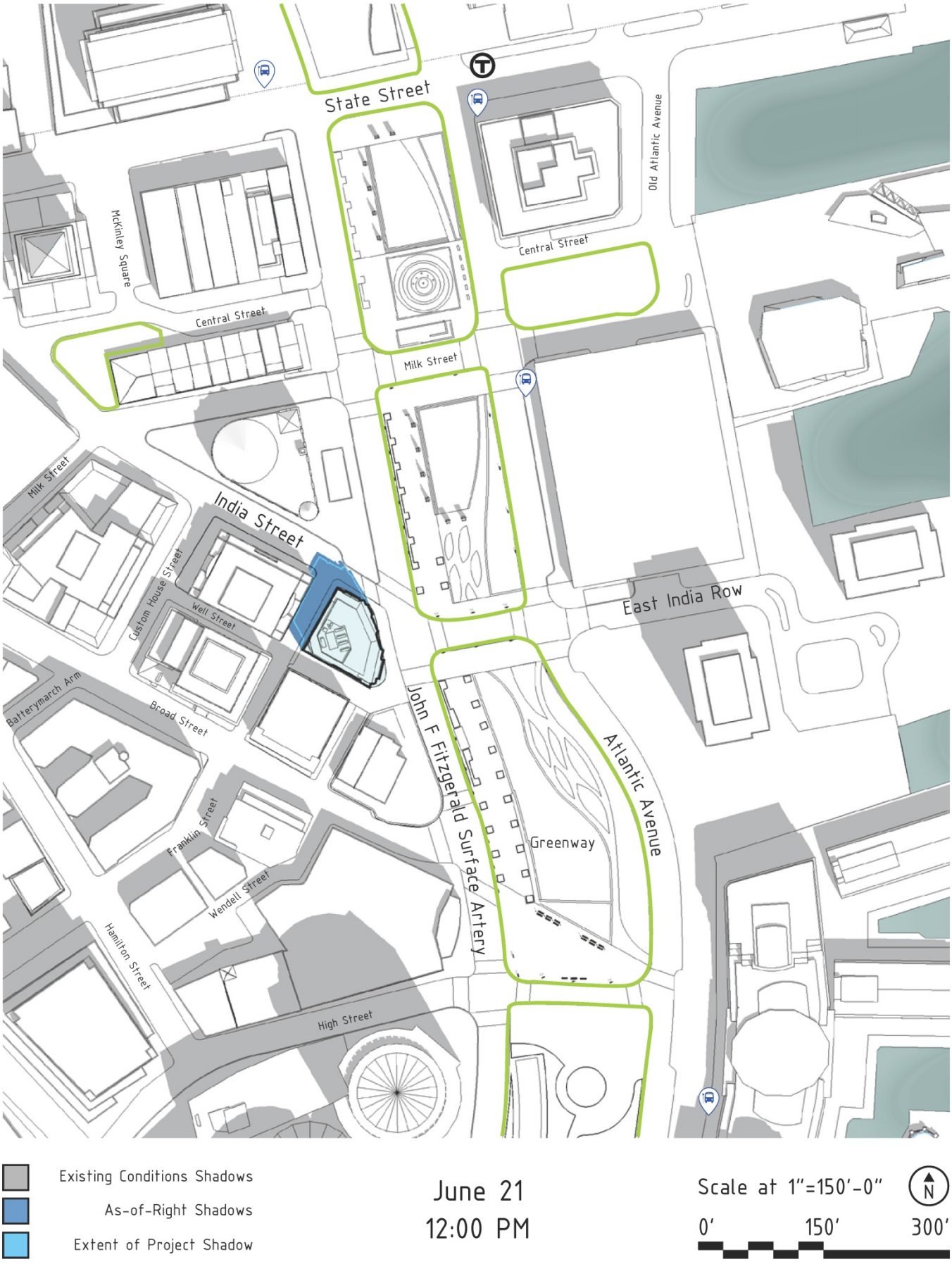
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 3.2-3
Shadow Study: March 21, 3:00 p.m.

55 India Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.2-4
Shadow Study: June 21, 9:00 a.m.



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Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 3.2-5
Shadow Study: June 21, 12:00 p.m.

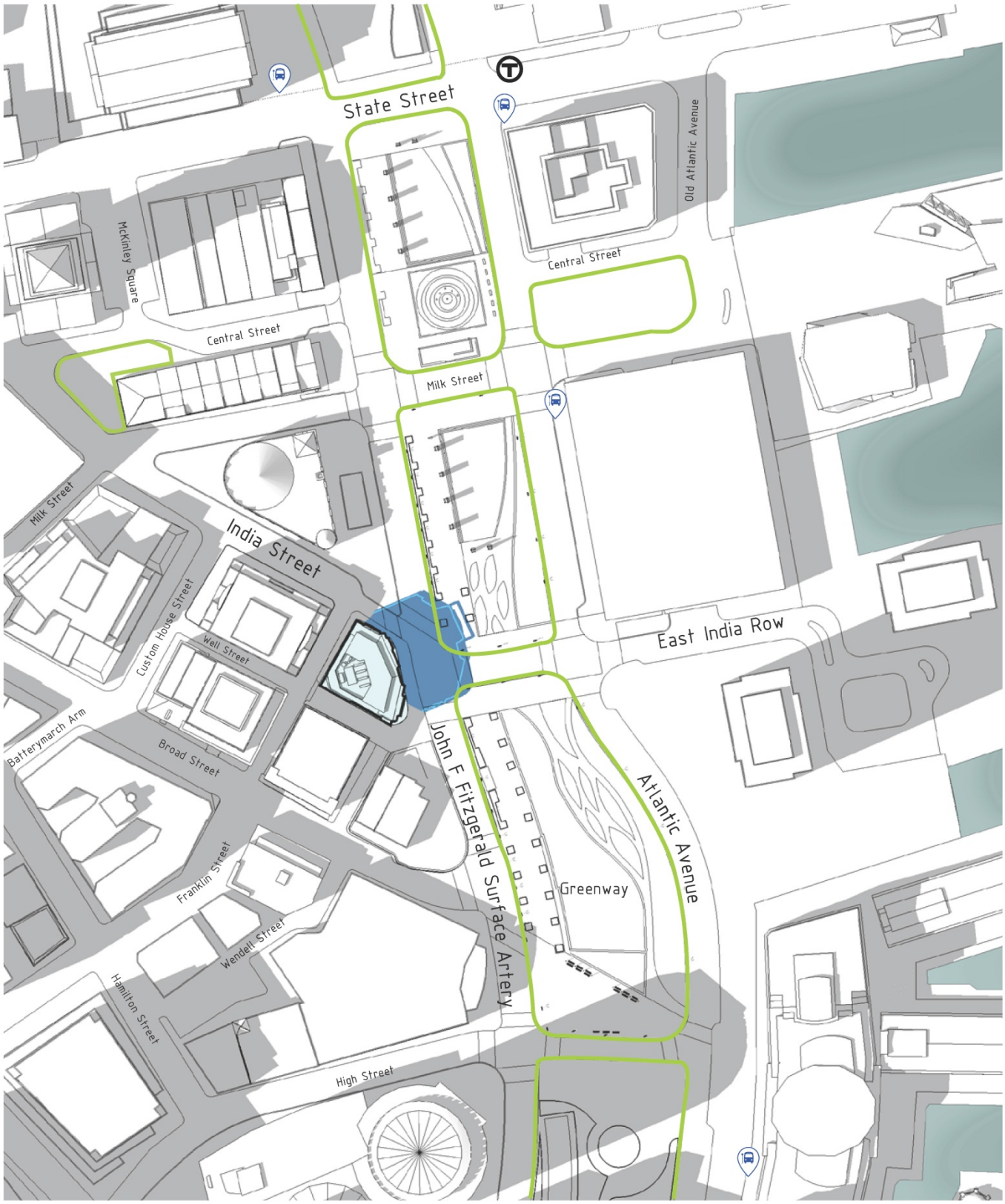

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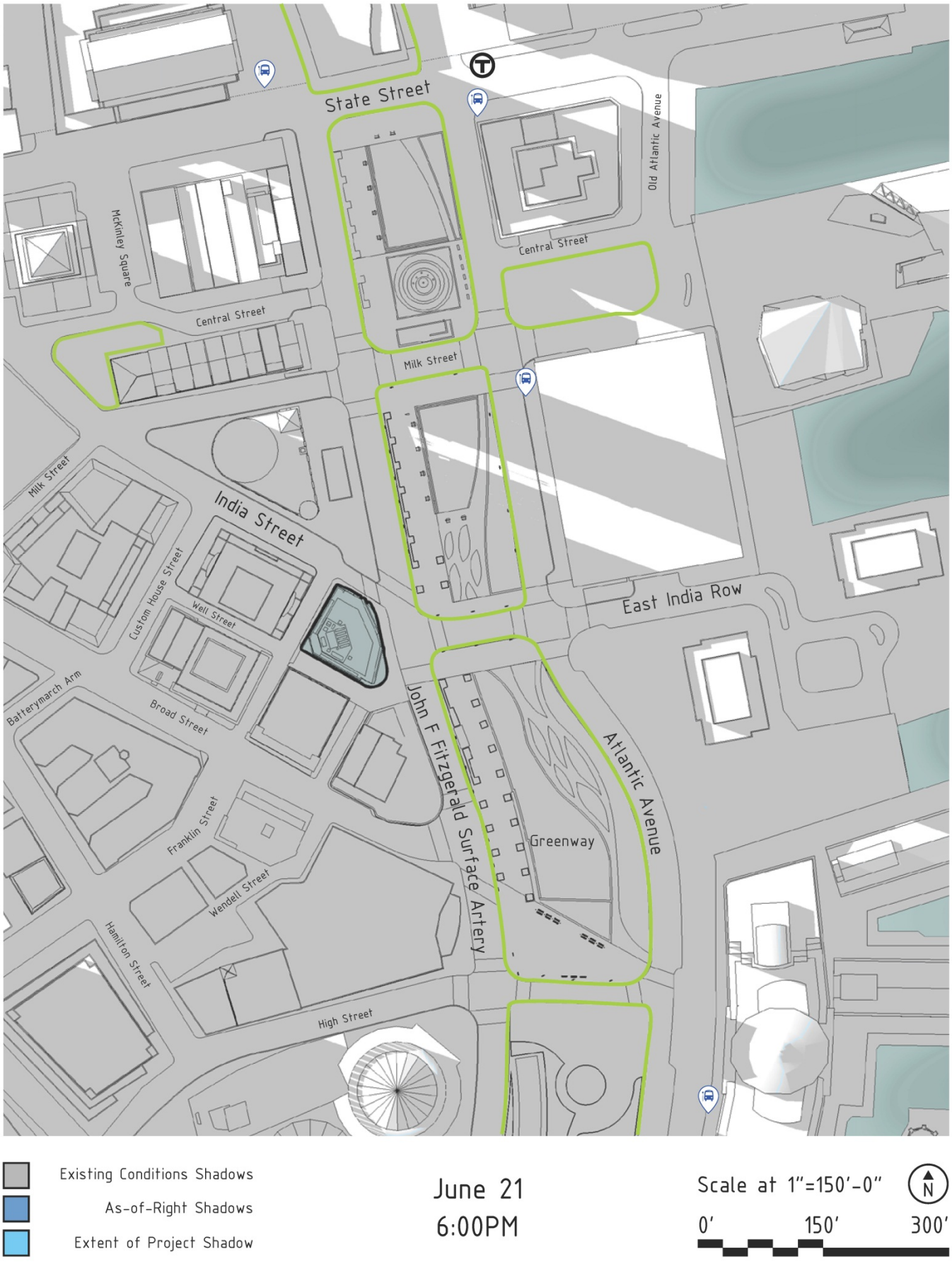
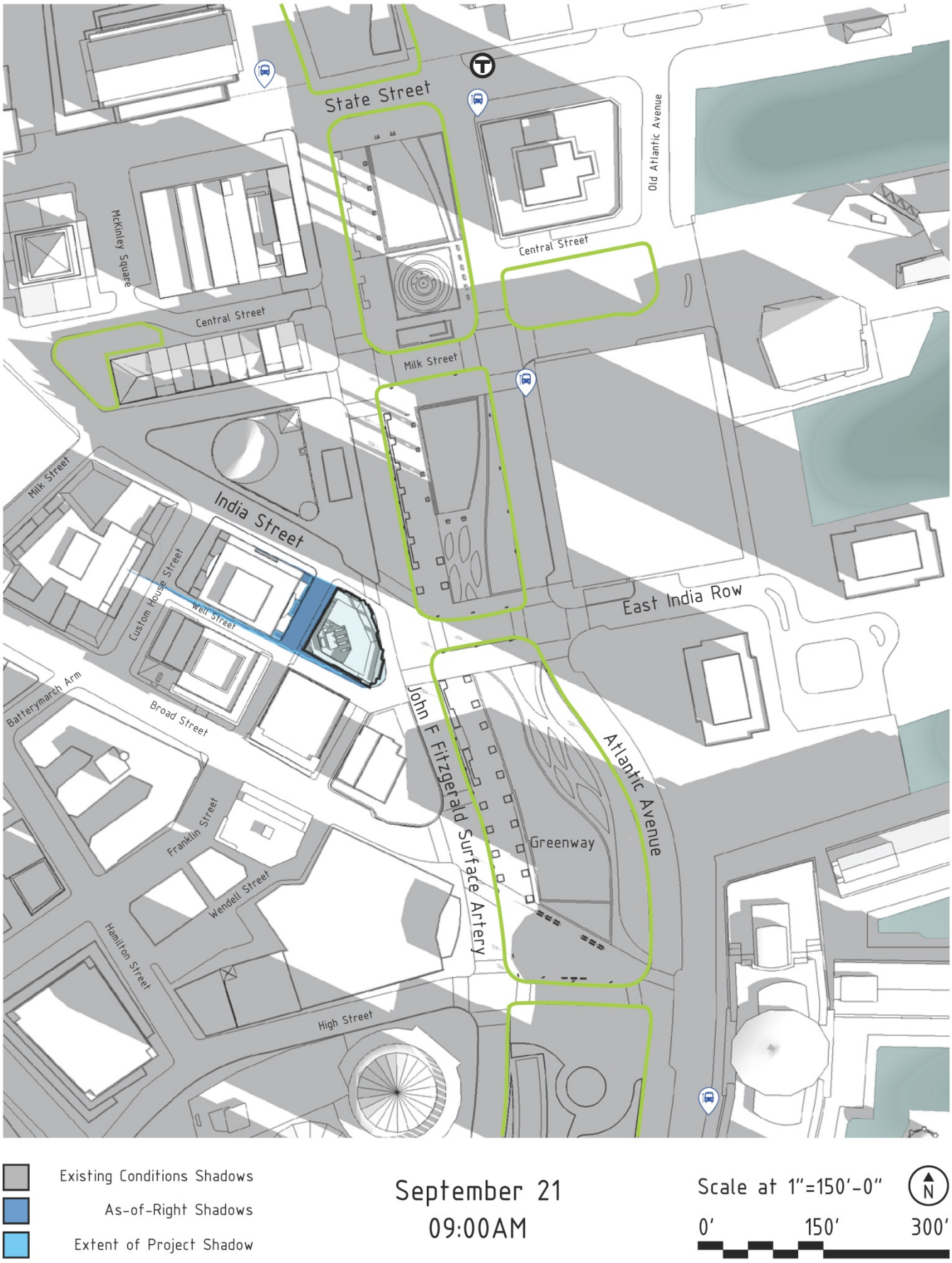
Figure 3.2-6
Shadow Study: June 21, 3:00 p.m.



55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure 3.2-7
Shadow Study: June 21, 6:00 p.m.



55 India Street Boston, Massachusetts

Figure 3.2-8
Shadow Study: September 21, 9:00 a.m.

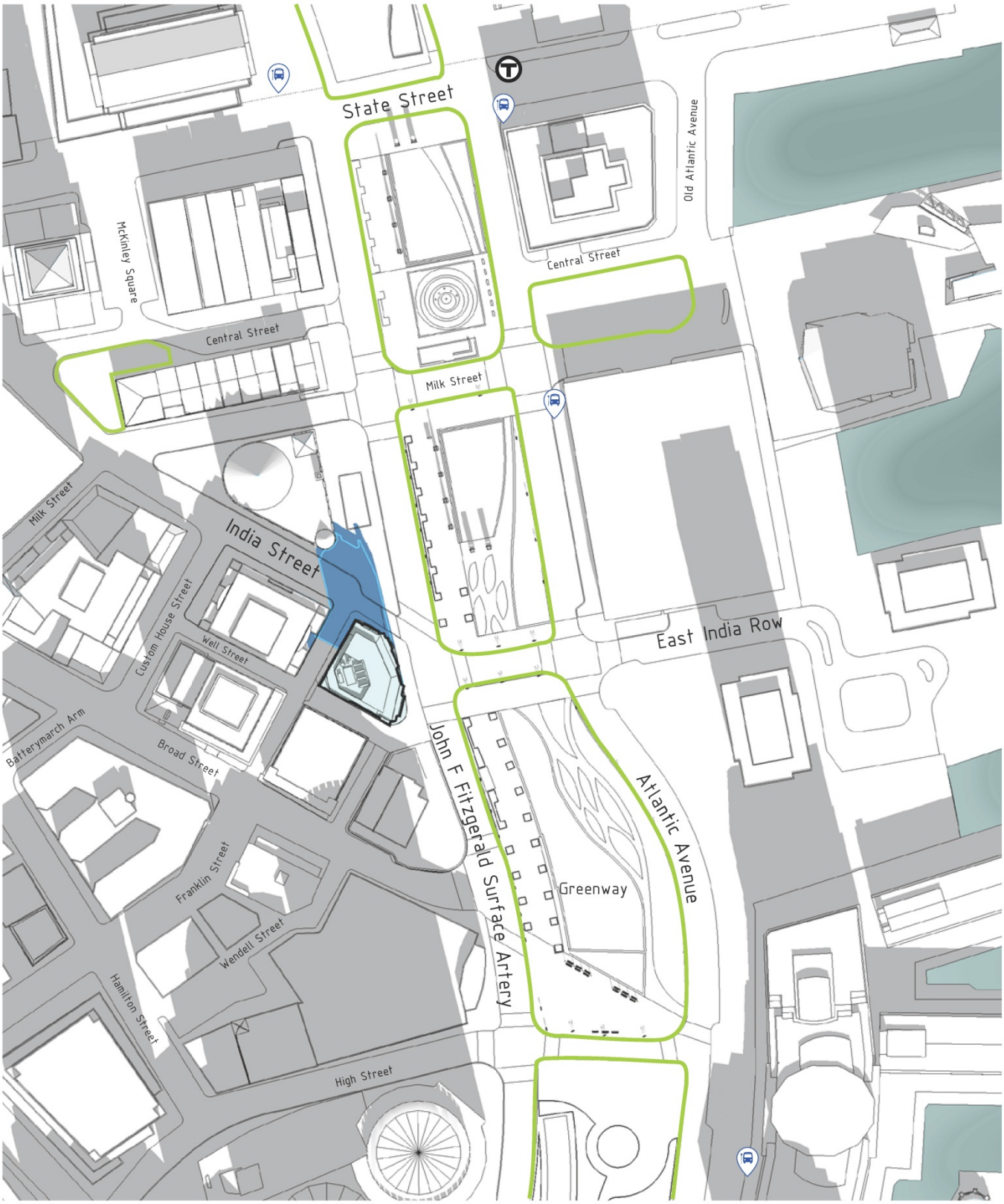


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Figure 3.2-9
Shadow Study: September 21, 12:00 p.m.

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Figure 3.2-10
Shadow Study: September 21, 3:00 p.m.

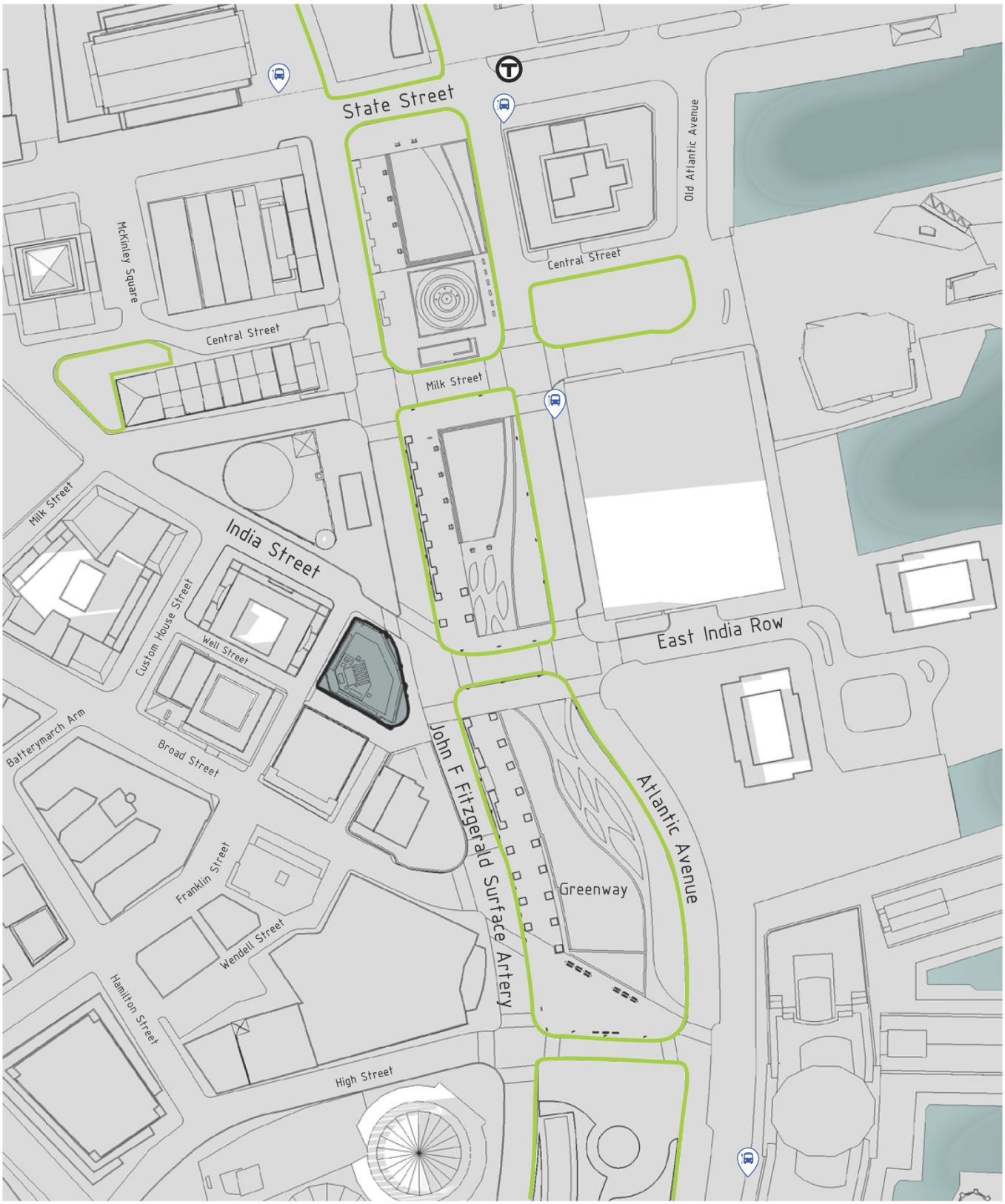

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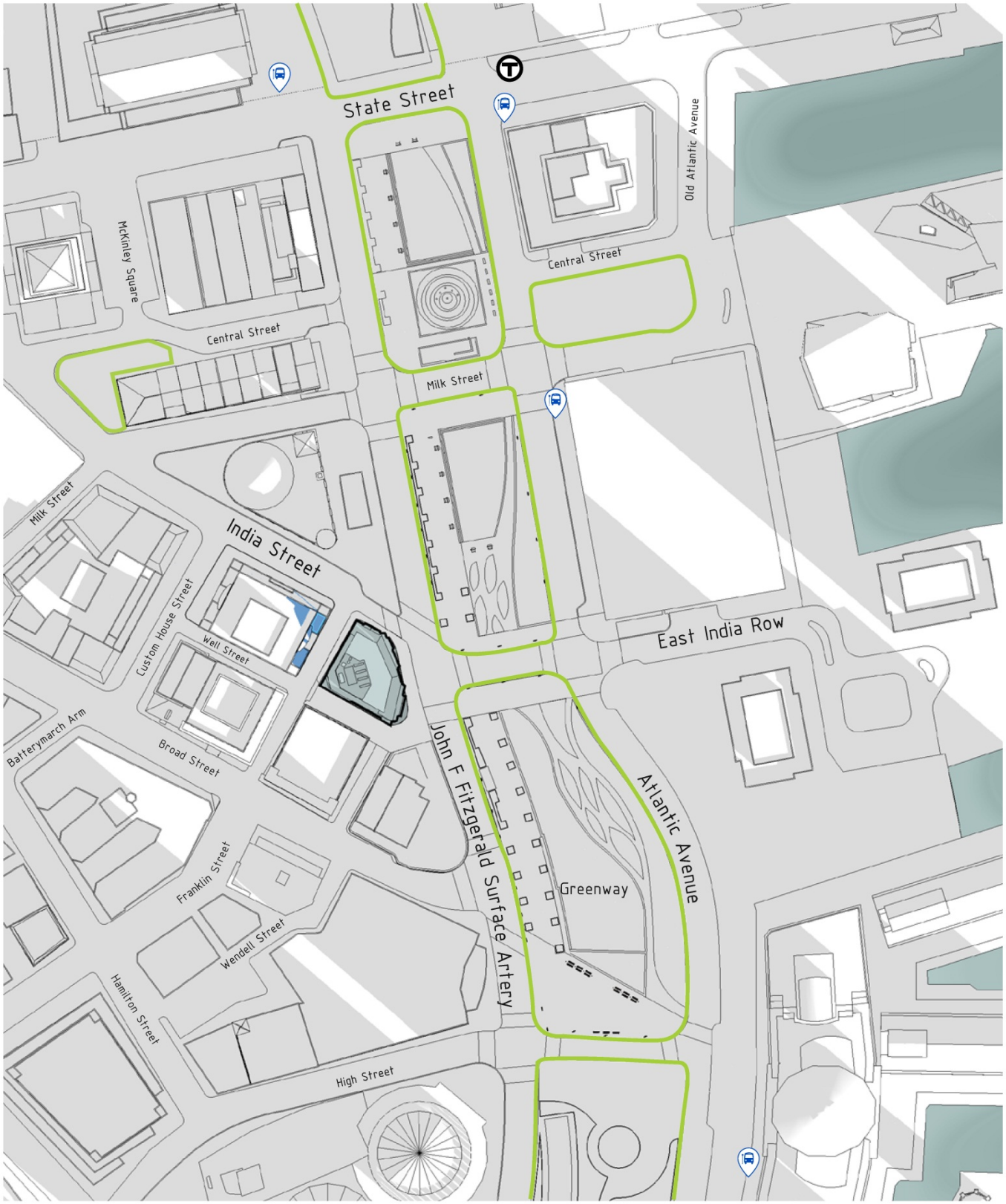
Figure 3.2-11
Shadow Study: September 21, 6:00 p.m.



Existing Conditions Shadows

As-of-Right Shadows

Extent of Project Shadow

December 21
09:00AM

Scale at 1"=150'-0"

0' 150' 300'

N

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Figure 3.2-12
Shadow Study: December 21, 9:00 a.m.

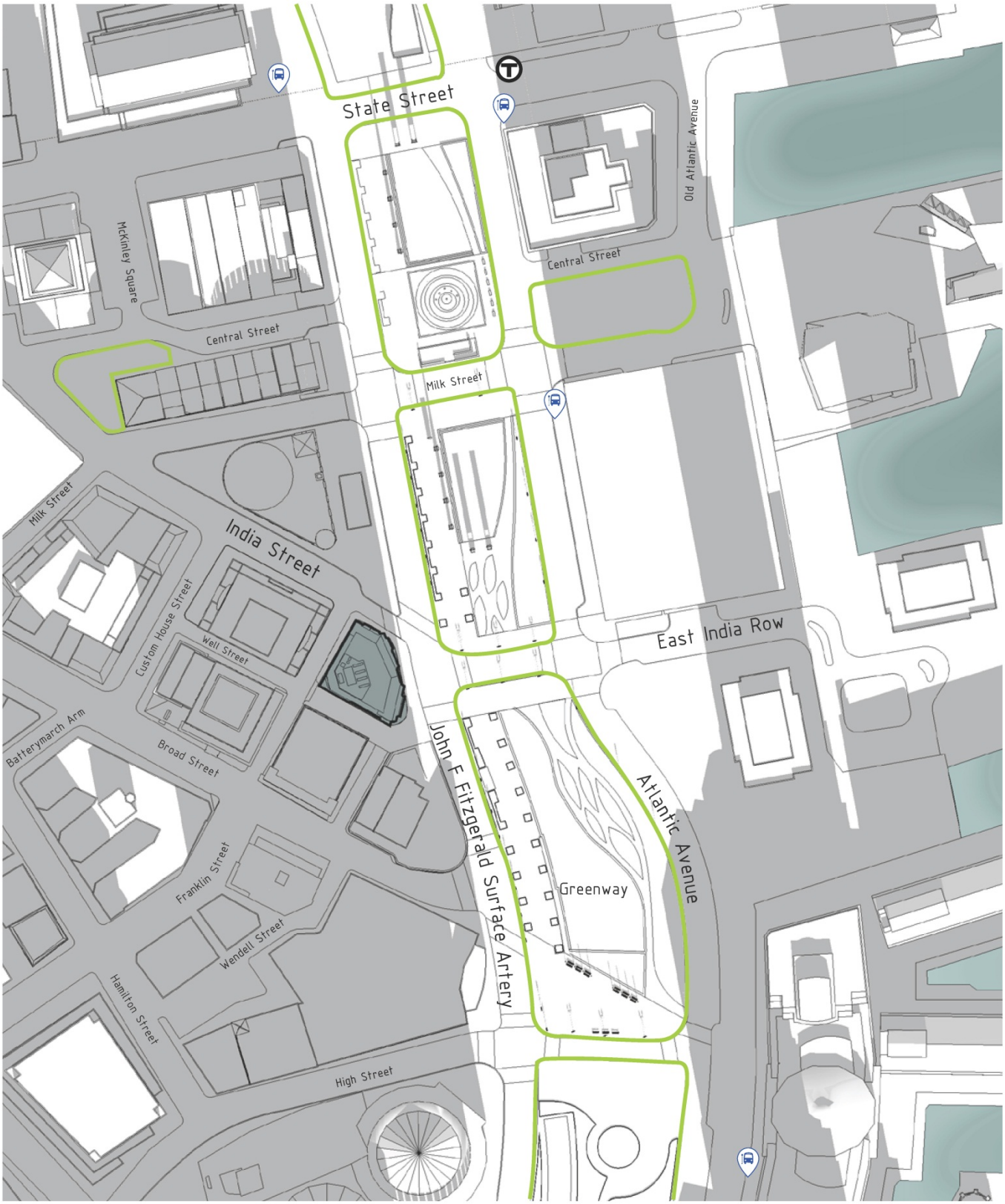

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Figure 3.2-13
Shadow Study: December 21, 12:00 p.m.

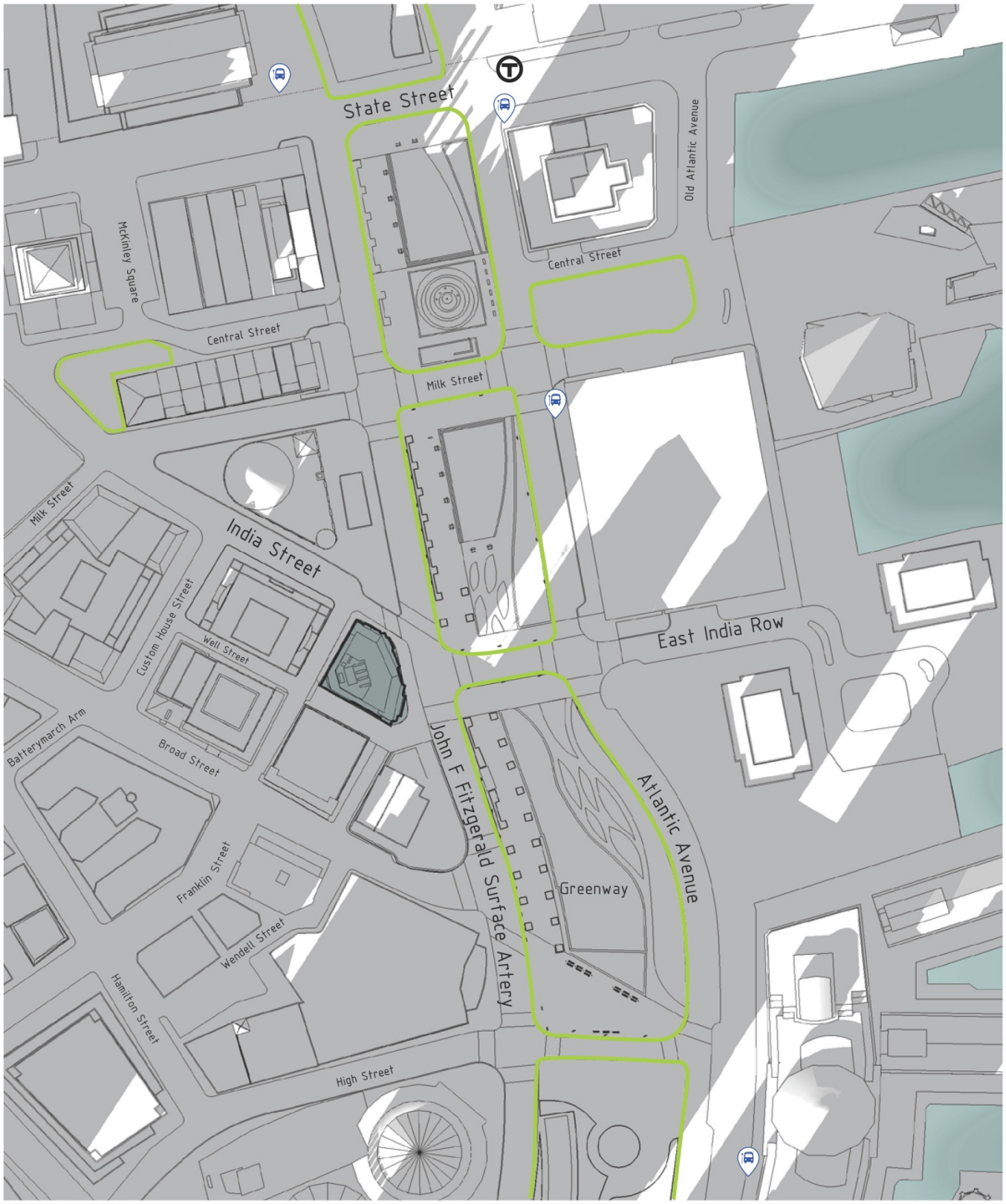

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Figure 3.2-14
Shadow Study: December 21, 3:00 p.m.

3.3 Daylight Analysis

3.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site.

Because the Project site currently consists of a parking lot and undeveloped land, the proposed Project will inherently increase daylight obstruction; however, because of the limited height, the resulting conditions are similar to or slightly lower than what is typical of the area and other urban areas.

3.3.2 Methodology

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

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

Since the Project site is currently undeveloped, the analysis compares the proposed conditions to the context of the area.

Two viewpoints were chosen to evaluate the daylight obstruction for the proposed conditions, one from John F Fitzgerald Surface Artery, and one from India Street. Two area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 3.3-1.

---

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

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

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Figure 3.3-1

Viewpoint and Area Context Locations

- **Viewpoint 1:** View from John F Fitzgerald Surface Artery facing southwest toward the Project site
- **Viewpoint 2:** View from India Street facing south toward the Project site
- **Area Context Viewpoint AC1:** View from Broad Street facing northeast toward the building at 120 Broad Street
- **Area Context Viewpoint AC2:** View from India Street facing southwest toward the building at 43 India Street

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 and 3.3-3 illustrate the BRADA results for each analysis.

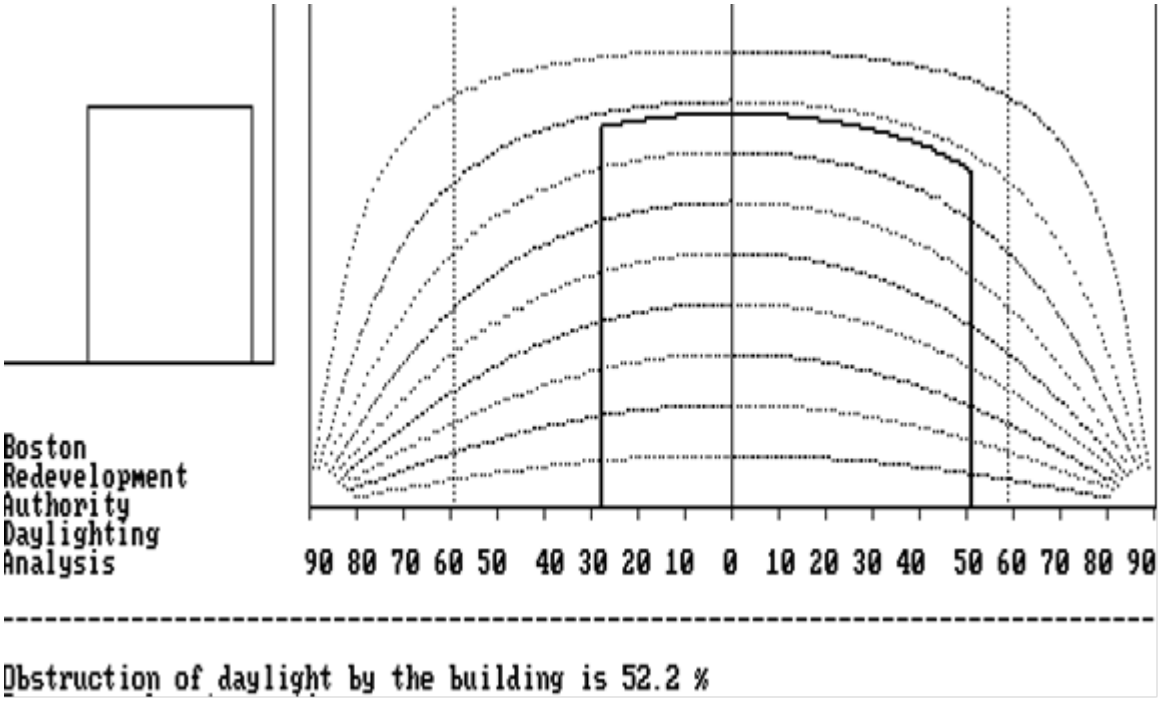
Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from John F Fitzgerald Surface Artery facing southwest toward the Project site	N/A	52.2%
Viewpoint 2	View from India Street facing south toward the Project site	N/A	72.8%
Area Context Points			
AC1	View from Broad Street facing northeast toward the building at 120 Broad Street	89.2%	N/A
AC2	View from India Street facing southwest toward the building at 43 India Street	88.7%	N/A

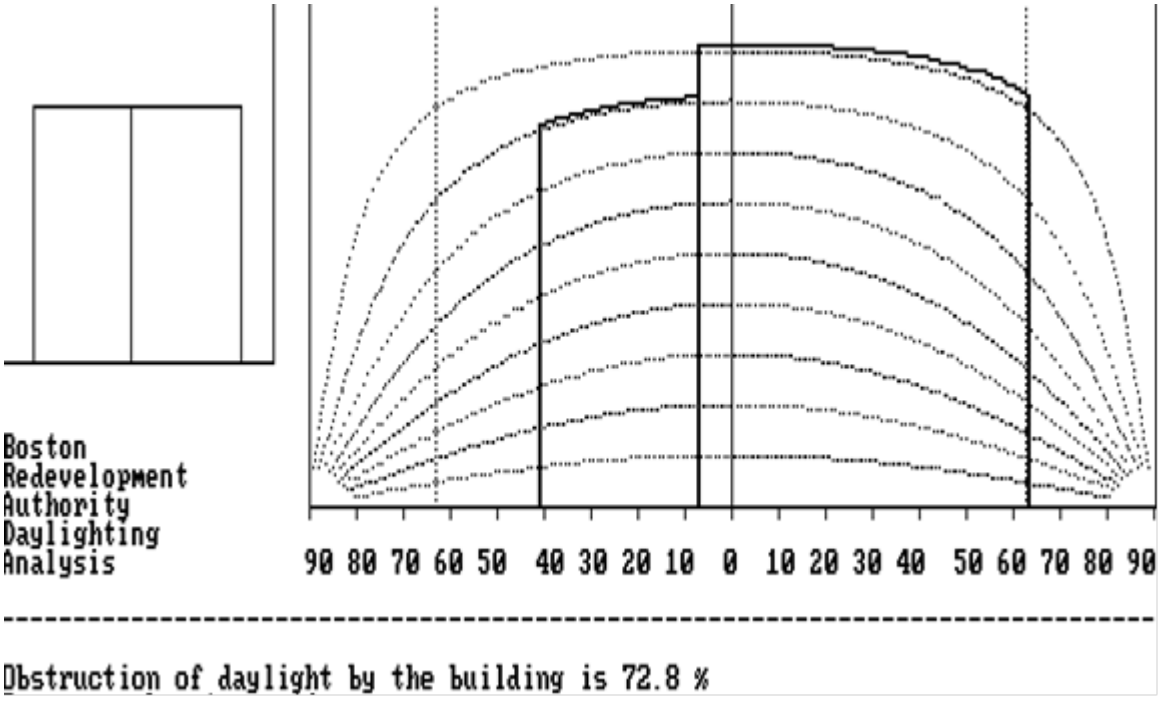
John F Fitzgerald Surface Artery – Viewpoint 1

John F. Fitzgerald Surface Artery runs along the northeastern edge of the Project site. Viewpoint 1 was taken from the center of John F Fitzgerald Surface Artery looking directly southwest toward the Project site. The development of the proposed Project would result in a daylight obstruction value of 52.2%. Since the Project site is currently a surface parking lot, this is an increase over existing conditions. However, the daylight obstruction value is lower than other buildings in the area, including the Area Context buildings.

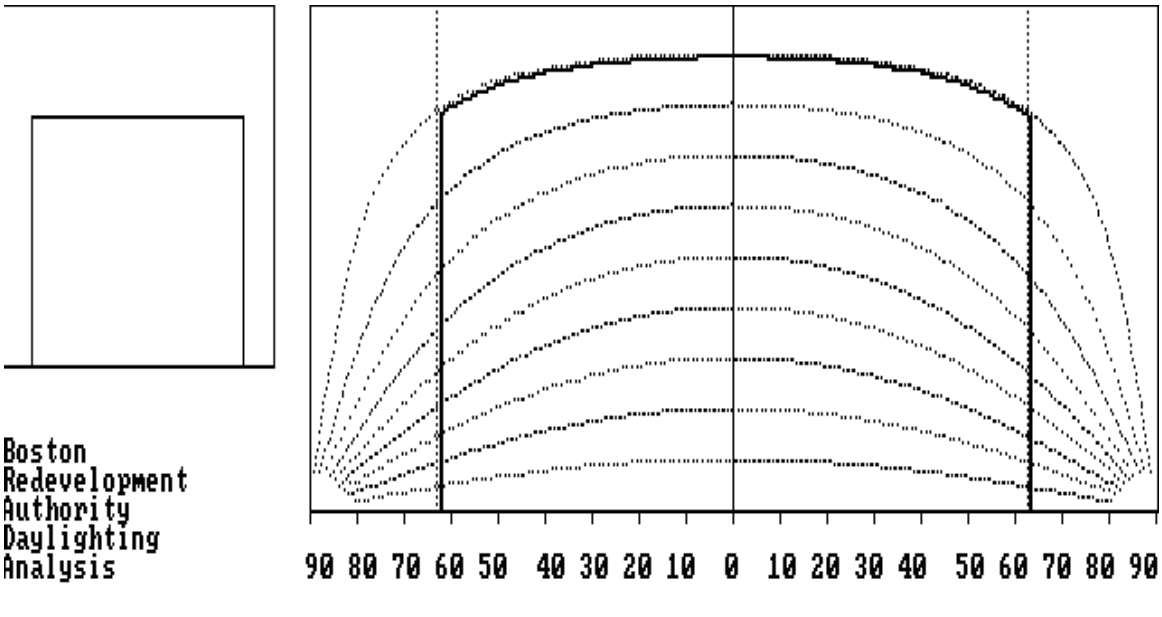
Viewpoint 1: View from John F Fitzgerald Surface Artery facing southwest toward the Project site



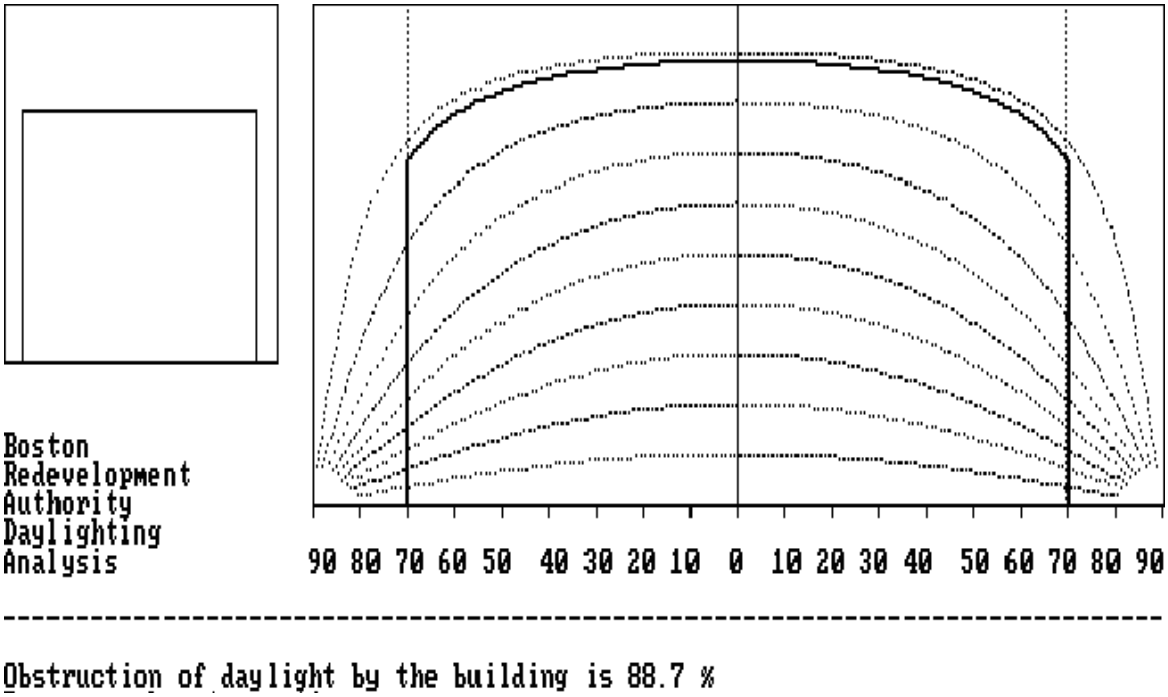
Viewpoint 2: View from India Street facing south toward the Project site



AC 1: View from Broad Street facing northeast toward the building at 120 Broad Street



AC 2: View from India Street facing southwest toward the building at 43 India Street



India Street – Viewpoint 2

India Street runs along the northern edge of the Project site. Viewpoint 2 was taken from the center of India Street facing south toward the Project site. The development of the Project will result in a daylight obstruction value of 72.8%. While this is an increase over existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings, and is typical of dense urban areas.

Area Context Views

The Project area currently consists of high-rise commercial and residential buildings and structured parking garages. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the two Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 88.7% for AC2 to 89.2% for AC1. Daylight obstruction values for the Project are consistent with or lower than the Area Context values.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes proposed daylight obstruction conditions at the Project site and existing conditions in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to or lower than the daylight obstruction values within the surrounding area and typical of densely built urban areas. The increased daylight obstruction is a result of developing on a site that is currently used as a surface parking lot.

3.5 Air Quality Analysis

The Boston Redevelopment Authority requires that project-induced impacts to ambient air quality be addressed. A microscale analysis is used to determine the effect on air quality of the increase in traffic generated by the Project. This microscale analysis may be required for a project at intersections where 1) project traffic would impact intersections or roadway links currently operating at Level of Service (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 (ADT) on roadways providing access to a single location.

The proposed Project does not generate 3,000 ADT, nor does it increase traffic volumes by 10 percent or 100 vehicles per hour. As discussed in Chapter 2, all intersections studied will continue to operate at the same LOS as under the No-Build conditions during both the a.m. and p.m. peak hours. Therefore, no quantitative analysis is required. Given the

generally well-operating intersections, and the small increases in volume at the worst intersections, it is expected that there would be no violations of the NAAQS for CO at any intersections associated with Project-related traffic.

It is expected that the majority of stationary sources (boilers, engines, etc) would be subject to the MassDEP's Environmental Results Program (ERP). The ERP regulation applies to new emergency generators greater than 37 kW. The regulation is similar to the boiler ERP in that new engines are subject to emission standards, recordkeeping, certification, and compliance with the MassDEP noise policy. Since the generator maximum rating capacity will be greater than the ERP limit of 37 kW, it will be subject to the ERP program. Per the ERP, the generator owner will limit operation of the generator to less than 300 hours per year and submit a certification form to MassDEP within 60 days of installation.

3.6 Solid and Hazardous Waste

3.6.1 Hazardous Waste

Lord Associates, Inc. has completed a Phase I Environmental Site Assessment of the Site. This assessment was performed with consideration to standard industry practice and the ASTM E-1527-05 site assessment standard entitled "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process". The assessment did not identify any Recognized Environmental Conditions (RECs) in connection with the property.

Excess soil that may be generated will require characterization to assess its disposition for off-site reuse, disposal, treatment or recycling in accordance with DEP policy #COMM-97-001 and the MCP. Therefore, a soil characterization program will be implemented to pre-characterize the soil and a Soil Management Plan will be prepared summarizing the results of chemical testing and providing soil disposal recommendations. The construction contractor will be responsible for proper off-site removal of contaminated soil, and disposal of solid waste and debris.

3.6.2 Operation Solid and Hazardous Waste Generation

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 76 tons of solid waste per year.

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

3.6.3 Recycling

A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills. The recycling program will be fully developed in accordance with LEED as described in Chapter 4. A single trash/recycle chute will be provided on each floor leading to the trash room on the Mezzanine level, at which point the 'bi-sorter' will divert the trash and recycling into appropriate bins. The trash will have a compactor and the recycling will be single stream, which collects more types of recycled materials and results in more recycling because there is no need to separate different types of materials.

3.7 Noise Impacts

3.7.1 Introduction

A noise analysis was conducted for the Project, including an estimate of future sound levels once the Project is in operation. The analysis was conducted in accordance with the BRA's typical guidance to address potential impacts solely from the Project.

Baseline noise levels were measured in the vicinity of the Project and were compared to predicted noise levels based on reference sound data for likely mechanical equipment identified by the Proponent for the Project. These predicted noise levels were compared to the City of Boston Zoning District Noise Standards (City Noise Standards) and the Massachusetts Department of Environmental Protection (MassDEP) Noise Policy. The analysis indicates that predicted noise levels from Project-related mechanical equipment with appropriate noise mitigation will comply with the City Noise Standards, and will result in sound level increases that are below the limit established by the MassDEP Noise Policy.

3.7.2 Noise Terminology

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

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. One property of the decibel scale is that the sound pressure levels of two separate sounds are not directly 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 (to 53 dB), not a doubling to 100 dB. Thus, every three dB change in sound levels represents a doubling or halving of sound energy. Related to this is that a change in sound levels of fewer than three dB is imperceptible to the human ear.

Another property of decibels is that if one source of noise is 10 dB (or more) louder than another source, then the total sound level is simply the sound level of the higher source. For example, a source of sound at 60 dB plus another source of sound at 47 dB is 60 dB.

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

Because the sounds in our environment vary with time, they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are 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 percent. 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 is designated L_{eq} and is also A-weighted. 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.

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

By using various noise metrics, it is possible to separate prevailing, steady sounds (the L_{90}) from occasional, louder sounds (L_{10}) in the noise environment or combined average levels (L_{eq}). This analysis of sounds expected from the Project treats all noises as though they will be steady and continuous, and hence the L_{90} exceedance level was used. In the design of noise control treatments, it is essential to know something about the frequency spectrum of the noise of interest. Noise control treatments do not function like the human ear, so simple A-weighted levels are not useful for noise-control design. The spectra of noises are usually stated in terms of octave-band sound pressure levels, in dB, with the octave frequency bands being those established by a generally-accepted standard. 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.

3.7.3 Noise Regulations and Criteria

The primary set of regulations relating to the potential increase in noise levels is the City Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise; and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Separate regulations within the City Noise Standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the proposed building, as completed, and was considered in the noise study for the Project. Table 3.7-1 includes the City Noise Standards.

Additionally, MassDEP regulates community noise by its Noise Policy (DAQC policy 90-001). The MassDEP Noise Policy limits source sound levels to a 10-dBA increase in the ambient measured noise level (L_{90}) at the Project property line and at the nearest residences. The property line evaluation is typically conducted at the property line of existing residences and/or at the property line of potential future sensitive receptors.[4] The policy further prohibits "pure tone" conditions—when any octave-band, center-frequency sound pressure level exceeds that of the two adjacent center-frequency sound pressure levels by three decibels or more.

[4] *"Noise levels that exceed the criteria at the source's property line by themselves do not necessarily result in a violation or a condition of air pollution under MassDEP regulations (see 310 CMR 7.10 U)."* MassDEP website (http://www.mass.gov/dep/air/laws/noisepol.htm), accessed April 2013.

Table 3.7-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

Octave Band Center	Residential 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:	Noise standards are extracted from Regulation 2.5, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976. All standards apply at the property line of the receiving property. dB and dBA based on a reference pressure of 20 micropascals. Daytime refers to the period between 7:00 a.m. and 6:00 p.m. daily except Sunday.					

3.7.4 Existing Conditions

3.7.4.1 Baseline Noise Environment

An ambient noise-level survey was conducted to characterize the "baseline" acoustical environment in the vicinity of the Project site. Existing noise sources consisted of: vehicular traffic (including buses and trucks) on the local roadways, pedestrians, landscaping activities (daytime only) at a nearby open space, aircraft, birds, and the general din of the city.

3.7.4.2 Noise Measurement Locations

The selection of the sound-monitoring locations was based upon a review of the current land uses in the Project area. Four noise-monitoring locations were selected as representative in obtaining a sampling of the ambient baseline noise environment. The measurement locations are depicted in Figure 3.7-1 and are described below.

- Location 1 is located at 65 East India Row, at the corner of East India Row and Atlantic Avenue, east of the Project site. This location is representative of the residential buildings (Harbors Towers) to the east of the Project. Noise sources at this location include vehicular and pedestrian traffic, birds chirping (daytime only), horns honking from the nearby roadway, vehicle unloading (daytime only), leaf rustle, and helicopter flying overhead (nighttime only).

- Location 2 is at the corner of India Street and Franklin Street, north of the Project site, which is across the street from office buildings located at 21 Custom House Street. Noise sources at this location include vehicular (including trucks) and pedestrian traffic, emergency vehicle sirens, birds chirping (daytime only), horns honking from nearby roadways, music from car stereos, planes overhead (daytime only), dogs barking (daytime only), a bell ringing from a nearby parking garage (daytime only), and landscaping activities associated with a nearby open space (daytime only).

- Location 3 is across the street from 80 Broad Street, a condominium building at the corner of Well and Franklin streets, west of the Project site. This location represents the closest residential location to the Project. Noise sources include vehicular traffic (including trucks), pedestrians, horns honking from nearby roadways, birds chirping (daytime only), planes flying overhead (daytime only), landscaping activities at a nearby park (daytime only), truck loading and unloading operations at nearby loading dock (daytime only) and emergency vehicle sirens.

- Location 4 is at a mixed use commercial/residential building (102 Broad Street) at the corner of Wharf and Well streets, southeast of the Project site. Noise sources include vehicular and pedestrian traffic, birds chirping (daytime only), helicopter passing by overhead (daytime only), music from cars on nearby roads (nighttime only), horns honking on nearby roadways, noise from weekly trash collection (nighttime only).

3.7.4.3 Noise Measurement Methodology

Sound-level measurements were taken for approximately 20 minutes per location during the daytime (12:00 p.m. to 3:00 p.m.) on April 10, 2014, and during nighttime hours (12:15 a.m. to 2:40 a.m.) on April 11, 2014. Since noise impacts are greatest at night when existing noise levels are 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 exclude peak traffic conditions.

The sound levels were measured at publicly-accessible locations at a height of approximately 1.5 meters above the ground. The measurements were made under low wind conditions, and roadway surfaces were dry. 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, including wind speed, temperature, and humidity, as well as 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 proposed Project.

3.7.4.4 Measurement Equipment

A Larson Davis model 831 Sound Level Analyzer, equipped with a Larson Davis model PRM831 Preamplifier, a PCB Piezotronics half-inch microphone, and a manufacturer windscreen were used to collect broadband and octave band ambient sound pressure level data. The instrumentation meets the "Type 1 – Precision" requirements set forth in American National Standards Institute (ANSI) S1.4 for acoustical measuring devices. The meter was tripod-mounted at a height of five feet above ground level (AGL). The meter has data logging capability and was programmed to log statistical data for each 20-minute sampling period for the following parameters: L_{10}, L_{50}, L_{90}, L_{max}, L_{min}, and L_{eq}.

All measurement equipment was calibrated in the field before and after the surveys with a LD CAL200 acoustical calibrator, which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. The meters were calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. These calibrations were conducted by an independent laboratory within the past 12 months.

3.7.4.5 Baseline Ambient Noise Levels

The existing ambient noise environment consists primarily of vehicular traffic on nearby roadways, aircraft, and pedestrian activity. Baseline noise monitoring results are presented in Table 3.7-2, and summarized below.

- The daytime residual background (L_{90}) measurements ranged from 53 to 63 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 52 to 59 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 64 to 70 dBA; and
- The nighttime equivalent level (L_{eq}) measurements ranged from 59 to 76 dBA.

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Figure 3.7-1

Sound Level Measurement Locations

Table 3.7-2 Baseline Ambient Sound Level Measurements

Receptor I.D	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Level (dB) per Octave Band Center Frequency (Hz)								
		(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	31.5	63	125	250	500	1000	2000	4000	8000
1-Day	11:59 AM	64	78	67	62	59	68	68	63	59	56	54	47	40	32
2-Day	1:01 PM	70	80	72	69	63	68	69	66	62	59	58	52	45	37
3-Day	1:25 PM	66	81	67	63	60	67	65	64	59	56	55	48	40	32
4-Day	2:40 PM	68	84	71	63	53	68	68	64	59	56	53	47	40	33
1-Night	12:17 AM	66	85	68	63	59	65	67	62	57	54	55	50	40	29
2-Night	2:19 AM	76	97	68	60	56	61	62	59	54	52	51	46	37	27
3-Night	1:50 AM	59	78	61	56	52	61	59	55	52	49	48	42	32	23
4-Night	12:41 AM	66	86	69	61	55	63	64	60	55	51	51	45	35	23

Notes:

1. Daytime weather: Temperature = 56˚ F, Relative Humidity = 23%, mostly clear skies, south south-east winds 0-3 miles per hour.
   Nighttime weather: Temperature = 53˚ F, Relative Humidity = 48%, mostly clear skies, south winds 0-3 miles per hour.
2. All road surfaces were dry during measurements, despite a brief period of drizzle during the night at measurement locations 2 and 3.
3. Sampling periods were at least 20 minutes in duration.
4. Daytime measurements were collected on April 10, 2014.
   Nighttime measurements were collected on April 11, 2014.

3.7.5 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 roof and there will be various exhaust/intakes along the façades of the building on several floors.

It is anticipated at this point in the design that the major sources of sound exterior to the Project will be five 24-ton air cooled condensing units, one 10-ton air cooled condensing unit, eleven 600 CFM energy recovery ventilators, one 750 cubic-feet-per-minute (CFM) energy recovery ventilator, one 800 CFM general exhaust fan, one 8,000 CFM kitchen exhaust fan, one 3,800 CFM dryer exhaust fan, one 4,000 CFM dryer exhaust fan, one 1,800 CFM dryer exhaust fan, one 8,000 CFM makeup air unit, and one 350 kW emergency generator.

A tabular summary of the modeled mechanical equipment proposed for the Project is presented below in Table 3.7-3a. Manufacturer specifications indicating the sound power for each piece of equipment—except for the 24-ton and 10-ton air cooled condensing units, and the emergency generator—are presented in Table 3.7-3b. The sound power of this equipment was calculated using the sound-pressure levels provided at a reference distance. These calculated values are presented in Table 3.7-3b.

The Project includes various noise-control measures that are necessary to achieve compliance with the applicable noise regulations. Attenuation due to the length and bends in the ductwork for the energy recovery ventilators was included in the analysis. Mitigation in the form of inside duct lining for at least a portion of the ductwork was included in the analysis as well. The emergency generator will be controlled using an exhaust silencer and an acoustical enclosure. To further limit impacts from the standby generator, its 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 below in Table 3.7-3c.

Table 3.7-3a Modeled Noise Sources

Noise Source	Quantity	Approximate Location	Size/Capacity
Air Cooled Condensing Unit	5	Roof	24 Ton
Air Cooled Condensing Unit	1	Roof	10 Ton
Energy Recovery Ventilator	11	Units interior, Intake/ Exhaust on Levels 1 – 9, Intakes on Franklin St facade and exhausts on Well St facade	600 CFM
Energy Recovery Ventilator	1	Unit interior, Intake/ Exhaust on Level 10, façade, Intakes on Franklin St facade and exhausts on Well St facade	750 CFM
General Exhaust Fan	1	Roof	800 CFM
Kitchen Exhaust Fan	1	Roof	8,000 CFM
Dryer Exhaust Fan	1	Roof	3,800 CFM
Dryer Exhaust Fan	1	Roof	4,000 CFM
Dryer Exhaust Fan	1	Roof	1,800 CFM
Make-up Air Unit	1	Roof	8,000 CFM
Generator	1	Roof	350 kW

Table 3.7-3b 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
Air Cooled Condensing Unit – 24 Ton [2]	82	90[1]	90	89	84	80	76	72	67	59
Air Cooled Condensing Unit – 10 Ton [3]	78	86[1]	86	85	81	76	71	68	62	54
Energy Recovery Ventilator – 600 CFM (Intake/Exhaust) [4]	64	57[1]	57	59	60	60	59	58	53	47
Energy Recovery Ventilator – 750 CFM (Intake/Exhaust)) [5]	71	64[1]	64	66	67	67	66	65	60	54
General Exhaust Fan – 800 CFM[6]	81	95[1]	95	89	83	79	70	67	63	58
Kitchen Exhaust Fan – 8,000 CFM[7]	92	97[1]	97	95	96	87	85	81	74	70
Dryer Exhaust Fan - 3,800 CFM[8]	80	78[1]	78	81	84	78	70	69	66	63
Dryer Exhaust Fan – 4,000 CFM[9]	80	78[1]	78	81	84	78	71	70	67	64
Dryer Exhaust Fan – 1,800 CFM[10]	75	73[1]	73	67	79	75	64	58	58	56
Make-up Air Unit – 8,000 CFM[11]	81	88[1]	88	86	81	79	74	73	68	58
350 kW Generator – Mechanical – Caterpillar	119	116[1]	116	109	114	114	114	111	107	111
350 kW Generator – Exhaust – Caterpillar	133	133[1]	133	142	137	130	126	122	116	109

Notes:
Sound power levels do not include mitigation or directivity correction.

1. Sound level assumed to be equal to dB level in 63 Hz band.
2. Mitsubishi Electric outdoor unit
3. Mitsubishi Electric outdoor unit
4. Renew Aire
5. Renew Aire
6. Greenheck 10-BISW-21-10-I-7
7. Greenheck 24-BISW-21-10-I-75
8. Greenheck
9. Greenheck
10. Greenheck
11. Greenheck IGX-120-H32

Table 3.7-3c 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
Energy Recovery Ventilator Intake	Duct Attenuation (Distance, Bends, Inside Lining)[1]	0	5	5	4	4	7	9	9	8
Energy Recovery Ventilator Exhaust	Duct Attenuation (Distance, Bends, Inside Lining)[1]	0	13	13	9	6	10	12	14	14
1,000 kW Generator – Mechanical – Caterpillar	Pritchard Brown Enclosure[2]	3	5	10	20	20	20	20	20	20
1,000 kW Generator – Exhaust – Caterpillar	Silex Silencer (JC-12)	18[1]	27	40	38	31	25	25	25	25

Notes:
1. Sound level reduction estimated.
2. Octave band reduction estimated based on a broadband reduction of 20 decibels.

3.7.6 Modeling Methodology

The noise impacts associated with the Project were predicted at the nearest 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.

3.7.6.1 Future Sound Levels – Nighttime

The analysis of sound levels at night considered all of the mechanical equipment without the emergency generators running, to simulate typical nighttime operating conditions at nearby receptors. Four modeling locations were included in the analysis. These modeling receptors, which correspond to the closest residential and nearby commercial locations, are depicted in Figure 3.7-2. The predicted exterior Project-Only sound levels range from 36 to 42 dBA at nearby receptors. According to data available through the Massachusetts Office of Geographic Information (MassGIS), the immediate area surrounding the Project site is zoned mixed use. The current land use in the area indicates that there are several residential uses within this mixed use zone. Therefore, the Residential limits have been applied to these locations. The remaining location has been evaluated against the Business limits.

Predicted sound levels from Project-related equipment are within these broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. The evaluation is presented in Table 3.7-4a. In addition, the predicted future total sound levels

(Project + Background) are below the MassDEP criteria of 10 dBA over the quietest nighttime sound levels (the L_{90} level) at sensitive receptors with nighttime use. The evaluation is presented in Table 3.7-4b. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions per the MassDEP Noise Policy when combined with existing middle of the night background sound levels at these locations as shown in Table 3.7-4c.

Table 3.7-4a 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	38	45	46	43	42	34	31	26	15	-3
B	Business	40	52	51	46	45	36	32	28	19	10
C	Residential	42	55	52	48	45	40	36	32	26	18
D	Residential	36	52	49	43	39	34	29	25	18	8
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

Table 3.7-4b Comparison of Future Predicted Nighttime Sound Levels with Existing Background – MassDEP Noise Policy

Modeling Location ID	Zoning / Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Nighttime (dBA)	Future L_{90} – Nighttime Total (dBA)	Increase (dBA)
A	Residential	38	59	59	0
C	Residential	42	52	52	0
D	Residential	36	55	55	0

Notes:

1. Sound levels at Modeling ID's A, C, and D correspond to measured sound levels at monitoring locations 1 3, and 4 respectfully.

55 India Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.7-2

Sound Level Modeling Locations

Table 3.7-4c MassDEP Noise Policy "Pure-Tone" Evaluation of Future Predicted Nighttime Sound Levels

Modeling Location ID	Zoning / Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	65	67	62	57	54	55	50	40	29
C	Residential	62	60	56	53	50	48	42	33	24
D	Residential	63	64	60	55	51	51	45	35	23

3.7.6.2 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. Daytime ambient sound levels were incorporated where applicable.

The predicted exterior Project-Only daytime sound levels range from 42 to 54 dBA at nearby receptors. The range at residential modeling locations is 42 to 50 dBA. 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 3.7-5a. In addition, the predicted future total sound levels (Project + Background) are below the MassDEP criteria of 10 dBA over the daytime ambient sound levels (the L_{90} level) at each of the residential locations. That evaluation is presented in Table 3.7-5b. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions as defined under the MassDEP Noise Policy when combined with existing midday background sound levels. The predicted total sound levels per octave band are shown in Table 3.7-5c.

Table 3.7-5a 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	47	61	61	50	46	43	43	39	31	24
B	Business	54	72	67	57	52	50	50	45	39	36
C	Residential	50	73	67	56	50	47	45	38	30	27
D	Residential	42	68	61	49	42	38	35	30	23	18
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

Table 3.7-5b Comparison of Future Predicted Daytime Sound Levels with Existing Background – MassDEP Noise Policy

Modeling Location ID	Zoning / Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Daytime (dBA)	Future L_{90} – Daytime Total (dBA)[1]	Increase (dBA)[1]
A	Residential	47	59	59	0
C	Residential	50	60	60	0
D	Residential	42	59	59	0

Notes:
1. Sound levels at Modeling ID's A, C, and D correspond to measured sound levels at monitoring locations 1 3, and 4 respectfully.

Table 3.7-5c MassDEP Noise Policy "Pure-Tone" Evaluation of Future Predicted Daytime Sound Levels

Modeling Location ID	Zoning / Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	69	69	63	59	56	54	48	41	33
C	Residential	74	69	65	60	57	55	48	40	33
D	Residential	71	69	64	59	56	53	47	40	33

3.7.7 Conclusion

Baseline noise levels were measured in the vicinity of the Project during the day and at night. These levels were compared to modeled sound levels that were calculated based on information provided by the manufacturers of the expected mechanical equipment. Project-Only and future sound levels (Project + Background) were compared to applicable limits.

Predicted mechanical equipment noise levels from the Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, will be below the broadband requirements of City Noise Standards. With appropriate mitigation measures, the predicted sound levels from Project-related equipment are expected to remain below 50 dBA, 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, and may result in a noise experience similar to that of a typical urban setting. In addition, it is anticipated that the Project will comply with the MassDEP Noise Policy.

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, as well as the MassDEP Noise Policy. Additional mitigation may include the selection of quieter mechanical units, and/or the addition of acoustical louvers, screening walls, mufflers, duct lining materials, or equipment enclosures, as needed.

3.8 Flood Hazard Zones/ Wetlands

The existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Project site indicates that it is located outside of a designated flood zone (FIRM, City of Boston, Community-Panel Number 25025C0081G, Effective Date September 25, 2009). However, a "preliminary" revised floodplain map for the site area was recently released by FEMA which shows the site as lying within the 100-year flood zone (FIRM, Suffolk County, Massachusetts; Panel 0081J, Map Number 25025C0081J, Map Revised, Preliminary November 15, 2013). As discussed in Chapter 4, the design of the site and buildings will recognize and account for the site's location proximate to the harbor and within this newly preliminarily designated flood zone, as well as the potential impacts of sea level rise.

The site does not contain wetlands.

3.9 Geotechnical Impacts

This section describes the geotechnical conditions relating to the construction of the Project and discusses the potential impacts that excavation and foundation construction may have on existing adjacent structures.

3.9.1 Subsurface Soil and Bedrock Conditions

Historically, the Project site is located along Boston's former Colonial Shoreline. Thus, the bituminous pavement currently present across the proposed building footprint is underlain by a 15- to 20-foot thick fill deposit associated with the former waterfront location. The fill typically consists of a very loose to compact, brown to gray sand with some to trace amounts of silt and gravel containing various amounts of brick, wood, asphalt, ash and cinders. Consistent with the former harbor bottom, the lower portion of the granular fill deposit is generally intermixed with organic silt and silty clay containing occasional shell fragments.

At intermittent locations across the site, the fill deposit is underlain by an 8- to 22-foot thick marine clay deposit. The marine clay typically consists of a stiff to hard, yellow to gray, silty clay with trace amounts of sand and gravel.

Underlying the fill and organic deposits, a glacial till deposit is present at depths ranging from about 15 to 39 feet below the existing ground surface. The glacial till generally consists of a dense to very dense, olive-green to gray silt and sand with a trace of clay and gravel, varying to a clay silt with some traces of sand and gravel. The glacial till deposit extends to depths of approximately 100 to 110 feet below the existing ground surface where it is underlain by the bedrock surface that typically consists of a very soft to soft, completely to severely weathered gray argillite.

3.9.2 Groundwater

Groundwater levels in observation wells installed within the general area of the site were measured at depths of approximately 8 to 10 feet below the existing ground surface, corresponding to about Elevation +5 to Elevation +7. Piezometric levels recorded within the glacial till deposit varied from about Elevation -3.0 to Elevation-5.5. Future groundwater and piezometric levels across the site are expected to vary from these values because of factors such as normal seasonal changes, periods of heavy precipitation, and alterations of existing drainage patterns.

It is noted that the Project site is not located within the Groundwater Conservation Overlay District (GCOD) as defined by Article 32 of the Boston Zoning Code.

3.9.3 Project Impacts and Foundation Considerations

The proposed 12-story building will have a ground floor footprint of approximately 4,750 square feet, while the upper floors will have a footprint of approximately 6,500 square feet. No below grade space is planned as part of the proposed construction. Based on the anticipated structural loads and subsurface conditions, the proposed building will be supported on a deep foundation system to transfer the building loads through the unsuitable fill and marine clay deposits into the upper portion of the dense to very dense glacial till deposit that underlies the project site. In consideration of the presence of the very loose to compact fill deposit that directly underlies the site, the lowest level floor slab is planned to be designed as a structurally-supported or framed slab.

The proposed Project will not include any below-grade space and the lowest level slab will be essentially coincident with the exterior finished grade. Therefore, no perimeter or underslab drainage is planned to be installed and little to no impact to the site groundwater is anticipated.

In summary, provisions will be incorporated into the design and contract documents to limit potential impacts to adjacent structures, streets and utilities. Thus, the impact to adjacent structures, streets and utilities is anticipated to be minimal.

3.9.4 Monitoring

Subject to property owner approvals, elevation reference points will be established on adjacent site buildings and other selected nearby facilities prior to construction and monitored during the work to confirm no impact from the construction activities. Vibration and noise monitoring stations will be established to monitor vibration and noise levels pre-construction and during construction.

A qualified representative (geotechnical engineer or technician) will be on site during the foundation and subsurface construction to confirm compliance of the work with the project plans and specifications, as well as monitor geotechnical instrumentation.

3.10 Construction Impacts

3.10.1 Introduction

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

Proper pre-planning with the City and neighborhood will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed. Techniques such as

barricades, walkways and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number and address of a contact person to communicate with on issues related to the construction. The construction contact will be a person responsible for responding to the questions/comments/complaints of the residents and businesses in the neighborhood.

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

3.10.2 Construction Methodology/Public Safety

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

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

3.10.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the first quarter of 2015 and last for approximately 16 months.

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

3.10.4 Construction Staging/Access

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

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

3.10.5 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 the Boston Harbor" plaques will be installed at storm drains that are replaced or installed as part of the Project.

3.10.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 90 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.

3.10.7 Construction Truck Routes and Deliveries

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

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

3.10.8 Construction Air Quality

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

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

3.10.9 Construction Noise

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

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;
- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

3.10.10 Construction Vibration

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

3.10.11 Construction Waste

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

3.10.12 Protection of Utilities

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

3.10.13 Rodent Control

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

3.10.14 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

4.1 Leadership in Energy and Environmental Design

To comply with Article 37, the Proponent intends to measure the results of their sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. The Project will use the LEED-NC v2009 as the rating system to show compliance with Article 37. The LEED rating system tracks the sustainable 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 in 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 as the design develops and engineering assumptions are substantiated. Presently, 43 points have been targeted, not including any of the potential Boston Zoning Code Article 37 points. Points that are still being studied and marked as "maybe" on the LEED checklist are italicized below.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention. The construction manager will submit and implement an Erosion and Sedimentation Control (ESC) Plan for construction activities related to the demolition of existing conditions and the construction of the new development specific to this Project. The ESC Plan will conform to the erosion and sedimentation requirements of the 2012 EPA Construction General Permit and specific municipal requirements for the City of Boston.

Credit 1: Site Selection. The Project site is located on a previously developed parking lot in a dense area of downtown Boston, and does not meet the criteria outlined in the credit regarding areas not to be developed.

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

Credit 4.1: Alternative Transportation, Public Transportation Access. The Project site is within one-half mile of the Aquarium MBTA station on the Blue Line and the State Street Station on the Blue and Orange Lines. These two stations meet the exemplary performance requirements to earn an Innovation Credit.

Credit 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms. The Project will include accommodations for one secure bicycle per unit as required by BTD. Exterior bike storage locations for visitors and employees are anticipated to be incorporated into the site design. The Project is also exploring the option to include showering facilities for employee occupants.

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

Credit 5.1: Site Development – Protect and Restore Habitat. The Proponent will seek the alternative compliance path, as described by Pilot Credit 83.

Credit 6.1: Stormwater Design, Quantity Control. The City of Boston has requirements for collection and dispersal of stormwater. Improved absorptive landscaped areas may be designed to help mitigate stormwater runoff from the Project site. The Project team is aiming to manage onsite the runoff the 95th percentile rainfall event (approximately 1.5 inches).

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

Credit 7.1: Heat Island Effect, Non-Roof. The Project team will study the use of highly reflective materials on the Project's hardscape, street trees, and permeable pavers.

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

Water Efficiency

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

Credit 1: Water Efficient Landscaping. The Project may include at least 5% of the total site area as vegetated, landscaped area. If landscaping is included, the design will incorporate native and adaptive plant materials and, if required, the design of the irrigation system will target a 50% reduction in potable water use when compared to a mid-summer baseline.

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

Energy and Atmosphere

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

Prerequisite 2: Minimum Energy Performance. Architectural and engineering systems will be designed to meet the mandatory requirements of ASHRAE 90.1-2004 and to achieve approximately 20-22% energy performance improvement beyond that defined by ASHRAE 90.1-2004 Appendix G. Energy use will be demonstrated using a DoE 2 whole building energy simulation software package. Energy performance is highly dependent on ultimate system selection and operational parameters.

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

Credit 1: Optimize Energy Performance. The Project will demonstrate a minimum of a 20%-22% improvement in energy use when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007. *The Project team will target a higher goal for the Project of at least a 28% improvement in energy use.*

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

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

Credit 5.1: Measurement and Verification, Base Building. The Project team will meet MPR through compliance Option 1, registering an account in ENERGY STAR's Portfolio Manager tool and sharing the project file.

Credit 6: Green Power. The Proponent is exploring purchase of 'green power' for a two-year renewable energy contract to provide a minimum of 35% of the building's electricity from renewable sources.

Materials and Resources

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

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

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

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

Credits 7: Certified Wood. The Project team will explore the cost and availability of FSC certified wood. The construction manager will track all wood materials installed on the Project, as well as invoicing documentation for all FSC certified products installed on the Project.

Indoor Environmental Quality

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

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

Credit 2: Increased Ventilation. The Project team will increase the ventilation rates to a 30% higher volume than ASHRAE 62.1-2007.

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

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

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

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

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

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

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

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

Credit 7.2: Thermal Comfort, Verification. The Proponent may seek this credit which requires a survey of occupants and adjustments, if necessary, to the thermal system based on the survey results.

Credits 8.1 and 8.2: Daylight and Views, Views for 90% of the spaces. The Project will be designed to maximize daylight into the building, and maximize views.

Innovation & Design Processes

The team has identified several possible ID credits listed below, (limited to five ID credits total):

Exemplary Performance for SSc2. The Project site is located in a densely developed urban area with more than 120,000 sf of building space per acre.

Exemplary Performance for SSc4.1. The Project site is located on several bus routes and rail lines with a frequency of service that includes over 200 transit rides per day.

Energy Star Appliances. The Project may seek to include Energy Star appliances in the building, where appropriate.

Green Housekeeping/Operations. The owner may use green cleaning products and equipment in the common areas and provide a package for residents explaining the 'green living' components of the Project.

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

Regional Priority Credits

Regional Priority Credits, (RPC) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. RPCs applicable to the site include: SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2(1%) and MRc1.1(75%). This Project anticipates one RPC for SSc7.2 Heat Island Effect, Roof. Additional *RPCs may be achievable: SSc7.1 Heat Island Effect, Non-Roof and SSc6.1 Stormwater Design, Quantity Control.*

4.2 Renewable Energy

The Proponent is studying the incorporation of a solar photovoltaic (PV) array on the roof of the building to provide a portion of the building's common electric load. A preliminary analysis of the building shows that the building may have space for an approximately 8 kilowatt solar PV array. Based on an estimated electrical load for the common areas of the building, a PV array of this size could provide for approximately half of this electrical load annually. The Proponent will study the incorporation of a PV array to determine physical and economic feasibility as the design progresses.

4.3 Climate Change Preparedness

Projects subject to Article 80, Large Project Review are required to complete the Climate Change Preparedness Checklist. Climate change conditions considered include sea level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, 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 completed Checklist is included in Appendix E. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

LEED 2009 for New Construction and Major Renovations

Project Checklist

India Street - April 2014

Y	?	N			
16	4	6	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
		3	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
1			Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1
3	3	4	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
	2	2	Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4
6	13	16	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5	5	9	Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
1	2		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2
3	4	7	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
1	1		Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
		1	Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1
11	3	1	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
		1	Credit 1	Outdoor Air Delivery Monitoring	1
1			Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1
3	2		**Innovation and Design Process**	Possible Points:	**6**
1			Credit 1.1	Innovation in Design: Exemplary Performance SSc2	1
1			Credit 1.2	Innovation in Design: Exemplary Performance SSc4.1	1
	1		Credit 1.3	Innovation in Design: ENERGY STAR	1
	1		Credit 1.4	Innovation in Design: Green Housekeeping	1
			Credit 1.5	Innovation in Design:	1
1			Credit 2	LEED Accredited Professional	1
1	2	1	**Regional Priority Credits**	Possible Points:	**4**
1			Credit 1.1	Regional Priority: SSc7.2	1
	1		Credit 1.2	Regional Priority: SSc7.1	1
	1		Credit 1.3	Regional Priority: SSc6.1	1
		1	Credit 1.4	Regional Priority:	1
43	31	35	**Total**	Possible Points:	**110**

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

Extreme Heat Events

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

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

Energy modeling for the Project has not yet been completed; however, the Proponent will strive to reduce the Project's overall energy demand and GHG emissions that contribute to global warming. The Project's proposed TDM program described in Section 2.5 will also help to lessen fossil fuel consumption.

Sea Level Rise

According to the IPCC, if the sea level continues to rise at historic rates, the sea level in Massachusetts as a whole will rise by one foot by the year 2100. However, using a high emissions scenario of climate change, sea level rise could reach six feet by 2100. Adding this potential rise to the mean higher high water (MHHW) level, in 50 years the MHHW could be as high as 15.2 feet Boston City Base (BCB), assuming a sea level rise of approximately four feet.[2] The first floor elevation of the Project is approximately 15.9 feet BCB.

Sea level rise is also a concern when combined with a large storm. If a major storm, such as another "Superstorm Sandy" with significant storm surge, were to impact Boston at high tide, the potential for flooding would markedly increase. Such a storm would be anticipated to increase sea level to approximately 18.7 feet BCB, which would impact the first floor of the building.[3] To minimize the impact of flooding, critical mechanical equipment is located above the first floor and the utility conduits will be water tight.

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

[2] "Preparing for the Rising Tide". The Boston Harbor Association. February 2013.

[3] Ibid.

Elevator equipment such as electrical controls and hydraulic pumps will be located above 18.7 feet BCB. During a flood event, a recall system will be activated that will send the elevator cab to the third floor so that the elevator will remain operable on the upper levels.

In addition to locating all critical building systems well above the flood level, the Project team is exploring the use of a demountable, post and panel flood protection system which would protect ground level openings (Storefront, entry doors, etc.) from water infiltration during a flood event. This system coupled with flood resistant exterior wall construction would provide a continuous perimeter barrier to protect the ground floor interior building area from flood damage for an indefinite period of time. When not in use, the posts and panels would be stored within the building.

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 and protect the Project's mechanical equipment. These measures include:

- Striving to infiltrate one-inch of stormwater runoff from impervious areas into the ground to the greatest extent possible;
- Incorporating a green roof;
- Locating critical mechanical and electrical equipment at the highest elevation possible to prevent exposure to flood waters;
- Locating the backup generator on the roof; and
- Incorporating pervious paving along portions of the sidewalks surrounding the building where possible if the soils are suitable for infiltration.

Drought Conditions

Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials and, if an irrigation system is required, the design of the irrigation system will target a 50% reduction in potable water use when compared to a mid-summer baseline. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies. In public areas, sensor operated faucets and toilets will be installed.

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Project Site History

The Project site at 55 India Street currently consists of a surface parking lot bounded by India Street to the north, Franklin Street to the west, Well Street to the south, and the John F. Fitzgerald Surface Artery facing the Rose Fitzgerald Kennedy Greenway to the east (see Figure 5-1). The realization of the Greenway is an important achievement in both the life and history of the City of Boston. In addition to actively reconnecting the torn historic fabric of the City, the Greenway is also a powerful symbol of Boston's future. The edges along the Greenway, including the Project site, will architecturally engage and enhance this bold new condition in the City fabric.

The site was originally rectangular and bounded by India, Franklin, Well and Wharf streets. It was laid out in 1805, when the first India Wharf and India Wharf Stores designed by Charles Bulfinch were constructed (see Figures 5-2 and 5-3). The site was truncated into a roughly triangular shape during the construction of the elevated John F. Fitzgerald Expressway in the 1950's and the remaining structures on the site were demolished (see Figures 5-4 and 5-5). During the Central Artery/Tunnel Project (CA/T) the site was reshaped again into its present configuration. The original India Wharf was commemorated as part of the Greenway landscape design. A symbolic strip of decorative paving, representing India Wharf, crosses the Greenway along with East India Row and ends in front of the Project site.

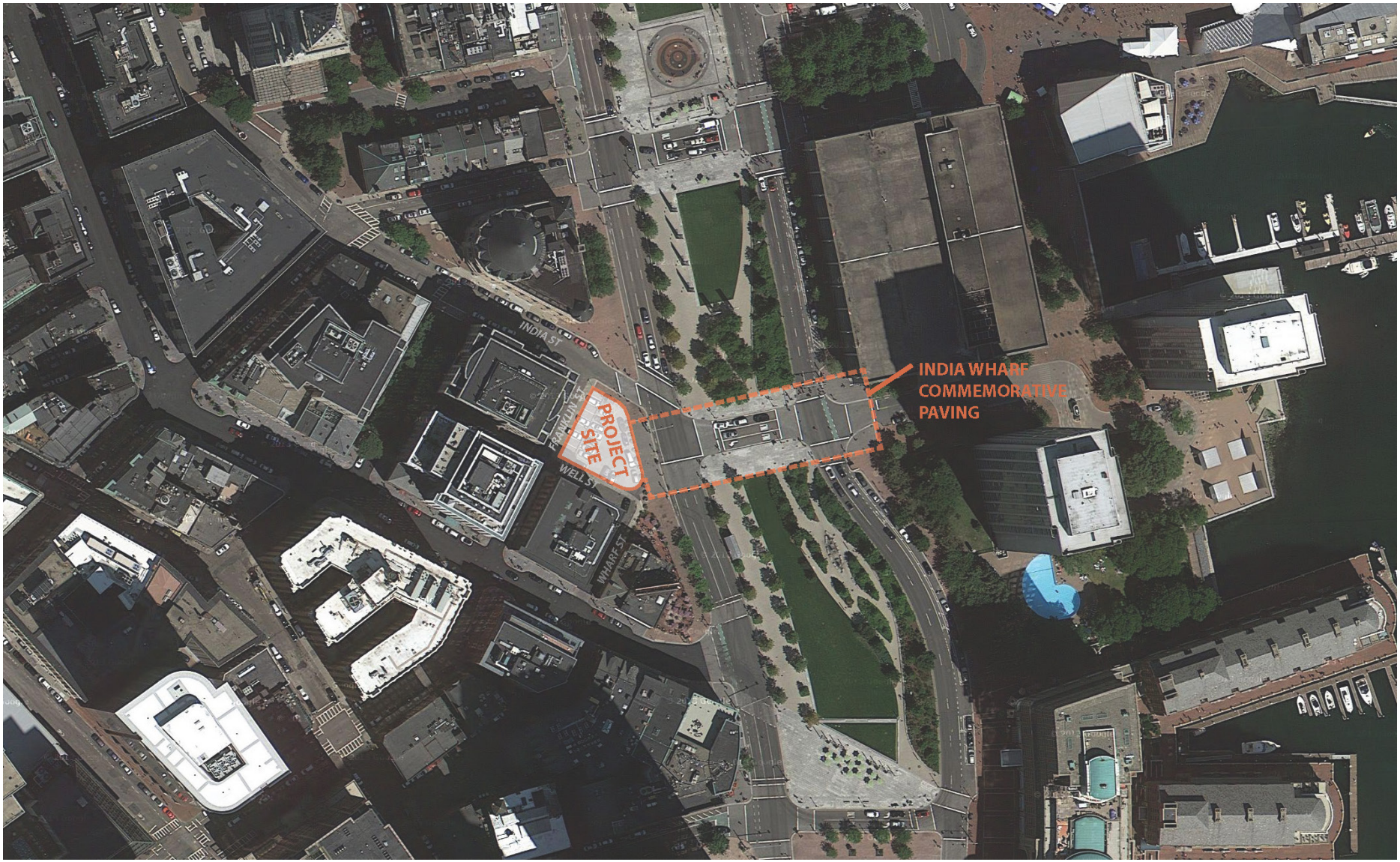
5.2 Urban Design Goals

The Project has been designed in accordance with the Greenway District Planning Study Use and Design Guidelines. The Guidelines recognize and aim to enhance the new set of opportunities opened up by the Rose Fitzgerald Kennedy Greenway. One of the main challenges the study sought to address was

> *"...to establish a set of guidelines that is both universal enough to enhance the continuity of the existing open space system and establish it as a district in its own right, and also specific enough to reinforce the diverse characters of existing neighborhoods touching the parks."*

This two pronged approach outlines District-Wide Guidelines in conjunction with Guidelines tailored to specific subdistricts. The Project is in the Town Cove subdistrict as described in the Guidelines.

As one of the few open sites along the Greenway, the Project negotiates and reconciles this rich, dual contextual relationship. The Project is a high-design building utilizing premium



55 India Street Boston, Massachusetts

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Figure 5-1

Current Aerial View

55 India Street Boston, Massachusetts

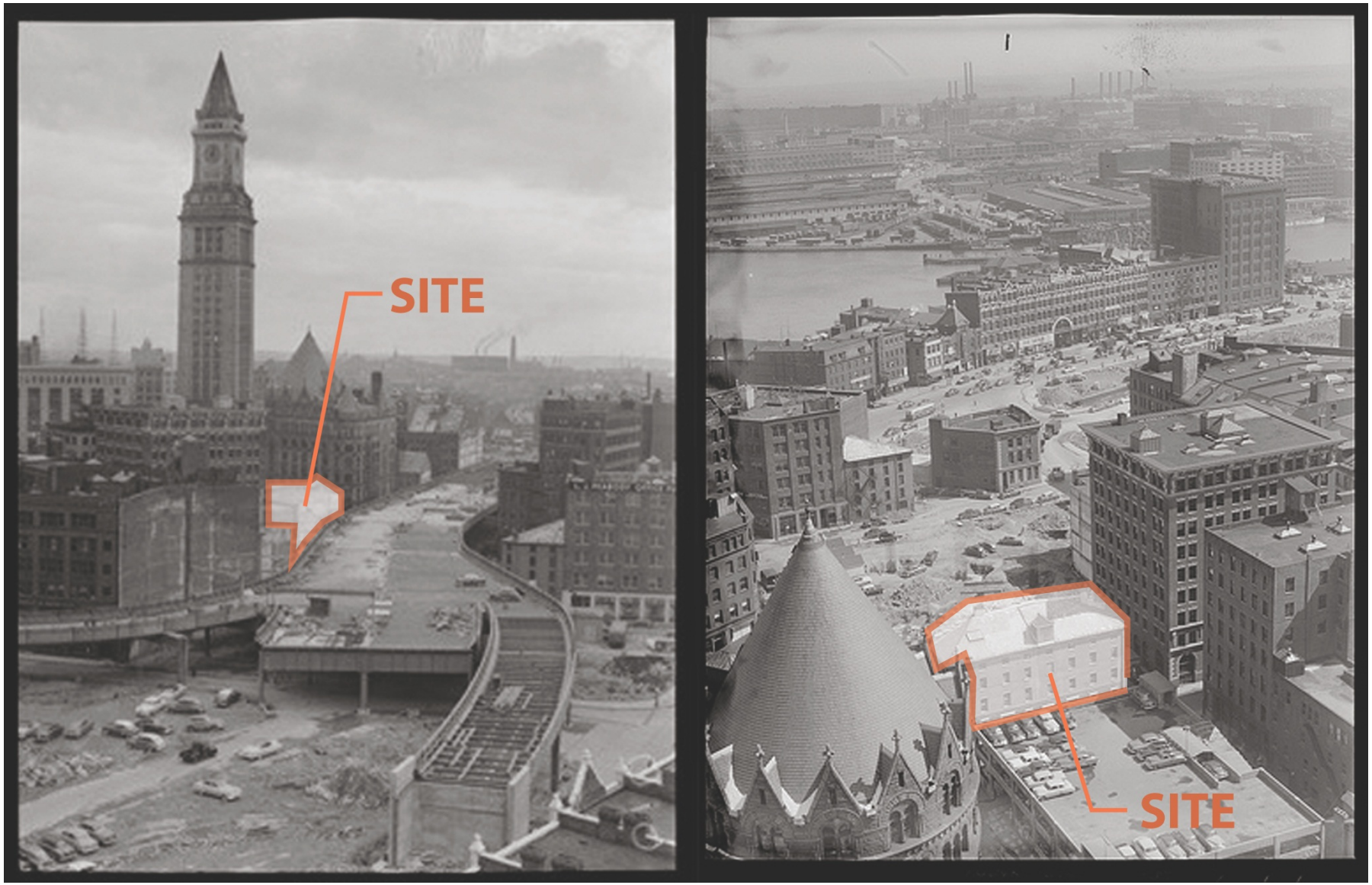
Figure 5-2

1814 Boston Hales Map Showing Original Site Configuration

55 India Street Boston, Massachusetts

Figure 5-3

India Wharf Stores Designed by Charles Bulfinch



55 India Street Boston, Massachusetts

Figure 5-4

Site Views During Construction of the John F. Fitzgerald Expressway

55 India Street Boston, Massachusetts

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Figure 5-5

John F. Fitzgerald Expressway Aerial View

materials and including improvements to the entire block such as sidewalks, curbs and decorative pavement along Well Street. In concept, the Project comprises a masonry volume which is grounded and locked into the fabric of the Town Cove subdistrict while presenting a lighter, larger scale, glassier series of facetted facades arrayed along the Greenway edges (see Figures 5-6 through 5-8).

The major District-Wide goal of the Guidelines is *Ground Floor Program and Streetscape Activation* which requires buildings to provide retail, restaurants, cafes, or other publicly accessible active programming directly along the Greenway edges. The ground floor face of the Project is set back from the lot line to create a larger, more appropriately scaled pedestrian zone along the Greenway and to provide commercial/restaurant frontage along the entire Greenway edge. This generous pedestrian zone is activated by potential outdoor café seating directly in front of the building and sheltered by the building overhang above (see Figure 5-8). Another important District-Wide goal is that ground floor uses and orientations should relate to adjacent features and uses along the Greenway. While not specifically mentioned in the Guidelines, the symbolic strip of decorative paving, representing India Wharf, ends in front of the Project site. The Project site design will preserve and integrate this important public marker into the design. The Project will also provide a plaque or marker commemorating the history of India Wharf integrated into the Project site design.

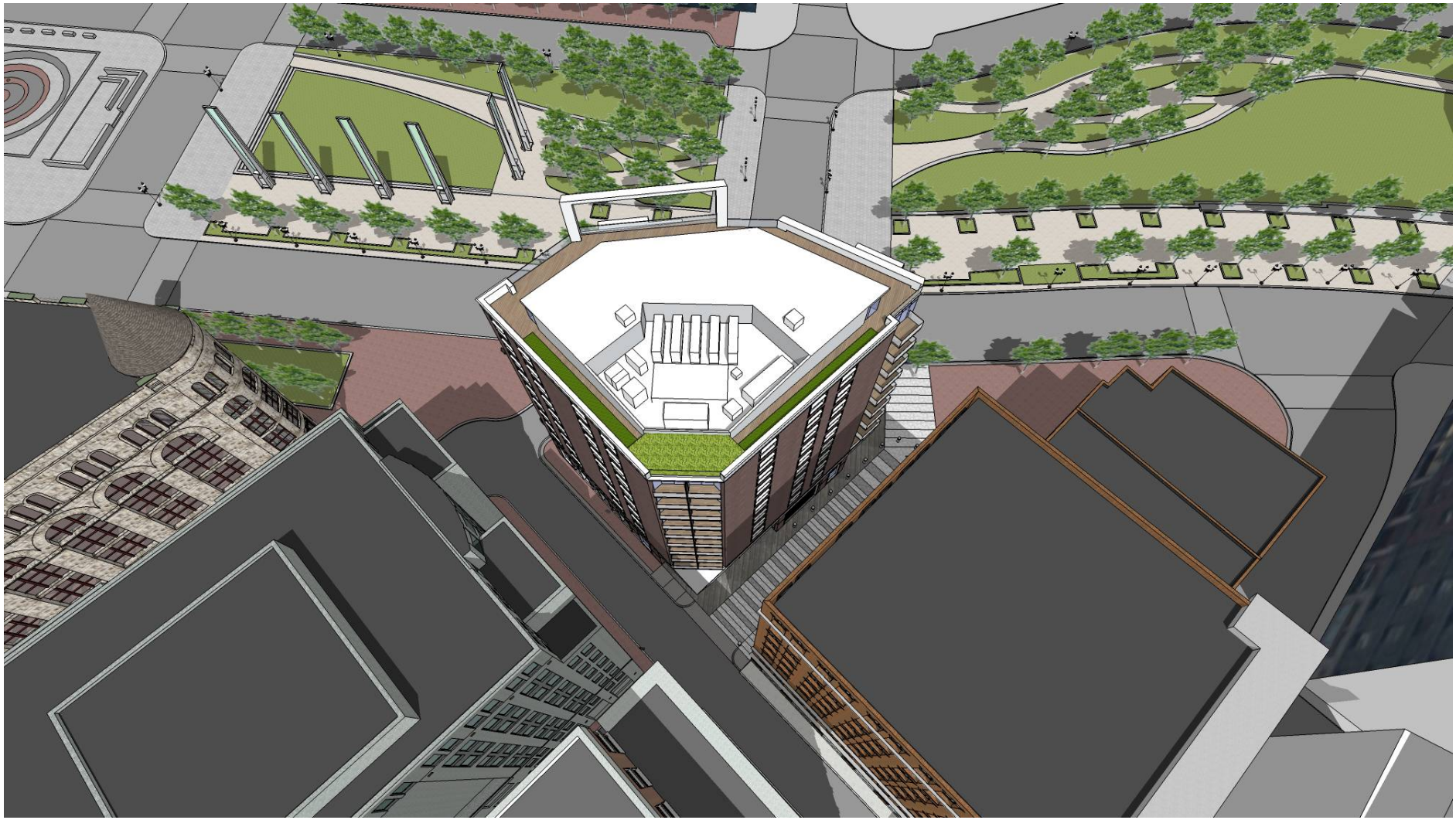
The Town Cove District goals are:

> *Preserve the historic character and scale of the neighborhood;*
> *Preserve views of the Custom House Tower;*
> *Repair and fill in unfinished edges along the Greenway;*
> *Retain and enhance connections to the small-street network;*

The Project achieves these goals in the following ways:

Preserve the historic character and scale of the neighborhood

The original 1805 site edges correspond to India, Franklin and Well streets. The neighboring buildings abutting the Project site all respect the street wall, and range in height from eight to fourteen stories. The Project massing respects the street walls along India, Franklin and Well streets and provides an active residential lobby entry at the intersection of Franklin and Well streets. The fine scaled detailing of the Project, including a granite base, cast stone belt coursing and brick masonry provide the rich materiality consistent with the close-up human scaled experience of these tight streets. Through the use of brick masonry, façade proportions, massing alignments and appropriate cornice heights, the Project respectfully nestles into the context of the Town Cove subdistrict (see Figure 5-9).



55 India Street Boston, Massachusetts

Figure 5-6

Aerial View from the West

55 India Street Boston, Massachusetts

Figure 5-7

Aerial View from the East

55 India Street Boston, Massachusetts

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Figure 5-8

View of Active Commercial/Restaurant/Outdoor Cafe from Greenway

55 India Street Boston, Massachusetts

Figure 5-9

Aerial View from the East

Preserve views of the Custom House Tower

Since the Project is a new building filling in an unfinished edge along the Greenway (a Town Cove District goal), the view of the Custom House Tower from the Greenway will be slightly diminished compared with the existing conditions views. However, this new view relationship will be in harmony with the existing Greenway street wall to the North and South (see Figure 5-10).

Repair and fill in unfinished edges along the Greenway

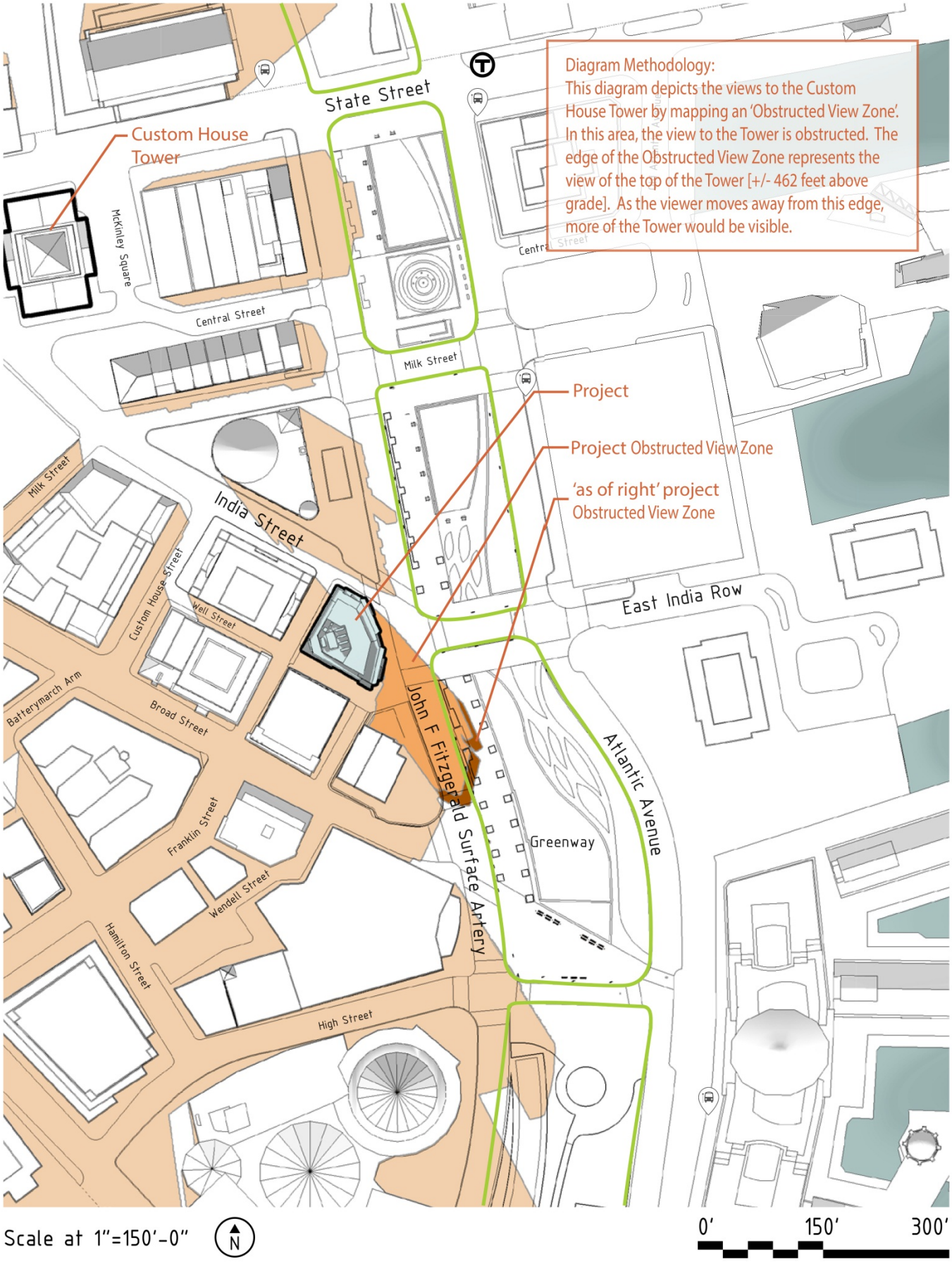
The 'new' Project site edges, created with the Central Artery/Tunnel (CA/T) and the Rose Fitzgerald Kennedy Greenway include wide sweeping curves on a larger scale than the tight street grid. To the north and south, the existing Greenway street wall flanking the Project site is not regular or uniform; the Flour and Grain Exchange building to the North is set back, and the partially vacant site at 110 Broad Street to the South, which has been identified by the Guidelines as a potential development site, still shows the jagged scars of the elevated John F. Fitzgerald Expressway. Further north and south the buildings roughly follow the Greenway edge more closely since most were constructed or altered after the construction of the elevated John F. Fitzgerald Expressway. The Project facades along the Greenway were conceived as a series of facets that help negotiate the existing undulating street wall and also return down India Street to face the over-sized sidewalk in front of the Flour and Grain Exchange building and finally turn the corner to integrate back into the Town Cove fabric (see Figure 5-11).

The Greenway corridor is wide, but the scale of the Greenway is largest and most impressive while viewing up or down its mile-long length. It is these North and South distant views that provide an entirely new visual connection of neighborhoods previously separated by urban fabric or the formerly elevated John F. Fitzgerald Expressway. The Project features two large 'frames' angled to the north and south that represent these new view opportunities and provide a larger scale distant reading of the building consistent with the scale of the Greenway corridor (see Figures 5-12 through 5-14). The frames alternately touch down to grade or float up higher, imparting a comparative lightness to the Project's architectural expression along the Greenway.

Retain and enhance connections to the small-street network

This goal refers to the historic Wharf and Well streets which no longer continue with vehicular traffic through to the Greenway. From the Guidelines:

> *"These small streets are integral to the character of Town Cove and provide multiple venues for pedestrians to "discover" the Greenway."*



55 India Street Boston, Massachusetts

Figure 5-10
Custom House Tower Obstructed View Diagram

55 India Street Boston, Massachusetts

Figure 5-11

View on Greenway from North

55 India Street Boston, Massachusetts

Figure 5-12

Greenway View from the South

55 India Street Boston, Massachusetts

Figure 5-13

Greenway View from the North

55 India Street Boston, Massachusetts

Figure 5-14

Greenway View from the East Showing the Full Façade

The Project retains and enhances the pedestrian experience along these small streets. The Project proposes to repave Well Street with decorative paving intended to recall a more historic character but also importantly creates a measure of traffic calming which will elevate the pedestrian experience over the vehicular. To make the pedestrian connection to the Greenway clearer, this special pavement runs through and onto the large public sidewalk along the Greenway (see Figures 5-15 and 5-16).

55 India Street Boston, Massachusetts

Figure 5-15

View Down Well Street

55 India Street Boston, Massachusetts

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Figure 5-16

View Down Well Street

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and in the vicinity of the Project site and describes the potential project-related impacts to these resources.

6.1 Project Site

As previously described, the Project site is approximately 7,100 square feet located at 55 India Street in Downtown Boston. Located at the southwest corner of India Street and John F. Fitzgerald Surface Artery, the Project site consists of a surface parking lot and is bound by India Street to the north, Franklin Street to the west, Well Street to the south, and the John F. Fitzgerald Surface Artery and the Rose Fitzgerald Kennedy Greenway to the east. Currently, there are no built structures occupying the Project site.

As noted in Chapter 5 Urban Design, the site was originally rectangular in shape and bounded by India, Franklin, Well and Wharf Streets. It was laid out in 1805, when the first India Wharf and India Wharf Stores designed by Charles Bulfinch were constructed (see Figures 5-2 and 5-3). The site was later truncated into a roughly triangular shape during the construction of the elevated John F. Fitzgerald Expressway in the 1950s and the remaining structures on the site were demolished (see Figures 5-4 and 5-5). During construction of the Central Artery/Tunnel Project (CA/T) in the past decade, the site was reshaped again into its present configuration. The original India Wharf was commemorated as part of the Greenway landscape design. A symbolic strip of decorative paving, representing the location of the original India Wharf, crosses the Greenway along with East India Row and ends in front of the Project site.

The Project site is located within the Custom House Historic District which was listed in the National Register of Historic Places in 1973. Adjacent to the Project site are six properties within the National Register District: an 1892, seven-story, commercial building located across India Street to the north known as the Flour & Grain Exchange (177 Milk Street); a 1988, a 10-story, commercial building located across Franklin Street to the northwest (49 India Street); a 2006, 11-story, mixed-use building located across Well and Franklin streets to the west (80 Broad Street); a 1903, nine-story, commercial building located across Well Street to the south (88 Broad Street); a circa 1805, four-story, commercial building abutting the Project site to the south (102 Broad Street); and a circa 1905, five-story, commercial building also abutting the Project site to the south (112 Broad Street). Two of the adjacent buildings, the Flour & Grain Exchange Building at 177 Milk Street and the ca. 1805 building at 102 Broad Street are also designated City of Boston landmarks.

6.2 Historic Resources in the Project Vicinity

The Project site encompasses an existing surface parking lot located within the Custom House National Register District. The Project site is also in the vicinity of numerous properties and districts included in the State and National Registers of Historic Places.

Historic districts in the vicinity of the Project site include the Long Wharf District, which is listed in the National Register, located to the northeast of the Project site. To the west of the Project site are other National Register properties, including Quincy Market and to the south is the Fort Point Channel Historic District. There are additional historic properties within a quarter mile of the Project site listed in the State and National Registers. Table 6-1 below lists historic resources within a one-quarter mile radius of the Project site; the locations of these resources are depicted on Figure 6-1.

Table 6-1 Historic Resources in the Vicinity of the Project

Map	State/National Register-Listed Properties & Historic Districts	Address
A	Custom House Historic District	Between Kilby Street, JFK Expressway, High and Batterymarch streets, Merchants Road, South Market and State Streets
B	Quincy Market – Faneuil Hall Market	North and South Market Streets
C	Fulton Street-Commercial Street Historic District	North End, Fulton, Commercial, Mercantile, Lewis, and Richmond Streets
D	Long Wharf and Custom House Block	Foot of State Street, east Atlantic Avenue
E	Fort Point channel Historic District	Roughly bounded by the Fort Pont channel seawalls, the Northern Avenue Bridge, Seaport Boulevard, Stillings, Midway, and A Streets, and Necco Court
1	5-7 Broad Street	5-7 Broad Street
2	9 Broad Street	9 Broad Street
3	United States Custom House	McKinley Square
4	25-27 India Street	25-27 India Street
5	Flour and Grain Exchange	177 Milk Street
6	50-52 Broad Street	50-52 Broad Street
7	64-64A Broad Street	64-64A Broad Street
8	66 Broad Street	66 Broad Street
9	68-70 Broad Street	68-70 Broad Street
10	72 Broad Street	72 Broad Street
11	Batterymarch Building	54 Batterymarch Street
12	102 Broad Street	102 Broad Street
13	Codman Building (10 Liberty Square Building)	51-57 Kilby Street
14	Samuel Appleton Building	110-114 Milk Street
15	Federal Reserve Bank Building	30 Pearl Street
16	Faneuil Hall	1 Dock Square
17	John W. McCormack Federal Building & Courthouse	5 Post Office Square
18	Richardson Block	115-151 Pearl Street
19	Second Brazer Building	25-29 State Street
20	Stock Exchange Building	43-65 State Street
21	National Shawmut Bank Building	20-42 Water Street

6.3 Impacts to Historic Resources

6.3.1 Design and Visual Impacts

As noted in Section 5.0, the Project has been developed in accordance with the Greenway District Planning Study Use and Design Guidelines and the Town Cove subdistrict. The proposed 12-story building draws its conceptual massing from the site constraints and reflects the mixed-use nature of the building with commercial frontage along the Greenway edge. The ground floor face of the Project is set back from the lot line to create a larger, more appropriately scaled pedestrian zone along the Greenway. This generous pedestrian zone is accentuated by potential outdoor café seating directly in front of the building and sheltered by the building overhang above (see Figure 5-8). Another important district-wide goal is that ground floor uses and orientations should relate to adjacent features and uses along the Greenway. While not specifically mentioned in the Guidelines, the symbolic strip of decorative paving, representing India Wharf, ends in front of the Project site. The Project site design will preserve and integrate this important public marker into the design. The Project will also integrate a plaque or marker to commemorate the history of India Wharf into the Project's site design.

Given its location within the Custom House National Register District, the Project will be visible from, and has the potential to affect views of historic properties within the district; however, it is not expected to introduce elements that are visually incompatible to the district. As envisioned, the Project's design will be respectful of, and complement, the historic and architectural character of the Custom House District, and its uses, massing, and height will help to serve as appropriate new infill construction of an unfinished edge of the street wall along the Greenway (a Town Cove District goal). The minimal obstruction of the viewshed is a consequence of construction on an underutilized surface parking lot site. Any new construction at the Project site has the potential to affect the viewshed of historic properties; however, as designed the Project will only affect views from portions of the immediately surrounding streets and the Greenway. Additionally, the proposed Project's impact on viewsheds is less than what is allowed by right and the view of the Project will be in harmony with the existing Greenway street wall to the north and south (see Figure 5-10).

The proposed massing and materials are respectful to the historic character of the area and complimentary to the surrounding buildings. The surrounding buildings include a variety of heights and are predominantly masonry in construction with materials including concrete, cut stone, and brick. The Project's 12-story height is comparable (slightly shorter) to that of the adjacent 11-story building at 49 India Street, but taller than that of other buildings so that its height will not be obtrusive for being either too tall or too short and will contribute to creating a street wall along the Greenway. The Project facades along the Greenway were conceived as a series of facets that help negotiate the existing undulating street wall and also return down India Street to face the over-sized sidewalk in front of the Flour & Grain Exchange building and finally turn the corner to integrate back into the Town

Cove fabric (see Figure 5-11). The Project will fit seamlessly into the existing palette of materials by using a combination of masonry (granite, concrete and brick) and glass on the exterior. The fine scaled detailing of the Project, including a granite base, cast stone belt coursing and brick masonry provide the rich materiality consistent with the close-up human scaled experience of the area's tight street network. Through the use of brick masonry, façade proportions, massing alignments and appropriate cornice heights, the Project respectfully nestles into the context of the Town Cove subdistrict (see Figure 5-9).

Additionally, the Project has been sited in accordance with the historic street layout of the original 1805 site edges corresponding to India, Franklin and Well streets. The neighboring buildings abutting the Project site all respect the street wall. The Project's massing respects the street walls along India, Franklin and Well streets and provides an active residential lobby entry at the intersection of Franklin and Well streets.

6.3.2 Shadow Impacts

While shadow impacts are inevitable given the largely unimproved nature of the Project site, impacts to the Custom House National Register District will be minimal given their locations north, south and west of the Project site.

As discussed in greater detail in Section 3.2, shadow studies were conducted to investigate impacts from the Project at three times of day (9:00 a.m., 12:00 noon, and 3:00 p.m.) during each of the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and the winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

As illustrated in the shadow study diagrams (Figures 3.2-1 to 3.2-14), the Project will cast net new shadow primarily on areas outside of the Custom House National Register District or on "non-contributing" (non-historic) properties within the district including 49 India Street and 80 Broad Street. During isolated time periods, the Project may cast shadows on portions of the Flour & Grain Exchange building, 177 Milk Street. Specifically, during two of the time periods studied (March 21 at 12:00 p.m., and September 21 at 12:00 p.m.), new shadow may be cast on the southeast corner of the building. However, none of the shadow impacts resulting from the Project will adversely impact the character-defining features of the Flour & Grain Exchange building, or any other buildings within the Custom House District, that make them eligible for inclusion in the National Register.

6.4 Archaeological Resources

The Project site consists of a previously developed urban parcel. No archaeological resources have been identified as occurring within the Project site. Due to previous development activities and disturbances, including site grading activities associated with the construction of the former raised Interstate 93 Expressway as well as the Central Artery/Tip

O'Neil Tunnel and Rose Fitzgerald Kennedy Greenway, it is not anticipated that the site contains significant archaeological resources. No impacts to archaeological resources are anticipated as a result of the Project.

6.5 Status of Project Reviews with Historical Agencies

6.5.1 Massachusetts Historical Commission Review

The Project will be subject to State Register Review (950 CMR 71) by the Massachusetts Historical Commission (MHC) due to a transfer of land from the Massachusetts Department of Transportation, which is considered to be a state action for purposes of State Register Review. To initiate the State Register Review process, an MHC Project Notification Form (PNF) will be filed with the MHC. The Boston Landmarks Commission (BLC) will be afforded the opportunity to comment on this PNF and will be provided with a copy of the MHC PNF and invited to participate in the MHC review process as an interested party.

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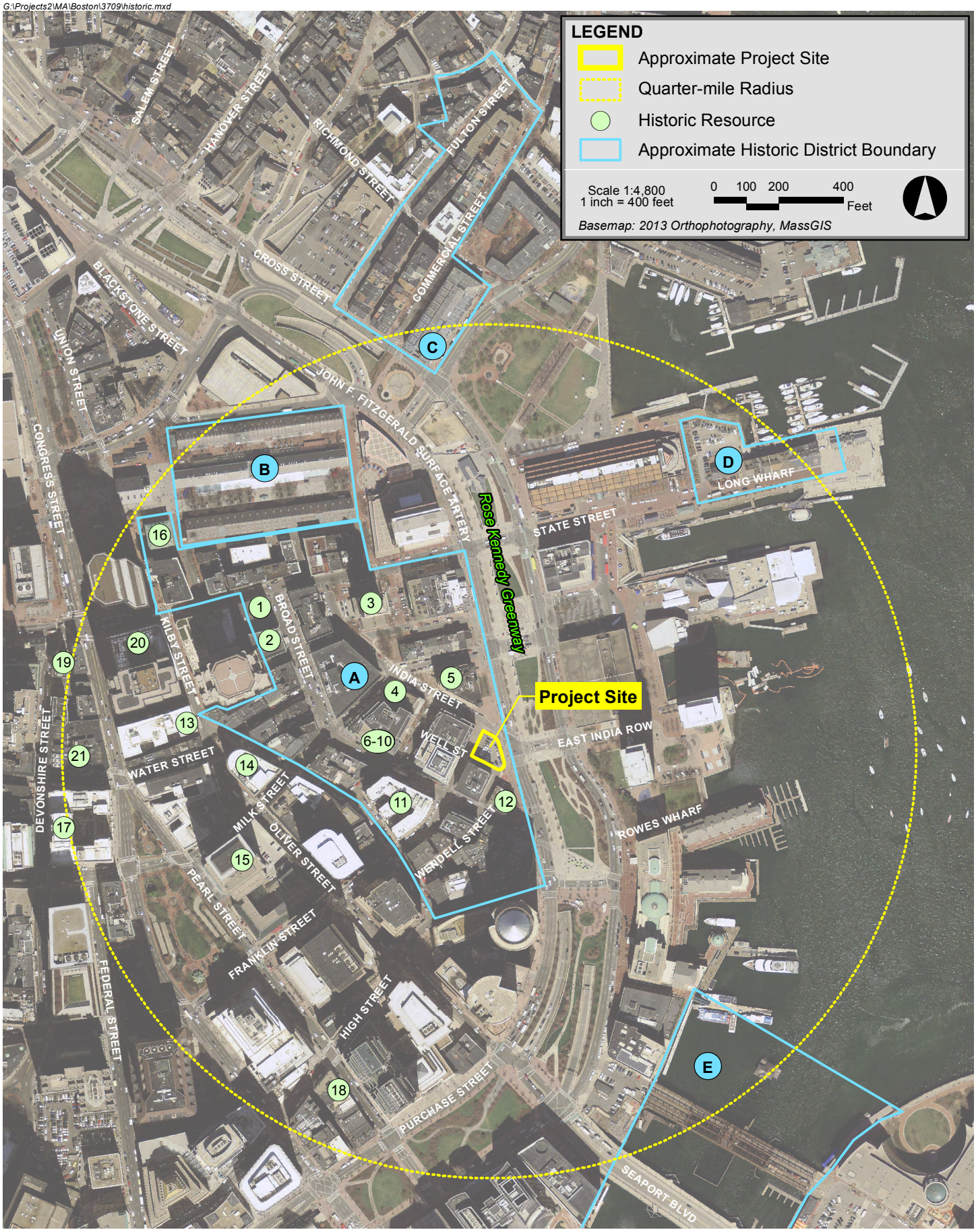


55 India Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE SYSTEMS COMPONENT

7.1 Introduction

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

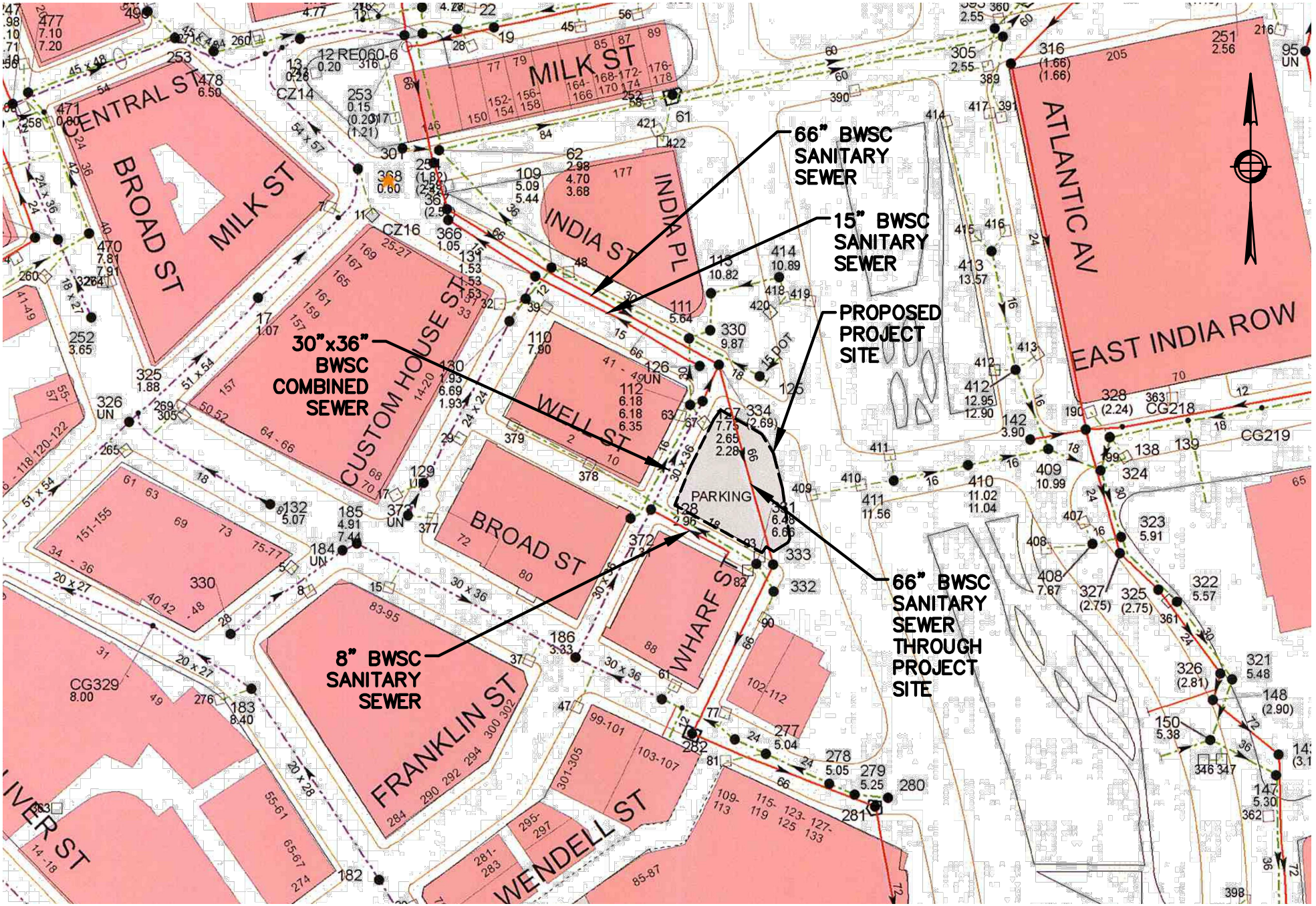
- Sewer
- Domestic water
- Fire protection
- Drainage
- Natural gas
- Electricity
- Telecommunications

The Project includes the development of an approximately 67,000 sf, 12-story residential and commercial building on an existing parking lot. The Project site is located on India Street, and is bound by India Street to the north, Franklin Street to the west, and the John F. Fitzgerald Surface Artery facing the Rose Fitzgerald Kennedy Greenway to the East

7.2 Wastewater

7.2.1 Sewer Infrastructure

Existing Boston Water and Sewer Commission (BWSC) sanitary sewer mains are located in Well Street, Franklin Street, India Street, and John F. Fitzgerald Surface Artery adjacent to the Project site. There is an 8-inch sanitary sewer beneath Well Street flowing in a westerly direction into the 30-inch x 36-inch combined sewer within Franklin Street. The 30-inch x 36-inch combined sewer in Franklin Street flows in a northerly direction to the 66-inch sanitary sewer within India Street. There is also a 15-inch sanitary sewer within India Street that flows in a westerly direction and connects to the 66-inch sanitary sewer within India Street flowing easterly. The 66-inch sanitary sewer in India Street flows southerly across the proposed Project site to continue to Wharf Street. The sanitary sewer continues to flow in a southerly direction and into the New East Side Interceptor which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. The existing sewer system is illustrated in Figure 7-1.



55 India Street **Boston, Massachusetts**

SCALE: 1"=100'

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Figure 7-1

Existing Sewer System

7.2.2 Wastewater Generation

The Project's sewage generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program from 314 CMR 07.00 and the proposed building program. 314 CMR 7.00 lists typical sewage generation values for the proposed building use, as shown in Table 7-1. Typical generation values are conservative values for estimating the sewage flows from new construction. 314 CMR 7.00 sewage generation values are used to evaluate new sewage flows or an increase in flows to existing connections. The existing site is a parking lot and does not produce any sewage flows. Table 7-1 describes the increased sewage generation in gallons per day (gpd) due to the Project.

Table 7-1 Proposed Project Wastewater Generation

Room Use	Size		314 CMR Value (gpd/unit)		Total Flow (gpd)
Residential	73	bedrooms	110	/bedroom	8,030
Restaurant	150	seats	35	/seat	5,250
				Total Proposed Flow:	13,280

7.2.3 Proposed Conditions

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The Project is expected to generate an increase in wastewater flows of approximately 13,280 gallons per day. Approval for the increase in sanitary flow will come from BWSC.

The sewer services for the Project will connect to the existing sanitary sewer mains located in Well Street, Franklin Street, and/or within the Project site near John F. Fitzgerald Surface Artery.

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.

In addition, the existing 66-inch BWSC sewer main located within the Project site will be protected and maintained during construction. To minimize the impact of the Project on the existing sewer infrastructure, the proposed building for the Project has been designed to cantilever over the existing sewer system with appropriate footings. The proposed Project's impacts to the existing sewer system will be reviewed as part of the BWSC's site plan review process.

7.2.4 Sewage Capacity

The Project's impact on the existing BWSC systems in Well Street, Franklin Street, and within the Project site adjacent to John F. Fitzgerald Surface Artery were analyzed. The existing sewer system capacity calculations are presented in Table 7-2.

Table 7-2 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Distance (feet)	Invert Elevation (up)	Invert Elevation (down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Well Street								
Unnamed to 128	70	103.0	101.23	2.5%	8	0.013	1.92	1.24
						Minimum Flow Analyzed:	1.92	1.24
Franklin Street								
128 to 127	228	2.96	2.28	0.3%	30 x 36	0.013	36.27	23.44
127 to 334	24	2.28	-2.69	20.7%	30 x 36	0.013	302.22	195.33
						Minimum Flow Analyzed:	36.27	23.44
Project Site - John F. Fitzgerald Surface Artery								
334 to 333	170	91.67	91.56	0.1%	66	0.013	85.42	55.21
						Minimum Flow Analyzed:	85.42	55.21

Notes:
1. Manhole numbers for Well Street were taken from Record Drawing sheet R36-48 prepared by Medford Engineering & Survey dated 3/15/2007
2. Manhole numbers for Franklin Street were taken from BWSC Sewer system Map no. 24L
3. Manhole numbers for the Project site were taken from Record Plan sheets C14C4-U-211 and C14C4-U-212 prepared by Massachusetts Highway Department, dated 1/14/2003
4. Flow Calculations based on Manning Equation

Table 7-2 indicates the hydraulic capacity of the 8-inch sanitary sewer within Well Street, the 30-inch x 36-inch combined sewer system within Franklin Street, and the 66-inch sanitary sewer within the Project site adjacent to John F. Fitzgerald Surface Artery. The minimum hydraulic capacity is 1.24 million gallons per day (MGD) or 1.92 cubic feet per second (cfs) for the 8-inch system in Well Street, 23.44 MGD or 36.27 cfs for the 30-inch x 36-inch system in Franklin Street, and 55.21 MGD or 85.42 cfs for the 66-inch system in the Project site adjacent to John F. Fitzgerald Surface Artery. Based on an average daily flow estimate for the Project of 14,820 GPD or 0.015 MGD; and with a factor of safety of 10 (total estimate = 0.015 MGD x 10 = 0.15 MGD), no capacity problems are expected within the Well Street, Franklin Street, or John F. Fitzgerald Surface Artery systems.

7.3 Water Supply

7.3.1 Water Infrastructure

Water for the Project site will be provided by the BWSC. There are five water systems within the City, and these provide service to portions of the City based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high. There is a 12-inch Southern Low Main, a 12-inch Southern High Main, and a 12-inch High Pressure Fire Service beneath India Street. There is also a 12-inch Southern Low Main, a 12-inch Southern High Main, and a 12-inch High Pressure Fire Service beneath the Project site and adjacent to John F. Fitzgerald Surface Artery. The existing water system is illustrated in Figure 7-2.

7.3.2 Anticipated Water Consumption

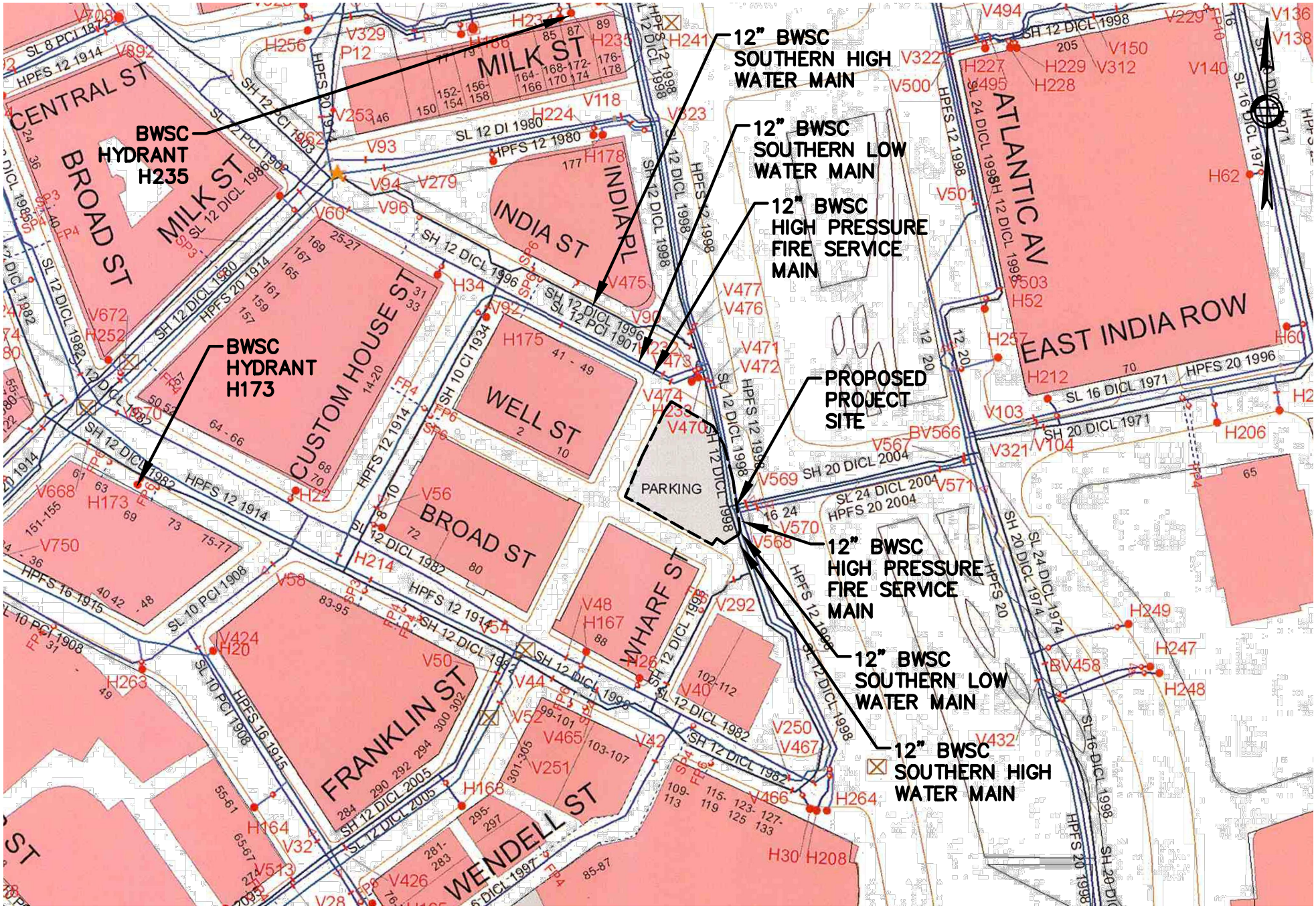
The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 314 CMR 07.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is approximately 14,608 gpd. The water for the Project will be supplied by the BWSC systems in India Street, and/or John F. Fitzgerald Surface Artery.

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. Chapter 4 Sustainable Design and Climate Change provides additional detail regarding water use reduction strategies.

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

7.3.3 Existing Water Capacity

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 two hydrants near the Project site. The existing hydrant flow data is shown in Table 7-3. As the design progresses, the Proponent will request hydrant flows be conducted by BWSC adjacent to the Project.



55 India Street **Boston, Massachusetts**

SCALE: 1"=100'

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Figure 7-2

Existing Water System

Table 7-3 Existing Hydrant Flow Data

Flow Hydrant Number	Date of Test	Static Pressure (psi)	Residual Pressure (psi)	Total Flow (gpm)	Flow (gpm) at 20 psi	Flow (gpm) at 10 psi
H173 Broad Street	4/19/2008	110	100	2,652	8,687	9,195
H235 Milk Street	3/20/2012	71	68	2,126	9,818	10,814

Note: 1. Data provided by BWSC, July 22, 2013

7.3.4 Proposed Project

The domestic and fire protection water services for the Project will connect to the existing BWSC water mains in India Street and/or John F. Fitzgerald Surface Artery.

In addition, the existing 12-inch Southern Low Main, the 12-inch Southern High Main, and the 12-inch High Pressure Fire Service within the Project site will be protected and maintained during construction. To minimize the impact of the Project on the existing water infrastructure, the proposed Project has been designed to cantilever over the existing water system with appropriate footings. 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 siamese connections that conform to BWSC and Boston Fire Department requirements.

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

7.4 Stormwater

7.4.1 Existing Storm Drainage System

There are existing BWSC storm drains in Well Street, Franklin Street, India Street and John F. Fitzgerald Surface Artery. There is an 18-inch storm drain main within Well Street that flows in a westerly direction. There is a 16-inch storm drain main within Franklin Street that flows in a northerly direction to India Street. There is a 30-inch storm drain main within

India Street that flows westerly, increases to a 36-inch storm drain main and flows to an 84-inch storm drain main on Milk Street. The storm drain main within Milk Street flows towards Central Wharf and ultimately discharges to the Boston Inner Harbor. The existing BWSC storm drain system is illustrated in Figure 7-3.

There are currently no closed drainage systems or catch basins within the Project site. Stormwater runoff from the existing parking lot sheet flows to the adjacent properties and to the storm drains within the closed drainage system in Franklin Street, Well Street, India Street, and John F. Fitzgerald Surface Artery.

7.4.2 Proposed Storm Drainage System

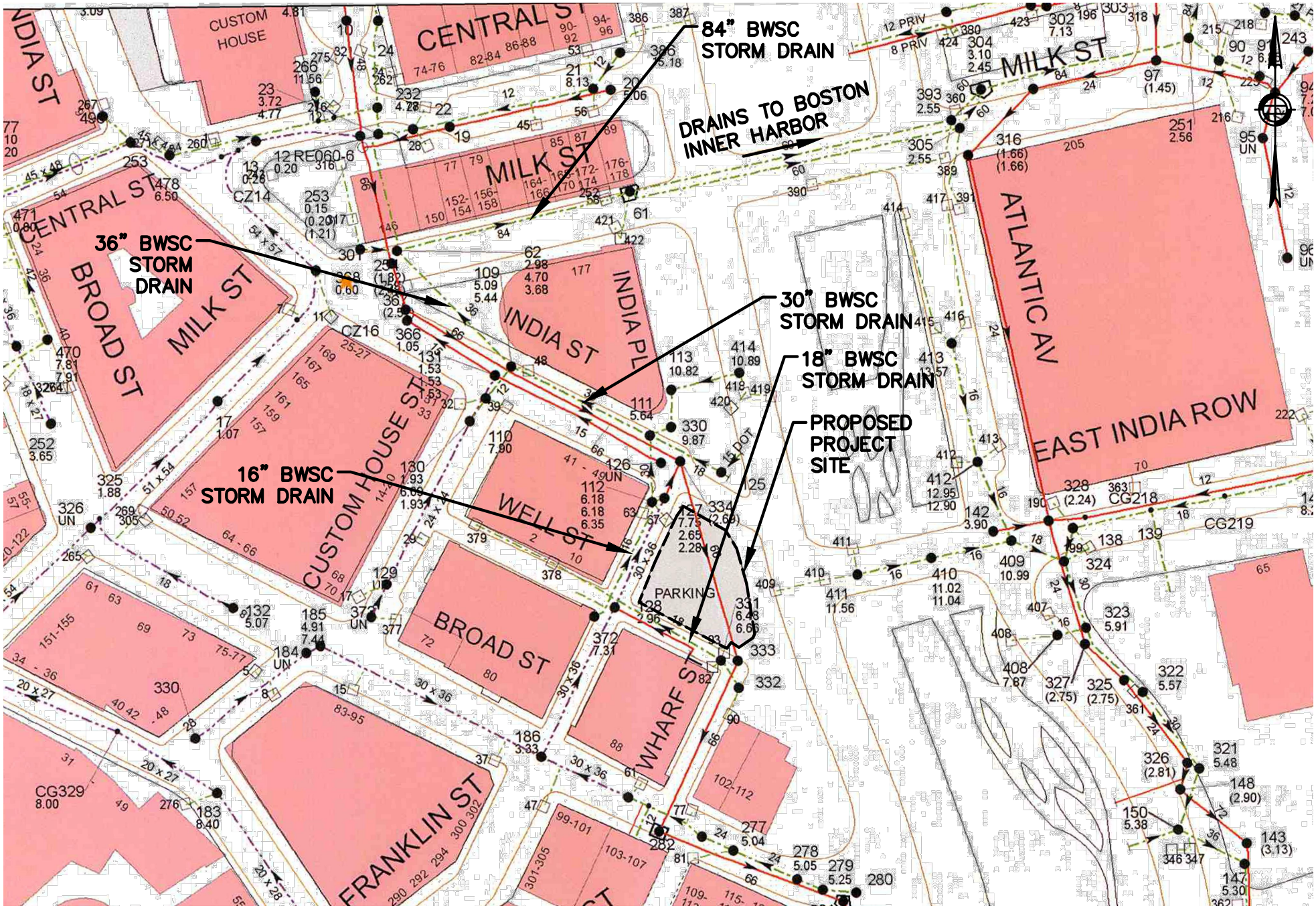
The existing site is approximately 100% impervious cover. The amount of impervious area at the site will remain the same or decrease compared to the existing condition due to the Project. The Project will reduce the existing peak rates of stormwater discharge and volumes of stormwater runoff from the site and promote runoff recharge to the greatest extent possible.

The Project will strive to infiltrate one-inch of stormwater runoff from impervious areas into the ground to the greatest extent possible. The proposed stormwater management system will include groundwater recharge systems. The design of the on-site stormwater system is still currently under development; however, it is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system and a combination of storage tanks in the building and pumps. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition.

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

7.4.3 Water Quality Impact

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



55 India Street **Boston, Massachusetts**

SCALE: 1"=100'

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Figure 7-3

Existing Storm Drain System

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

7.4.4 DEP Stormwater Management Policy Standards

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall

be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

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

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

Compliance: The proposed design will comply with this Standard. The Project complies with the Stormwater Management Standards as applicable to the redevelopment.

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

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

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

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

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

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

7.5 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.

7.6 Conservation of Resources

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

7.7 Proposed Energy Usage and Impacts

NSTAR owns the electrical system in the vicinity of the Project site. It is expected that adequate service is available in the existing electrical systems in the surrounding streets to serve the Project. The total electrical demand associated with the Project is estimated at 8,736 kW. The Proponent will work with NSTAR to confirm adequate system capacity as the design is finalized.

7.8 Telecommunications Systems

The Proponent will select private telecommunications companies to provide telephone, cable, and data services. There are several potential candidates with substantial downtown Boston networks capable of providing service. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals.

7.9 Gas Systems

National Grid has gas services in India Street and the Surface Artery adjacent to the site. The Proponent will work with National Grid to confirm adequate system capacity as design is finalized.

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designated to comply with the standards of the Americans with Disabilities Act.

8.2 Massachusetts Environmental Policy Act (MEPA)

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. The Project does not exceed any of the review thresholds for the filing of an Environmental Notification Form under MEPA.

8.3 Massachusetts Historical Commission

The Project will be subject to State Register Review (950 CMR 71) by the Massachusetts Historical Commission (MHC) because the Project involves the transfer of land owned by the Massachusetts Department of Transportation. Accordingly, the Proponent will file an MHC Project Notification Form to initiate the State Register Review process. The Boston Landmarks Commission will receive a copy of the MHC PNF and will be invited to participate in the MHC review process. Please see additional discussion in the historic resources section of this PNF.

8.4 Boston Civic Design Commission

Because the Project is located within the Greenway Overlay District and subject to Large Project Review, it will be subject to review by the Boston Civic Design Commission (BCDC) under the provisions of Article 28 of the Code. The BRA will submit this PNF to the BCDC to initiate such review.

8.5 Boston Parks and Recreation Commission

Given that the Project involves construction within 100 feet of the Rose Kennedy Greenway, the Project requires review and approval by the Boston Parks and Recreation Commission, which will be subject to advice from the Rose Kennedy Greenway Conservancy.

Appendix A

Site Boundary Description

BOUNDARY DESCRIPTION

LOT 100

A certain parcel of land situated in the City of Boston, Suffolk County, Commonwealth of Massachusetts, being bounded and described as follows:

Beginning at the intersection of the southerly sideline of India Street and the easterly sideline of Franklin Street;

Thence running along said southerly sideline of India Street S 62°55'24" E, a distance of 33.18 feet to a point of curvature;

Thence turning and running on a curve to the right having an radius of 37.50 feet, an arc length of 32.40 feet, a chord length of 31.40 feet, and a chord bearing of S 38°10'18" E to a point of tangency on the westerly sideline of Surface Artery;

Thence turning and running along said westerly sideline of Surface Artery S 13°25'11" E, a distance of 58.58 feet to a point of curvature;

Thence turning and running on a curve to the right having a radius of 17.00 feet, an arc length of 38.68 feet, a chord length of 30.86 feet, and a chord bearing of S 51°45'54" W to a point of tangency on the northerly sideline of Well Street;

Thence turning and running along said northerly sideline of Well Street N 62°58'48" W, a distance of 85.68 feet to the easterly sideline of Franklin Street;

Thence turning and running along said easterly sideline of Franklin Street N 26°17'52" E, a distance of 85.83 feet to the point of beginning.

Appendix B

Floor Plans

55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure B-1

Ground Level Floor Plan

55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure B-2

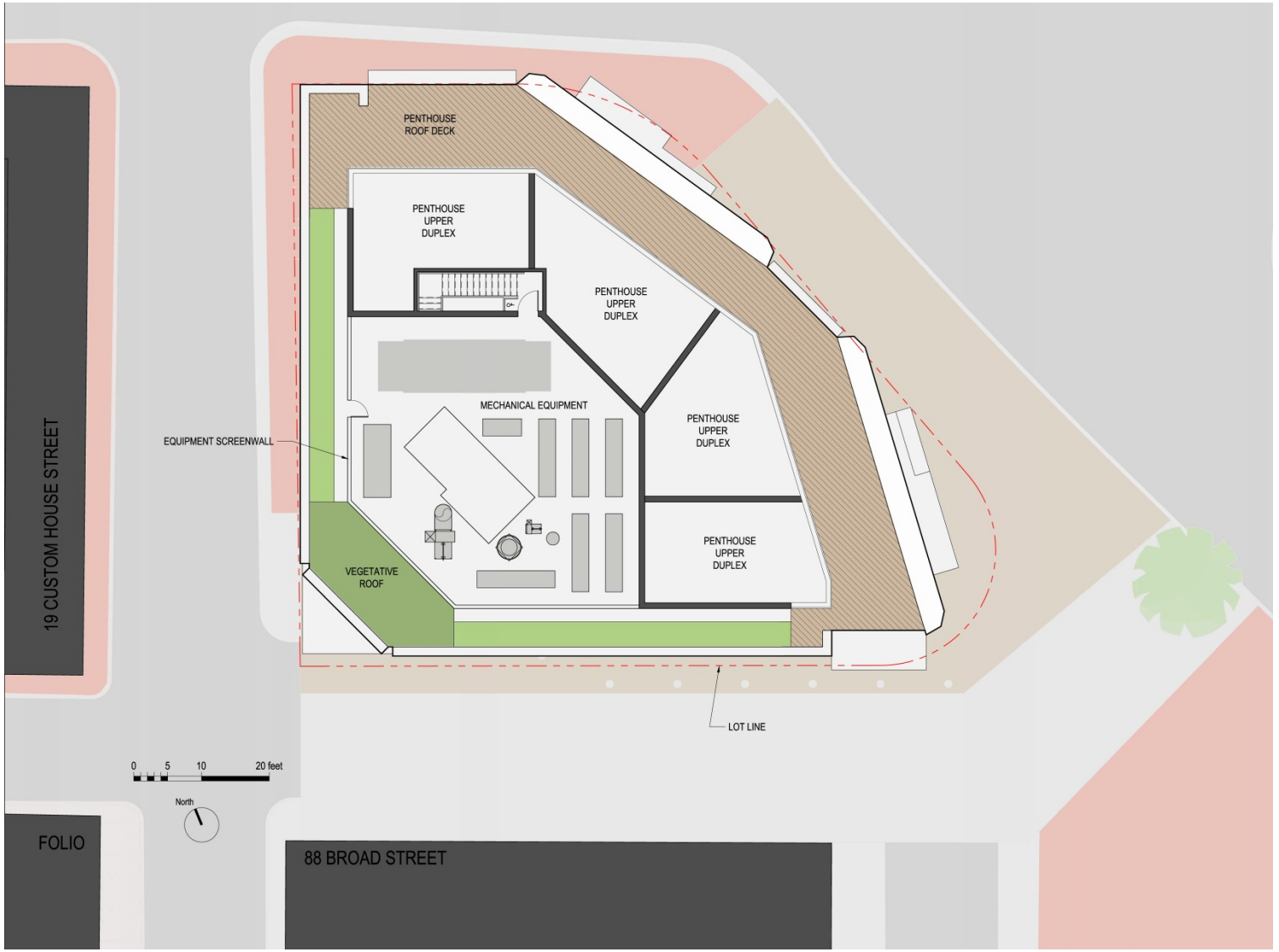
Mezzanine Level Floor Plan

55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure B-3

Typical Floor Plan (Levels 3-9)



55 India Street Boston, Massachusetts

Hacin + Associates Inc. [architecture + design]
112 Shawmut Avenue, Studio 5A, Boston, MA 02118

Figure B-4

Roof Penthouse Level Floor Plan

Appendix C

Transportation

Available Upon Request

Appendix D

Wind Appendix

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	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	15	+25%	Standing	23	+15%	Acceptable
		Summer	11		Sitting	18	+12%	Acceptable
		Fall	13	+18%	Standing	20	+18%	Acceptable
		Winter	14	+17%	Standing	22		Acceptable
		Annual	13	+18%	Standing	21	+17%	Acceptable
	C	Spring	15	+25%	Standing	25	+25%	Acceptable
		Summer	12	+20%	Sitting	20	+25%	Acceptable
		Fall	13	+18%	Standing	21	+24%	Acceptable
		Winter	15	+25%	Standing	24	+20%	Acceptable
		Annual	14	+27%	Standing	23	+28%	Acceptable
2	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20	+11%	Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	C	Spring	16	+14%	Walking	23		Acceptable
		Summer	12	+20%	Sitting	17		Acceptable
		Fall	14	+17%	Standing	20	+11%	Acceptable
		Winter	15	+15%	Standing	22		Acceptable
		Annual	15	+15%	Standing	21	+11%	Acceptable
3	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable

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

Configurations	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
C – Build with Broad St	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
	B	Spring	9	-18%	Sitting	14	-22%	Acceptable
		Summer	7	-22%	Sitting	12	-14%	Acceptable
		Fall	8	-20%	Sitting	13	-24%	Acceptable
		Winter	8	-27%	Sitting	14	-22%	Acceptable
		Annual	8	-20%	Sitting	13	-24%	Acceptable
	C	Spring	10		Sitting	16	-11%	Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	9		Sitting	14	-18%	Acceptable
		Winter	9	-18%	Sitting	15	-17%	Acceptable
		Annual	10		Sitting	15	-12%	Acceptable
4	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	14	+17%	Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13	+18%	Standing	19		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
5	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	17	+31%	Walking	24	+20%	Acceptable
		Summer	13	+30%	Standing	18	+12%	Acceptable
		Fall	15	+36%	Standing	21	+24%	Acceptable
		Winter	16	+33%	Walking	23	+15%	Acceptable
		Annual	15	+36%	Standing	22	+16%	Acceptable

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

Configurations	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
C – Build with Broad St	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
	C	Spring	16	+23%	Walking	24	+20%	Acceptable
		Summer	12	+20%	Sitting	18	+12%	Acceptable
		Fall	14	+27%	Standing	21	+24%	Acceptable
		Winter	15	+25%	Standing	23	+15%	Acceptable
		Annual	15	+36%	Standing	22	+16%	Acceptable
6	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	C	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
7	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	15	+15%	Standing	24	+14%	Acceptable
		Summer	12	+20%	Sitting	19	+19%	Acceptable
		Fall	12		Sitting	20	+11%	Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	22	+16%	Acceptable
	C	Spring	15	+15%	Standing	23		Acceptable
		Summer	12	+20%	Sitting	18	+12%	Acceptable
		Fall	13		Standing	20	+11%	Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	14	+17%	Standing	21	+11%	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
C – Build with Broad St	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
8	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	C	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
9	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	16	+14%	Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21	+11%	Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	C	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
10	A	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	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
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	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
	B	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	C	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
11	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	14	+40%	Standing	21	+24%	Acceptable
		Summer	11	+38%	Sitting	17	+31%	Acceptable
		Fall	12	+33%	Sitting	18	+20%	Acceptable
		Winter	13	+30%	Standing	21	+24%	Acceptable
		Annual	12	+33%	Sitting	20	+33%	Acceptable
	C	Spring	13	+30%	Standing	20	+18%	Acceptable
		Summer	10	+25%	Sitting	15	+15%	Acceptable
		Fall	11	+22%	Sitting	17	+13%	Acceptable
		Winter	12	+20%	Sitting	19	+12%	Acceptable
		Annual	12	+33%	Sitting	18	+20%	Acceptable
12	A	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	12	+20%	Sitting	18	+12%	Acceptable
		Summer	9	+12%	Sitting	13		Acceptable
		Fall	11	+22%	Sitting	16		Acceptable
		Winter	12	+20%	Sitting	18	+12%	Acceptable
		Annual	11	+22%	Sitting	16		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
	C	Spring	12	+20%	Sitting	18	+12%	Acceptable
		Summer	9	+12%	Sitting	13		Acceptable
		Fall	10	+11%	Sitting	16		Acceptable
		Winter	11		Sitting	18	+12%	Acceptable
		Annual	11	+22%	Sitting	17	+13%	Acceptable
13	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	15	-12%	Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	C	Spring	16		Walking	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	16		Walking	22		Acceptable
		Annual	15		Standing	20		Acceptable
14	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		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
C – Build with Broad St	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
15	A	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12	-20%	Sitting	18	-18%	Acceptable
		Summer	9	-18%	Sitting	15	-12%	Acceptable
		Fall	10	-23%	Sitting	16	-20%	Acceptable
		Winter	11	-21%	Sitting	18	-14%	Acceptable
		Annual	11	-15%	Sitting	17	-15%	Acceptable
	C	Spring	15		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	12	-14%	Sitting	20		Acceptable
		Annual	13		Standing	19		Acceptable
16	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	8	-11%	Sitting	14		Acceptable
		Fall	9	-18%	Sitting	16	-11%	Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16	-11%	Acceptable
	C	Spring	15	+25%	Standing	22		Acceptable
		Summer	11	+22%	Sitting	16		Acceptable
		Fall	13	+18%	Standing	19		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	13	+18%	Standing	19		Acceptable
17	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	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
C – Build with Broad St	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
	B	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
	C	Spring	12	-14%	Sitting	19		Acceptable
		Summer	9	-25%	Sitting	14	-18%	Acceptable
		Fall	11		Sitting	17	-11%	Acceptable
		Winter	11	-15%	Sitting	17	-15%	Acceptable
		Annual	11	-15%	Sitting	17	-15%	Acceptable
18	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	16		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	C	Spring	9	-25%	Sitting	15	-17%	Acceptable
		Summer	7	-22%	Sitting	11	-15%	Acceptable
		Fall	8	-20%	Sitting	13	-19%	Acceptable
		Winter	9	-18%	Sitting	14	-18%	Acceptable
		Annual	8	-27%	Sitting	13	-19%	Acceptable
19	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		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
C – Build with Broad St	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
	C	Spring	12	-14%	Sitting	18	-14%	Acceptable
		Summer	9	-18%	Sitting	14	-12%	Acceptable
		Fall	10	-17%	Sitting	15	-17%	Acceptable
		Winter	12		Sitting	18	-14%	Acceptable
		Annual	11	-15%	Sitting	16	-20%	Acceptable
20	A	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	16	+14%	Walking	23		Acceptable
		Summer	13	+30%	Standing	18	+12%	Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15	+15%	Standing	22		Acceptable
		Annual	14	+17%	Standing	21	+11%	Acceptable
21	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	15		Standing	23		Acceptable
	C	Spring	16		Walking	25		Acceptable
		Summer	12	-14%	Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	23		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	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
C – Build with Broad St	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
22	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	15	+15%	Standing	24	+14%	Acceptable
		Summer	11		Sitting	18	+12%	Acceptable
		Fall	13		Standing	21	+11%	Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	13		Standing	21	+11%	Acceptable
	C	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
23	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	13		Standing	22		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
	C	Spring	15	+15%	Standing	24	+14%	Acceptable
		Summer	12	+20%	Sitting	18		Acceptable
		Fall	13		Standing	21	+11%	Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14	+17%	Standing	21		Acceptable
24	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	13		Standing	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
C – Build with Broad St	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
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	17	+21%	Walking	25	+14%	Acceptable
		Summer	13	+18%	Standing	19	+12%	Acceptable
		Fall	15	+25%	Standing	22	+16%	Acceptable
		Winter	16	+23%	Walking	24		Acceptable
		Annual	15	+15%	Standing	23	+15%	Acceptable
25	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	11	-31%	Sitting	18	-25%	Acceptable
		Summer	9	-25%	Sitting	14	-22%	Acceptable
		Fall	10	-29%	Sitting	15	-29%	Acceptable
		Winter	11	-27%	Sitting	17	-23%	Acceptable
		Annual	11	-21%	Sitting	16	-24%	Acceptable
	C	Spring	14	-12%	Standing	21	-12%	Acceptable
		Summer	11		Sitting	16	-11%	Acceptable
		Fall	12	-14%	Sitting	17	-19%	Acceptable
		Winter	13	-13%	Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
26	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	15	+15%	Standing	23		Acceptable
		Summer	11		Sitting	18	+12%	Acceptable
		Fall	13	+18%	Standing	20	+11%	Acceptable
		Winter	13		Standing	21	+11%	Acceptable
		Annual	13		Standing	21	+11%	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
C – Build with Broad St	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
	C	Spring	16	+23%	Walking	24	+14%	Acceptable
		Summer	12	+20%	Sitting	18	+12%	Acceptable
		Fall	14	+27%	Standing	20	+11%	Acceptable
		Winter	15	+25%	Standing	22	+16%	Acceptable
		Annual	14	+17%	Standing	21	+11%	Acceptable
27	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	17		Acceptable
28	A	Spring	16		Walking	22		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	13	-19%	Standing	20		Acceptable
		Summer	10	-17%	Sitting	15		Acceptable
		Fall	12	-14%	Sitting	18		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12	-14%	Sitting	18		Acceptable
	C	Spring	13	-19%	Standing	20		Acceptable
		Summer	10	-17%	Sitting	15		Acceptable
		Fall	11	-21%	Sitting	17	-15%	Acceptable
		Winter	12	-14%	Sitting	19		Acceptable
		Annual	12	-14%	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
C – Build with Broad St	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
29	A	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	13	-28%	Standing	19	-27%	Acceptable
		Summer	10	-23%	Sitting	14	-26%	Acceptable
		Fall	11	-31%	Sitting	17	-26%	Acceptable
		Winter	12	-29%	Sitting	18	-25%	Acceptable
		Annual	11	-31%	Sitting	17	-26%	Acceptable
	C	Spring	11	-39%	Sitting	18	-31%	Acceptable
		Summer	8	-38%	Sitting	14	-26%	Acceptable
		Fall	10	-38%	Sitting	16	-30%	Acceptable
		Winter	10	-41%	Sitting	17	-29%	Acceptable
		Annual	10	-38%	Sitting	16	-30%	Acceptable
30	A	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12	-14%	Sitting	17	-11%	Acceptable
		Winter	13	-13%	Standing	19		Acceptable
		Annual	12	-14%	Sitting	18		Acceptable
	C	Spring	14		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12	-14%	Sitting	17	-11%	Acceptable
		Winter	12	-20%	Sitting	19		Acceptable
		Annual	12	-14%	Sitting	18		Acceptable
31	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		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
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C – Build with Broad St	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
	B	Spring	11	-31%	Sitting	17	-26%	Acceptable
		Summer	9	-25%	Sitting	13	-24%	Acceptable
		Fall	9	-36%	Sitting	15	-25%	Acceptable
		Winter	11	-27%	Sitting	17	-23%	Acceptable
		Annual	10	-29%	Sitting	16	-24%	Acceptable
	C	Spring	10	-38%	Sitting	16	-30%	Acceptable
		Summer	8	-33%	Sitting	12	-29%	Acceptable
		Fall	9	-36%	Sitting	14	-30%	Acceptable
		Winter	9	-40%	Sitting	15	-32%	Acceptable
		Annual	9	-36%	Sitting	14	-33%	Acceptable
32	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	7	-42%	Sitting	11	-42%	Acceptable
		Summer	5	-44%	Sitting	9	-40%	Acceptable
		Fall	6	-40%	Sitting	10	-41%	Acceptable
		Winter	6	-45%	Sitting	11	-39%	Acceptable
		Annual	6	-45%	Sitting	10	-41%	Acceptable
	C	Spring	6	-50%	Sitting	10	-47%	Acceptable
		Summer	5	-44%	Sitting	8	-47%	Acceptable
		Fall	6	-40%	Sitting	9	-47%	Acceptable
		Winter	6	-45%	Sitting	10	-44%	Acceptable
		Annual	6	-45%	Sitting	9	-47%	Acceptable
33	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	10		Sitting	15		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	8	-27%	Sitting	13	-24%	Acceptable
		Summer	6	-25%	Sitting	10	-17%	Acceptable
		Fall	8	-20%	Sitting	12	-20%	Acceptable
		Winter	8	-20%	Sitting	13	-13%	Acceptable
		Annual	8	-20%	Sitting	12	-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
C – Build with Broad St	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
	C	Spring	8	-27%	Sitting	13	-24%	Acceptable
		Summer	6	-25%	Sitting	10	-17%	Acceptable
		Fall	7	-30%	Sitting	12	-20%	Acceptable
		Winter	8	-20%	Sitting	12	-20%	Acceptable
		Annual	7	-30%	Sitting	12	-20%	Acceptable
34	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	12		Sitting	19	+12%	Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	13		Standing	22		Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	12		Sitting	19	+12%	Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable
35	A	Spring	10		Sitting	16		Acceptable
		Summer	7		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		Sitting	11		Acceptable
		Fall	8	-11%	Sitting	13		Acceptable
		Winter	8	-11%	Sitting	14		Acceptable
		Annual	8	-11%	Sitting	13		Acceptable
	C	Spring	13	+30%	Standing	21	+31%	Acceptable
		Summer	10	+43%	Sitting	15	+25%	Acceptable
		Fall	12	+33%	Sitting	18	+29%	Acceptable
		Winter	12	+33%	Sitting	18	+20%	Acceptable
		Annual	12	+33%	Sitting	18	+29%	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
C – Build with Broad St	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
36	A	Spring	7		Sitting	12		Acceptable
		Summer	6		Sitting	9		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	8		Sitting	12		Acceptable
		Annual	7		Sitting	11		Acceptable
	B	Spring	9	+29%	Sitting	14	+17%	Acceptable
		Summer	7	+17%	Sitting	11	+22%	Acceptable
		Fall	8	+14%	Sitting	13	+18%	Acceptable
		Winter	9	+12%	Sitting	14	+17%	Acceptable
		Annual	8	+14%	Sitting	13	+18%	Acceptable
	C	Spring	9	+29%	Sitting	15	+25%	Acceptable
		Summer	7	+17%	Sitting	11	+22%	Acceptable
		Fall	8	+14%	Sitting	13	+18%	Acceptable
		Winter	8		Sitting	14	+17%	Acceptable
		Annual	8	+14%	Sitting	13	+18%	Acceptable
37	A	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	C	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
38	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		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
C – Build with Broad St	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
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	C	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
39	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
40	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8	-11%	Sitting	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.

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
C – Build with Broad St	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
	C	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	9		Sitting	15		Acceptable
41	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
42	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8		Sitting	14		Acceptable
		Fall	9		Sitting	15		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	C	Spring	11		Sitting	18		Acceptable
		Summer	9	+12%	Sitting	14		Acceptable
		Fall	10	+11%	Sitting	15		Acceptable
		Winter	11		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.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
43	A	Spring	16		Walking	25		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	18	+12%	Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	C	Spring	18	+12%	Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16	+14%	Walking	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
44	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14	-12%	Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14	-12%	Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
45	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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	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
	B	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	22		Acceptable
	C	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	16		Walking	22		Acceptable
46	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11	-15%	Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11	-15%	Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
47	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	22		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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	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
	C	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
48	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	13		Standing	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
49	A	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable

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

Configurations	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
C – Build with Broad St	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
50	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
51	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	10	+11%	Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	18		Acceptable
52	A	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		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
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C – Build with Broad St	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
	B	Spring	19		Walking	28		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
	C	Spring	19		Walking	28		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
53	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		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	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
54	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	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
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	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
	C	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
55	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	21		Acceptable
	C	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
56	A	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
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
	C	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
58	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	C	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
59	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	24		Acceptable

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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
C – Build with Broad St	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
	B	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	C	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
60	A	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
	C	Spring	19		Walking	27		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	18		Walking	25		Acceptable
61	A	Spring	19		Walking	28		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	20		Uncomfortable	28		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	27		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
C – Build with Broad St	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
	C	Spring	20		Uncomfortable	29		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	19		Walking	27		Acceptable
62	A	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
	C	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
63	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	C	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	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
C – Build with Broad St	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
64	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
	C	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
65	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	16	+14%	Walking	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	C	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
66	A	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		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
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	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
	B	Spring	18		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
	C	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
67	A	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	C	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
68	A	Spring	19		Walking	27		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	18		Walking	24		Acceptable
	B	Spring	20		Uncomfortable	27		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	25		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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	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
	C	Spring	20		Uncomfortable	28		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	26		Acceptable
69	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	C	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
70	A	Spring	22		Uncomfortable	29		Acceptable
		Summer	18		Walking	24		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
	B	Spring	22		Uncomfortable	29		Acceptable
		Summer	18		Walking	24		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
	C	Spring	22		Uncomfortable	31		Acceptable
		Summer	18		Walking	24		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	28		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
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	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
71	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	C	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
72	A	Spring	21		Uncomfortable	28		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
	B	Spring	22		Uncomfortable	28		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	19		Walking	26		Acceptable
	C	Spring	22		Uncomfortable	29		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
73	A	Spring	21		Uncomfortable	28		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	19		Walking	26		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
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	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
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	19		Walking	26		Acceptable
	C	Spring	21		Uncomfortable	29		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	27		Acceptable
74	A	Spring	21		Uncomfortable	28		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	25		Acceptable
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	18		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
	C	Spring	22		Uncomfortable	28		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
75	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	17		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.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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	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
	C	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
76	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	C	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
77	A	Spring	19		Walking	30		Acceptable
		Summer	16		Walking	25		Acceptable
		Fall	15		Standing	25		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	19		Walking	30		Acceptable
		Summer	16		Walking	26		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	17		Walking	27		Acceptable
	C	Spring	19		Walking	30		Acceptable
		Summer	16		Walking	25		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	17		Walking	27		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
C – Build with Broad St	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
78	A	Spring	26		Uncomfortable	32		Unacceptable
		Summer	21		Uncomfortable	27		Acceptable
		Fall	21		Uncomfortable	27		Acceptable
		Winter	22		Uncomfortable	29		Acceptable
		Annual	23		Uncomfortable	29		Acceptable
	B	Spring	25		Uncomfortable	32		Unacceptable
		Summer	21		Uncomfortable	27		Acceptable
		Fall	21		Uncomfortable	27		Acceptable
		Winter	22		Uncomfortable	29		Acceptable
		Annual	23		Uncomfortable	29		Acceptable
	C	Spring	25		Uncomfortable	32		Unacceptable
		Summer	21		Uncomfortable	27		Acceptable
		Fall	21		Uncomfortable	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	22		Uncomfortable	29		Acceptable
79	A	Spring	22		Uncomfortable	29		Acceptable
		Summer	19		Walking	24		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
	B	Spring	22		Uncomfortable	29		Acceptable
		Summer	19		Walking	24		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
	C	Spring	22		Uncomfortable	29		Acceptable
		Summer	19		Walking	24		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	20		Uncomfortable	26		Acceptable
80	A	Spring	24		Uncomfortable	31		Acceptable
		Summer	21		Uncomfortable	26		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	22		Uncomfortable	28		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
	B	Spring	24		Uncomfortable	31		Acceptable
		Summer	20		Uncomfortable	25		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	21		Uncomfortable	28		Acceptable
		Annual	22		Uncomfortable	28		Acceptable
	C	Spring	24		Uncomfortable	31		Acceptable
		Summer	20		Uncomfortable	26		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	22		Uncomfortable	28		Acceptable
81	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	C	Spring	15	+36%	Standing	22	+29%	Acceptable
		Summer	12	+33%	Sitting	17	+21%	Acceptable
		Fall	12	+20%	Sitting	18	+20%	Acceptable
		Winter	14	+27%	Standing	21	+24%	Acceptable
		Annual	13	+30%	Standing	20	+25%	Acceptable
82	A	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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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
C – Build with Broad St	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
	C	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
83	A	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	C	Spring	16		Walking	22		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	14	+17%	Standing	20	+11%	Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	15	+15%	Standing	20		Acceptable
84	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	20		Acceptable
	C	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	14		Standing	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
C – Build with Broad St	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
85	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	10	+11%	Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
86	A	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17	-11%	Acceptable
		Winter	11	-15%	Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
87	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	16		Acceptable
		Fall	10		Sitting	18		Acceptable
		Winter	10		Sitting	18		Acceptable
		Annual	10		Sitting	18		Acceptable

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	Dangerous Conditions:	> 27 mph		

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Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	13		Standing	22		Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	11		Sitting	19		Acceptable
		Annual	11		Sitting	19		Acceptable
	C	Spring	13		Standing	22		Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	12	+20%	Sitting	19		Acceptable
		Winter	11		Sitting	19		Acceptable
		Annual	12	+20%	Sitting	19		Acceptable
88	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	C	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17	-11%	Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	12		Sitting	18		Acceptable
89	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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	Dangerous Conditions:	> 27 mph		

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Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	C	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
90	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	10		Sitting	16		Acceptable
		Annual	12		Sitting	17		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	12		Sitting	17		Acceptable
	C	Spring	14		Standing	20		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	12		Sitting	17		Acceptable
91	A	Spring	11		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	14		Acceptable
		Winter	11		Sitting	16		Acceptable
		Annual	10		Sitting	15		Acceptable
	C	Spring	11		Sitting	16		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	15		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
92	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	9	-25%	Sitting	15	-17%	Acceptable
		Summer	7	-22%	Sitting	11	-15%	Acceptable
		Fall	8	-20%	Sitting	13	-19%	Acceptable
		Winter	9		Sitting	14	-18%	Acceptable
		Annual	8	-20%	Sitting	14	-12%	Acceptable
93	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	C	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
94	A	Spring	9		Sitting	16		Acceptable
		Summer	7		Sitting	13		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	8		Sitting	15		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
	B	Spring	9		Sitting	16		Acceptable
		Summer	7		Sitting	13		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9	+12%	Sitting	15		Acceptable
	C	Spring	10	+11%	Sitting	17		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9	+12%	Sitting	15		Acceptable
95	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
96	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable

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

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A - No Build	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
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C – Build with Broad St	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
	C	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
97	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
98	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	C	Spring	12		Sitting	19		Acceptable
		Summer	10	+11%	Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	18		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
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	Dangerous Conditions:	> 27 mph		

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BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
99	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	22		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	27		Acceptable
	C	Spring	21		Uncomfortable	29		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	27		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
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Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
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	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Appendix E

Climate Change Preparedness Questionnaire

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:	**55 India Street**
Project Address Primary:	**55 India Street**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	

A.2 - Team Description

Owner / Developer:	**Otis & Ahearn**
Architect:	**Hacin + Associates**
Engineer (building systems):	**Vanderweil Engineers, LLP**
Sustainability / LEED:	
Permitting:	**Epsilon Associates, Inc**
Construction Management:	
Climate Change Expert:	**Epsilon Associates, Inc**

A.3 - Project Permitting and Phase

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

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

A.4 - Building Classification and Description

List the principal Building Uses:	Residential, Commercial/Restaurant
List the First Floor Uses:	*Commercial/Restaurant, Residential Lobby*

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

☐ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*7,081 SF*	Building Area:	*67,000 SF*
Building Height:	*117 Ft.*	Number of Stories:	*12 Flrs.*
First Floor Elevation (reference Boston City Base):	*15.90 Elev.*	Are there below grade spaces/levels, if yes how many:	*No* / *Number of Levels*

A.5 - Green Building

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

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

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

Registered:	*Yes* / **No**	Certified:	*Yes* / **No**

A.6 - Building Energy-

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

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

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

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

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

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

B - Extreme Weather and Heat Events

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

B.1 - Analysis

What is the full expected life of the project?

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

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

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

What time span of future Climate Conditions was considered?

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

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

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

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

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

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

30-90 Days	*0.2 Events / yr.*

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

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

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

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

B.2 - Mitigation Strategies

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

Building energy use below code:	*20%*
How is performance determined:	Energy Model

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

Select all appropriate:	☑ High performance building envelop	☐ High performance lighting & controls	☐ Building day lighting	☑ EnergyStar equip. / appliances
	☑ High performance HVAC equipment	☑ Energy recovery ventilation	☐ No active cooling	☐ No active heating
Describe any added measures:				

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

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13BATTS + R8 continuous insulation*
Foundation:	*R = 15*	Basement / Slab:	*R =10*
Windows:	*R = / U =0.4*	Doors:	*R = / U =0.7*

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:	The Project team is studying the possibility of solar PV on the roof.			

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

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

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

	Yes / *No*	If yes, for how long:	*Days*
If Yes, is building "Islandable?	No		
If Yes, describe strategies:			

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

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

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

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

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

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

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

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

C - Sea-Level Rise and Storms

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

C.1 - Location Description and Classification:

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

	Yes / No

Describe site conditions?

Site Elevation – Low/High Points:	*Boston City Base Elev.(Ft.)*
Building Proximity to Water:	*520 Ft.*

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

Coastal Zone:	Yes / No	Velocity Zone:	Yes / No
Flood Zone:	Yes / No	Area Prone to Flooding:	Yes / No

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

2013 FEMA Prelim. FIRMs:	Yes / No	Future floodplain delineation updates:	Yes / No

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

0 Ft.

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

C - Sea-Level Rise and Storms

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

C.2 - Analysis

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

Sea Level Rise:	*3 Ft.*	Frequency of storms:	*0.25 per year*

C.3 - Building Flood Proofing

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

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

Flood Proof Elevation:	*15.9 Boston City Base Elev.(Ft.)*	First Floor Elevation:	*15.9 Boston City Base Elev. (Ft.)*

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

	Yes / No	If Yes, to what elevation	*18.7 Boston City Base Elev. (Ft.)*
If Yes, describe:	The Project team is exploring the use of a demountable, post and panel flood protection system which would protect ground level openings [Storefront, entry doors, etc.] from water infiltration during a flood event.		

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

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

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

Yes / No

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

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

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

Yes / No

If Yes, describe:

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

Yes / No	If Yes, for how long:	*days*

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

C.4 - Building Resilience and Adaptability

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

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

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

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

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

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

Select appropriate:	*Yes / 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