PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA") pursuant to Article 80, Section 80A-2 of the Boston Zoning Code (the "Code"), hereby gives notice that on May 27, 2016 Nordblom Development Company, on behalf of 1000 W Acquisitions, LLC, submitted (1) a Project Notification Form ("PNF") pursuant to Section 80B-5 of the Code, and (2) a PDA Development Plan pursuant to Section 80C of the Code for the project to be located at 1000 Washington Street and 321 Harrison Avenue ("Proposed Project"). The Proposed Project will entail the construction of an approximately 230,0000 gross square foot office building to be constructed atop the existing parking garage at 321 Harrison Avenue, and the reconstruction of the lobby to serve as a shared lobby area with the existing office building at 1000 Washington Street, with sidewalk and other pedestrian realm improvements, and with parking for approximately 240 parking spaces in the existing parking garage.

A Scoping Determination is required pursuant to Article 80. Pursuant to Section 80B-5.3(d) of the Code, the BRA in the Scoping Determination may waive further review if, after reviewing public comments, the Authority finds that such PNF adequately describes the Project's impacts. Approvals are requested of the BRA pursuant to Article 80 for the approval of a petition to the Zoning Commission for the establishment of a Planned Development Area, the approval of the PDA Development Plan, and the issuance of a Certification of Consistency by the Director of the BRA. The PNF and the PDA Development Plan may be viewed at the following location: Office of the Executive Director/Secretary of the BRA, Boston City Hall, Boston, MA 02210 (Monday through Friday, 9 AM to 5 PM, except legal holidays). Public comments on the PNF should be transmitted to Mr. Phil Cohen, Project Manager, BRA, at the address stated above, or by email at phil.cohen@boston.gov within 30 days days of the publication of this notice or by June 27, 2016, or on the PDA Development Plan within 45 days of the publication of this notice or by July 12, 2016.

Boston Redevelopment Authority
Teresa Polhemus, Executive Director/Secretary

PROJECT NOTIFICATION FORM

321 Harrison Avenue

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

Submitted by:
Nordblom Development Company, Inc.
on behalf of
1000 W. Acquisitions, LLC.
71 Third Avenue,
Burlington, MA 01803

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

In Association with:
SMMA
McNamara/Salvia, Inc.
Haley & Aldrich, Inc.
Howard Stein Hudson

May 26, 2016

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Chapter 1.0

Project Description

1.0 INTRODUCTION/ PROJECT DESCRIPTION

1.1 Introduction

Nordblom Development Company, Inc, on behalf of 1000 W Acquisitions, LLC (the Proponent), proposes to construct a building addition to its existing office complex located at 1000 Washington Street in the South End area of Boston. The site encompasses approximately 83,470 square feet of land, and is currently designated by the City as both '1000 Washington Street' and '321 Harrison Avenue' (the Project site). It is currently improved with an approximately 235,000 square foot (sf) office building and a 300 car parking garage. The proposal contemplates the construction of a new, eight-story office building of approximately 230,000 square feet to be built above the existing three-story parking garage. The new office building is to be known as 321 Harrison Avenue.

The existing building lobby at 1000 Washington Street currently connects this building to the adjoining parking garage. This lobby will be redesigned to also accommodate the new 321 Harrison Avenue elevator core, thus connecting both buildings and functioning as a shared lobby. As part of the proposed office expansion, several other refinements will occur: the existing garage will be reduced by 60 spaces, the current loading dock area at 1000 Washington will be pulled back from the Harrison Avenue street edge and that area reconstructed as public open space, and significant additional pedestrian realm improvements will be constructed (the Project). Figure 1-1 is an Aerial Locus and indicates the Project site.

The Project will complement the existing office uses in 1000 Washington Street, as well as the abundance of new residential units in the immediate neighborhood. This additional office use will fit well with the activity on Herald Street and the Massachusetts Turnpike a little further to the north, and will create a stronger connection between Downtown Boston and the South End. The pedestrian connectivity and circulation will be improved as the Project brings additional workers to the area for a richer mix of 18/7 uses. The Project serves as a vital physical and economic link between the Downtown, Chinatown, and South End neighborhoods.

The Project will also result in a number of public benefits, including tax revenues and an improved urban environment.

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

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

321 Harrison Avenue **Boston, MA**

Epsilon ASSOCIATES INC.

Figure 1-1

Aerial Locus Map

1.2 Project Identification

Address/Location:	321 Harrison Avenue Boston, MA 02118
Developer:	Nordblom Development Company, Inc. on behalf of 1000 W Acquisitions, LLC 71 Third Avenue Burlington, MA 01803 (781) 272-4000 Ogden Hunnewell Todd Fremont-Smith
Architect Landscape Architect Civil Engineer MEP/FP Engineers	SMMA 1000 Massachusetts Avenue Cambridge, MA 02138 (617) 547-5400 Gregory Downes Mark Spaulding
Landscape Advisor:	Copley Wolff Design Group 160 Boylston Street - 3rd Floor Boston, MA 02116 (617) 654-9000 John Copley
Legal Counsel:	Rubin and Rudman LLP 50 Rowes Wharf Boston, MA 02110-3319 (617) 330-7000 Paula Devereaux
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Talya Moked

Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Guy Busa Michael Santos
Structural Engineer:	McNamara/Salvia Inc. Consulting Engineers 101 Federal Street, 11th Floor Boston, MA 02110 (617) 737-0040 John Matuszewski Joe Salvia
Geotechnical Consultant:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Boston, MA 02129 (617) 886-7400 Mark Haley

1.3 Project Description

1.3.1 Project Site

The Project site is bounded by Herald Street to the north, Harrison Avenue to the east, William E. Mullins Way to the south, and Washington Street to the west. The Project site is an approximately two acre property (approximately 83,470 square feet) that contains an existing 11-story, 234,900 square foot office building with a one-story lobby (known as 1000 Washington Street) located on the southern portion of the site. On the northern portion of the site is an existing three-story 300 space parking garage connected by the one-story lobby to 1000 Washington Street. The lobby is accessible by pedestrians from both Harrison Avenue and Washington Street. Vehicular access to the garage is provided from both Harrison Avenue and Washington Street. Service access is predominantly from William E. Mullins Way. The site is located along major MBTA bus routes including a northbound MBTA Silver Line station on the Washington Street side of the property.

Located near the intersection of I-90 (Massachusetts Turnpike) to the north and I-93 (Southeast Expressway) to the east, the site is a gateway for the South End. Chinatown and Downtown are to the north of the Project across the Massachusetts Turnpike. With the Fort Point Channel and the South Boston neighborhoods to the east, as well as the South End and Back Bay neighborhoods immediately southwest and west respectively, the general area is transitioning to a vibrant new mixed-use community.

1.3.2 Area Context

The existing surrounding buildings have generally been industrial and include light manufacturing and warehouses. However, five major developments have recently been constructed or are underway within a few blocks of the site, which will dramatically change the area. Figure 1-2 presents the area context of the site.

- To the east along Harrison Avenue is the recently completed "Ink Block" residential project which includes approximately 475 apartments and condominiums as well as a flagship Whole Foods Market.
- To the southeast of the site, the Troy (275 Albany Street), recently completed, includes approximately 400 apartments and complementary retail uses.
- To the south of the Project on Harrison Avenue and Washington Street, another significant residential development, 345 Harrison Avenue, has begun construction in 2016 and includes 369 residential units planned for the Harrison Avenue building and the 233 units planned for the Washington Street building, plus 33,500 sf of retail/restaurant space.
- To the southwest of the site is 80 East Berkeley Street, which will include an approximately 308,000 sf mixed-use office and retail building.
- To the southwest of the Project site on Harrison Avenue between East Berkeley Street and Traveler Street is 370-380 Harrison Avenue, which proposes to demolish the existing structures and construct an approximately 14-story mixed-use building with 6,000 sf of ground floor commercial uses and approximately 280 residential units above.

There are three public open spaces located within a short walk of the Project site including Eliot Norton Park, Peter's Park and Rotch Playground.

1.3.3 Proposed Project

The Project includes the construction of a building addition, above the existing parking garage (up to 150 feet), located on the northern portion of the site at 321 Harrison Avenue. The addition shall include approximately 230,000 square feet of office space, with a new lobby and significant pedestrian realm improvements. There will be a reduction of approximately 60 parking spaces due to the construction of the addition, and the resulting 240 space parking garage will serve both the existing office building and the addition. A new lobby will be located in the same location as the original lobby and is designed to allow pedestrians to walk through the site between Harrison Avenue to Washington Street during normal business hours. The lobby will be generous enough to allow for people to access the buildings as well as traverse the site. The entry courts to each lobby entrance

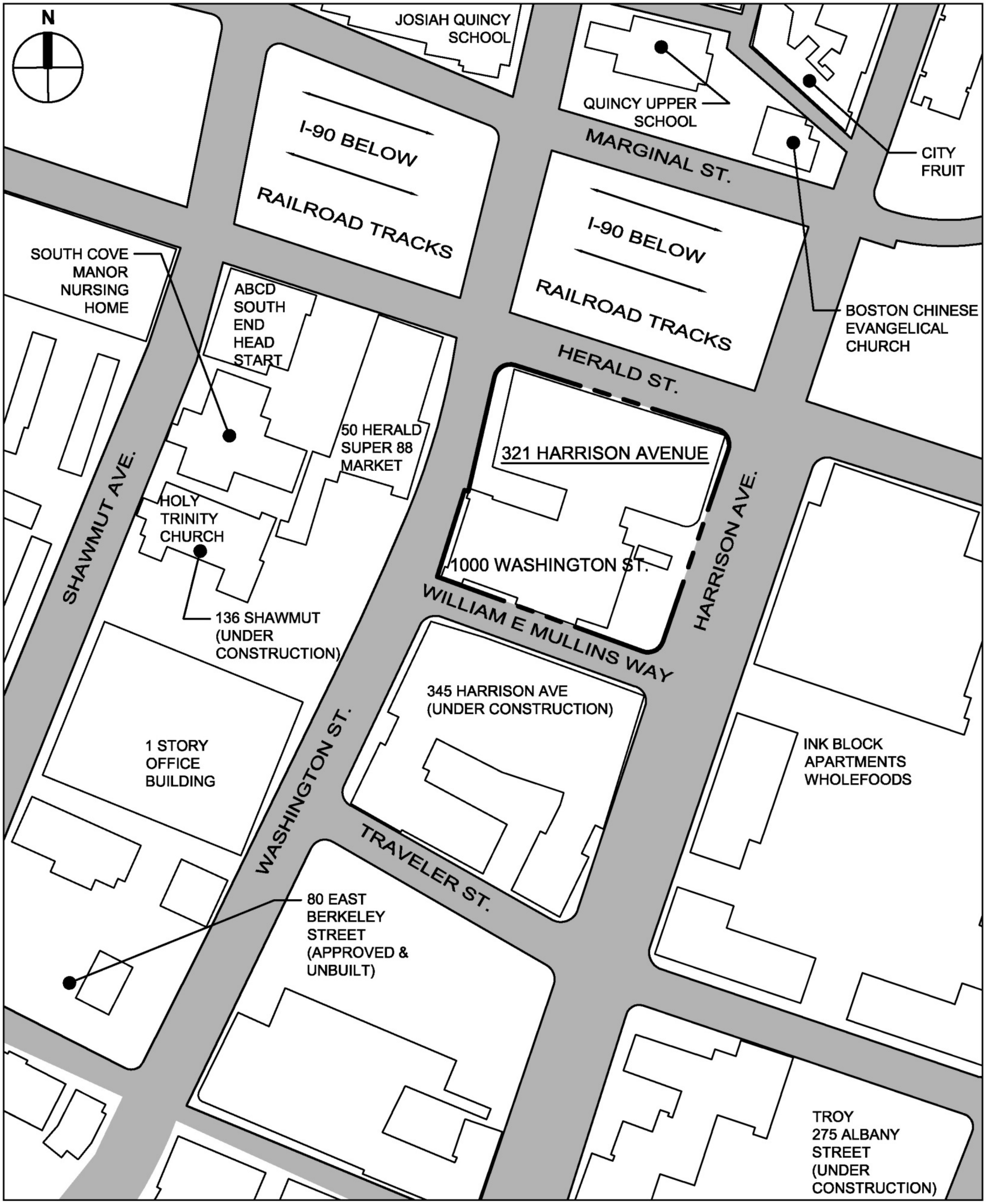


Figure 1-2
Area Context

will have significant welcoming urban design elements such as landscaping, light poles, bollards, benches and the like to improve the neighborhood as well as the pedestrian experience to this new Class A office building. Figure 1-3 presents the proposed site plan. Figures 1-4 to 1-7 present sections and elevations. Floor plans can be found in Appendix A.

The Project will include the development of a small cultural/gallery space on the corner of Herald Street and Harrison Avenue. This space will help “anchor” the building to the street life and will allow for an active presence facing the Whole Foods Market and the residential entry across Harrison Avenue.

Loading and service will continue to occur from the existing loading area on the south side of the site off of William E. Mullins Way. However, the existing service area will be reduced to provide a landscaped open space at the corner of Harrison Avenue and William E. Mullins Way adjacent to the existing 1000 Washington Street building, across the street from the new Whole Foods Market at the Ink Block (see Figure 1-8). The space will be scaled appropriately to allow for a multitude of uses and will provide a focus to the neighborhood allowing people to gather, relax, socialize, and enjoy lunch outdoors. Other landscape design improvements will include enhancing the sidewalks and improving accessibility, incorporating new site furniture, lighting designed to work with the existing streetscape elements, and adding or replacing street trees. Approximately 20% of the site is designed and built to ensure public access and to enhance the public realm.

The proposed office expansion would benefit the New York Streets neighborhood by:

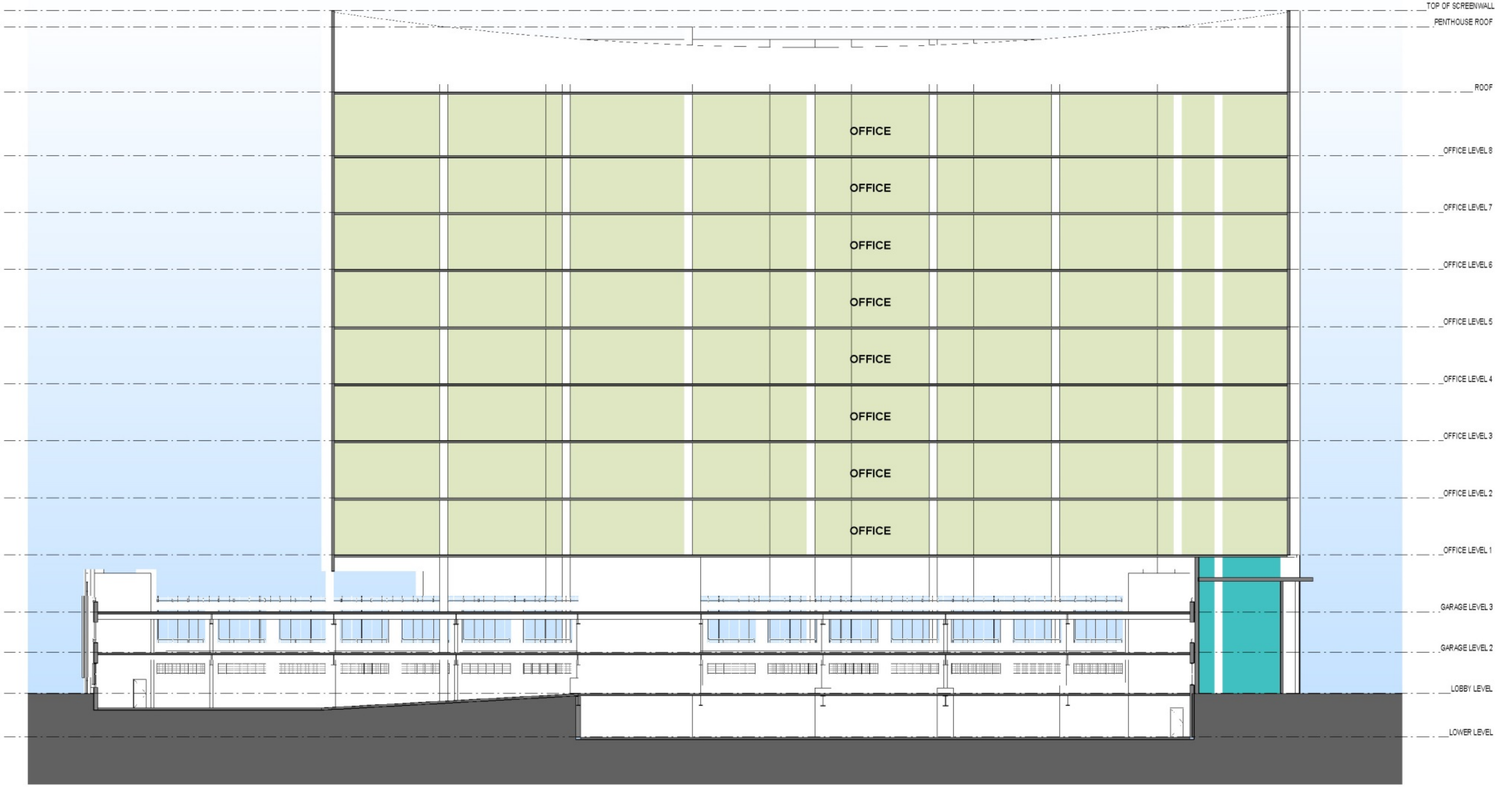
- Infilling a ‘missing tooth’ in the Harrison Avenue streetscape.
- Helping to buffer the burgeoning residential / retail uses from the Mass Pike.
- Contributing an expanded office component to this evolving, but residential-centric mixed-use neighborhood.
- Updating the original 1000 Washington tower with a new lobby, and streetscape improvements.
- Creating meaningful public open space along the Harrison Avenue edge, via a significant reduction in the existing loading dock area.

Table 1-1 Project Program

Project Element	321 Harrison Avenue Building
Office and Lobby Space	230,000 sf
Building Height	150 feet
Parking	(-60 spaces) 240 spaces to remain in existing

Figure 1-3

Site Plan



321 Harrison Avenue Boston, Massachusetts

SMMA

Figure 1-4

Longitudinal Section

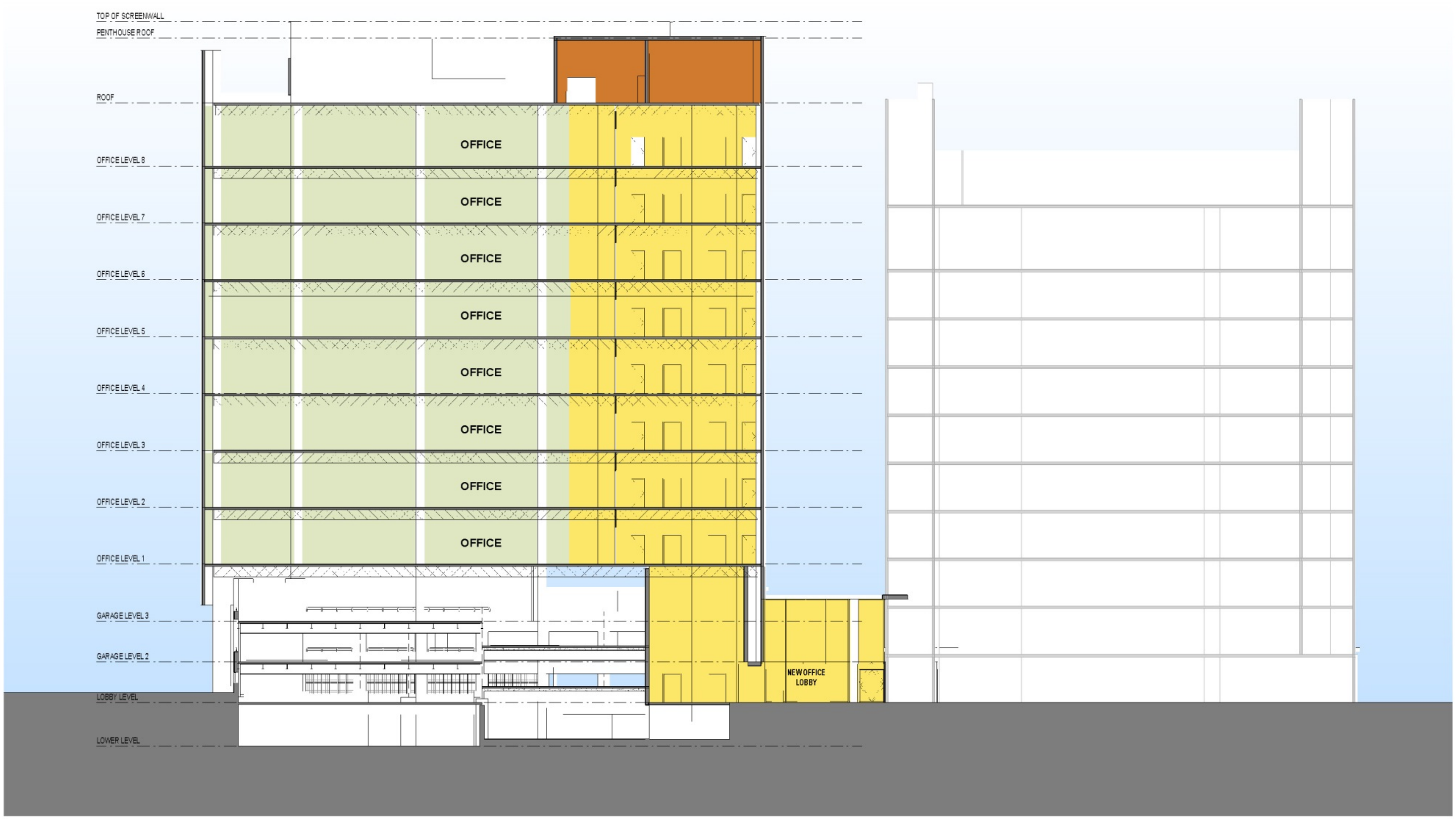


Figure 1-5

Latitudinal Section

321 Harrison Avenue   Boston, Massachusetts

SMMA

Figure 1-6

North Elevation

321 Harrison Avenue   Boston, Massachusetts

SMMA

Figure 1-7

East Elevation

Figure 1-8

View from Harrison Avenue

1.3.4 Consistency with the Harrison-Albany Corridor Strategic Plan

The Project is located within the boundaries of the Harrison-Albany Corridor Strategic Plan, which was adopted by the BRA in November of 2011. The Strategic Plan is made up of four distinct sub-areas, with the Project site located in the New York Streets sub-area. The vision for the area is to:

> "emphasize its location as the vital physical and economic link between the City's downtown, Chinatown, and South End neighborhoods with convenient access to South Boston and the regional roadway system. Future development should provide exciting new 18-hour uses within a pedestrian-friendly public realm that includes a finer grain of city blocks that allow for enhanced transportation access and circulation. Non-residential uses should provide new jobs for Boston residents." (p. 20) note:

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

- Encouraging pedestrian activity in the area with a dynamic and diverse group of office users. These folks may walk from the new office space to nearby restaurants or businesses and may be walking to work from nearby neighborhoods or transit stops;
- Creating a pedestrian-friendly environment on the major streets, and maintaining vehicular and truck access on William E. Mullins Way;
- Using land with a commercial purpose efficiently to connect the area to downtown and Chinatown;
- Introducing high-quality architecture and diverse architecture styles to provide a transformative effect for the neighborhood;
- Improving the public realm with new benefits, including new landscaped open space, sidewalks with increased width and streetscape enhancements; and
- Promoting the use of alternative modes of transportation and minimizing parking on-site, while providing bicycle racks and amenities.

1.3.5 Evolution of Design

At the outset of the Project, the Proponent considered building new residential units on the site. However, after several months of study, it was determined that office use would better complement the site, the immediate neighborhood, and the South End due to the abundance of residential units currently being built in the area.

The initial design task was to understand the development opportunities with respect to the existing conditions. It was determined the existing office building and garage provide an excellent base for further development and should remain. Therefore, the proposed 321 Harrison Avenue office building has been designed as an addition to the existing garage. In order to maintain the existing open space, an air rights design approach over the existing garage was developed. With this scenario in mind, the garage will be clad with an architectural screen to unify the base, or plinth, of the new addition and the larger complex.

There were several urban design issues to consider in the articulation of the mass. First, the site is a "gateway" to the South End, suggesting that the edges of the district marker along the highway be a little taller and a little more commercial in nature. The presence of the building on the Massachusetts Turnpike and facing the Downtown and Chinatown neighborhoods calls for an iconic design.

There were several iterations of the north and east facades. The first approach was a large wall of glass on the north side only, providing a great presence towards the Financial District and the Massachusetts Turnpike. A scheme with glass wrapped around the corner onto Harrison Street was also explored. Another iteration explored more a solid wall on the north in an interesting pattern with curtainwall more selectively utilized on the east and west ends. The intent of this scheme was to strategically use curtainwall while further animating the east and west facades. In the end, these last two schemes were abandoned due to the excessive amount of solar heat gain on the east and west facades. After considering several options, the original scheme of curtainwall on the north that would have minimal heat gain and maximum iconic presence towards the Financial District and the Massachusetts Turnpike was chosen.

Also considered were the specific urban conditions on Washington Street and Harrison Avenue. It is important for the pedestrian experience for the building to address the street, relate to the first and second stories of adjacent buildings forming the dynamic edges of the street space, and to address the neighboring buildings above. With the goal of further improving the pedestrian experience, current zoning and planning in the area were considered as well as the pedestrian experience on Harrison Avenue with projects such as the Ink Block.

On Washington Street, less is known about future development. The new office space is pulled back from the garage façade along Washington Street. In addition, the profile of the office building has been narrowed to prevent obscuring views to the north from the existing office building.

It was also important to see the two buildings on the site as "talking" to each other. Through the use of materiality and articulation of mass, the new 321 Harrison Avenue building is designed to create a complementary architectural relationship with the existing 1000 Washington Street building.

An earlier iteration of the open space included a wide open hardscape plaza for the community to use as they pleased. The current site design will allow for open interpretations of usage with soft landscape elements that provide for a much more comfortable and inviting place to meet with friends.

1.4 Public Benefits

The Project includes an addition to an underused site with a pedestrian-friendly, sustainably designed building that complements the recent and proposed growth in the area. Among its many other improvements, the Project will result in the following benefits:

- Creating approximately 300 construction jobs and 1,500 permanent jobs at the site;
- Generating over $2.6 million in property taxes, a substantial increase from the approximately $1.1 million in tax currently levied on the underdeveloped Project site; and
- Contributing to the Neighborhood Housing Trust and Neighborhood Jobs Trust.

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

- Creating a building that complements the existing uses in the area with an addition to an underutilized parcel in an emerging neighborhood;
- Creating a new landscaped open space allowing people to gather, relax and socialize;
- Introducing high-quality architecture and diverse architecture styles to provide a transformative effect for the neighborhood;
- Providing an improved streetscape with street trees;
- Reconnecting the South End with Downtown;
- Complying with Article 37 of the Boston Zoning Code by being Leadership in Energy and Environmental Design (LEED) certifiable at the Silver level; and
- Creating a new building that will complement both the existing buildings in the area and the new developments that have either been recently completed or are underway.

1.5 City of Boston Zoning

The Site is located within the South End Neighborhood District in the EDA North Area. Planned Development Areas are allowed within the EDA North Area. It is proposed that the entire site (existing building, existing parking garage, and new building) be included as a Planned Development Area (PDA) pursuant to the provisions of Article 64 of the Boston Zoning Code (the Code). The site satisfies the one acre requirement for a PDA contained in Section 3-1A(a) of the Code. It is anticipated that the site will be reviewed and approved as PDA pursuant the provisions of Article 64 and Article 80c of the Code. The Project will provide at least a portion of the required cultural space on-site in accordance with Article 64. The balance of the requirement will be met either with additional cultural space on the site, and/or a contribution to a fund to benefit the neighborhood. Approval as a PDA requires the approval by the BRA and the Boston Zoning Commission of a PDA Development Plan that outlines the proposed densities, dimensions, uses, appearance, landscaping and other matters that the BRA deems appropriate for the site.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

There are no legal judgements affecting the site.

1.6.2 History of Tax Arrears on Property

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

1.6.3 Site Control/ Public Easements

The site is owned by 1000W Acquisitions LLC pursuant to the Quitclaim Deed dated December 19, 2014 recorded with the Suffolk Registry of Deeds in Book 53869, Page 279. The site is subject to an easement with the Boston Water and Sewer Commission and a Maintenance Agreement with the City of Boston Public Improvement Commission. The Survey for the site can be found in Appendix B.

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 Name	Permit / Approval
FEDERAL	
U.S. Environmental Protection Agency	National Pollution Discharge Elimination System Small Construction Discharges Groundwater Treatment Construction Dewatering
Federal Aviation Administration	Determination of No Hazard to Air Navigation
STATE	
Department of Environmental Protection, Division of Air Quality Control	Pre-Construction Notice
Massachusetts Water Resources Authority	Sewer Use Discharge Permit; Construction Dewatering Permit
Massachusetts Historical Commission	Determination of Affect on Historic Resources, if applicable
LOCAL	
Boston Redevelopment Authority	Article 80B Large Project Review; Article 80C Planned Development Area Review
Boston Civic Design Commission	Schematic Design Review
Boston Zoning Commission	Planned Development Area Approval
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan; Street and Sidewalk Occupation Permits
Boston Water and Sewer Commission	Sewer Use Discharge Permit; Site Plan Approval; Construction Dewatering Permit; Sewer Extension/ Connection Permit; Stormwater Connection
Public Works Department/Public Improvement Commission	Streetscape Improvements Curb Cut Permits; Specific Repairs; Tieback/Earth Retention Permit
Boston Air Pollution Control Commission	Exemption from Boston Parking Freeze
City of Boston Committee on Licenses	Parking Garage Permit; Fuel Storage License
City of Boston Inspectional Services Department	Building and Occupancy Permits
South End Landmark District Commission	Design Review

1.8 Public Participation

Members of the development team participated in the Harrison-Albany Corridor Strategic Plan planning process including participation or attendance at numerous community and public meetings. The BRA worked with neighborhood businesses, property owners, institutions and community members to develop a comprehensive Strategic Plan for the Harrison-Albany Corridor. The Mayor appointed a 30-member Advisory Group as part of this Strategic Planning process, which started in April 2009. There were more than 15 Advisory Group meetings (open to the public) and two community-wide meetings. The Harrison-Albany Corridor Strategic Plan was adopted by the BRA Board of Directors in November 2011.

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 city, neighbors, and others as the design and review processes move forward.

1.9 Schedule

The Proponent anticipates that the Project will commence construction in the first quarter of 2017 and last for approximately 18 months.

Chapter 2.0

Transportation

2.0 TRANSPORTATION

2.1 Introduction

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

2.1.1 Project Description

The Project is located at 321 Harrison Avenue in Boston's South End neighborhood and is the northernmost parcel located on the block that is bounded by Harrison Avenue to the east, Herald Street to the north, Washington Street to the west, and William E. Mullins Way to the south.

The site currently contains an existing 11-story, 234,900 square foot office building with a one-story lobby (known as 1000 Washington Street) located on the southern portion of the site. On the northern portion of the site is a three-story 300 space parking garage connected by the one-story lobby to 1000 Washington Street. The Project will include the construction of an approximately 230,000 sf office addition above the existing parking garage, a new lobby, and significant improvements to the pedestrian realm at the street level. The parking garage will be reconstructed to contain approximately 240 parking spaces (a reduction of 60 parking spaces) and will serve both the existing office building and the Project. Loading and service is currently provided to the site off of William E. Mullins Way, adjacent to the south side of the existing office building. The existing service area will be reduced to provide additional landscaping at the corner of Harrison Avenue and William E. Mullins Way. The service area will continue to serve the existing office building, and will also serve the needs of the Project. Primary pedestrian access will be provided through a new shared lobby that will be constructed between the existing office building and the Project. Access to the lobby will be available from both Washington Street and Harrison Avenue. Secondary pedestrian access will be provided through the garage at the corners of Washington Street/Herald Street and Harrison Avenue/Herald Street.

Safe and secure bicycle storage will be provided on the site, in accordance with the BTD Boston Bikes Guidelines. Additional bicycle racks will be provided around the building to accommodate visitors and other patrons of the Project. All bicycle racks will conform to BTD guidelines and be located in safe, secure locations. The Proponent will work with BTD to identify the most appropriate quantity and location for bicycle racks on the Project site as part of the Transportation Access Plan Agreement (TAPA) process.

2.1.2 *Study Methodology*

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

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

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2023, based on a seven-year horizon from the year of the filing of this traffic study. Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capabilities and deficiencies are identified. This section includes the following scenarios:

- The No-Build (2023) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project site.

- The Build (2023) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2023) Condition analysis.

The 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.

2.1.3 *Study Area*

The transportation study area includes intersections surrounding the Project site along Washington Street, Harrison Avenue, Albany Street, I-93 NB Frontage Road, Herald Street Traveler Street, and East Berkeley Street. The study area consists of the following 14 intersections in the vicinity of the Project site, also shown on Figure 2-1:

- Washington Street/Herald Street (signalized);

- Harrison Avenue/Herald Street (signalized);

- Albany Street/Herald Street/I-93 SB On-Ramp (signalized);

- Washington Street/Traveler Street (signalized);

321 Harrison Avenue Boston, Massachusetts

Figure 2-1

Study Area Intersections

- Harrison Avenue/Traveler Street (signalized);
- Albany Street/Traveler Street (signalized);
- Albany Street/West Fourth Street/East Berkeley Street (signalized);
- I-93 NB Frontage Road/Traveler Street/I-90 WB On-Ramp/I-93 NB On-Ramp/Broadway Bridge (signalized);
- I-93 NB Frontage Road/West Fourth Street (signalized);
- Harrison Avenue/East Berkeley Street (signalized);
- Washington Street/William E. Mullins Way/Driveway (unsignalized);
- Harrison Avenue/William E. Mullins Way/Parking Lot (unsignalized);
- Washington Street/Garage Driveway (unsignalized); and
- Harrison Avenue/Garage Driveway (unsignalized).

2.2 Existing Conditions

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

2.2.1 Existing Roadway Conditions

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

Harrison Avenue is a two-way, two to four lane roadway divided by a median, and located adjacent to the east side of the Project site. Harrison Avenue generally runs in a north-south direction between Essex Street to the north and Dudley Square to the south. Harrison Avenue is classified as an urban minor arterial roadway under BTD jurisdiction. In the vicinity of the site, on-street parking and sidewalks are provided along both sides of the roadway.

Washington Street is a two-way, four lane roadway located adjacent to the west side of the Project site that generally runs in a north-south direction between downtown Boston to the north and the outer Boston neighborhoods to the south. Washington Street is classified as an urban principal arterial roadway under BTD jurisdiction. Washington Street has a dedicated bus lane in both the northbound and southbound directions. In the vicinity of the Project site, there is one southbound bus only lane and three northbound lanes, one of which is a bus only lane. On-street parking is provided on the east side of the roadway. Sidewalks exist on both sides of the roadway.

Herald Street is a one-way eastbound, three lane roadway located adjacent to the north side of the Project site. Herald Street generally runs in an east-west direction between Tremont Street to the west and Albany Street to the east. Herald Street is classified as an urban principal arterial roadway under BTD jurisdiction. In the vicinity of the site, on-street parking is restricted on both sides of the roadway. Sidewalks are provided on both sides of the roadway; however, the sidewalk on the northern side is only approximately three feet wide.

William E. Mullins Way is a two-way, two lane roadway located adjacent to the south side of the Project site that runs in an east-west direction between Harrison Avenue to the east and Washington Street to the west. William E. Mullins Way is classified as a local roadway under BTD jurisdiction. In the vicinity of the site, on-street parking is provided along both sides of the roadway, Sidewalks are provided on both sides of the roadway.

Traveler Street is located south of the Project site, and generally runs in an east-west direction between the I-93 NB Frontage Road to the east and Washington Street to the west. Between the I-93 NB Frontage Road and Albany Street, Traveler Street is a one-way eastbound three lane roadway and is classified as an urban principal arterial roadway under BTD jurisdiction. Parking is not provided along this section of Traveler Street. Between Albany Street and Harrison Avenue, Traveler Street is a two-way, two lane roadway and is classified as a local roadway under BTD jurisdiction. Parking is provided along both sides of this section of the roadway. Between Harrison Avenue and Washington Street, Traveler Street is a one-way westbound, one lane roadway and is classified as a local roadway under BTD jurisdiction. Parking is provided along both sides of this section of the roadway. Sidewalks are provided on both sides of Traveler Street.

East Berkeley Street is a one-way westbound, three lane roadway located south of the Project site, and generally runs in an east-west direction between the I-93 NB Frontage Road to the east and Tremont Street to the west. East Berkeley Street is classified as an urban principal roadway under BTD jurisdiction. In the vicinity of the site, peak hour restricted on-street parking is provided along both sides of the roadway. Sidewalks are provided on both sides of the roadway.

Albany Street is a one-way southbound, three lane roadway located to the east of the Project site that generally runs in a north-south direction between Kneeland Street to the north and Eustis Street to the south. Albany Street is classified as an urban minor arterial roadway under MassDOT jurisdiction. In the vicinity of the Project site, on-street parking is restricted along both sides of the roadway. Sidewalks are provided on both sides of the roadway.

I-93 NB Frontage Road is a one-way northbound, three lane roadway located to the east of the Project site that generally runs in a north-south direction between Traveler Street to the north and Southampton Street to the south. Albany Street is classified as an urban minor arterial roadway under MassDOT jurisdiction. In the vicinity of the Project site, on-street parking is restricted along both sides of the roadway. Sidewalks are provided on both sides of the roadway.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Washington Street/Herald Street is a four-legged, signalized intersection with three approaches. The Herald Street eastbound approach consists of a left-turn/through lane and two through lanes. The Washington Street northbound approach consists of two through lanes and a right-turn lane. The Washington Street southbound approach consists of a bus-only lane. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Harrison Avenue/Herald Street is a four-legged, signalized intersection with three approaches. The Herald Street eastbound approach consists of two through lanes and a through/right-turn lane. The Harrison Avenue northbound approach consists of two right-turn lanes. The Harrison Avenue southbound approach consists of a left-turn lane and two through lanes. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Albany Street/Herald Street/I-93 SB On-Ramp is a four legged, signalized intersection with two approaches. The Herald Street eastbound approach consists of three right-turn lanes. The Albany Street southbound approach consists of a left-turn/through lane and two through lanes. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Washington Street/Traveler Street is a three-legged, signalized intersection with two approaches. The Traveler Street westbound approach consists of a right-turn lane. The Washington Street northbound approach consists of two through lanes and a bus-only lane. The Washington Street southbound approach consists of a bus-only lane. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Harrison Avenue/Traveler Street is a four-legged, signalized intersection with three approaches. The Traveler Street westbound approach consists of one shared left-turn/through/right-turn lane. The Harrison Avenue northbound and southbound approaches both consist of a left-turn/through lane and a through/right-turn lane. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Albany Street/Traveler Street is a four-legged, signalized intersection with two approaches. The Traveler Street eastbound approach consists of a through/right-turn lane. The Albany Street southbound approach consists of a left-turn lane, a left-turn/through lane, and a through/right-turn lane. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across the east, south, and west legs of the intersection.

Albany Street/East Berkeley Street/West Fourth Street is a four-legged, signalized intersection with two approaches. The West Fourth Street westbound approach consists of a left-turn lane and two through lanes. The Albany Street southbound approach consists of two through lanes and a through/right-turn lane. Sidewalks are provided along all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across the east, south, and west legs of the intersection.

I-93 NB Frontage Road/Traveler Street/I-90 WB On-Ramp/I-93 NB On-Ramp/Broadway Bridge is a five-legged, signalized intersection with three approaches. The Traveler Street eastbound approach consists of a left-turn lane and two through lanes. The Broadway Bridge westbound approach consists of two right-turn lanes. The I-93 NB Frontage Road consists of two through lanes and three right-turn lanes. Sidewalks are provided along all approaches with the exception of the northwest corner. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across the south and east approaches to the intersection.

I-93 NB Frontage Road/West Fourth Street is a four-legged, signalized intersection with two approaches. The West Fourth Street westbound approach consists of two through lanes and a through/right-turn lane. The I-93 NB Frontage Road northbound approach consists of a left-turn lane, a left-turn/through lane, and a shared through/right-turn lane. Sidewalks are provided along all approaches with the exception of the northwest corner of the intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across the south and east approaches to the intersection.

Washington Street/William E. Mullins Way is a three-legged, unsignalized intersection with three approaches. The William E. Mullins Way westbound approach consists of a right-turn only lane. The Washington Street northbound approach consists of two through lanes and a shared right-turn/bus only lane. The Washington Street southbound approach consists of a bus only lane. Crosswalks and wheelchair ramps are provided across the north and east approaches to the intersection.

Harrison Avenue/William E. Mullins Way is a three-legged, unsignalized intersection with three approaches. The William E. Mullins Way eastbound approach consists of a shared right-turn/left-turn lane. The Harrison Avenue northbound approach consists of a shared left-turn/through lane and a through lane. The Harrison Avenue southbound approach consists of a through lane and a shared through/right-turn lane. Crosswalks and wheelchair ramps are provided across the north, south, and west approaches to the intersection.

Washington Street/Garage is a three-legged, unsignalized intersection with three approaches. The Garage westbound approach consists of a right-turn only lane. The Washington Street northbound approach consists of two through lanes and a shared right-turn/bus only lane. The Washington Street southbound approach consists of a bus only lane. Crosswalks and wheelchair ramps are not provided across any approaches to the intersection.

Harrison Avenue/Garage is a three-legged, unsignalized intersection with three approaches. The Garage eastbound approach consists of a shared right-turn/left-turn lane. The Harrison Avenue northbound approach consists of a shared left-turn/through lane and a through lane. The Harrison Avenue southbound approach consists of a through lane and a shared through/right-turn lane. Crosswalks and wheelchair ramps are not provided across any approaches to the intersection.

2.2.3 Existing Parking

An inventory of the existing on-street parking in the vicinity of the Project site was collected. On-street curb usage surrounding the Project site generally restricts parking. The parking that is allowed mostly consists of metered parking. The on-street parking regulations within the study area are shown in Figure 2-2.

2.2.4 Existing Traffic Conditions

Traffic movement data was collected at the study area intersections on Wednesday, January 13, 2016. Turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The vehicle classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Appendix C.

2.2.4.1 Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the January 2016 TMCs. The seasonal adjustment factors for roadways similar to the study area indicate that average

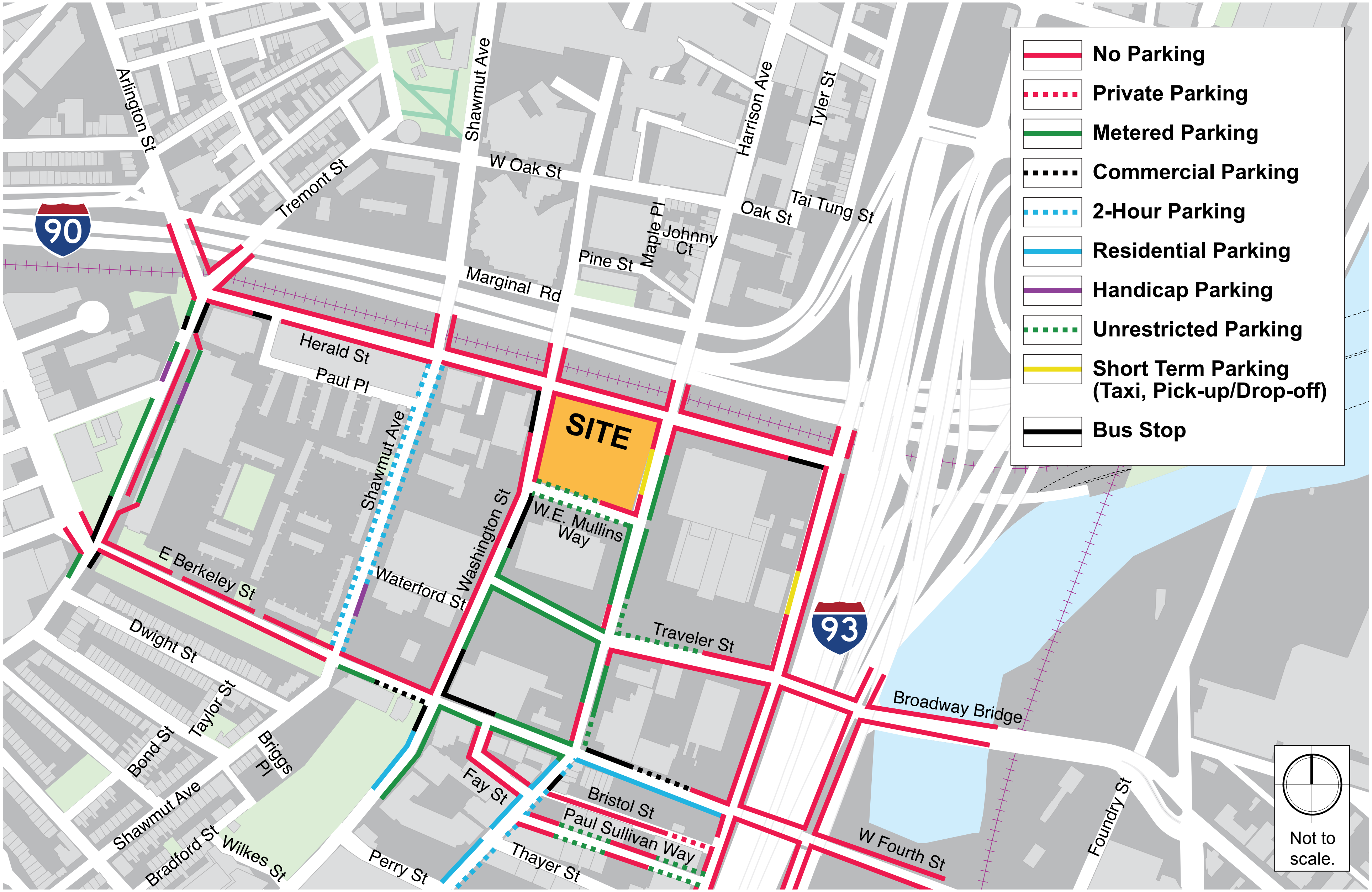


Figure 2-2
On-Street Parking Regulations

month traffic volumes are approximately three percent higher than the traffic volumes that were collected. Therefore, the traffic counts were grown by three percent to reflect average month conditions. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix C.

The Existing (2016) weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown in Figures 2-3 and Figure 2-4, respectively.

2.2.5 Existing Bicycle Volumes and Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is conveniently located in close proximity to several bicycle facilities. The South Bay Harbor Trail is located to the east of the Project site and will ultimately connect the Fort Point District in South Boston to the Pierre Lallement Bike Path along the MBTA Orange Line/Southwest Corridor Park. Segments of the trail are in place, including the Harborwalk section in South Boston and the Melnea Cass Bike Path in Roxbury. The incomplete connecting segment will operate along portions of the I-93 frontage roads between West Fourth Street and Biosquare Drive at Boston Medical Center.

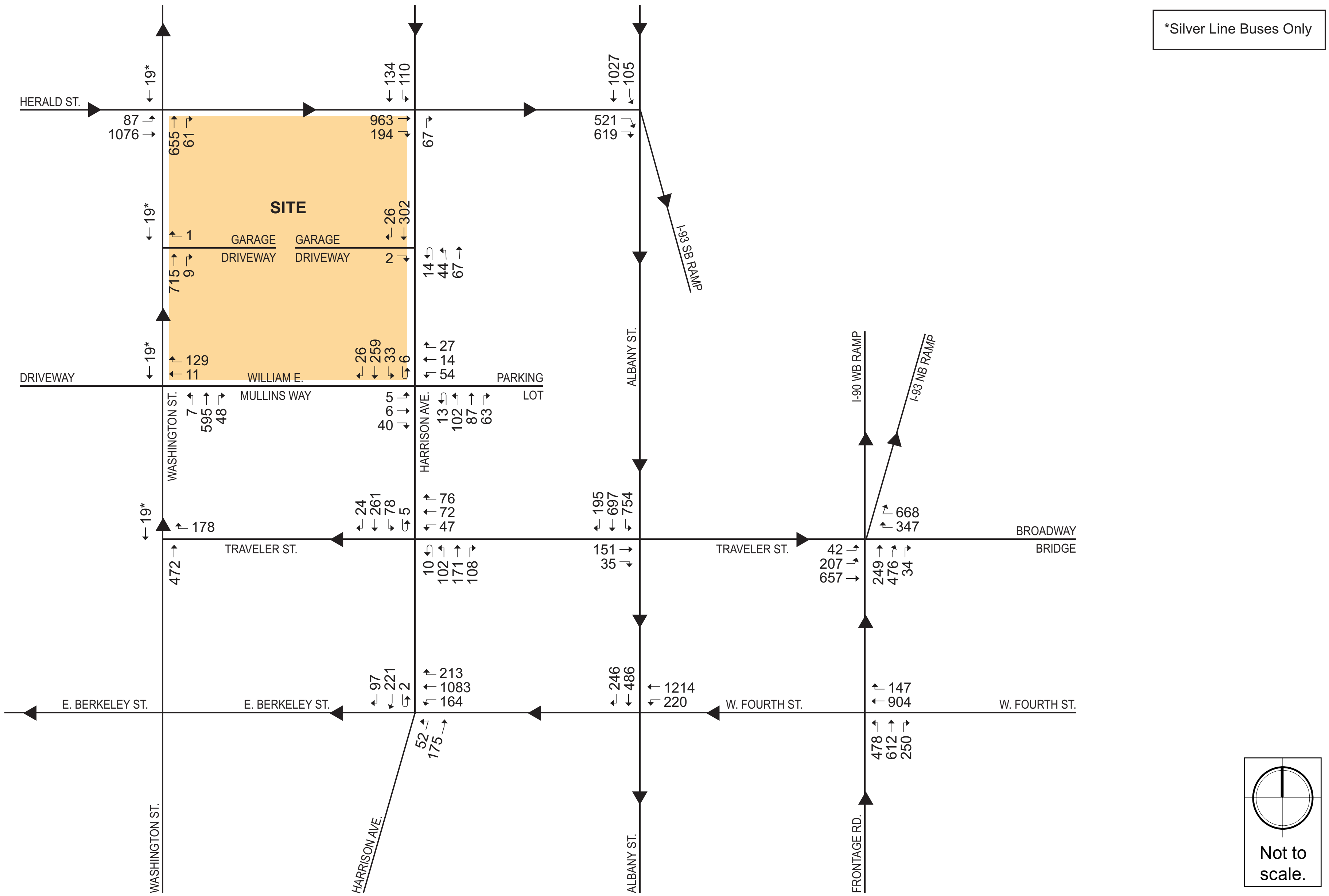
The City of Boston's "Bike Routes of Boston" map designates Shawmut Avenue as a beginner route. Beginner routes are suitable for all riders, including new cyclists with little or no on-road experience. West Fourth Street/East Berkeley Street and Washington Street are designated as intermediate routes. Washington Street has a shared bus/bicycle lane in the vicinity of the Project site. Intermediate routes are suitable for riders with some on-road experience. Herald Street and Albany Street are designated as advanced routes. Advanced routes are suitable for experienced and traffic-confident riders.

Bicycle counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-5. As shown in the figure, bicycle volumes are heaviest along Washington Street during the peak periods.

2.2.6 Existing Pedestrian Volumes and Accommodations

The Project site is located on the block surrounded by Harrison Avenue to the east, Herald Street to the north, Washington Street to the west, and William E. Mullins Way to the south. Sidewalks are generally in good condition surrounding the site and are provided along both sides of all roadways adjacent to the site. Marked crosswalks, wheel chair ramps, and pedestrian signal equipment are provided at all study area intersections.

To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersections and are presented in Figure 2-6. As shown in the figure, pedestrian activity is heavy throughout the study area, specifically along the Washington Street and Harrison Avenue corridors.



321 Harrison Avenue   Boston, Massachusetts

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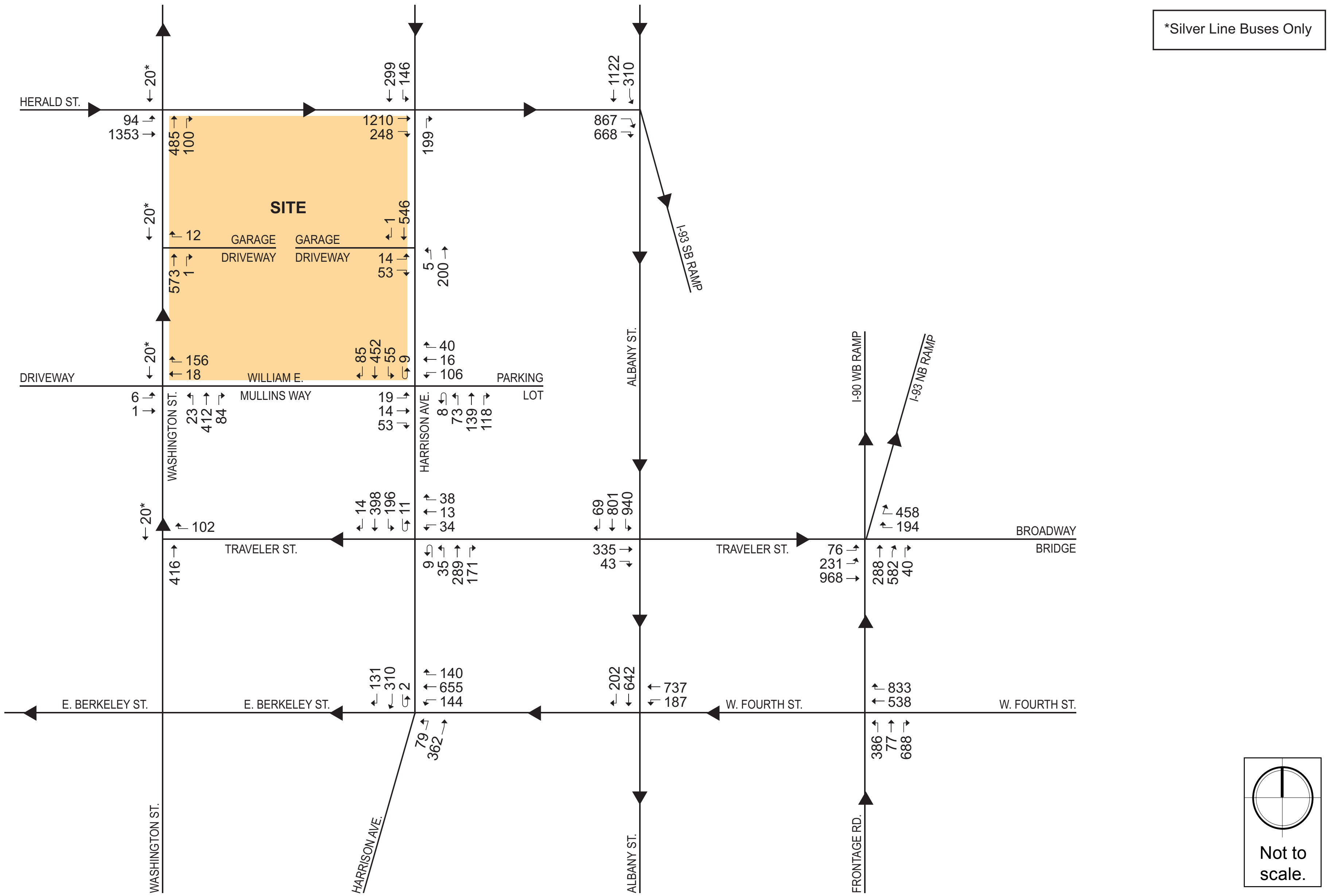
Figure 2-3

Existing (2016) Condition Traffic Volumes, Weekday a.m. Peak Hour (8:00-9:00 a.m.)



321 Harrison Avenue Boston, Massachusetts

Figure 2-4

Existing (2016) Condition Traffic Volumes, Weekday p.m. Peak Hour (4:45-5:45 p.m.)

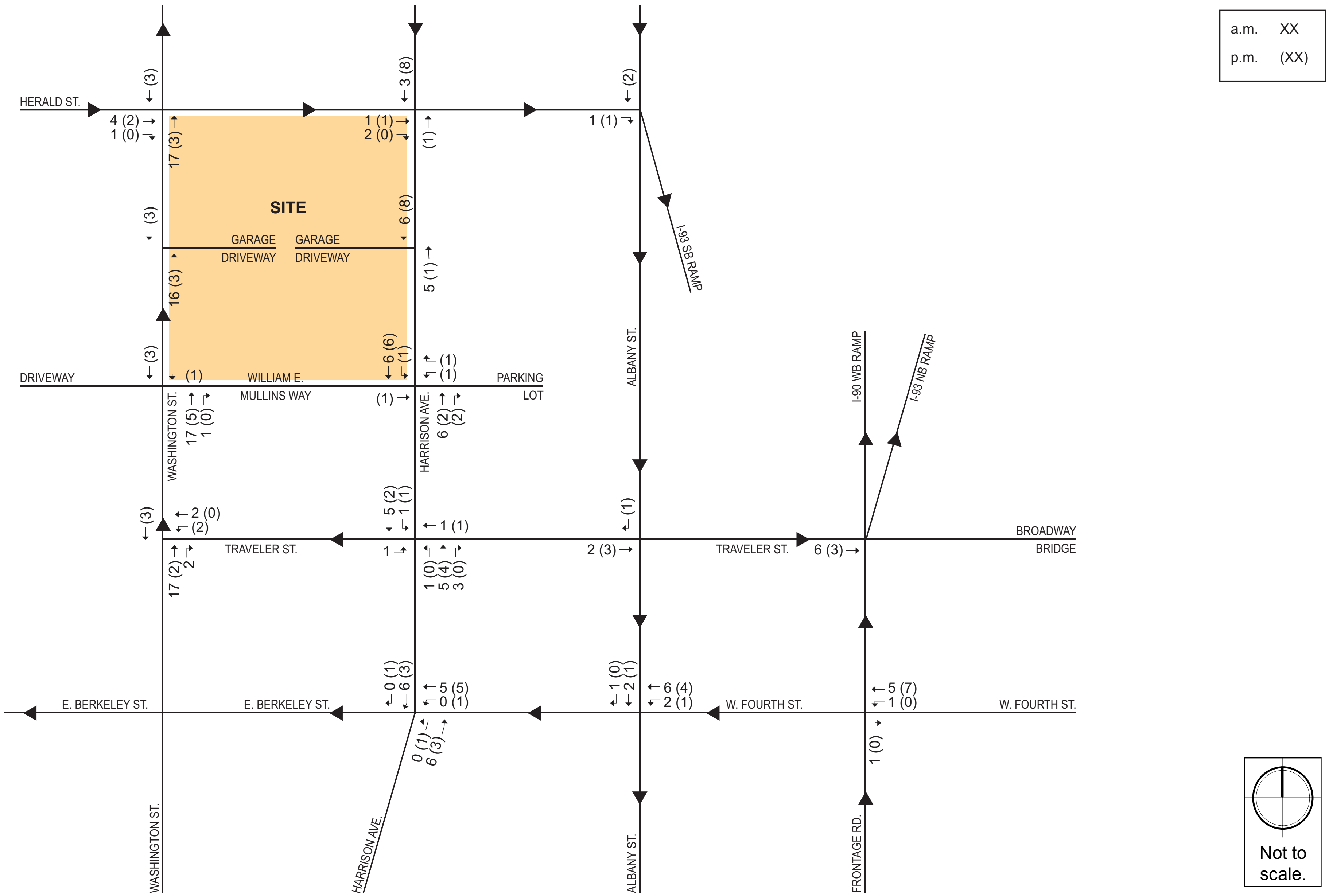


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Figure 2-5

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

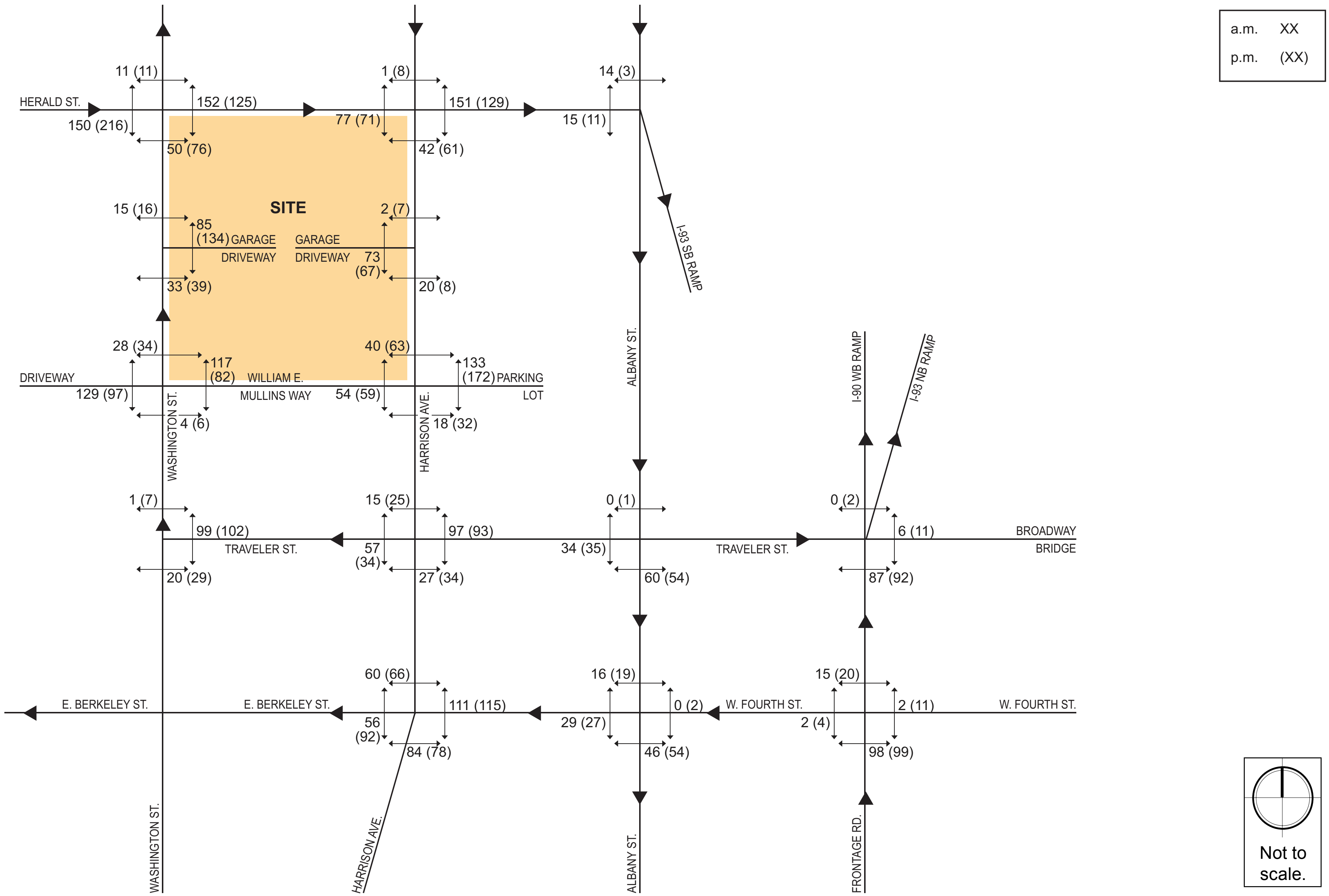

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Figure 2-6
Existing (2016) Condition Pedestrian Volumes, a.m. and p.m. Peak Hours

2.2.7 Car and Bicycle Sharing Services

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

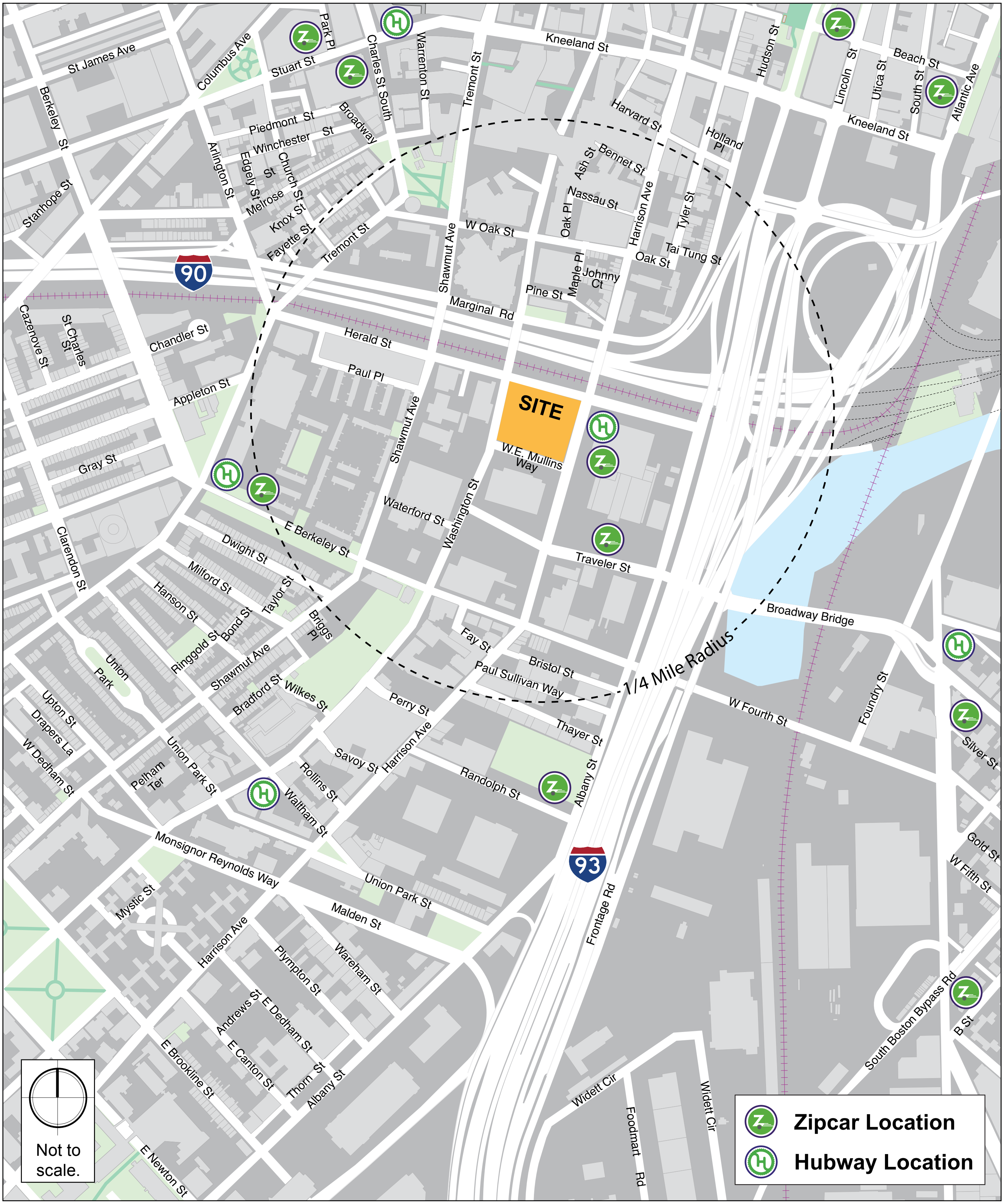
Zipcar is the primary company in the Boston car sharing market. There are currently three Zipcar locations within a quarter-mile walk of the Project Site. The nearby car sharing locations are shown in Figure 2-7.

The site is also located in proximity to a bicycle sharing station provided by Hubway. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 140 stations and 1,300 bicycles. A Hubway station is located across Harrison Avenue at the Ink Block site. Figure 2-7 shows the Hubway stations in the vicinity of the Project site.

2.2.8 Existing Public Transportation Services

The Project site is located in Boston's South End neighborhood proximate to several public transportation opportunities. The MBTA's Broadway Station is located approximately one-third of a mile east of the site, serving the Red Line and providing access to downtown Boston, Cambridge, Quincy, Dorchester, and Braintree. The MBTA Silver Line and several bus lines are also located proximate to the site. The closest Silver Line station is located across the street from the Project site at the intersection of Washington Street/Herald Street.

The MBTA operates four bus routes, as well as two Silver Line routes, proximate to the Project. Figure 2-8 maps all of the public transportation service located in close proximity of the Project site, and Table 2-1 provides a brief summary of all routes.



321 Harrison Avenue Boston, Massachusetts

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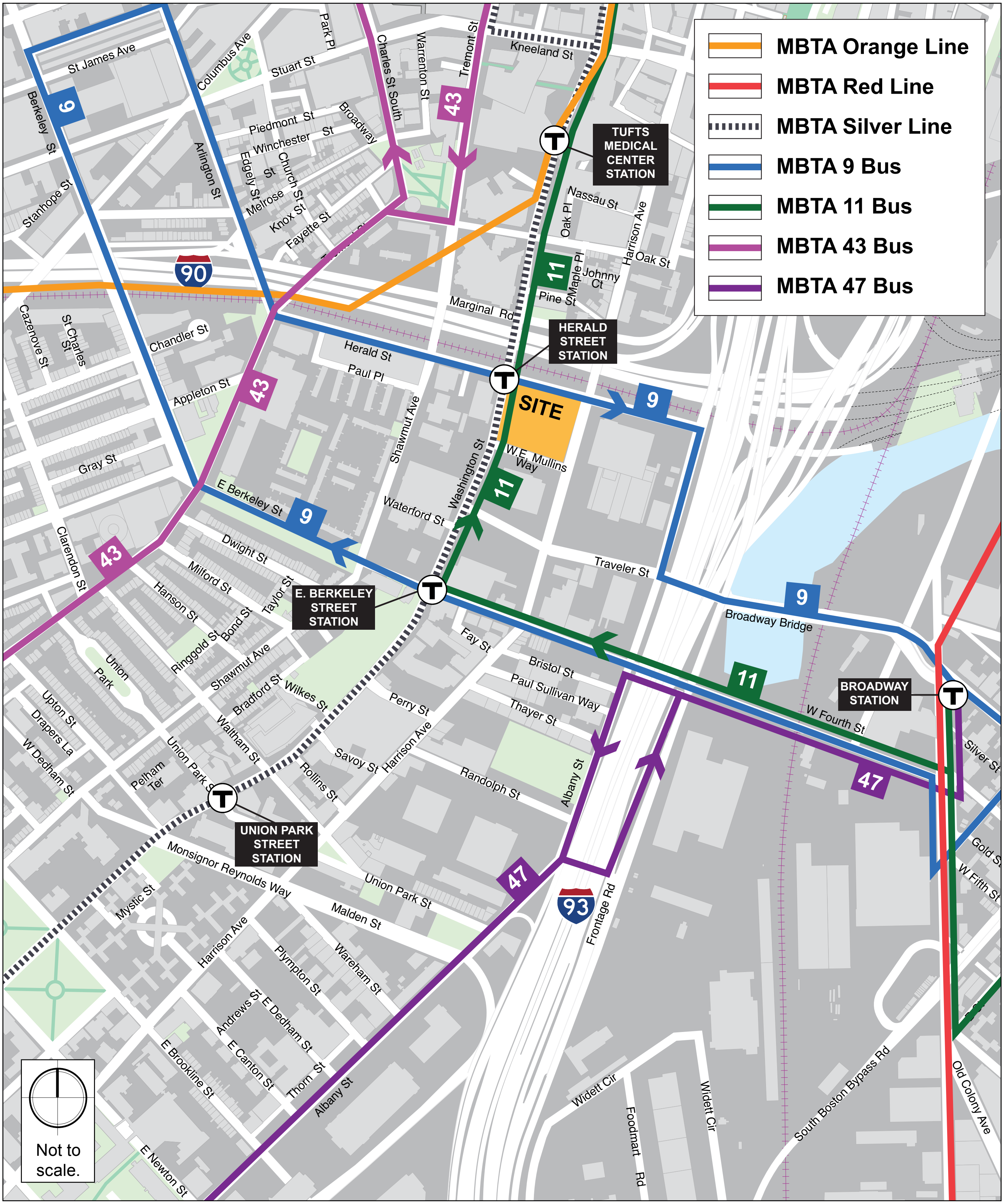
Figure 2-7

Bicycle and Car Sharing Services



321 Harrison Avenue Boston, Massachusetts

Figure 2-8

Public Transportation

Table 2-1 Existing Public Transportation Service Summary

Transit Service	Description	Rush-hour Headway (in minutes)*
	Rapid Transit Routes	
Red Line	Alewife – Ashmont/Braintree	9
	Bus Routes	
SL4	Dudley Station – South Station at Essex St. via Washington St.	8
SL5	Dudley Station – Downtown Crossing at Temple Place via Washington St.	8
9	City Point – Copley Square via Broadway Station	5
11	City Point – Downtown BayView Route	6
43	Ruggles Station – Park & Tremont Streets via Tremont Street	12
47	Central Sq., Cambridge - Broadway Station via B.U. Medical Center, Dudley Station & Longwood Medical Area	10

* Headway is the time between buses.

2.2.9 Existing (2016) Condition Traffic Operations Analysis

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

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-2 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay.

Table 2-2 Vehicle Level of Service Criteria

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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

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

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

The 50th percentile queue length, measured in feet, represents the queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes. The 95th percentile queue length, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour, and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Table 2-3 and Table 2-4 summarize the Existing (2016) Condition capacity analysis for the study area intersection during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

Table 2-3 Existing (2016) Condition, Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**C**	**23.1**	-	-	-
Herald Street EB left/thru | thru| thru	C	23.9	0.67	228	279
Washington Street NB thru | thru	C	23.2	0.60	189	231
Washington Street NB right	B	10.9	0.16	14	38
Washington Street SB thru	B	16.2	0.06	8	21
Herald Street/Harrison Avenue	**B**	**11.4**	-	-	-
Herald Street EB thru | thru| thru/right	B	10.6	0.77	27	34
Harrison Avenue NB right | right	A	0.2	0.09	0	m0
Harrison Avenue SB left	A	6.0	0.38	0	19
Harrison Avenue SB thru | thru	C	31.1	0.19	36	63
Herald Street/Albany Street/I-93 SB On-Ramp	**D**	**40.7**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~571	#852
Herald Street EB right | right	A	5.3	0.60	25	31
Albany Street SB left/thru | thru | thru	D	35.3	0.89	239	#339
Washington Street/Traveler Street	**A**	**4.7**	-	-	-
Traveler Street WB right	A	4.3	0.45	0	13
Washington Street NB thru | thru| thru	A	4.8	0.20	19	52
Washington Street SB thru	A	5.4	0.04	2	12
Harrison Avenue/Traveler Street	**C**	**24.9**	-	-	-
Traveler Street WB left/thru/right	E	56.3	0.80	113	#211
Harrison Avenue NB left/thru	B	18.2	0.42	65	m100
Harrison Avenue SB thru/right	B	15.0	0.38	48	m118
Albany Street/Traveler Street	**D**	**35.1**	-	-	-
Traveler Street EB thru/right	F	>80.0	0.93	220	214
Albany Street SB left	C	29.7	0.74	375	549
Albany Street SB left/thru | thru/right	C	25.9	0.74	384	480
Albany Street/W. Fourth Street/E. Berkeley Street	**C**	**28.8**	-	-	-
W. Fourth Street WB left	B	13.9	0.31	48	m58
W. Fourth Street WB thru | thru	D	37.6	0.80	232	m577
Albany Street SB thru | thru | thru/right	B	19.5	0.51	80	m126
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**D**	**36.6**	-	-	-
Traveler Street EB left/bear left	F	>80.0	0.92	206	m#327
Traveler Street EB thru | thru	C	21.0	0.37	222	m222
Broadway Bridge WB right/hard right	E	61.1	0.95	431	#692
Broadway Bridge WB hard right	D	46.2	0.86	358	#560
I-93 NB Frontage Road NB bear left | bear left	B	10.3	0.34	44	m45
I-93 NB Frontage Road NB thru | thru | thru/right	B	10.7	0.45	70	m72

Table 2-3 Existing (2016) Condition, Operations Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
I-93 NB Frontage Road/W. Fourth Street	**E**	**61.5**	-	-	-
W. Fourth Street WB thru | thru | thru/right	E	56.8	0.87	305	366
I-93 NB Frontage Road NB left	E	55.7	0.89	373	#593
I-93 NB Frontage Road NB left/thru | thru/right	E	69.5	>1.00	~432	#586
Harrison Avenue/E. Berkeley Street	**D**	**35.2**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	C	31.3	0.86	304	#467
Harrison Avenue NB left/thru	E	79.7	0.94	154	#256
Harrison Avenue SB thru	C	28.8	0.63	79	m98
Harrison Avenue SB right	A	3.2	0.28	4	m11
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru	A	0.0	0.00	-	0
William E. Mullins Way WB thru/right	C	18.2	0.43	-	52
Washington Street NB left/thru | thru | thru/right	A	0.1	0.20	-	0
Washington Street SB thru	A	0.0	0.01	-	0
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	B	14.4	0.15	-	13
Parking Lot WB left/thru/right	D	34.4	0.46	-	56
Harrison Avenue left/thru | thru	A	6.2	0.11	-	9
Harrison Avenue thru | thru/left	A	1.9	0.10	-	0
Washington Street/Garage	-	-	-	-	-
Garage WB right	B	11.4	0.01	-	1
Washington Street NB thru | thru | thru/right	A	0.0	0.20	-	0
Washington Street SB thru	A	0.0	0.11	-	0
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	A	9.9	0.01	-	1
Harrison Avenue NB left	A	8.4	0.05	-	4
Harrison Avenue NB thru | thru	A	0.0	0.02	-	0
Harrison Avenue SB thru | thru/right	A	0.0	0.13	-	0

Grey Shading indicates LOS E or F.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.

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

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**C**	**20.6**	-	-	-
Herald Street EB left/thru | thru| thru	B	18.9	0.66	244	295
Washington Street NB thru | thru	C	26.2	0.49	133	183
Washington Street NB right	B	17.7	0.28	32	76
Washington Street SB thru	C	21.1	0.06	9	25
Herald Street/Harrison Avenue	**C**	**22.1**	-	-	-
Herald Street EB thru | thru| thru/right	C	23.4	0.91	332	#427
Harrison Avenue NB right | right	A	0.7	0.25	0	m0
Harrison Avenue SB left	B	13.7	0.54	0	56
Harrison Avenue SB thru | thru	C	34.5	0.45	98	136
Herald Street/Albany Street/I-93 SB On-Ramp	**F**	**>80.0**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~1230	m#1438
Herald Street EB right | right	A	6.9	0.63	39	m51
Albany Street SB left/thru | thru | thru	C	23.8	0.75	280	339
Washington Street/Traveler Street	**A**	**3.0**	-	-	-
Traveler Street WB right	A	0.7	0.19	0	0
Washington Street NB thru | thru| thru	A	3.6	0.14	15	41
Washington Street SB thru	A	4.3	0.03	2	11
Harrison Avenue/Traveler Street	**C**	**22.8**	-	-	-
Traveler Street WB left/thru/right	C	30.3	0.57	39	52
Harrison Avenue NB left/thru	B	17.4	0.45	94	158
Harrison Avenue SB thru/right	C	25.7	0.73	138	#271
Albany Street/Traveler Street	**E**	**64.1**	-	-	-
Traveler Street EB thru/right	F	>80.0	>1.00	~412	#580
Albany Street SB left	C	26.8	0.74	378	568
Albany Street SB left/thru | thru/right	C	22.9	0.74	390	493
Albany Street/W. Fourth Street/E. Berkeley Street	**C**	**27.6**	-	-	-
W. Fourth Street WB left	B	13.1	0.31	31	m37
W. Fourth Street WB thru | thru	C	27.7	0.53	64	m68
Albany Street SB thru | thru | thru/right	C	30.7	0.47	247	m286
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**D**	**38.4**	-	-	-
Traveler Street EB left/bear left	F	>80.0	0.83	211	m267
Traveler Street EB thru | thru	B	10.8	0.57	64	m114
Broadway Bridge WB right/hard right	E	56.1	0.87	269	#435
Broadway Bridge WB hard right	D	44.6	0.77	225	330
I-93 NB Frontage Road NB bear left | bear left	C	34.2	0.34	123	m78
I-93 NB Frontage Road NB thru | thru | thru/right	D	36.3	0.49	192	m120

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

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
I-93 NB Frontage Road/W. Fourth Street	**F**	**>80.0**	-	-	-
W. Fourth Street WB thru | thru | thru/right	F	>80.0	>1.00dr	~598	#663
I-93 NB Frontage Road NB left	C	29.7	0.61	223	336
I-93 NB Frontage Road NB left/thru | thru/right	C	34.4	>1.00dr	289	379
Harrison Avenue/E. Berkeley Street	**D**	**51.5**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	D	41.0	0.78	249	305
Harrison Avenue NB left/thru	F	>80.0	>1.00	~443	#610
Harrison Avenue SB thru	C	32.8	0.50	197	284
Harrison Avenue SB right	A	4.7	0.26	0	39
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru	B	14.8	0.04	-	3
William E. Mullins Way WB thru/right	B	11.7	0.28	-	28
Washington Street NB left/thru | thru | thru/right	A	1.4	0.13	-	1
Washington Street SB thru	A	0.0	0.02	-	0
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	C	17.9	0.30	-	31
Parking Lot WB left/thru/right	E	37.2	0.66	-	108
Harrison Avenue left/thru | thru	A	4.8	0.13	-	6
Harrison Avenue thru | thru/left	A	0.0	0.20	-	4
Washington Street/Garage	-	-	-	-	-
Garage WB right	A	9.6	0.02	-	2
Washington Street NB thru | thru | thru/right	A	0.0	0.15	-	0
Washington Street SB thru	A	0.0	0.07	-	0
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	B	10.3	0.11	-	9
Harrison Avenue NB left	A	8.3	0.00	-	0
Harrison Avenue NB thru | thru	A	0.0	0.06	-	0
Harrison Avenue SB thru | thru/right	A	0.0	0.24	-	0

Grey Shading indicates LOS E or F.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.
dr De facto right turn lane – Indicates that the lane operates as an exclusive right-turn lane due to high traffic volumes.

As shown in Table 2-3 and Table 2-4, the majority of intersections and approaches operate at LOS D or better under the Existing (2016) Condition scenario. The following locations were shown to have movements at capacity (v/c ratio of 1.00 or higher) or operating with higher delays (LOS E or LOS F).

- The signalized intersection of **Herald Street/Albany Street/I-93 SB On-Ramp** operates at an overall LOS F during the p.m. peak hour. The Herald Street eastbound right-turn movements at the intersection operate at capacity during both weekday peak hours, with high delays and long queues. This is due to the traffic volume destined for I-93 southbound.
- The Traveler Street westbound shared left-turn/thru/right-turn lane at the signalized intersection of **Harrison Avenue/Traveler Street** operates at LOS E during the a.m. peak hour, but still operates under capacity with minimal queuing.
- The signalized intersection of **Albany Street/Traveler Street** operates at an overall LOS E during the p.m. peak hour, with the Traveler Street eastbound movements operating at LOS F during both the weekday a.m. and p.m. peak hours.
- The Traveler Street eastbound left-turn movements at the signalized intersection of **I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge** operate at LOS F during both the a.m. and p.m. peak hours. The Broadway Bridge westbound right-turn movements operate at LOS E during both the a.m. and p.m. peak hours. All movements at the intersection operate under capacity.
- The signalized intersection of **I-93 NB Frontage Road/West Fourth Street** operates at an overall LOS E during the a.m. peak hour and LOS F during the p.m. peak hour. During the a.m. peak hour, all approaches at this intersection operate at LOS E. The West Fourth Street westbound approaches operate at LOS F during the p.m. peak hour. The I-93 NB Frontage Road northbound left/thru thru/right approach operates at capacity during both peak hours.
- The Harrison Avenue northbound approach at the signalized intersection of **Harrison Avenue/East Berkeley Street** operates at LOS E during the weekday a.m. peak hour and LOS F during the weekday p.m. peak hour.
- The Parking Lot westbound left-turn/thru/right-turn approach operates at LOS E during the p.m. peak hour at the unsignalized intersection of **Harrison Avenue/ William E. Mullins Way/Parking Lot**.

2.3 No-Build (2023) Condition

The No-Build (2023) Condition reflects a future scenario that incorporates anticipated traffic volume changes. These changes can be contributed to background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

2.3.1 Background Traffic Growth

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

2.3.2 Specific Development Traffic Growth

Traffic volumes associated with known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. The following four projects were specifically accounted for in the traffic volumes for future scenarios:

- **370-380 Harrison Avenue** – This project includes the construction of approximately 280 residential units and 6,000 sf of ground floor commercial/retail space. This Project is currently under review by the BRA.
- **345 Harrison Avenue** – This project calls for the construction of two buildings, totaling approximately 602 residential units, approximately 33,500 sf of ground floor retail and restaurant space, and parking for approximately 252 vehicles in an underground garage. This project has been approved by the BRA.
- **80 East Berkeley Street** – This project calls for the construction of a 308,000 sf, 11-story mixed-use building consisting of 290,000 sf of office space, 18,000 sf of ground floor retail space, and 200 parking spaces. This project has been approved by the BRA.
- **Ink Block (Siena)** – This phase of the Ink Block project includes the construction of 76 residential condominium units at the corner of Albany Street and Traveler Street. A total of 72 parking spaces will also be provided as part of the Project. This project has been approved by the BRA. The other phases of the Ink Block project are in operation and are included in the existing conditions.

Figure 2-9 shows the location of all nearby development projects in the area including the four projects described above and other projects that are smaller in scale or more remote from the Project site. The traffic expected to be generated by the projects other than the four listed above is expected to be minimal and is accounted for in the general background traffic growth rate.

2.3.3 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area. Based on this review, the nearby infrastructure projects are listed below.

Harrison Albany Corridor Strategic Plan – The Project site is located within the Harrison Albany Corridor, which was the focus of a comprehensive planning study published in June 2012. The Harrison Albany Corridor Strategic Plan includes proposed reconfiguration and improvements to several roadways in the vicinity of the Project site. These improvements are intended to enhance pedestrian facilities, eliminate some of the one-way roadways in the area, and to provide easier and more efficient vehicular circulation throughout the area. The proposed reconfiguration includes the following changes:

- **Washington Street** currently has four travel lanes – two northbound lanes for vehicular travel, one northbound lane designated for bicycles and buses, and one southbound lane designated for bicycles and buses. The City of Boston has plans to reassign the lanes to provide a single travel lane for vehicles in both directions. The bus only lanes in both directions will remain and continue to accommodate right turning vehicles.

- **Harrison Avenue** is currently being redesigned with a reduced cross section to provide bicycle lanes and turning lanes at driveways and intersections. These modifications will be implemented between Herald Street and East Berkeley Street.

- **Traveler Street** will be reconfigured to allow two-way travel between Harrison Avenue and Washington Street. This will require new signal equipment and signal phasing at the intersection of Harrison Avenue/Traveler Street.

These roadway modifications were incorporated into the future conditions traffic analysis.

2.3.4 No-Build Traffic Volumes

Record information from the BRA and from the traffic analyses conducted for the 345 Harrison Avenue, 80 East Berkeley Street, Ink Block, and 275 Albany Street projects was used along with the existing traffic counts conducted in January 2016 and the one-percent per year annual growth rate to develop the No-Build (2023) Condition traffic volumes. The traffic volumes account for the new travel patterns throughout the study area that will be created by the proposed roadway reconfiguration and improvements. The No-Build (2023) weekday morning and evening peak hour traffic volumes are shown on Figures 2-10 and Figure 2-11, respectively.

321 Harrison Avenue Boston, Massachusetts

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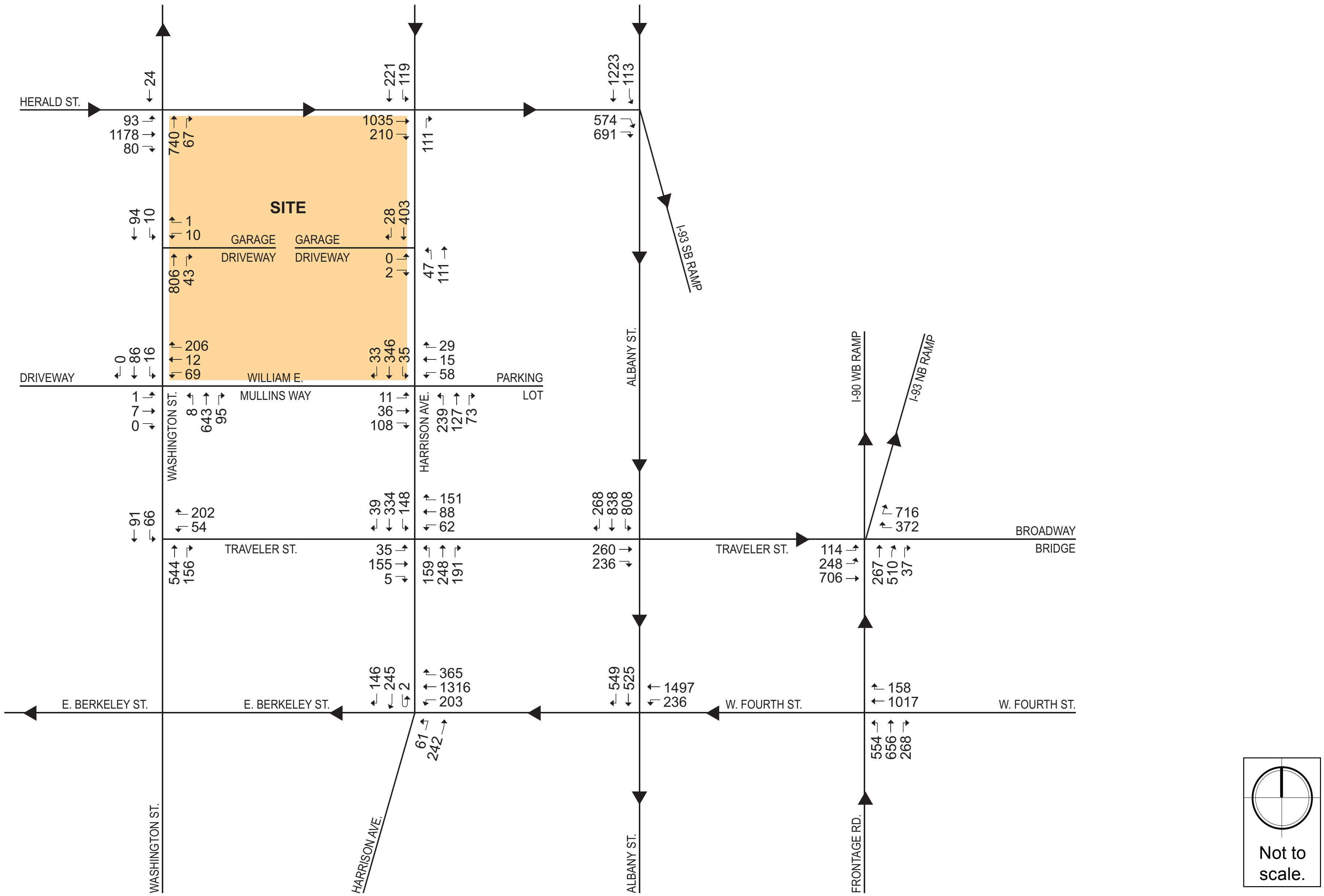
Figure 2-9
Nearby Development Projects



321 Harrison Avenue Boston, Massachusetts

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Figure 2-10

No-Build (2023) Condition Traffic Volumes, Weekday a.m. Peak Hour

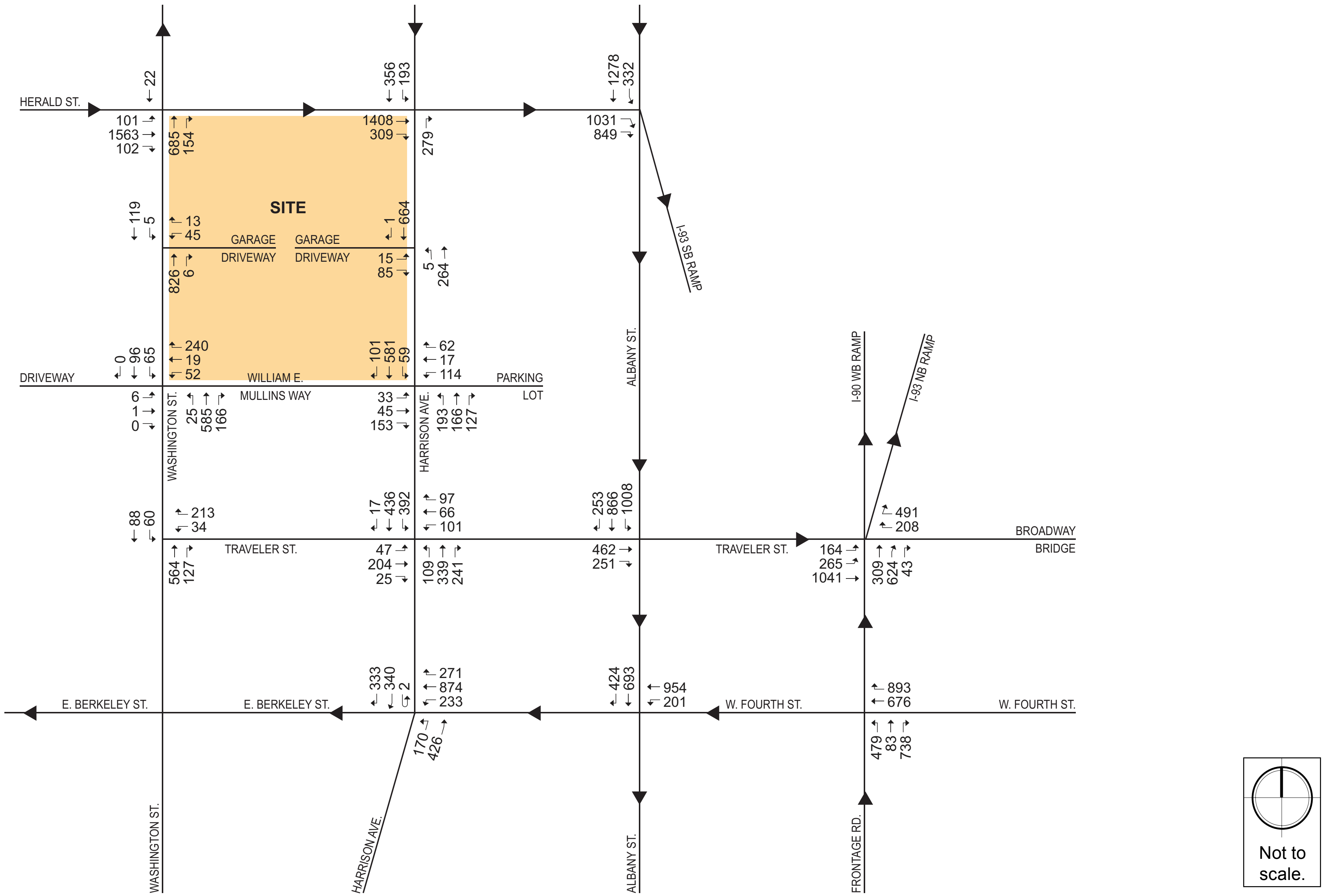

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Figure 2-11

No-Build (2023) Condition Traffic Volumes, Weekday p.m. Peak Hour

2.3.5 No-Build (2023) Condition Traffic Operations Analysis

The No-Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition capacity analysis. Tables 2-5 and Table 2-6 present the No-Build (2023) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the Existing (2016) Condition and the No-Build (2023) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix C.

Table 2-5 No-Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**D**	**44.6**	-	-	-
Herald Street EB left/thru | thru| thru/right	C	25.0	0.74	269	327
Washington Street NB thru	F	>80.0	>1.00	~575	#805
Washington Street NB right	B	12.4	0.14	18	45
Washington Street SB thru	B	15.1	0.03	9	24
Herald Street/Harrison Avenue	**D**	**45.2**	-	-	-
Herald Street EB thru | thru| thru/right	D	54.8	0.69	331	380
Harrison Avenue NB right	A	0.7	0.24	0	m0
Harrison Avenue SB left	B	12.1	0.42	0	53
Harrison Avenue SB thru | thru	C	31.4	0.28	65	99
Herald Street/Albany Street/I-93 SB On-Ramp	**E**	**56.1**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~682	#961
Herald Street EB right | right	C	31.7	0.64	280	338
Albany Street SB left/thru | thru | thru	C	24.1	0.70	261	316
Washington Street/Traveler Street	**A**	**7.7**	-	-	-
Traveler Street WB left/right	B	17.9	0.70	31	87
Washington Street NB thru | thru/right	A	4.8	0.38	39	92
Washington Street SB left/thru | thru	A	4.4	0.11	8	24
Harrison Avenue/Traveler Street	**E**	**64.7**	-	-	-
Traveler Street EB left/thru/right	E	58.5	0.78	127	#246
Traveler Street WB left/thru/right	F	>80.0	>1.00	~214	#388
Harrison Avenue NB left	B	13.9	0.77	48	m38
Harrison Avenue NB thru/right	E	65.9	1.00	287	m217
Harrison Avenue SB left	E	55.6	0.80	72	m#140
Harrison Avenue SB thru/right	D	51.2	0.88	179	#425
Albany Street/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB thru/right	F	>80.0	>1.00	~598	#814
Albany Street SB left	F	>80.0	0.91	518	#810
Albany Street SB left/thru | thru/right	E	64.6	0.90	510	#645

Table 2-5 No-Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Albany Street/W. Fourth Street/E. Berkeley Street	**D**	**49.3**	-	-	-
W. Fourth Street WB left	B	15.2	0.31	59	m65
W. Fourth Street WB thru | thru	E	72.9	0.97	642	m#759
Albany Street SB thru | thru | thru/right	C	23.8	>1.00dr	183	m201
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**D**	**52.8**	-	-	-
Traveler Street EB left/bear left	F	>80.0	>1.00	~368	m#359
Traveler Street EB thru | thru	C	31.2	0.37	191	m166
Broadway Bridge WB right/hard right	F	>80.0	>1.00	~563	#815
Broadway Bridge WB hard right	E	58.8	0.95	432	#673
I-93 NB Frontage Road NB bear left | bear left	B	10.6	0.35	47	m48
I-93 NB Frontage Road NB thru | thru | thru/right	B	11.4	0.48	76	m79
I-93 NB Frontage Road/W. Fourth Street	**F**	**>80.0**	-	-	-
W. Fourth Street WB thru | thru | thru/right	F	>80.0	0.91	347	#436
I-93 NB Frontage Road NB left	F	>80.0	1.00	451	#713
I-93 NB Frontage Road NB left/thru | thru/right	E	66.8	0.99	448	#609
Harrison Avenue/E. Berkeley Street	**F**	**>80.0**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	F	>80.0	>1.00	~632	#731
Harrison Avenue NB left/thru	F	>80.0	0.98	206	#380
Harrison Avenue SB thru	D	38.8	0.57	174	m192
Harrison Avenue SB right	B	17.0	0.31	61	m68
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru/right	C	19.2	0.03	-	3
William E. Mullins Way WB left/thru/right	D	26.5	0.66	-	119
Washington Street NB left/thru | thru/right	A	0.2	0.27	-	0
Washington Street SB left/thru | thru/right	A	2.6	0.03	-	2
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	D	32.4	0.57	-	83
Parking Lot WB left/thru/right	F	>50.0	>1.00	-	170
Harrison Avenue NB left	A	9.1	0.23	-	22
Harrison Avenue NB thru/right	A	0.0	0.13	-	0
Harrison Avenue SB left	A	7.7	0.03	-	2
Harrison Avenue SB thru/right	A	0.0	0.24	-	0

Table 2-5 No-Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Washington Street/Garage	-	-	-	-	-
Garage WB left/right	C	19.6	0.05	-	4
Washington Street NB thru | thru/right	A	0.0	0.34	-	0
Washington Street SB left/thru | thru	A	2.6	0.04	-	1
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	B	10.8	0.00	-	0
Harrison Avenue NB left	A	8.5	0.05	-	4
Harrison Avenue NB thru	A	0.0	0.07	-	0
Harrison Avenue SB thru/right	A	0.0	0.28	-	0

Grey Shading indicates a decrease to LOS E or F from the No-Build (2023) Condition.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.
dr De facto right turn lane – Indicates that the lane operates as an exclusive right-turn lane due to high traffic volumes.

Table 2-6 No-Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**E**	**76.7**	-	-	-
Herald Street EB left/thru | thru| thru/right	F	>80.0	>1.00	~507	#605
Washington Street NB thru	D	37.7	0.90	398	#661
Washington Street NB right	B	11.9	0.26	46	86
Washington Street SB thru	B	11.3	0.05	7	19
Herald Street/Harrison Avenue	**C**	**30.6**	-	-	-
Herald Street EB thru | thru| thru/right	D	35.1	0.91	264	m238
Harrison Avenue NB right	B	11.9	0.69	0	48
Harrison Avenue SB left	B	12.9	0.59	0	61
Harrison Avenue SB thru | thru	D	35.2	0.52	120	157
Herald Street/Albany Street/I-93 SB On-Ramp	**F**	**>80.0**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~1548	m#1780
Herald Street EB right | right	C	24.4	0.78	337	m388
Albany Street SB left/thru | thru | thru	C	28.0	0.84	346	416
Washington Street/Traveler Street	**A**	**4.4**	-	-	-
Traveler Street WB left/right	A	8.2	0.78	27	m26
Washington Street NB thru | thru/right	A	3.2	0.34	37	86
Washington Street SB left/thru | thru	A	3.2	0.16	8	22

Table 2-6 No-Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Harrison Avenue/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB left/thru/right	F	>80.0	>1.00	~267	#429
Traveler Street WB left/thru/right	F	>80.0	>1.00	~408	#401
Harrison Avenue NB left	C	26.7	0.56	36	68
Harrison Avenue NB thru/right	F	>80.0	>1.00	~387	#592
Harrison Avenue SB left	F	>80.0	>1.00	~356	#538
Harrison Avenue SB thru/right	D	46.0	0.88	251	#437
Albany Street/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB thru/right	F	>80.0	>1.00	~990	#1177
Albany Street SB left	D	44.2	0.88	525	#826
Albany Street SB left/thru | thru/right	D	37.0	0.89	534	#726
Albany Street/W. Fourth Street/E. Berkeley Street	**D**	**49.9**	-	-	-
W. Fourth Street WB left	B	15.4	0.33	39	m38
W. Fourth Street WB thru | thru	E	63.8	0.69	98	m88
Albany Street SB thru | thru | thru/right	D	44.2	0.64	308	m288
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**D**	**52.6**	-	-	-
Traveler Street EB left/bear left	F	>80.0	>1.00	~396	m#296
Traveler Street EB thru | thru	D	40.4	0.60	104	m100
Broadway Bridge WB right/hard right	E	60.6	0.91	297	#485
Broadway Bridge WB hard right	D	46.5	0.80	248	#365
I-93 NB Frontage Road NB bear left | bear left	D	35.2	0.37	132	m74
I-93 NB Frontage Road NB thru | thru | thru/right	D	37.8	0.54	205	m115
I-93 NB Frontage Road/W. Fourth Street	**F**	**>80.0**	-	-	-
W. Fourth Street WB thru | thru | thru/right	F	>80.0	>1.00dr	~720	#781
I-93 NB Frontage Road NB left	D	36.0	0.75	301	451
I-93 NB Frontage Road NB left/thru | thru/right	D	38.5	>1.00dr	325	#436
Harrison Avenue/E. Berkeley Street	**F**	**>80.0**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	E	62.6	>1.00	~357	#454
Harrison Avenue NB left/thru	F	>80.0	>1.00	~621	#790
Harrison Avenue SB thru	D	49.0	0.79	225	#362
Harrison Avenue SB right	A	9.1	0.61	13	93
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru/right	F	>50.0	0.15	-	13
William E. Mullins Way WB left/thru/right	F	>50.0	0.95	-	262
Washington Street NB left/thru | thru/right	A	0.8	0.29	-	1
Washington Street SB left/thru | thru/right	A	6.3	0.13	-	11

Table 2-6 No-Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	F	>50.0	>1.00	-	688
Parking Lot WB left/thru/right	F	>50.0	>1.00	-	Err
Harrison Avenue NB left	B	11.0	0.27	-	27
Harrison Avenue NB thru/right	A	0.0	0.20	-	0
Harrison Avenue SB left	A	8.1	0.05	-	4
Harrison Avenue SB thru/right	A	0.0	0.44	-	0
Washington Street/Garage	-	-	-	-	-
Garage WB left/right	C	23.0	0.28	-	28
Washington Street NB thru | thru/right	A	0.0	0.36	-	0
Washington Street SB left/thru | thru	A	1.1	0.06	-	1
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	C	18.8	0.33	-	35
Harrison Avenue NB left	A	9.3	0.01	-	0
Harrison Avenue NB thru	A	0.0	0.17	-	0
Harrison Avenue SB thru/right	A	0.0	0.43	-	0

Grey Shading indicates a decrease to LOS E or F from the No-Build (2023) Condition.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.
dr De facto right turn lane – Indicates that the lane operates as an exclusive right-turn lane due to high traffic volumes.

As shown in Table 2-5 and Table 2-6, the majority of intersections and approaches continue to operate at a similar level of service as the Existing (2016) Condition. The analysis presented in Table 2-5 and Table 2-6 incorporates planned improvements and reconfigurations of Harrison Avenue, Washington Street, and Traveler Street. The following intersections have movements that experience a decrease in LOS when compared to the Existing (2016) Condition analysis:

- Operations at the signalized intersection of **Herald Street/Washington Street** decrease from LOS C to LOS E during the p.m. peak hour. The Herald Street eastbound approach decrease from LOS B to LOS F during the p.m. peak hour and the Washington Street northbound through lane decrease from LOS C to LOS F during the a.m. peak hour.

- Operations at the signalized intersection of **Herald Street/Albany Street/I-93 SB On-Ramp** decrease from LOS D to LOS E during the a.m. peak hour.

- Operations at the signalized intersection of **Harrison Avenue/Traveler Street** decrease from the LOS C to LOS E during the a.m. peak hour, and from LOS C to LOS F during the p.m. peak hour, with the majority of the movements at the intersection worsening between the Existing and No-Build condition. The No-Build analysis assumes that Traveler Street will be two-way and will create a new eastbound approach to the intersection.

- Operations at the signalized intersection of **Albany Street/Traveler Street** decrease from the Existing (2016) Condition from LOS D to LOS F during the a.m. peak hour, and from LOS E to LOS F during the p.m. peak hour. The Albany Street southbound left/thru/thru/right approach decreases from LOS C to LOS E during the a.m. peak hour.

- The signalized intersection of **Albany Street/W Fourth Street/East Berkeley Street** continues to operate under capacity in the No-Build (2023) Condition during both the a.m. and p.m. peak hour. The Fourth Street westbound through movements decrease from LOS D to LOS E during the a.m. peak hour and from LOS C to LOS E during the p.m. peak hour.

- The signalized intersection of **I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge** continues to operate at the same overall LOS in the No-Build (2023) Condition during both the a.m. and p.m. peak hour. The Broadway Bridge westbound right-turn movements decrease from LOS E to LOS F and the hard-right movements decrease from LOS D to LOS E during the a.m. peak hour.

- Operations at the signalized intersection of **I-93 NB Frontage Road/West Fourth Street** decrease from an overall LOS E to LOS F during the a.m. peak hour. The West Fourth Street eastbound approach and I-93 NB Frontage Road northbound left-turn approach decreases from LOS E to LOS F during the a.m. peak hour.

- Operations at the signalized intersection of **Harrison Avenue/East Berkeley Street** decrease from an overall LOS D to LOS F during both the a.m. and p.m. peak hours. The East Berkeley Street westbound approach decreases from LOS C to LOS F during the a.m. peak hour and from LOS D to LOS E during the p.m. peak hour. The Harrison Avenue northbound left-turn/through approach decreases from LOS E to LOS F during the a.m. peak hour.

- The driveway eastbound and William E. Mullins Way westbound movements at the unsignalized intersection of **Washington Street/William E. Mullins Way/Driveway** decrease from LOS B to LOS F during the p.m. peak hours. This decrease is primarily due to the roadway configuration changes along Washington Street and the introduction of two-way travel.

- The parking lot westbound movements at the unsignalized intersection of **Harrison Avenue/William E. Mullins Way/Parking Lot** decrease from LOS D to LOS F during the a.m. peak hour and from LOS E to LOS F during the p.m. peak hour. The

William E. Mullins Way eastbound movements decrease from LOS C to LOS F during the p.m. peak hour. These changes in LOS are primarily due to the slight increase in traffic volumes from background growth and the proposed changes to Harrison Avenue.

2.4 Build (2023) Condition

As previously summarized, the proposed Project will consist of the construction of an addition of approximately 230,000 sf of office space to be known as 321 Harrison Avenue. The new office space will be located above an existing 300 space garage that currently serves the office building immediately to the south. The parking garage will also be reconfigured to include a total of 240 parking spaces (a net decrease of 60 spaces from the existing conditions). The parking garage will serve the Project needs and will continue to serve the existing building located on the southern portion of the Project site.

2.4.1 Site Access and Vehicle Circulation

Vehicular access to the garage will remain the same as in existing conditions. Two full access driveways will serve the 240-space parking garage. One driveway will be located along Washington Street and one driveway will be located along Harrison Avenue. Both driveways will be located between Herald Street and William E. Mullins Way. Primary pedestrian access will be provided through a new shared lobby that will be constructed between the existing office building and the Project. Access to the lobby will be available from both Washington Street and Harrison Avenue. The site plan is shown in Figure 2-12.

2.4.2 Project Parking

The Project consists of 230,000 sf of new office space, however the garage will be shared with the existing office space at 1000 Washington Street, which consists of approximately 242,000 sf of office space, for a total of 472,000 sf of office space on the site. The garage will have a total of 240 parking spaces for a parking ratio of 0.51 spaces per 1,000 sf of office space.

2.4.3 Loading and Service Accommodations

Loading and service is currently provided to the 1000 Washington building off of William E. Mullins Way. The existing service area will continue to serve the existing building and will also be used to serve the Project's loading, service, and delivery needs. Truck trip estimates for the Project were based on a recent survey at the John Hancock Tower[1]. Deliveries to the Project Site will be limited to mostly SU-36 trucks and smaller delivery vehicles. Based on the John Hancock report, office uses generate approximately 0.046 light truck trips per 1,000 sf of floor area and 0.002 medium/heavy truck trips per 1,000 sf of gross floor area.

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1 Loading Dock Survey at the John Hancock Tower, Boston, February 8 – 12, 2010. Conducted by Howard Stein Hudson.

321 Harrison Avenue Boston, Massachusetts

SMMA

Figure 2-12
Site Acess Plan

Based on the data listed above, the Project is expected to generate approximately eleven new deliveries per day. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. The numbers do not include trash truck trips.

2.4.4 Trip Generation Methodology

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

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[2] were 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:

Land Use Code 710 – Office. General office is defined as an office building containing multiple tenants. An office building typically contains a mixture of professional services. Trip generation estimates are based on average vehicular trip rates per 1,000 sf of office.

2.4.5 Mode Share

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. Mode share splits were obtained from BTD and are consistent with traffic studies conducted for nearby projects, and applied to the trip generation estimates. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[3]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-7.

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

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

Table 2-7 Travel Mode Share

Land Use		Walk/Bicycle Share	Transit Share	Auto Share	Vehicle Occupancy
Daily					
General Office	In	31%	43%	26%	1.13
	Out	31%	43%	26%	1.13
a.m. Peak					
General Office	In	5%	63%	32%	1.13
	Out	26%	18%	56%	1.13
p.m. Peak					
General Office	In	26%	18%	56%	1.13
	Out	5%	63%	32%	1.13

2.4.6 Project Trip Generation

The mode share percentages shown in Table 2-7 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates for the Project. The trip generation for the Project by mode is shown in Table 2-8. The detailed trip generation information is provided in Appendix C.

Table 2-8 Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
General Office[1]	In	444	616	330
	Out	444	616	330
	Total	888	1,232	660
a.m. Peak Hour				
General Office	In	18	225	101
	Out	13	9	24
	Total	31	234	125
p.m. Peak Hour				
General Office	In	17	12	33
	Out	16	203	91
	Total	33	215	124

1. ITE Trip Generation Rate, 9th Edition, LUC 710 (General Office Building), 230,000 square feet.

As shown in Table 2-8, there is expected to be 888 new pedestrian/bicycle trips, 1,232 new transit trips, and 660 new vehicle trips throughout the day. During the a.m. peak hour, there is expected to be 31 pedestrian trips (18 in and 13 out), 234 transit trips (225 in and 9 out), and 125 vehicle trips (101 in and 24 out). During the p.m. peak hour, there is expected to be 33 pedestrian trips (17 in and 16 out), 215 transit trips (12 in and 203 out), and 124 vehicle trips (33 in and 91 out).

2.4.7 Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Project. Trip distribution patterns for the Project were based on BTD's origin-destination data and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-13.

2.4.8 Build Traffic Volumes

The vehicle trips were distributed through the study area based on the trip distribution shown in Figure 2-13 to create the Project-generated trips. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 2-14 and Figure 2-15, respectively. The trip assignments were added to the No-Build (2023) Condition vehicular traffic volumes to develop the Build (2023) Condition vehicular traffic volumes. The Build (2023) Condition a.m. and p.m. peak hour traffic volumes are shown on Figure 2-16 and Figure 2-17, respectively.

2.4.9 Bicycle Accommodations

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

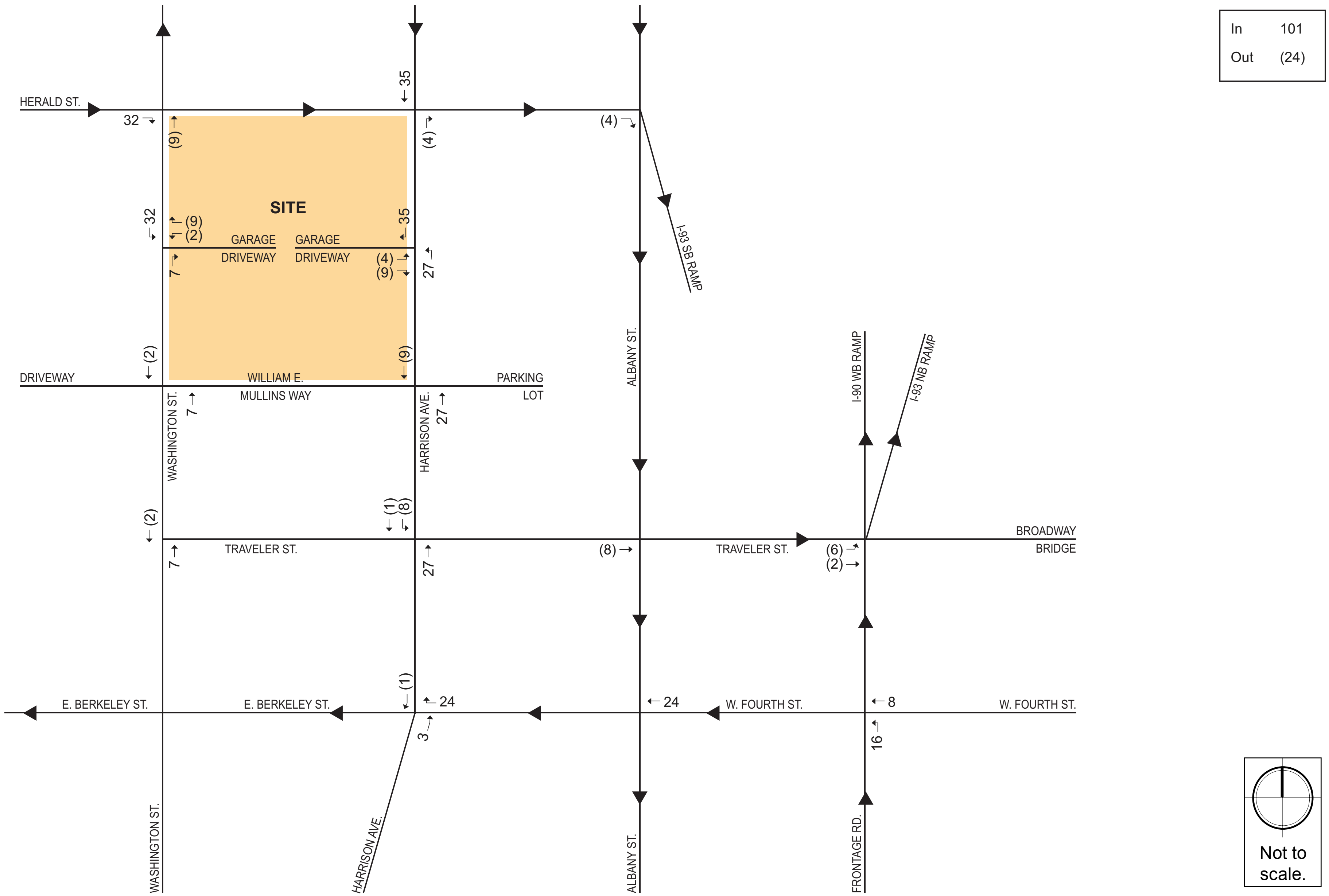
2.4.10 Build Condition Traffic Operations Analysis

The Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition and No-Build (2023) Condition analysis. Table 2-9 and Table 2-10 present the Build (2023) Condition 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 No-Build (2023) Condition and the Build (2023) Condition to an LOS E or F. The detailed analysis sheets are provided in Appendix C.

321 Harrison Avenue Boston, Massachusetts

Figure 2-13

Vehicle Trip Distribution



321 Harrison Avenue Boston, Massachusetts

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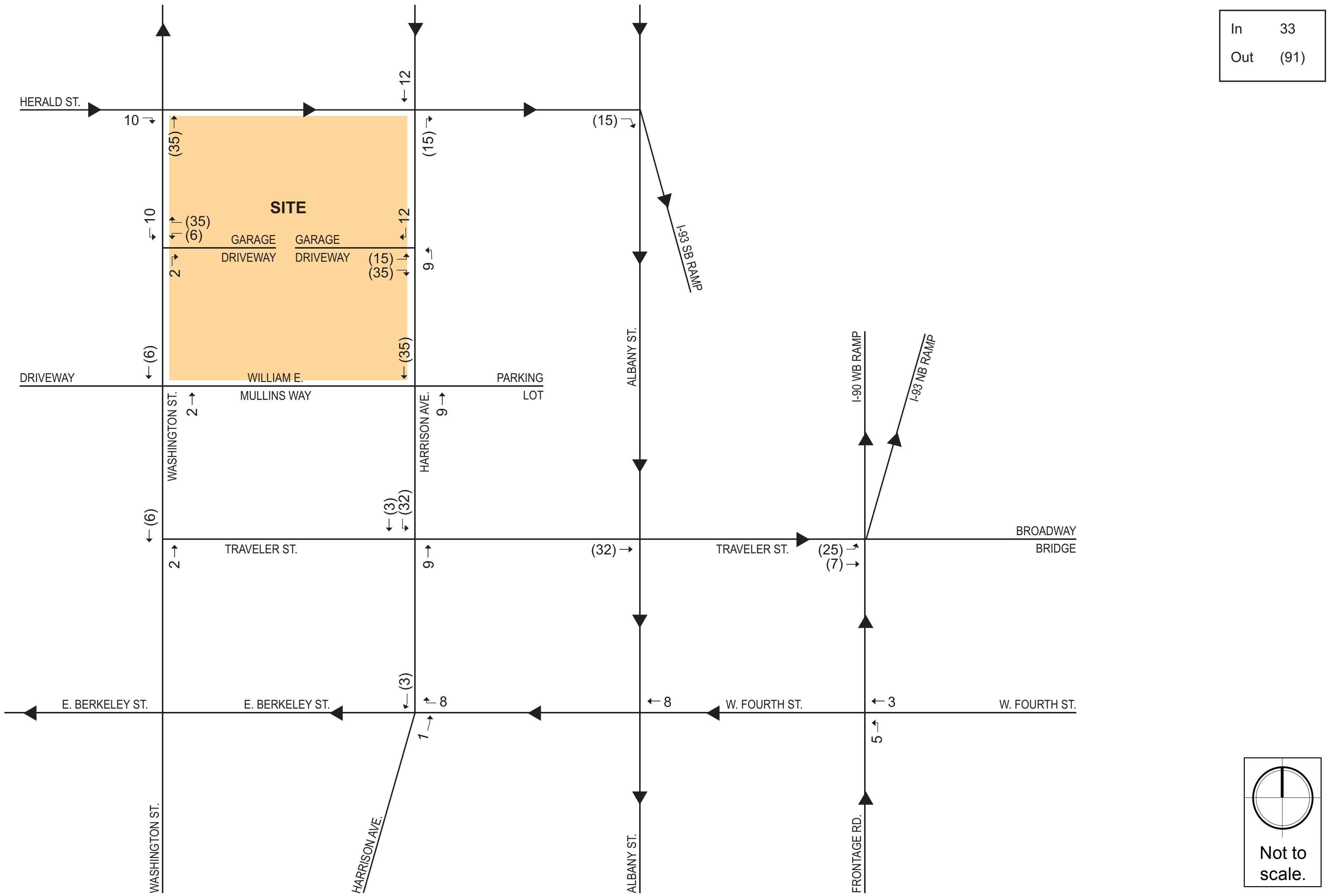
Figure 2-14

Project Generated Trips, Weekday a.m. Peak Hour



321 Harrison Avenue   Boston, Massachusetts

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Figure 2-15
Project Generated Trips, Weekday p.m. Peak Hour

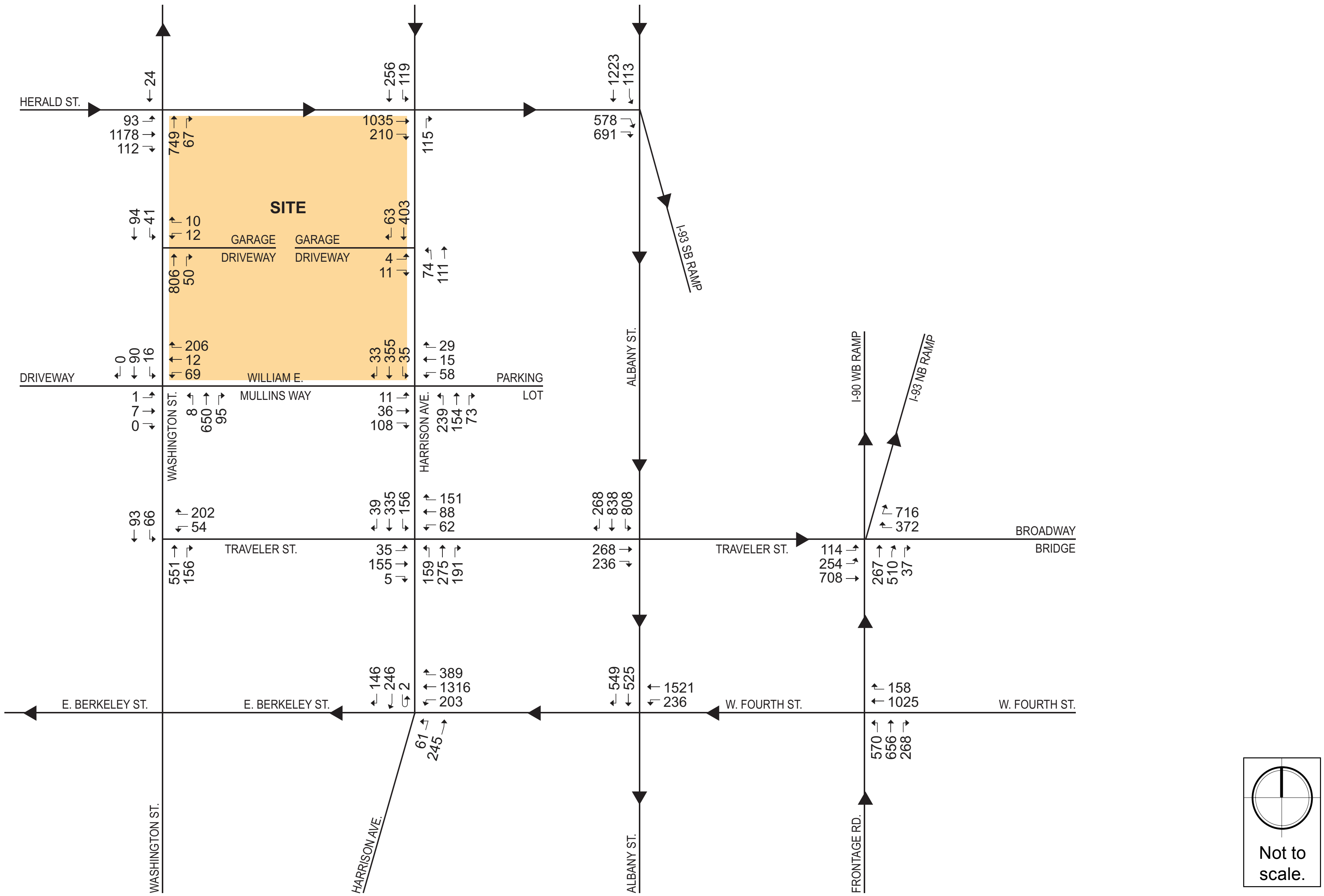

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Figure 2-16

Build (2023) Condition Traffic Volumes, Weekday a.m. Peak Hour

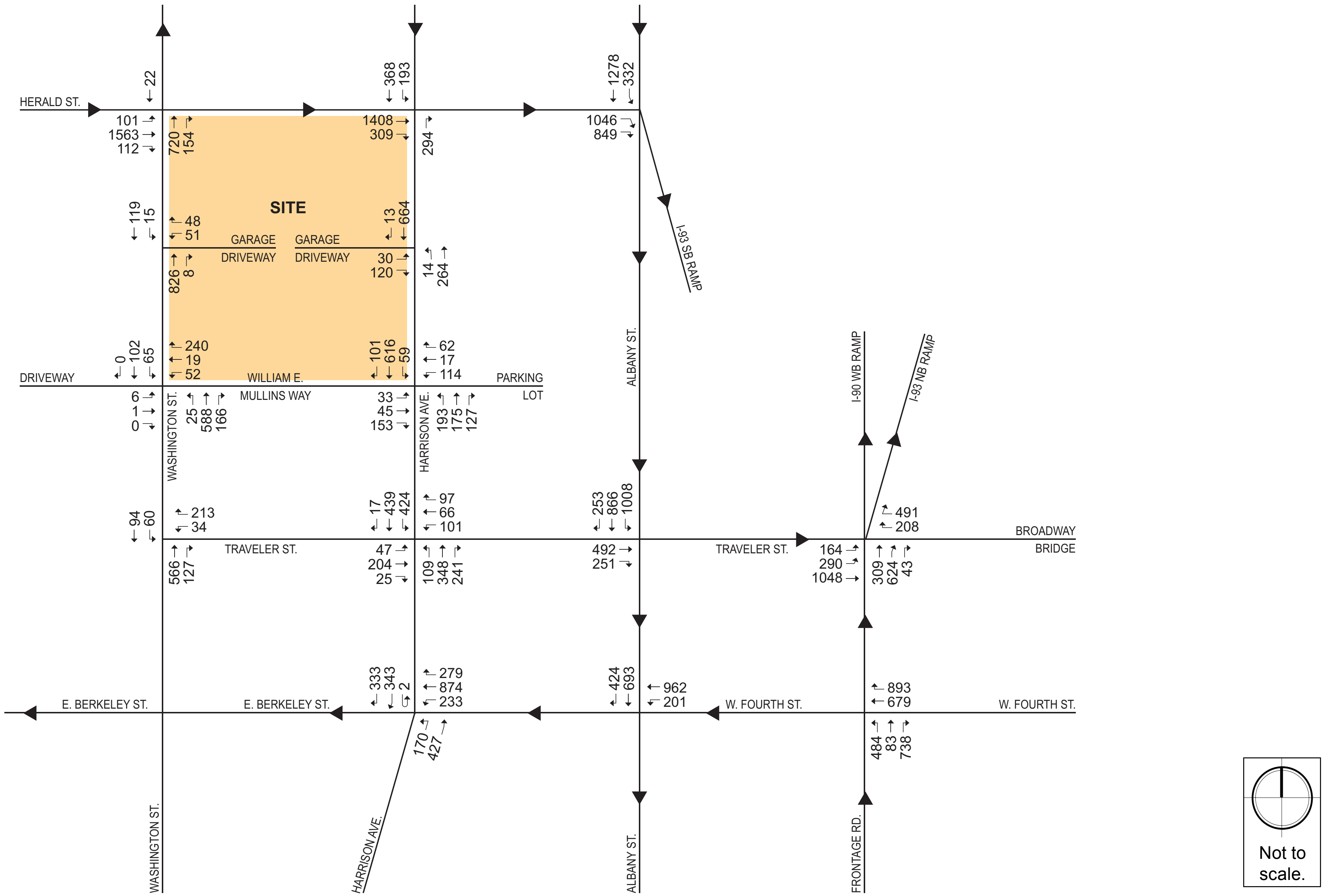

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Figure 2-17

Build (2023) Condition Traffic Volumes, Weekday p.m. Peak Hour

Table 2-9 Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**D**	**46.4**	-	-	-
Herald Street EB left/thru | thru| thru/right	C	25.5	0.76	279	339
Washington Street NB thru	F	>80.0	>1.00	~589	#818
Washington Street NB right	B	12.4	0.14	18	45
Washington Street SB thru	B	15.1	0.03	9	24
Herald Street/Harrison Avenue	**D**	**44.6**	-	-	-
Herald Street EB thru | thru| thru/right	D	54.3	0.69	331	380
Harrison Avenue NB right	A	0.7	0.25	0	m0
Harrison Avenue SB left	B	12.1	0.42	0	53
Harrison Avenue SB thru | thru	C	31.9	0.33	76	114
Herald Street/Albany Street/I-93 SB On-Ramp	**E**	**57.0**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~689	#969
Herald Street EB right | right	C	31.8	0.64	280	338
Albany Street SB left/thru | thru | thru	C	24.1	0.70	261	316
Washington Street/Traveler Street	**A**	**7.8**	-	-	-
Traveler Street WB left/right	B	18.2	0.70	32	88
Washington Street NB thru | thru/right	A	4.8	0.39	40	93
Washington Street SB left/thru | thru	A	4.5	0.12	8	24
Harrison Avenue/Traveler Street	**E**	**68.4**	-	-	-
Traveler Street EB left/thru/right	E	58.5	0.78	127	#246
Traveler Street WB left/thru/right	F	>80.0	>1.00	~214	#388
Harrison Avenue NB left	B	14.0	0.77	46	m36
Harrison Avenue NB thru/right	E	70.4	>1.00	~359	m232
Harrison Avenue SB left	F	>80.0	0.93	84	m#185
Harrison Avenue SB thru/right	D	50.4	0.88	173	#425
Albany Street/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB thru/right	F	>80.0	>1.00	~611	#828
Albany Street SB left	F	>80.0	0.91	518	#810
Albany Street SB left/thru | thru/right	E	66.2	0.90	510	#645
Albany Street/W. Fourth Street/E. Berkeley Street	**D**	**49.8**	-	-	-
W. Fourth Street WB left	B	15.3	0.31	60	m65
W. Fourth Street WB thru | thru	E	73.6	0.98	652	m#772
Albany Street SB thru | thru | thru/right	C	23.8	>1.00dr	183	m201

Table 2-9 Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**D**	**54.2**	-	-	-
Traveler Street EB left/bear left	F	>80.0	>1.00	~378	m#364
Traveler Street EB thru | thru	C	32.3	0.37	192	m167
Broadway Bridge WB right/hard right	F	>80.0	>1.00	~563	#815
Broadway Bridge WB hard right	E	58.8	0.95	432	#673
I-93 NB Frontage Road NB bear left | bear left	B	10.6	0.35	47	m48
I-93 NB Frontage Road NB thru | thru | thru/right	B	11.4	0.48	76	m78
I-93 NB Frontage Road/W. Fourth Street	**F**	**>80.0**	-	-	-
W. Fourth Street WB thru | thru | thru/right	F	>80.0	0.92	351	#442
I-93 NB Frontage Road NB left	F	>80.0	>1.00	~458	#716
I-93 NB Frontage Road NB left/thru | thru/right	E	73.4	1.00	~460	#622
Harrison Avenue/E. Berkeley Street	**F**	**>80.0**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	F	>80.0	>1.00	~643	#741
Harrison Avenue NB left/thru	F	>80.0	0.99	208	#385
Harrison Avenue SB thru	D	38.7	0.57	175	m193
Harrison Avenue SB right	B	17.0	0.31	61	m68
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru/right	C	19.3	0.03	-	3
William E. Mullins Way WB left/thru/right	D	26.5	0.66	-	119
Washington Street NB left/thru | thru/right	A	0.2	0.27	-	0
Washington Street SB left/thru | thru/right	A	2.6	0.03	-	2
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	E	35.7	0.60	-	90
Parking Lot WB left/thru/right	F	>50.0	>1.00	-	186
Harrison Avenue NB left	A	9.1	0.23	-	22
Harrison Avenue NB thru/right	A	0.0	0.14	-	0
Harrison Avenue SB left	A	7.8	0.03	-	2
Harrison Avenue SB thru/right	A	0.0	0.25	-	0
Washington Street/Garage	-	-	-	-	-
Garage WB left/right	C	18.4	0.08	-	7
Washington Street NB thru | thru/right	A	0.0	0.34	-	0
Washington Street SB left/thru | thru	A	6.1	0.06	-	5

Table 2-9 Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	B	12.2	0.03	-	2
Harrison Avenue NB left	A	8.7	0.08	-	6
Harrison Avenue NB thru	A	0.0	0.07	-	0
Harrison Avenue SB thru/right	A	0.0	0.30	-	0

Grey Shading indicates a decrease to LOS E or F from the No-Build (2023) Condition.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.
dr De facto right turn lane – Indicates that the lane operates as an exclusive right-turn lane due to high traffic volumes.

Table 2-10 Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Herald Street/Washington Street	**F**	**>80.0**	-	-	-
Herald Street EB left/thru | thru| thru/right	F	>80.0	>1.00	~513	#611
Washington Street NB thru	D	45.5	0.95	439	#713
Washington Street NB right	B	11.9	0.26	46	86
Washington Street SB thru	B	11.3	0.05	7	19
Herald Street/Harrison Avenue	**C**	**31.1**	-	-	-
Herald Street EB thru | thru| thru/right	D	35.6	0.92	264	m236
Harrison Avenue NB right	B	14.1	0.73	0	61
Harrison Avenue SB left	B	12.9	0.59	0	61
Harrison Avenue SB thru | thru	D	35.4	0.53	124	163
Herald Street/Albany Street/I-93 SB On-Ramp	**F**	**>80.0**	-	-	-
Herald Street EB bear right/right	F	>80.0	>1.00	~1578	m#1810
Herald Street EB right | right	C	24.4	0.78	336	m388
Albany Street SB left/thru | thru | thru	C	28.1	0.85	346	416
Washington Street/Traveler Street	**A**	**4.4**	-	-	-
Traveler Street WB left/right	A	8.2	0.78	27	m26
Washington Street NB thru | thru/right	A	3.2	0.34	37	86
Washington Street SB left/thru | thru	A	3.2	0.17	9	23

Table 2-10 Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Harrison Avenue/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB left/thru/right	F	>80.0	>1.00	~268	#429
Traveler Street WB left/thru/right	F	>80.0	>1.00	~408	#401
Harrison Avenue NB left	C	27.0	0.56	36	68
Harrison Avenue NB thru/right	F	>80.0	>1.00	~398	#602
Harrison Avenue SB left	F	>80.0	>1.00	~403	#591
Harrison Avenue SB thru/right	D	46.7	0.89	253	#441
Albany Street/Traveler Street	**F**	**>80.0**	-	-	-
Traveler Street EB thru/right	F	>80.0	>1.00	~1044	#1232
Albany Street SB left	D	45.7	0.88	525	#826
Albany Street SB left/thru | thru/right	D	38.6	0.89	534	#726
Albany Street/W. Fourth Street/E. Berkeley Street	**D**	**50.2**	-	-	-
W. Fourth Street WB left	B	15.5	0.33	40	m38
W. Fourth Street WB thru | thru	E	63.9	0.69	100	m90
Albany Street SB thru | thru | thru/right	D	44.6	0.64	308	m287
I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge	**E**	**58.4**	-	-	-
Traveler Street EB left/bear left	F	>80.0	>1.00	~437	m#342
Traveler Street EB thru | thru	D	45.6	0.61	103	m96
Broadway Bridge WB right/hard right	E	60.6	0.91	297	#485
Broadway Bridge WB hard right	D	46.5	0.80	248	#365
I-93 NB Frontage Road NB bear left | bear left	D	35.2	0.37	132	m74
I-93 NB Frontage Road NB thru | thru | thru/right	D	37.8	0.54	205	m115
I-93 NB Frontage Road/W. Fourth Street	**F**	**>80.0**	-	-	-
W. Fourth Street WB thru | thru | thru/right	F	>80.0	>1.00dr	~721	#782
I-93 NB Frontage Road NB left	D	36.4	0.76	305	456
I-93 NB Frontage Road NB left/thru | thru/right	D	38.6	>1.00dr	326	#437
Harrison Avenue/E. Berkeley Street	**F**	**>80.0**	-	-	-
E. Berkeley Street WB left/thru | thru | thru/right	E	64.1	>1.00	~360	#457
Harrison Avenue NB left/thru	F	>80.0	>1.00	~623	#791
Harrison Avenue SB thru	D	49.6	0.80	227	#366
Harrison Avenue SB right	A	9.3	0.61	14	96

Table 2-10 Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Unsignalized Intersections					
Washington Street/William E. Mullins Way/Driveway	-	-	-	-	-
Driveway EB left/thru/right	F	>50.0	0.15	-	13
William E. Mullins Way WB left/thru/right	F	>50.0	0.95	-	265
Washington Street NB left/thru | thru/right	A	0.8	0.29	-	1
Washington Street SB left/thru | thru/right	A	6.2	0.13	-	11
Harrison Avenue/ William E. Mullins Way/Parking Lot	-	-	-	-	-
William E. Mullins Way EB left/thru/right	F	>50.0	>1.00	-	724
Parking Lot WB left/thru/right	F	>50.0	>1.00	-	Err
Harrison Avenue NB left	B	11.3	0.28	-	28
Harrison Avenue NB thru/right	A	0.0	0.20	-	0
Harrison Avenue SB left	A	8.1	0.05	-	4
Harrison Avenue SB thru/right	A	0.0	0.46	-	0
Washington Street/Garage	-	-	-	-	-
Garage WB left/right	C	24.0	0.41	-	49
Washington Street NB thru | thru/right	A	0.0	0.36	-	0
Washington Street SB left/thru | thru	A	2.9	0.06	-	2
Harrison Avenue/Garage	-	-	-	-	-
Garage EB left/right	C	25.1	0.52	-	73
Harrison Avenue NB left	A	9.4	0.02	-	1
Harrison Avenue NB thru	A	0.0	0.17	-	0
Harrison Avenue SB thru/right	A	0.0	0.44	-	0

Grey Shading indicates a decrease to LOS E or F from the No-Build (2023) Condition.
~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.
dr De facto right turn lane – Indicates that the lane operates as an exclusive right-turn lane due to high traffic volumes.

As shown in Table 2-9 and Table 2-10, the majority of intersections and approaches continue to operate at the same level of service as the No-Build (2023) Condition with the following exceptions:

- Operations at the signalized intersection of Herald Street/Washington Street decrease from an overall LOS E to LOS F during the p.m. peak hour due to a slight increase in vehicular delay. All the approaches continue to operate at the same LOS as the No-Build (2023) Condition during both the a.m. and p.m. peak hours.

- The signalized intersection of **Harrison Avenue/Traveler Street** continues to operate at the same overall LOS during both the a.m. and p.m. peak hour. The Harrison Avenue southbound left-turn approach decrease from LOS E to LOS F during the a.m. peak hour due to a slight increase in traffic volume at the intersection.

- Operations at the signalized intersection of **I-93 NB Frontage Road/I-90 WB On-Ramp/I-93 NB On-Ramp/Traveler Street/Broadway Bridge** decrease from overall LOS D to LOS E during the p.m. peak hour caused by a slight increase in vehicular delay and traffic volumes. All the approaches continue to operate at the same LOS as the No-Build (2023) Condition during both the a.m. and p.m. peak hours.

- The William E. Mullins Way eastbound left-turn/through/right-turn approach decreases from LOS D to LOS E during the a.m. peak hour at the unsignalized intersection of **Harrison Avenue/ William E. Mullins Way/Parking Lot**.

Although the traffic impacts associated with the new trips are minimal (generating less than five vehicle trips per minute during the peak hours), the Proponent will continue to work with the City of Boston to ensure that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

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 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 employees of the Project 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 Project site to future tenants and employees by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel.

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

- The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with tenants as they move in to office space to raise awareness of public transportation, bicycling, and walking opportunities;

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

- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ride sharing, bicycling, alternative work schedules, and other travel options;
- Promote to commercial tenants that, as employers, they can save on payroll-related taxes and provide employee benefits when they offer transportation benefits such as subsidized public transportation;
- Encourage employers to subsidize on-site full-time employees' purchase of monthly transit passes;
- Encourage employers to arrange to provide Guaranteed Ride Home during hours in which public transit service is no longer available to employee's home;
- Provide access to information on area carpool and vanpool participants through the local TMA membership;
- Provide electric vehicle charging stations for 3 percent of the parking spaces in the garage;
- Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby; and
- The Proponent will explore the feasibility of providing spaces in the garage for a car sharing service.

2.6 Transportation Mitigation Measures

Although the traffic impacts associated with the new trips are minimal (generating less than five vehicle trips per minute during the peak hours), the Proponent will continue to work with the City of Boston to ensure that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, 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. 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.

2.7 Evaluation of Short-term Construction Impacts

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

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

- Limited construction worker parking on-site;
- Encouragement of worker carpooling;
- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

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

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

A pedestrian wind study was conducted on the proposed Project.. The objective of the study was to assess the effect of the Project on local conditions in pedestrian areas around the study site and provide recommendations for minimizing adverse effects, where necessary.

The study involved wind simulations on a 1:300 scale model of the proposed building and surroundings. These simulations were then conducted in RWDI's boundary-layer wind tunnel at Guelph, Ontario, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by BRA were used in the study and the following sections include a discussion of the methods and present the results of the wind tunnel simulations.

Overall, the proposed Project is expected to result in a net improvement of wind conditions. The number of uncomfortable locations is expected to decrease from 24 locations in the No Build scenario to 17 locations in the Build scenario. The number of locations with an unacceptable rating of annual effective gust speeds is predicted to be reduced from seven locations in the No Build scenario to three locations in the Build scenario.

3.1.2 Overview

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

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further.

3.1.3 Methodology

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

- **No Build Configuration:** includes all existing surroundings and BRA approved buildings; and

- **Build Configuration:** includes the proposed Project and all existing surroundings and BRA approved buildings.

As shown in Figures 3.1-1 and 3.1-2, the wind tunnel model included the Project and all relevant surrounding buildings and topography within a 1,200 foot radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 77 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of five feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1995 to 2015 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 3.1-3 to 3.1-5 present "wind roses", summarizing the seasonal and annual wind climates in the Boston area, based on the data from Logan Airport. The first wind rose in Figure 3.1-3, for example, summarizes the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west-northwest, northwest, west, southwest and south-southwest. In the case of strong winds (speeds greater than 20 mph, shown by the red bands in the wind rose diagrams), however, the most common wind directions are northeast and west-northwest. On an annual basis (see Figure 3.1-5) the most common wind directions are those between south-southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

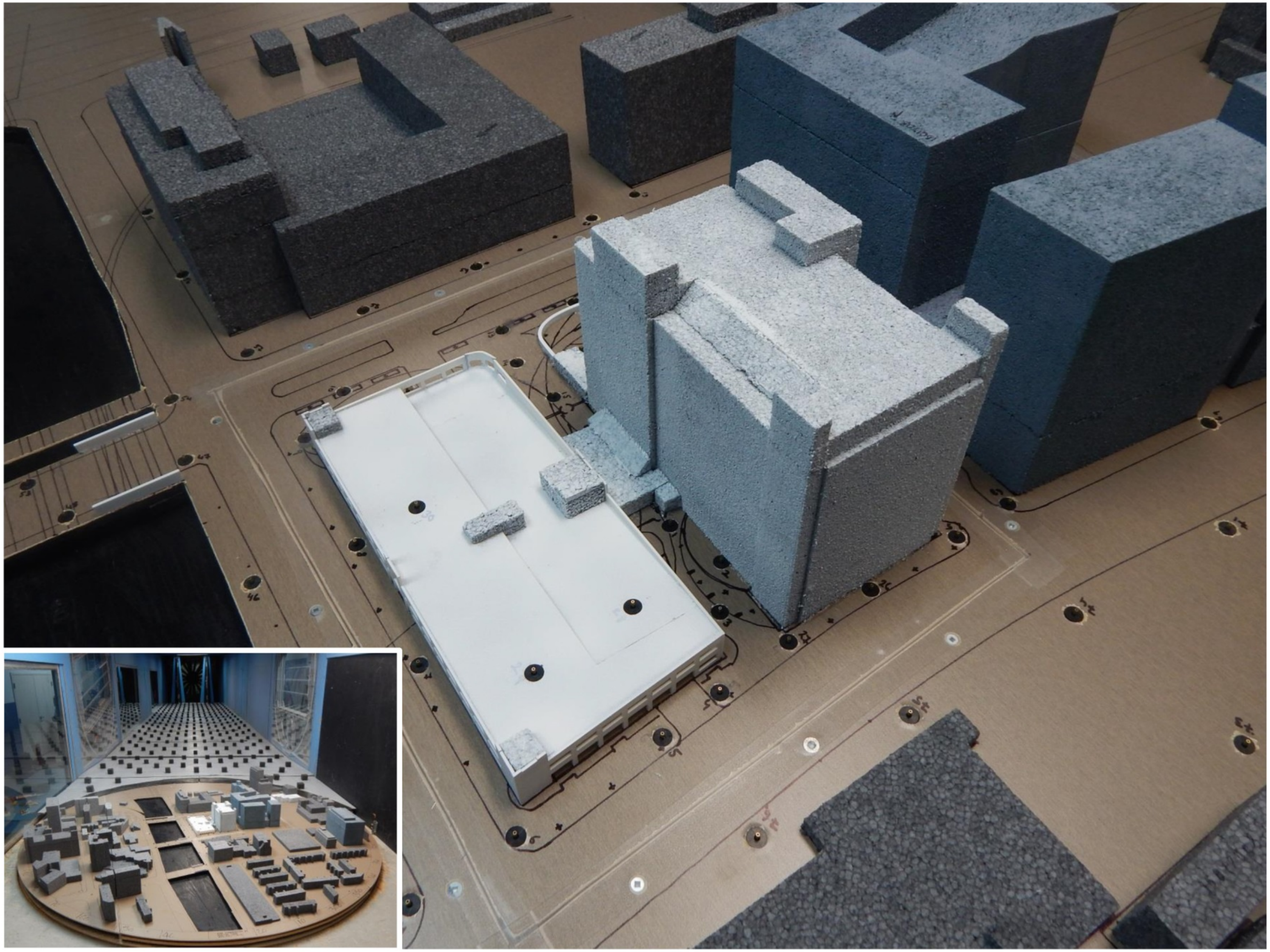

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Figure 3.1-1

Wind Tunnel Study Model – No Build

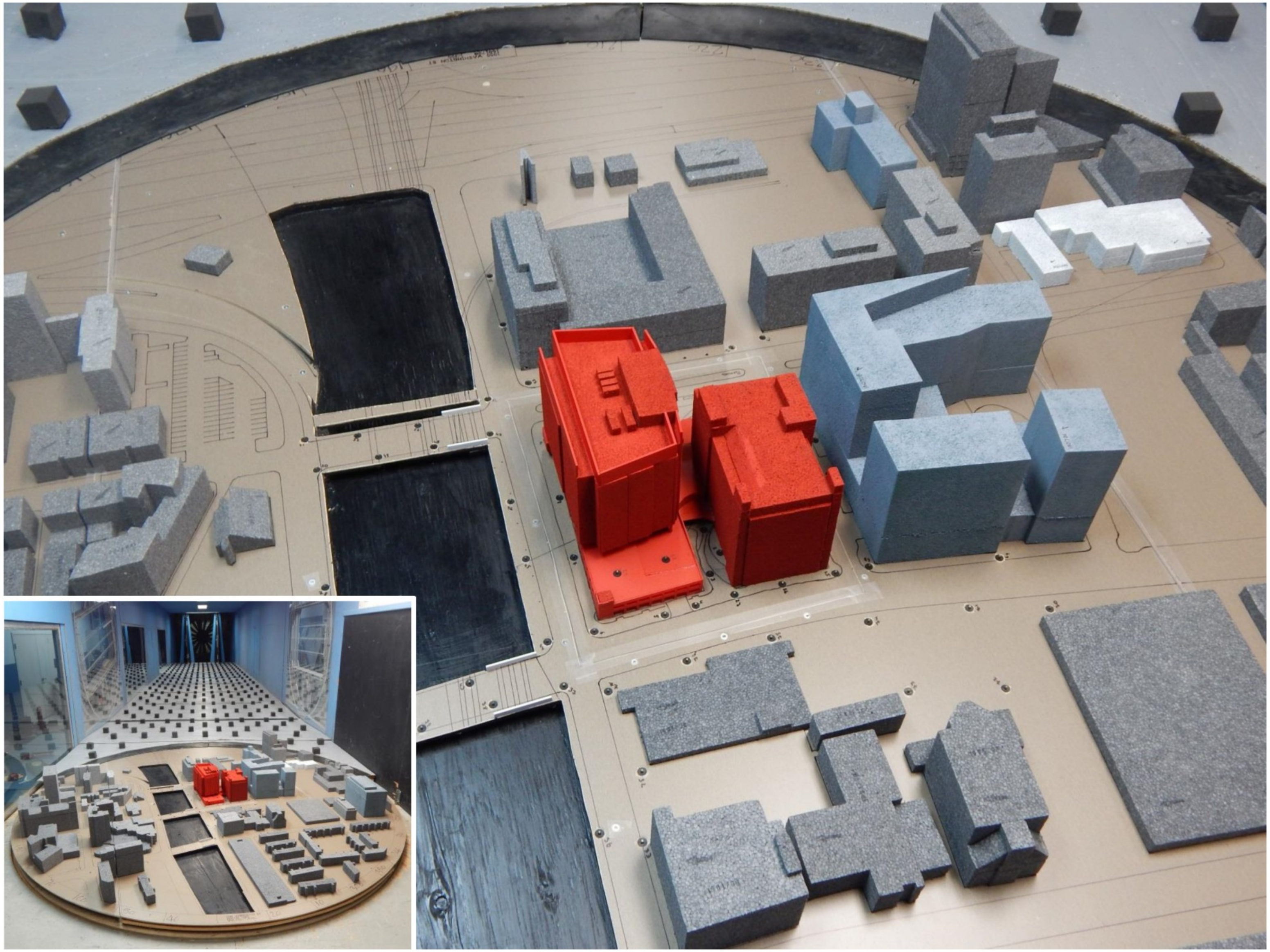

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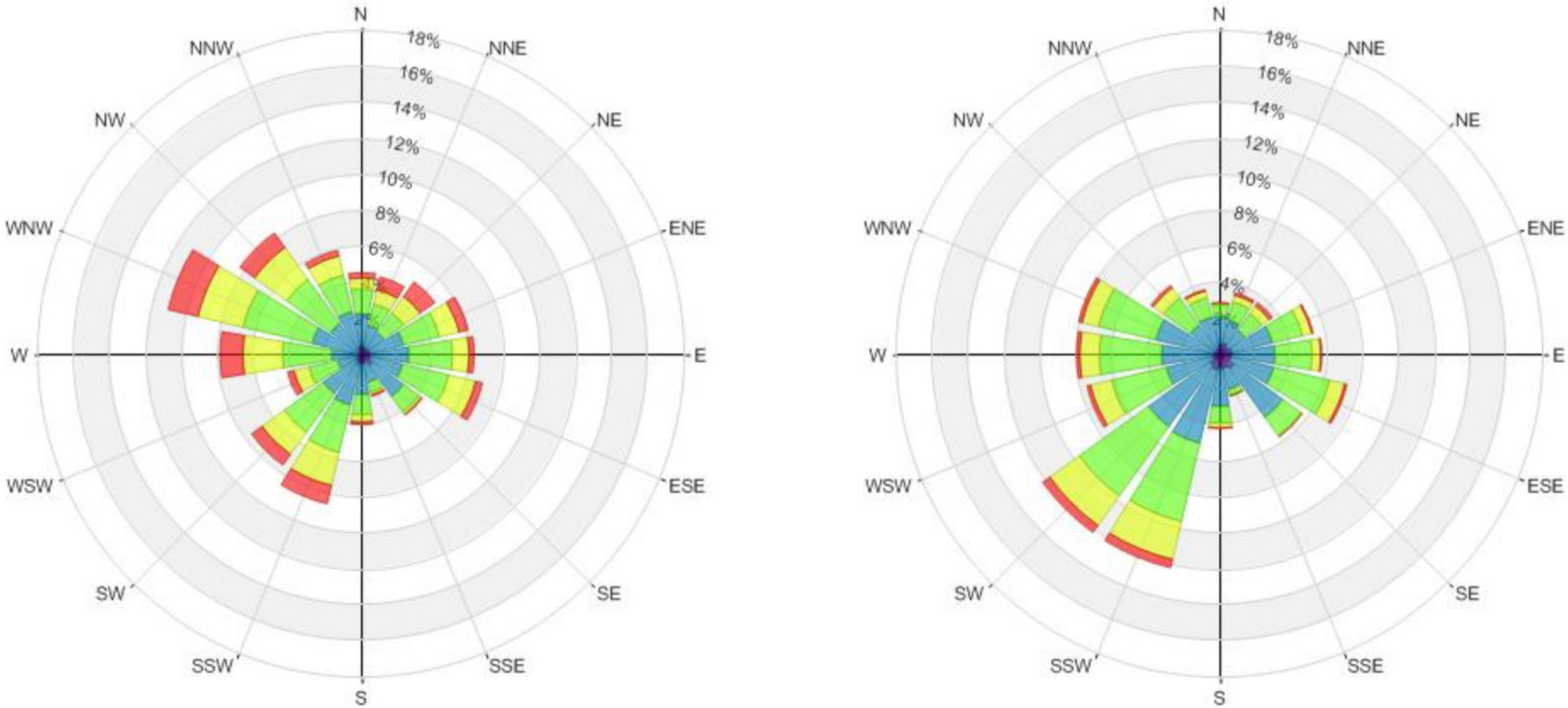
Figure 3.1-2

Wind Tunnel Study Model – Build



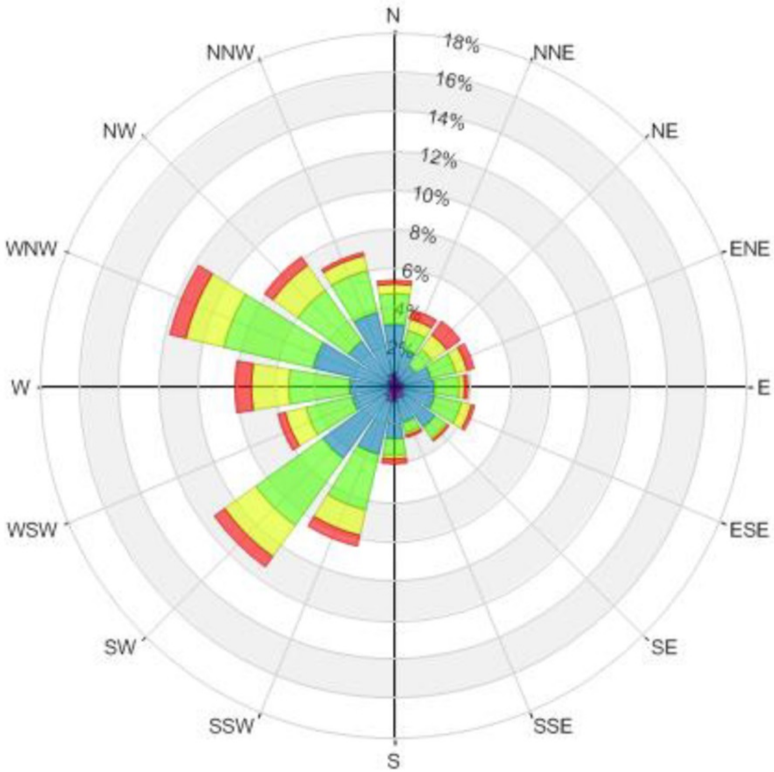
Spring
(March - May)

Summer
(June - August)

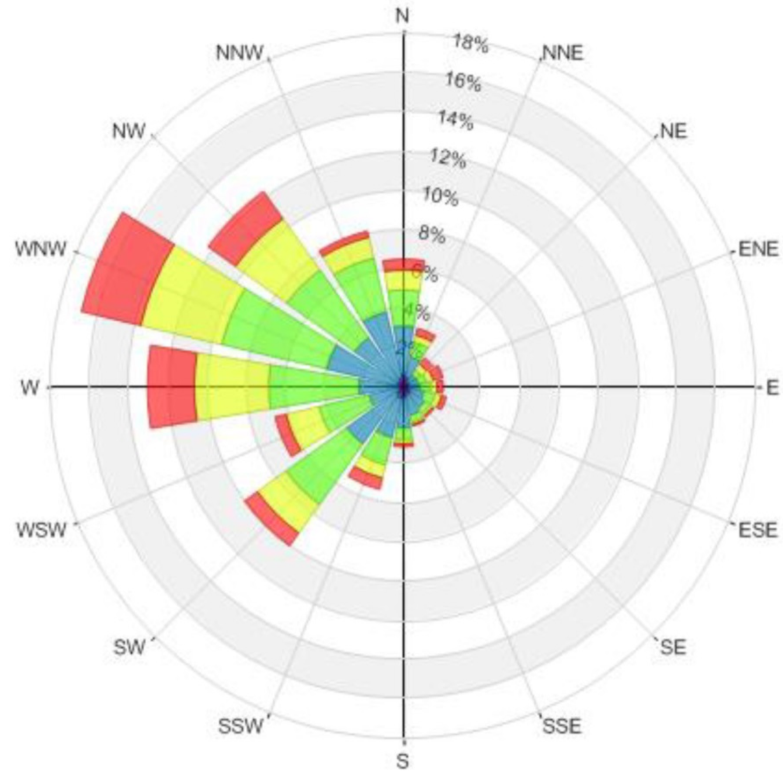
Wind Speed (mph)	Probability (%) Spring	Probability (%) Summer
Calm	2.8	3.1
1-5	6.7	9.5
6-10	28.8	38.8
11-15	32.7	34.4
16-20	19.1	11.7
>20	9.9	2.5

Figure 3.1-3

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1995-2015)



Fall
(September - November)

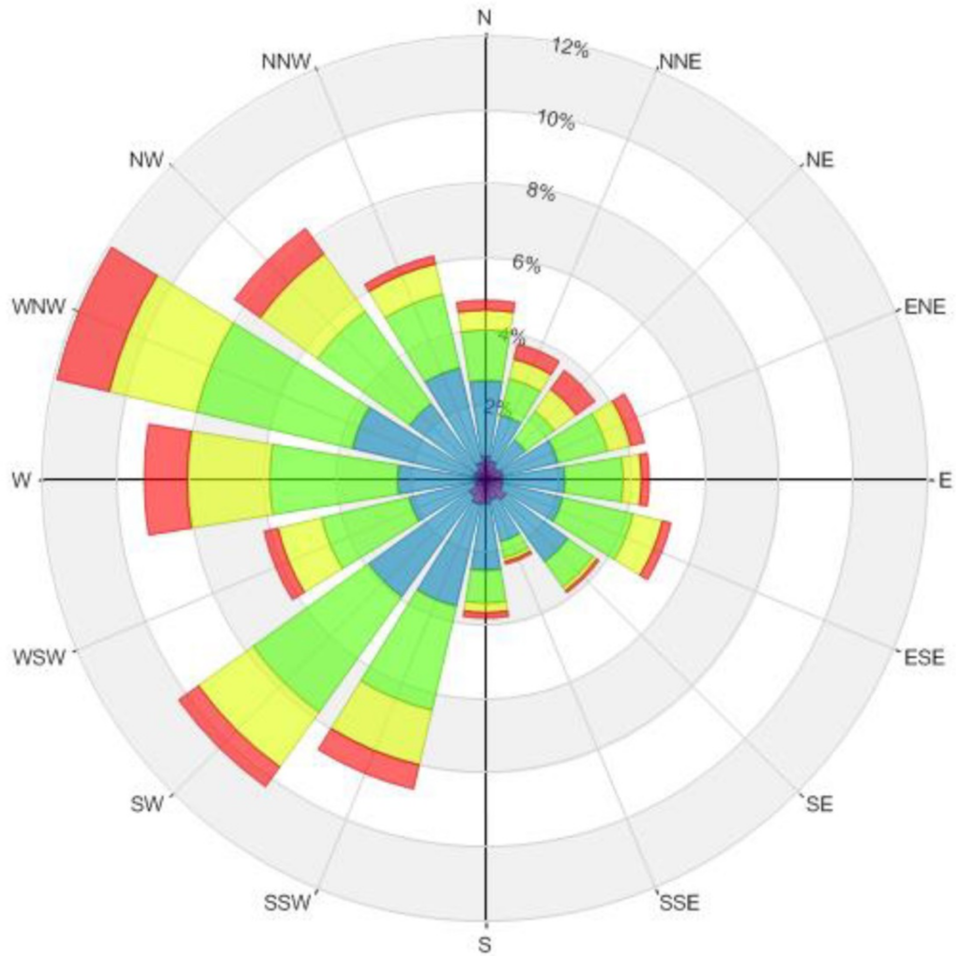


Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	3.4	2.6
1-5	8.5	6.5
6-10	34.7	28.0
11-15	32.3	30.8
16-20	14.4	19.7
>20	6.6	12.3

Figure 3.1-4

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1995-2015)



Annual Winds

	Wind Speed (mph)	Probability (%)
	Calm	3.0
	1-5	7.8
	6-10	32.6
	11-15	32.6
	16-20	16.2
	>20	7.8

321 Harrison Avenue Boston, Massachusetts

Figure 3.1-5

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1995-2015)

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

3.1.4 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second standard used by the BRA is based on the work of Melbourne[1] and is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking, as shown in Table 3.1-1.

The criteria are shown in terms of benchmarks for the one-hour mean speed exceeded one percent of the time (*i.e.*, the 99-percentile mean wind speed).

Table 3.1-1 Boston Redevelopment Authority Mean Wind Criteria*

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

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

The wind climate found in a typical downtown Boston location is generally comfortable for pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, the general wind climate in Boston is likely to be frequently uncomfortable for more passive activities such as sitting.

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

3.1.5 Results

Figures 3.1-6 through 3.1-9 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds. Appendix D presents the mean and effective gust wind speeds for each season as well as annually. 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 in the text.

3.1.5.1 Mean Speed

A wind comfort categorization of walking is considered appropriate for sidewalks. A wind speed rated comfortable for standing or sitting is preferred in the vicinity of building entrances. Similar low wind speed conditions are preferred in other passive use areas like parks and courtyards, particularly in the summer. In the winter, walking conditions are also considered acceptable in courtyard areas owing to the lower frequency of use compared to the other seasons.

No Build

As shown in Figure 3.1-6, mean wind speeds, on an annual basis, at the main entrance (Location 1) are comfortable for sitting. The conditions at most areas along the north and east of the existing building (Locations 7 through 21) are rated comfortable for standing, whereas winds are rated as uncomfortable for walking at the majority of areas along the south and west of the building (Locations 3 through 6 and 22 through 27). The top of the two story garage (Locations 28 through 30) is comfortable for walking on the east side and uncomfortable on the west side.

There are a number of locations, further from the site, along Washington Street (Locations 39, 43, 44, 72, and 75), Herald Street (Locations 34, 35, 55 and 58), Harrison Avenue (Locations 50, 55, 58, 61 and 63), and William E Mullins Way (locations 68 and 69) that are rated uncomfortable.

Build

The mean speed results for the Build scenario are presented in Figure 3.1-7. The main entrances to the Project are represented by Locations 1 and 15. Wind speeds at both locations are expected to be comfortable for sitting. Wind conditions are predicted to generally improve or remain similar to that in the No Build scenario at several locations along the eastern building perimeter and to the west of the site along Washington Street (Locations 1 through 5, 15, 16, 27, 58, 61, 74 and 76). Six of those locations (Locations 3 through 5, 27, 58, and 61) improved from uncomfortable to comfortable for walking or better with the Project in place. An increase in wind speeds is expected on the sidewalks along Herald Street to the north and Harrison Avenue to the east of the Project (Locations 6

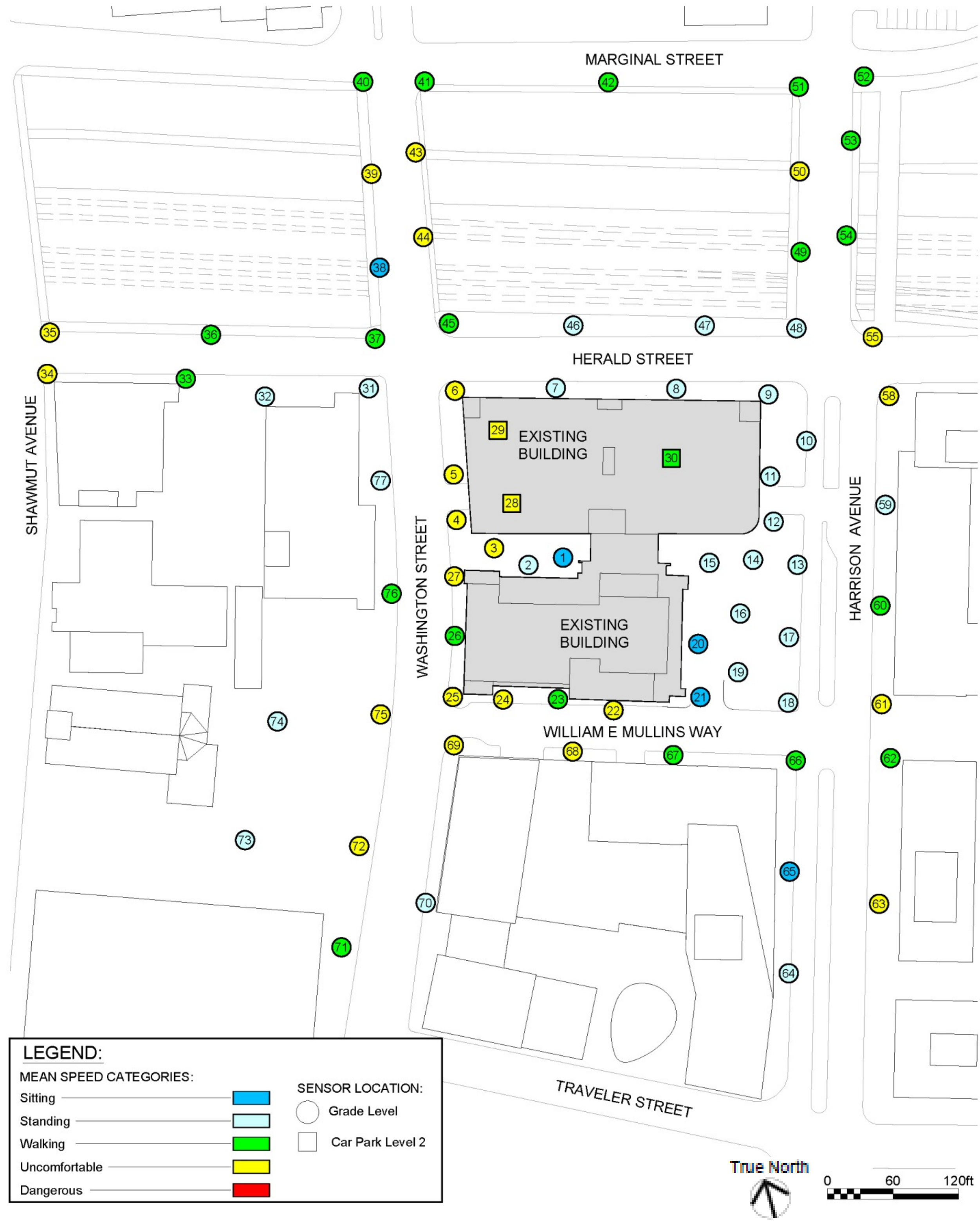


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Figure 3.1-6

Pedestrian Wind Conditions – Mean Speed – No Build

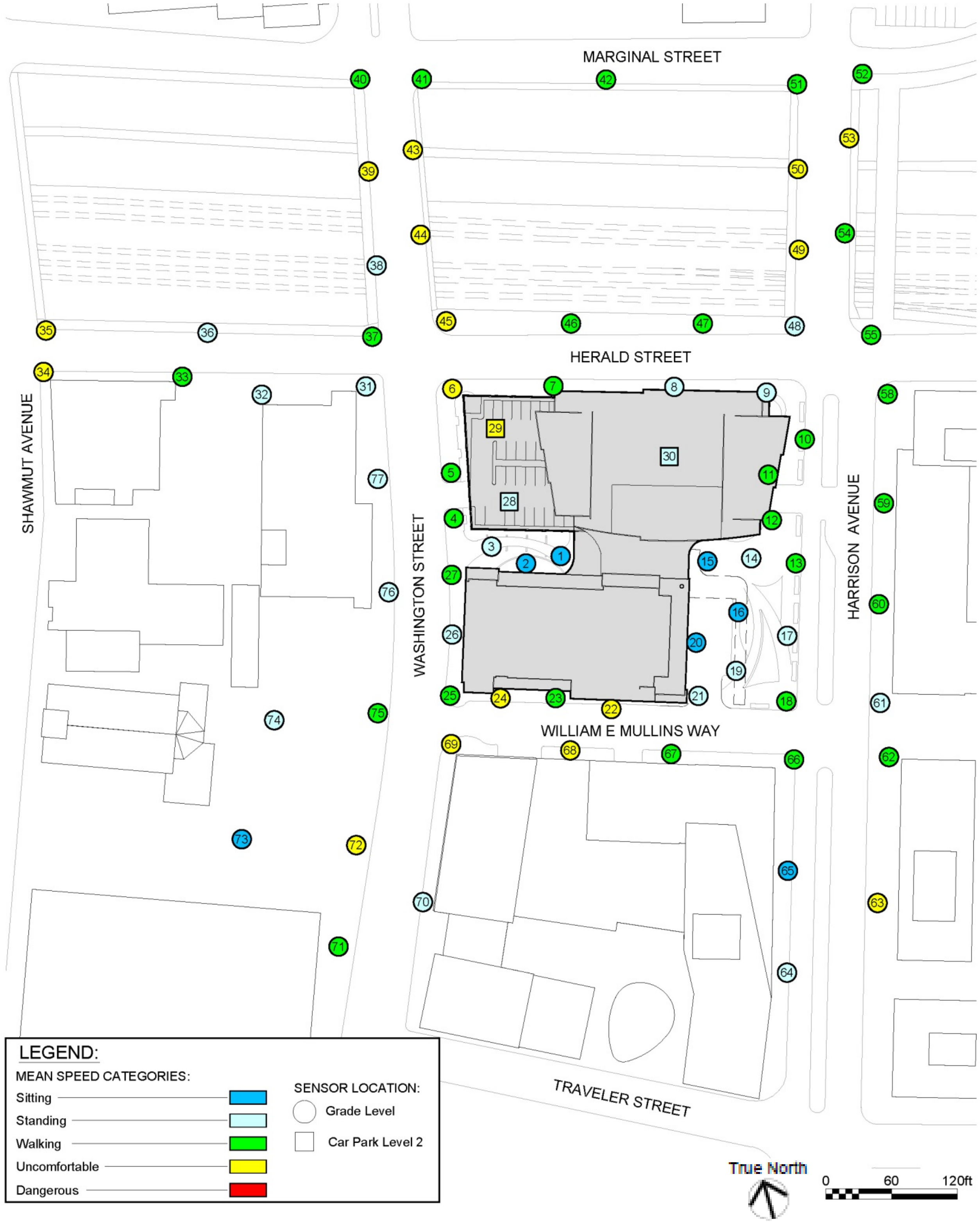

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Figure 3.1-7

Pedestrian Wind Conditions – Mean Speed – Build

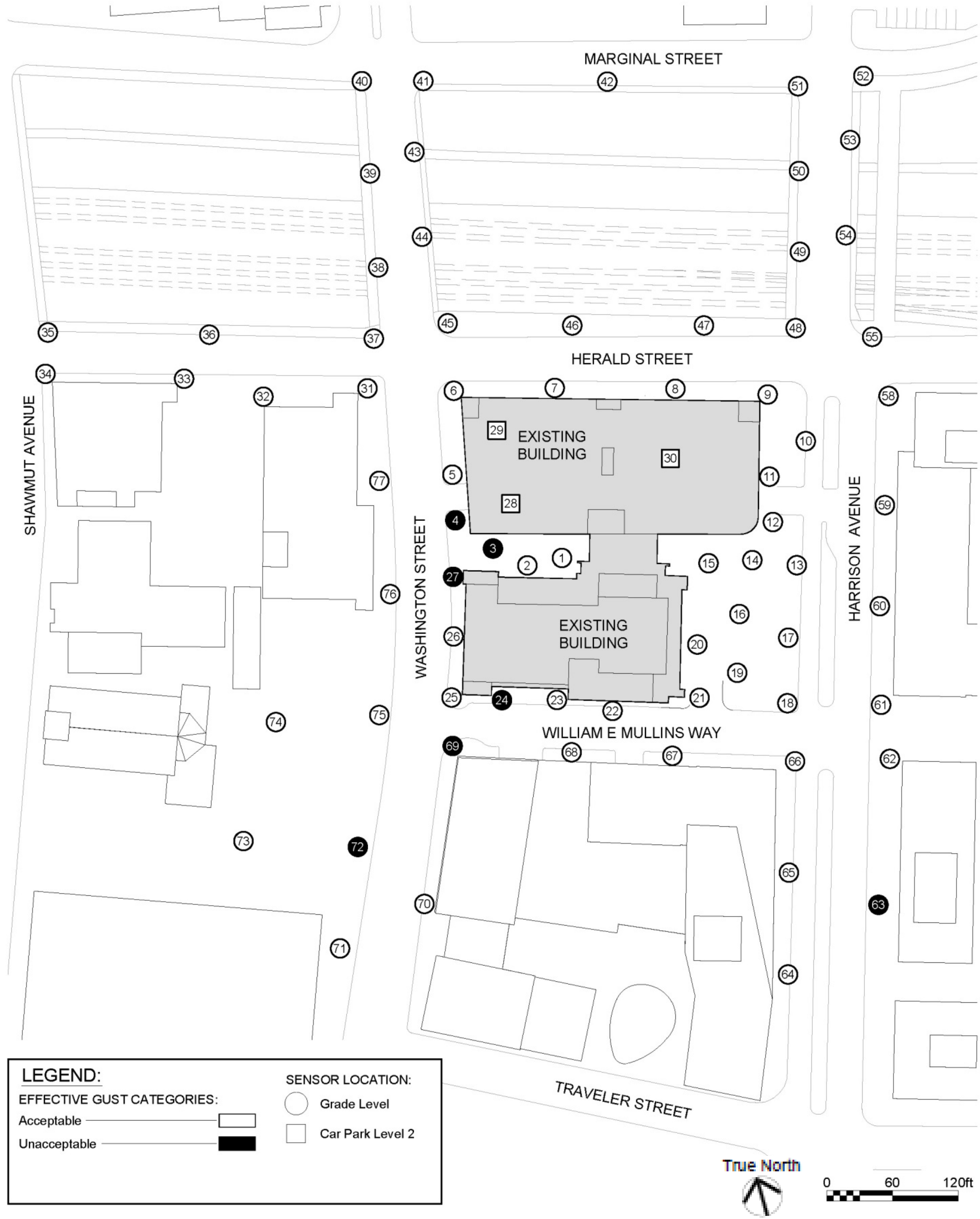

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Figure 3.1-8

Pedestrian Wind Conditions – Effective Gust Speed – No Build

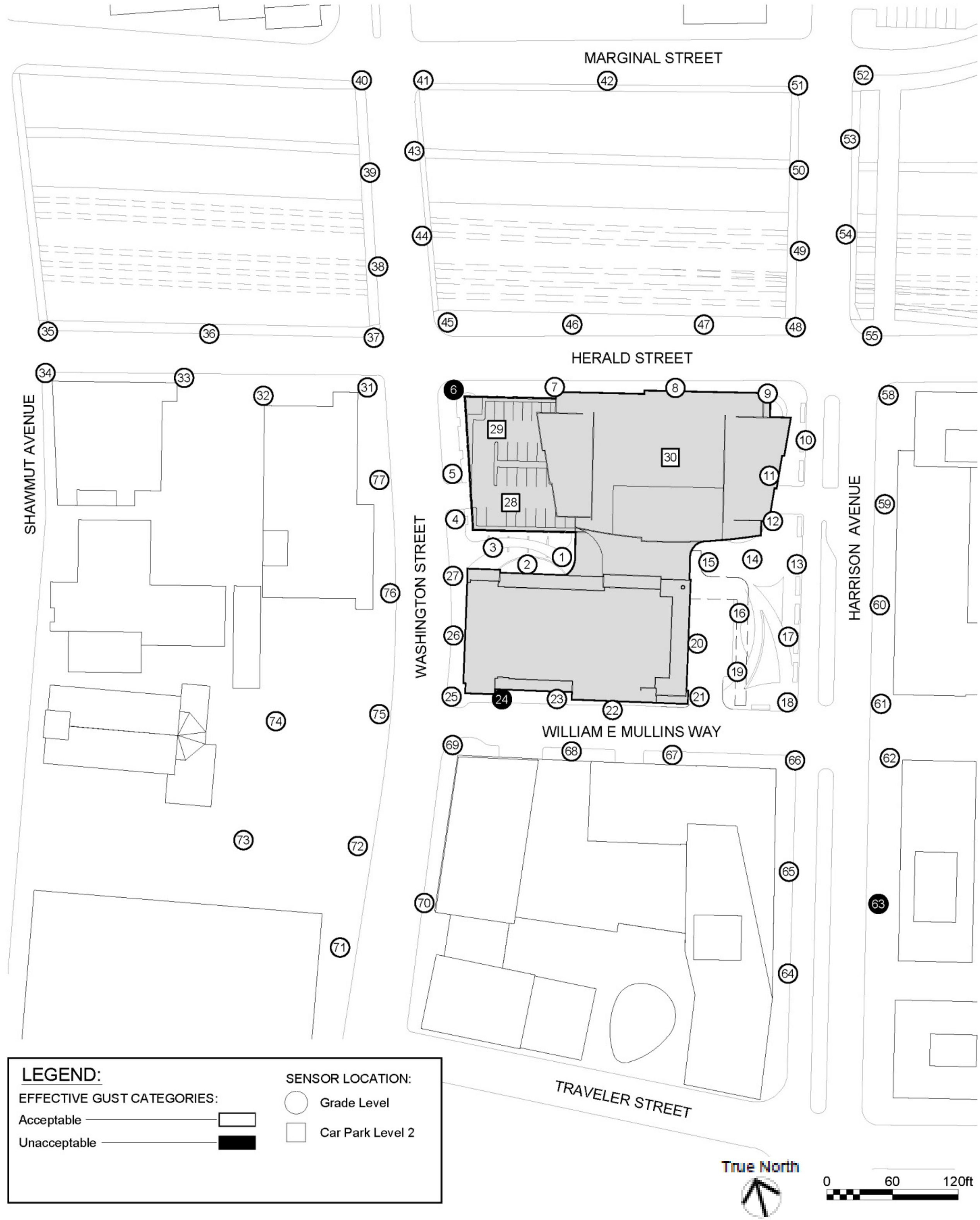

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Figure 3.1-9

Pedestrian Wind Conditions – Effective Gust Speed – Build through 13, 18, 21, 45, 46, 47, 48 and 49). However, most of these locations will remain comfortable for walking and the Project eliminates uncomfortable wind conditions at Locations 58 and 61. Wind conditions at the northwest corner of the Project and at locations to the south along William E. Mullins Way are predicted to remain uncomfortable, however, the Project results in the elimination of uncomfortable winds at Location 25 . Wind speeds at other areas further away from the Project site are not predicted to change significantly with the addition of the Project. On top of the two-story garage, wind conditions are expected to improve or remain similar to that in the No Build scenario.

Overall, the proposed Project is expected to result in a net improvement of wind conditions, with the number of uncomfortable locations decreasing from 24 locations in the No Build scenario to 17 locations in the Build scenario.

3.1.5.2 Effective Gust

No Build

In the No Build scenario, unacceptable effective gust speeds are noted at seven locations on and around the Project site (Figure 3.1-8). Three locations are to the immediate west of the site, (Locations 3, 4 and 27), three to the south of the building (Locations 24, 69 and 72) and one to the southeast on Harrison Avenue (Location 63), which is further away from the Project site.

There are also a number of locations where wind speeds exceed the effective gust speeds in the winter and spring (see Appendix D).

Build

With the addition of the Project, the number of locations with an unacceptable rating of annual effective gust speeds is predicted to be reduced to three (Figure 3.1-9). One of these is on the northwest corner of the development (Location 6) where wind speeds exceed the BRA criterion by only 1 mph (see Appendix D). As in the No Build scenario, the effective gust exceedances at Location 24 to the south and Location 63 to the southeast are predicted to remain; the impact of the Project on winds at these locations is minimal. Overall, the addition of the Project significantly improves effective gust speeds on and around the site on an annual and seasonal basis.

3.1.6 Mitigation

The proposed Project results in an overall improvement in the wind conditions on and around the site. With the addition of the Project, the number of locations where effective gust speeds exceed the BRA criterion is expected to be reduced from seven locations in the No Build scenario to three locations in the Build scenario. Wind control measures as described below are being considered.

Existing landscaping was not included in the study in order to understand the worst case scenario. Any existing and additional trees along sidewalks would improve conditions further including at Locations 45, 49 and 53.

Conditions at the northwest corner of the garage (Location 6) are due to horizontal winds from the northeast throughout the year, and the southwest in the winter. Large dense trees similar to those that exist in the vicinity of the Project site, if placed around the northwest corner of the site on Washington and Herald streets, should assist with improving conditions in the area (Location 6). These trees would be effective during summer and part of spring and fall when the trees foliage is still dense. In the winter, the trees would lose their leaves and therefore, would not be effective in wind control. Coniferous trees on the other hand, would be effective throughout the year. It should be noted that the proposed Project does not change the wind category or have a significant impact on the wind conditions at locations 24 and 63. However, conditions may be improved with landscaping, along William E. Mullins Way and Harrison Avenue. The Project will include landscaping at the corner of Harrison Avenue and William E. Mullins Way that was not considered in the study.

3.1.7 Conclusions

Overall, the proposed Project is expected to result in a net improvement of wind conditions. The number of uncomfortable locations is expected to decrease from 24 locations in the No Build scenario to 17 locations in the Build scenario. The number of locations with an unacceptable rating of annual effective gust speeds is predicted to be reduced from seven locations in the No Build scenario to three locations in the Build scenario. As design progresses, the Proponent will consider mitigation measures such as additional landscaping to improve wind conditions at the northwestern and southeastern corners of the Project site.

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 shadow analysis presents the existing shadow and new shadow that would be created by the proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, 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.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest. New shadow will be cast onto Herald Street and its sidewalks and onto Washington Street and its sidewalks. New shadow will be cast onto the Washington Street at Herald Street bus stop; however, no new shadow will be cast onto public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north. No new shadow will be cast onto nearby bus stops or public open space. New shadow will be cast across Herald Street and its sidewalks, a sliver on the Washington Street sidewalks and onto Interstate 90.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast across Herald Street and its sidewalks, Harrison Avenue and its sidewalks, and onto Interstate 90. New shadow will be cast onto the Herald Street at Harrison Avenue bus stop; however, no new shadow will be cast onto public open space.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west. New shadow will be cast across Washington Street and its sidewalks and onto the Washington Street at Herald Street bus stop. No new shadow will be cast onto public open space.

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

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast onto Herald Street and its sidewalks and onto the Herald Street bus stop at Harrison Avenue. No new shadow will be cast onto public open space.

At 6:00 p.m., new shadow from the Project will be cast to the east. New shadow will be cast across Harrison Avenue and its sidewalks, onto Herald Street and its southern sidewalks, and onto the Herald Street at Harrison Avenue bus stop. No new shadow will be cast onto public open space.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., new shadow from the Project will be cast to the northwest. New shadow will be cast onto Washington Street and its sidewalks, across Herald Street and its sidewalks and onto the Washington Street at Herald Street bus stop. No new shadow will be cast onto public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow will be cast across Herald Street and its sidewalks and onto Interstate 90. No new shadow will be cast onto nearby bus stops or public open space.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast across Herald Street and its sidewalks, Harrison Avenue and its sidewalks, onto Interstate 90 and on the Herald Street at Harrison Avenue bus stop. No new shadow will be cast onto nearby public open space.

At 6:00 p.m., new shadow from the Project will be cast to the northeast. A sliver of new shadow will be cast onto Herald Street and across Harrison Avenue and onto Interstates 90 and 93. No new shadow will be cast onto nearby bus stops or public open space.

3.2.5 Winter Solstice (December 21)

The winter solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season, causing the shadows in urban areas to elongate and be cast onto large portions of the surrounding area.

At 9:00 a.m., new shadow from the Project will be cast to the northwest. New shadow will be cast across Washington Street and its sidewalks, across Marginal Road and its sidewalks, onto Shawmut Avenue and its sidewalks, and onto Interstate 90. New shadow will also be cast onto the Herald Street at Harrison Avenue bus stop. No new shadow will be cast onto nearby public open space.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow will be cast across Herald Street and its sidewalks, Marginal Road and its sidewalks, Interstate 90, onto the Pine Street Park basketball courts across Marginal Road and onto Herald Street at Harrison Avenue bus stop.

At 3:00 p.m., new shadow from the Project will be minimal. New shadow from the Project will be cast to the northeast onto a sliver of Marginal Road and Harrison Avenue and its sidewalks. No new shadow will be cast onto nearby bus stops or public open space.

3.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. The Project will not cast new shadow on public open spaces during 13 of the 14 time periods studied. New shadow from the Project will be cast onto the Washington Street at Herald Street bus stop during three of the time periods and will be cast onto the Herald Street at Harrison Avenue bus stop during six of the time periods.

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.

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 the daylight obstruction values within the surrounding area and typical of densely built 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 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

---

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

321 Harrison Avenue Boston, Massachusetts

SMMA

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.

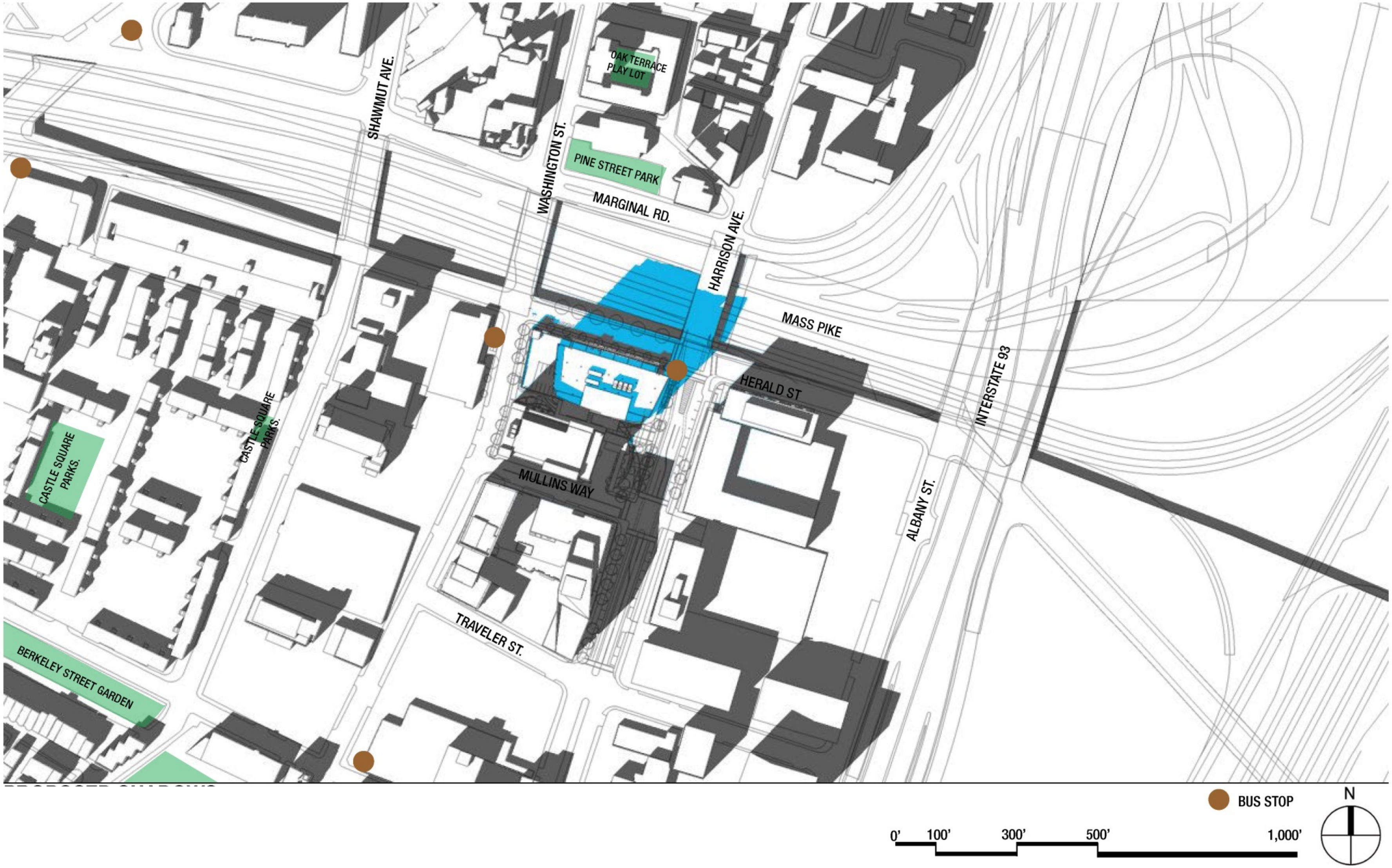

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Figure 3.2-3

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

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Figure 3.2-4

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

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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.

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Figure 3.2-7

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

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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.

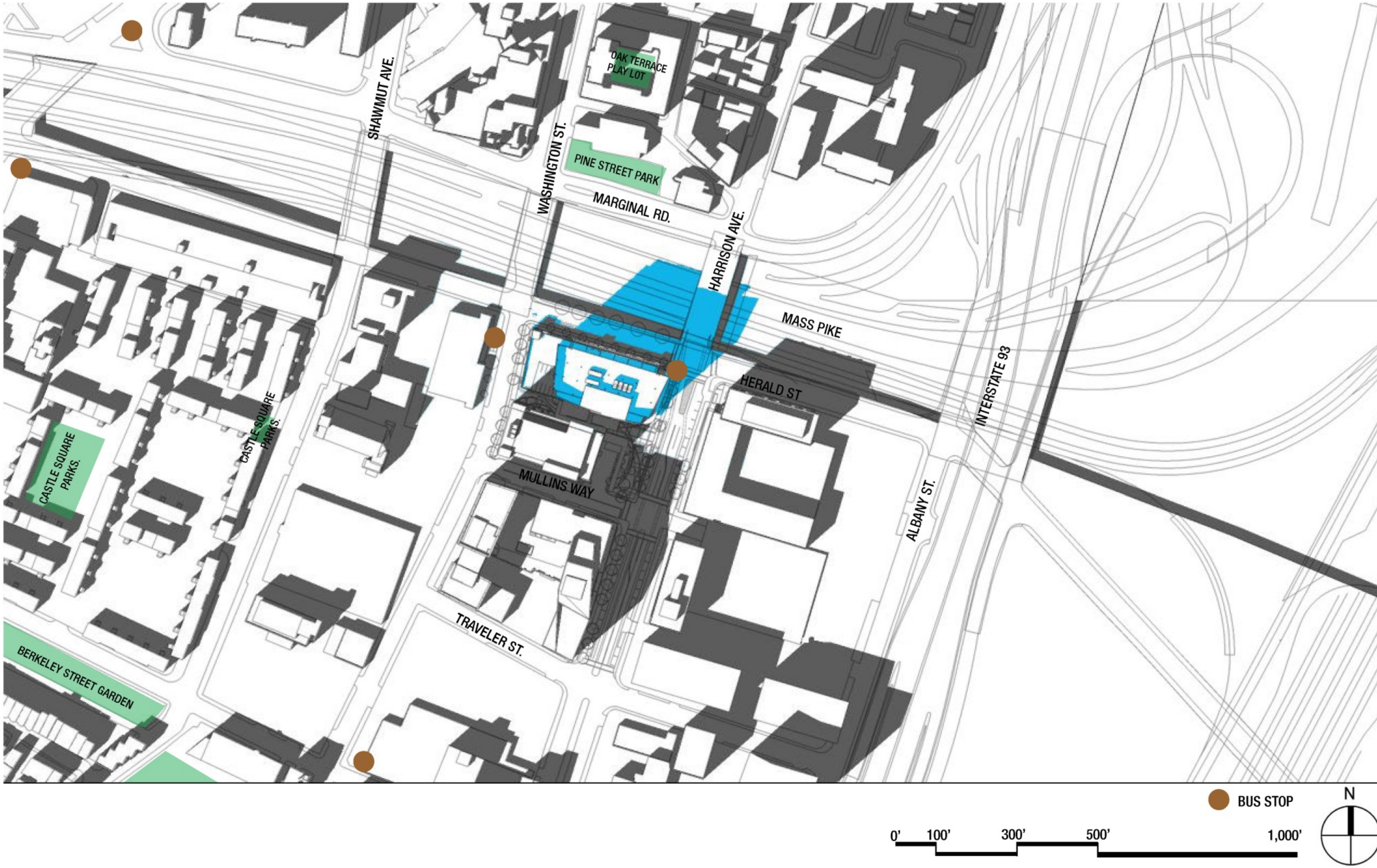

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Figure 3.2-10

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

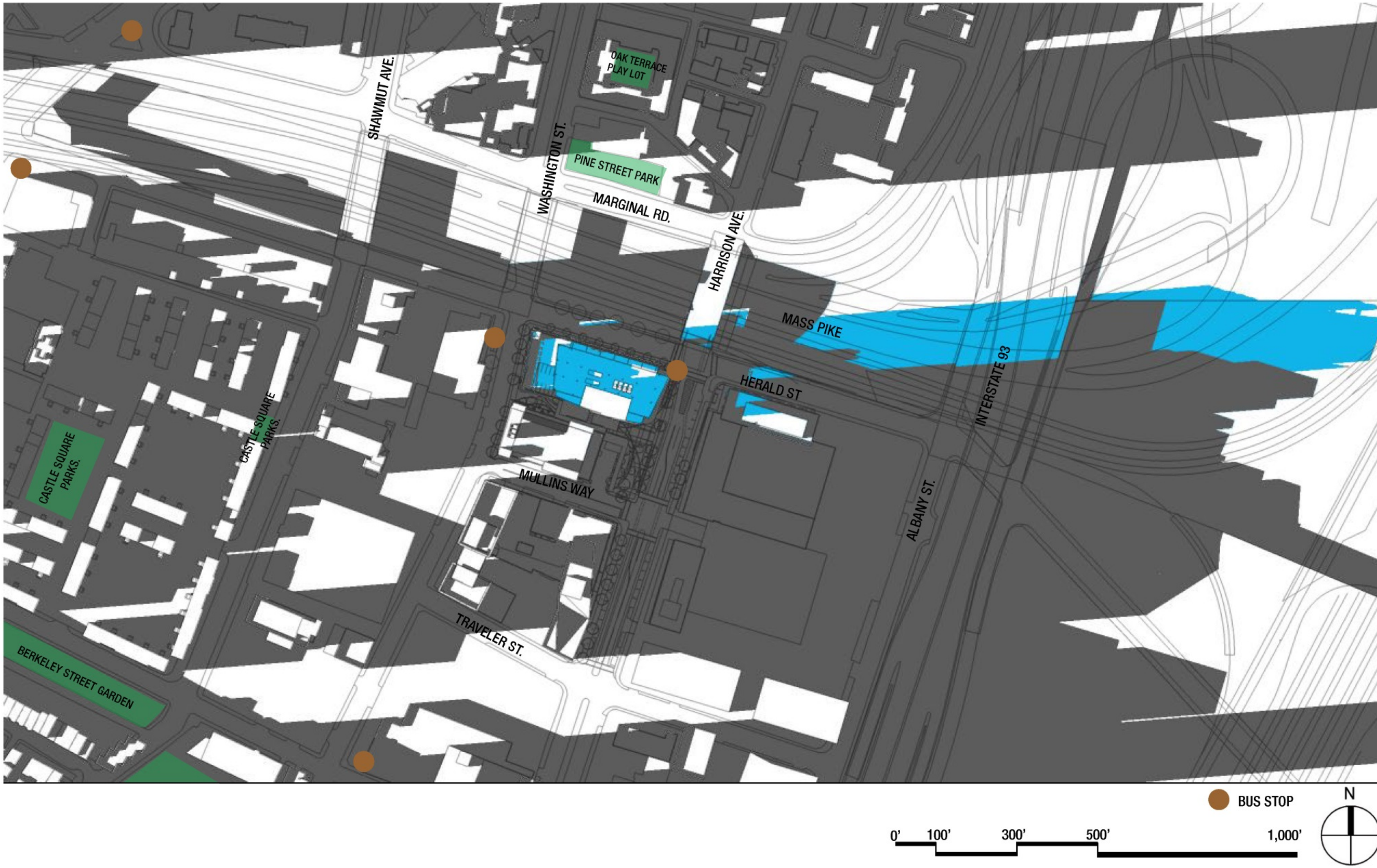

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Figure 3.2-11

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

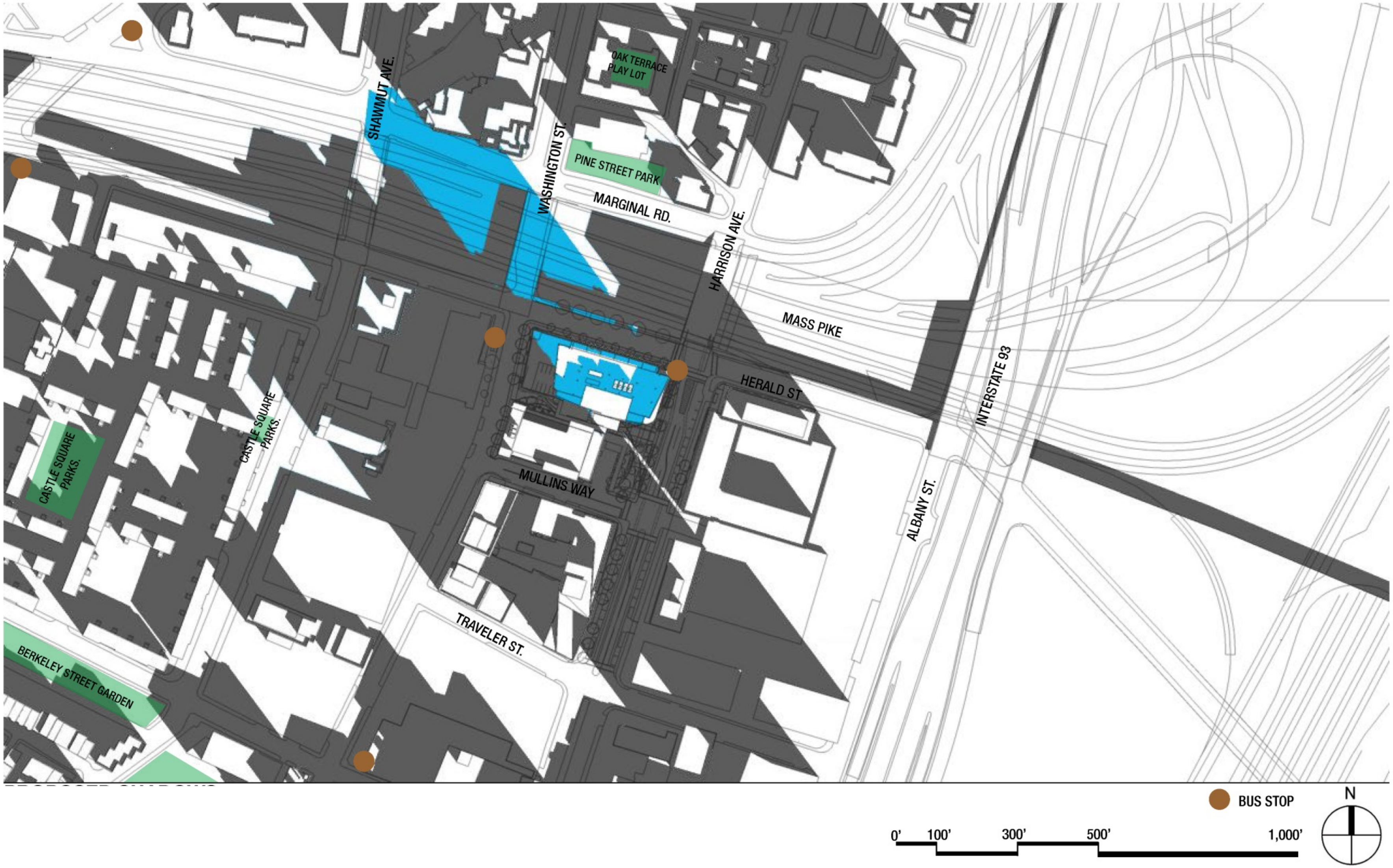

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Figure 3.2-12

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

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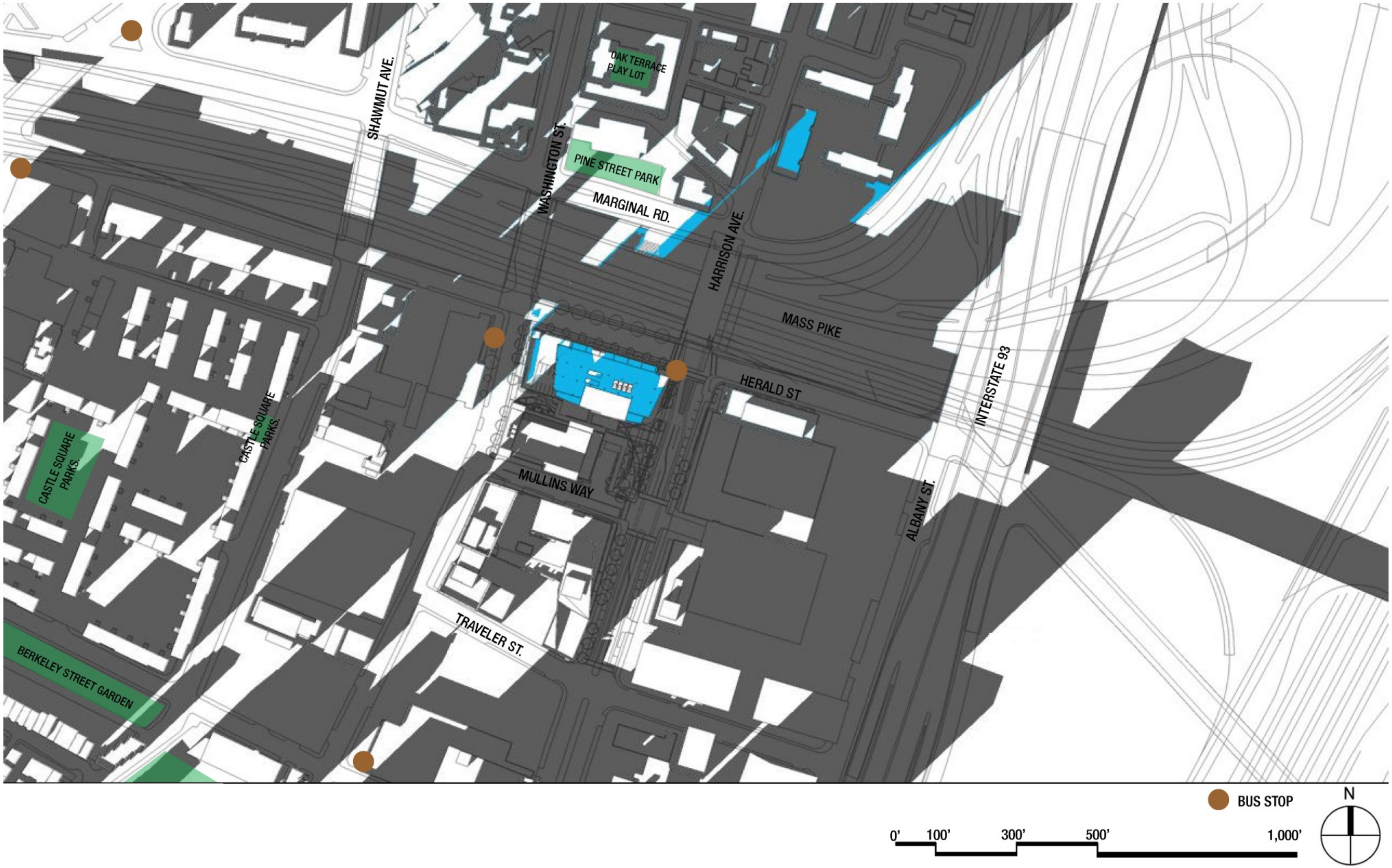
Figure 3.2-13

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



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SMMA

Figure 3.2-14

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

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

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

- **Viewpoint 1:** View from Herald Street facing south toward the Project site.
- **Viewpoint 2:** View from Harrison Avenue facing west toward the Project site.
- **Viewpoint 3:** View from William E. Mullins Way facing north toward the Project site.
- **Viewpoint 4:** View from Washington Street facing east toward the Project site.
- **Area Context Viewpoint AC1:** View from Herald Street facing south toward 100 Shawmut Avenue.
- **Area Context Viewpoint AC2:** View from Washington Street facing east toward 345 Harrison Avenue, currently under construction.

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-6 illustrate the BRADA results for each analysis.

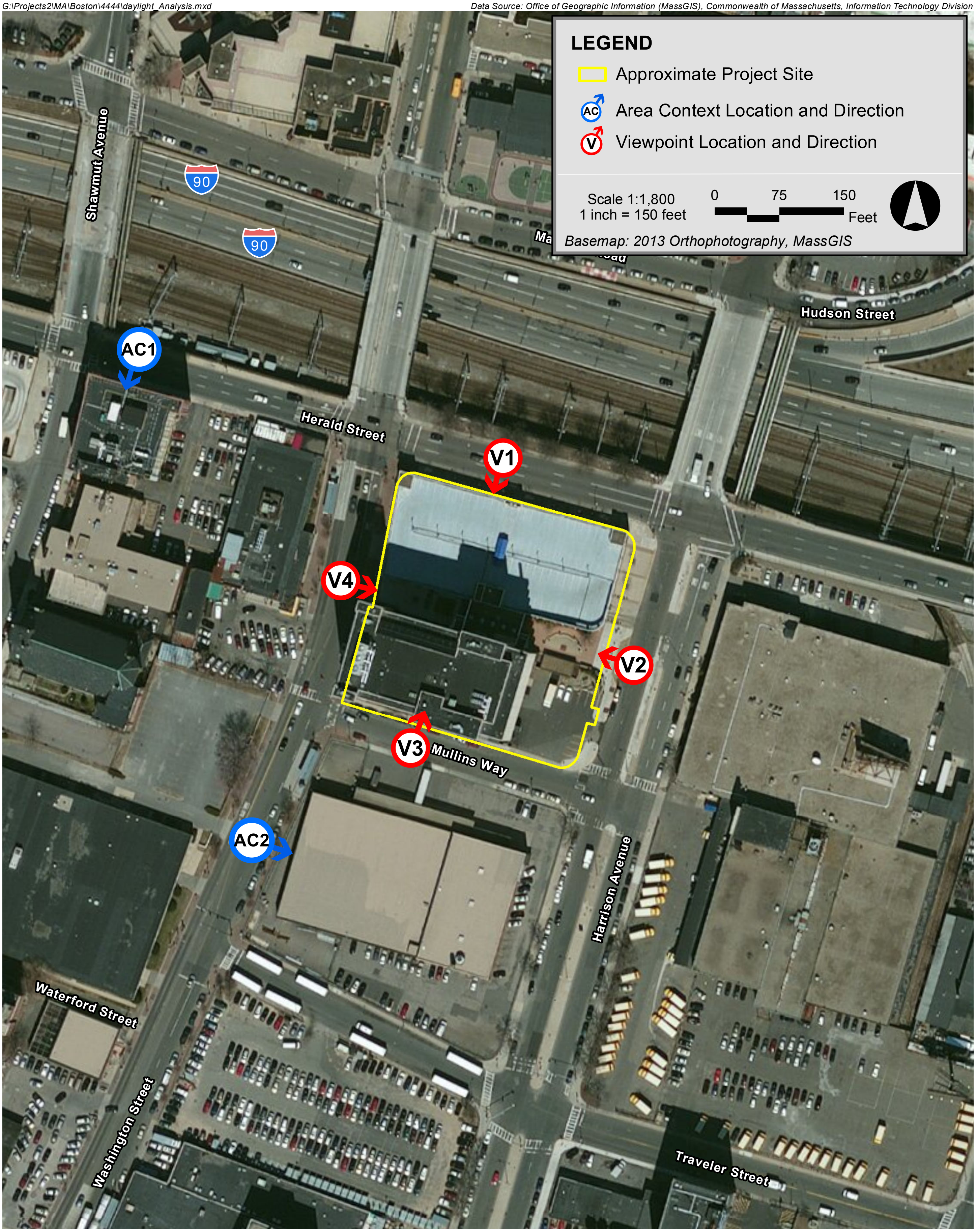

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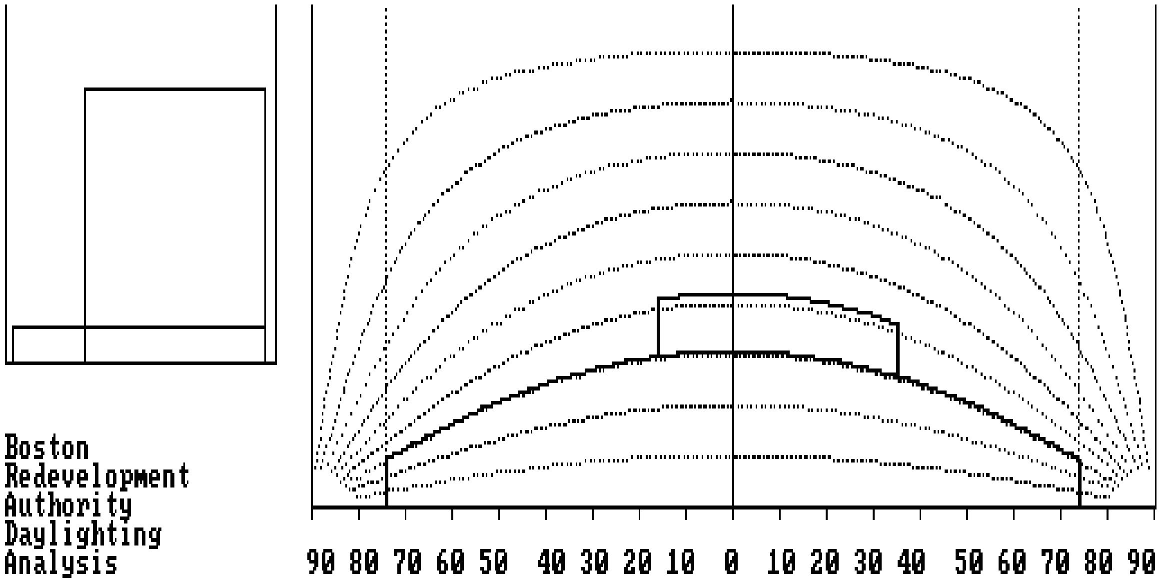
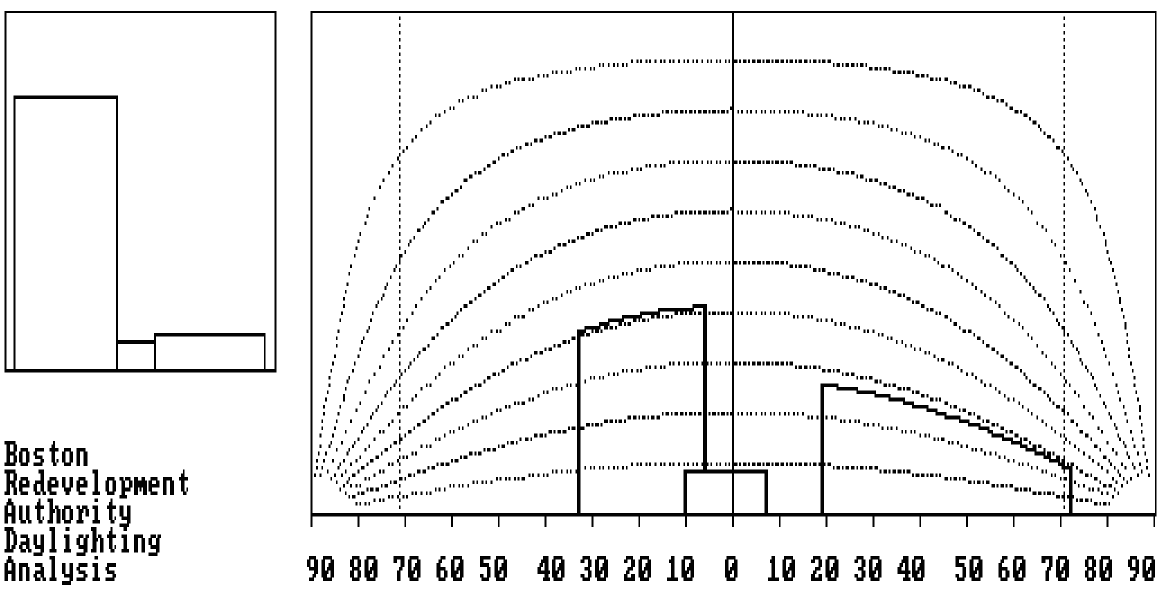
Figure 3.3-1
Daylight Analysis Viewpoints

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



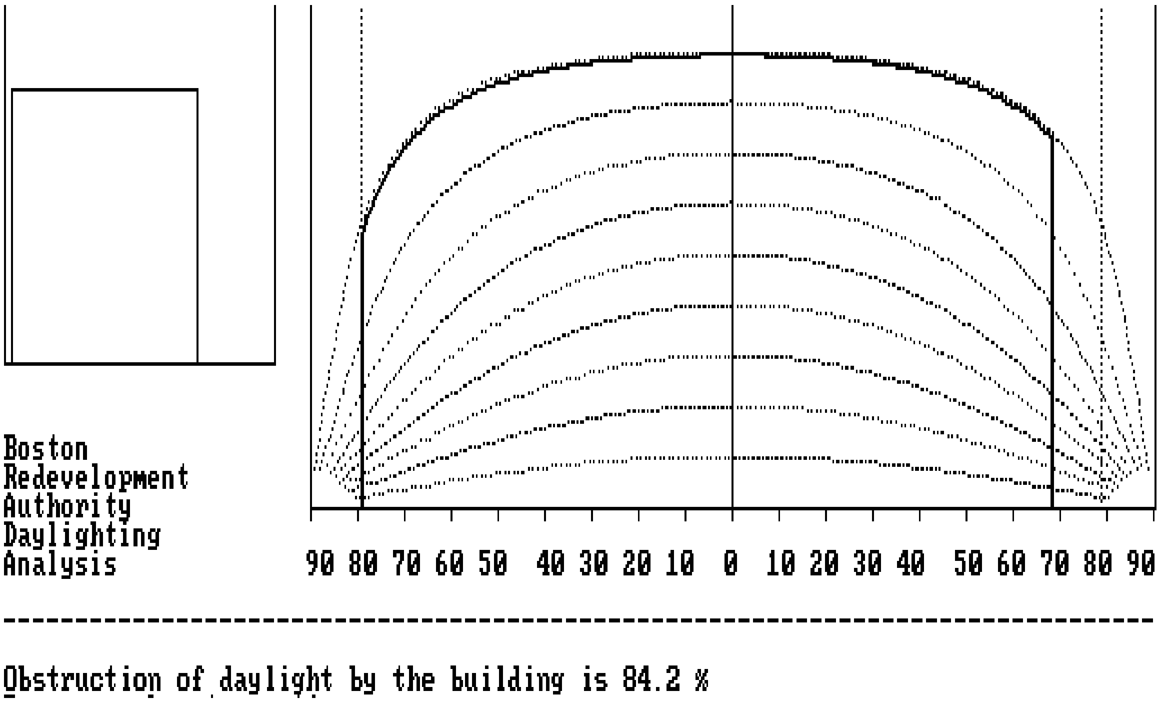
Obstruction of daylight by the building is 34.6 %

Viewpoint 2: View from Harrison Avenue facing west toward the Project site

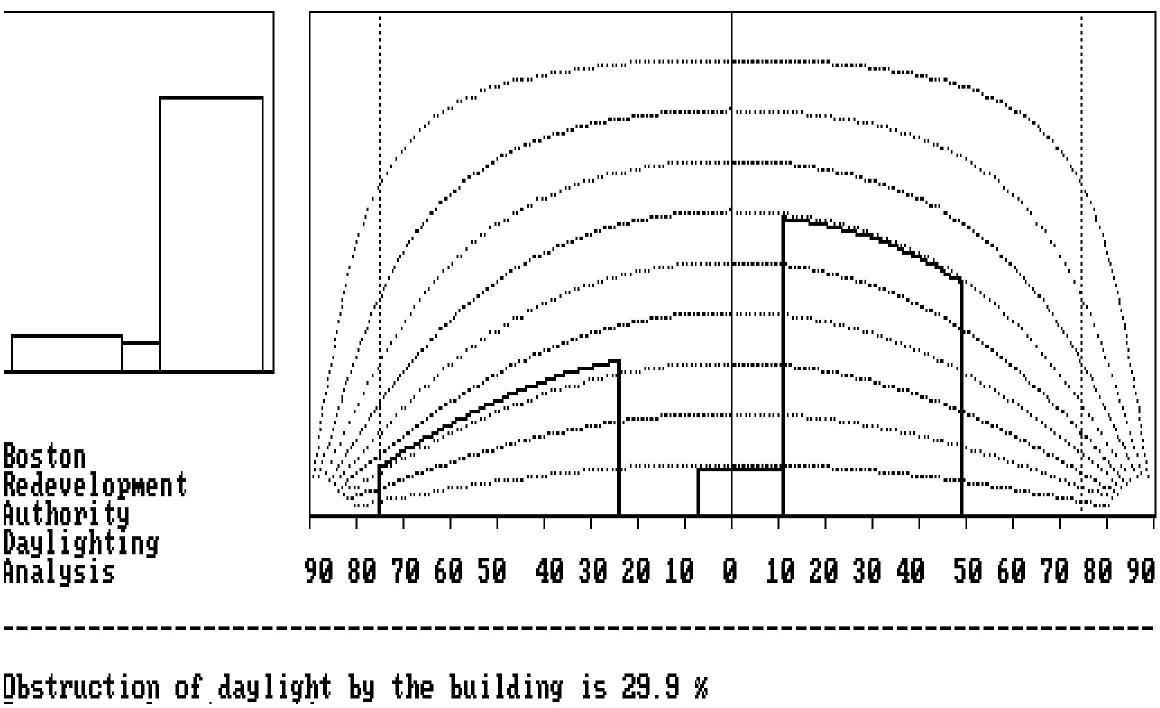


Obstruction of daylight by the building is 8.7 %

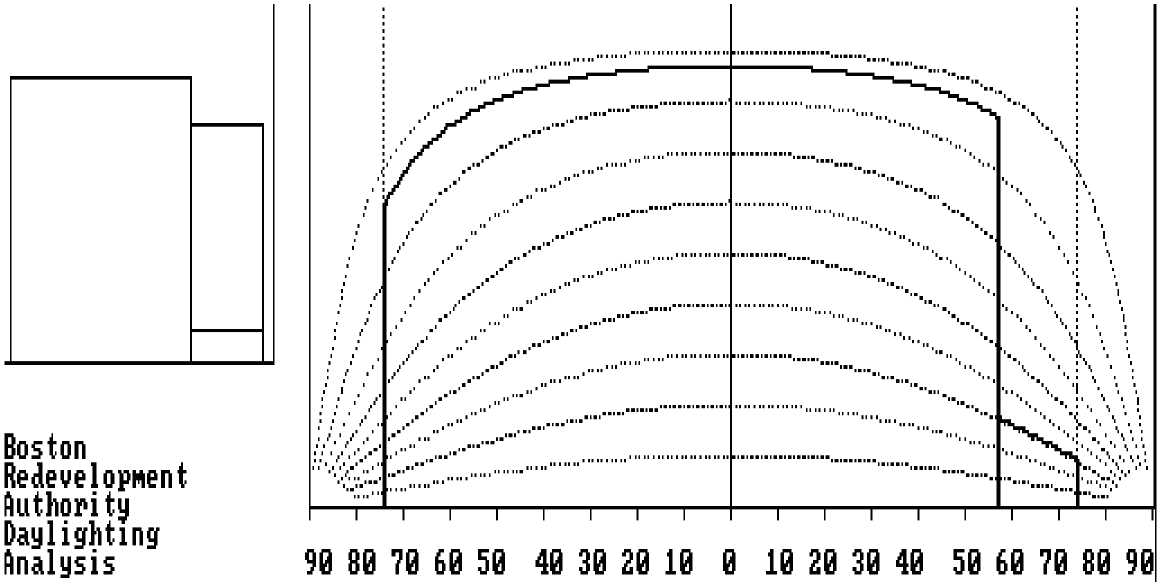
Viewpoint 3: View from Mullins Way facing north toward the Project site



Viewpoint 4: View from Washington Street facing east toward the Project site

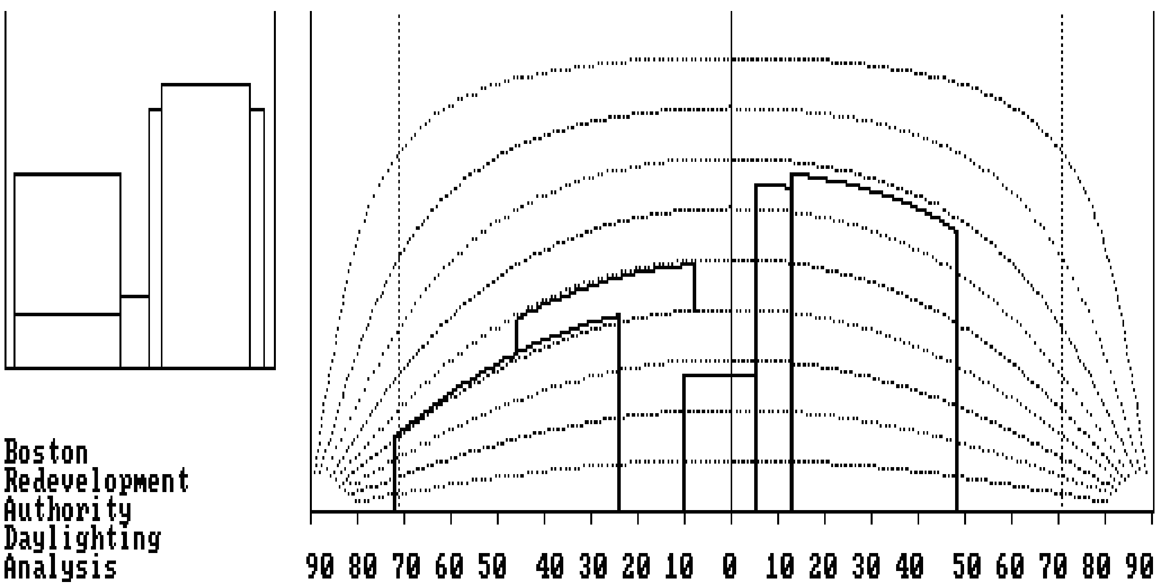


Viewpoint 1: View from Herald Street facing south toward the Project site



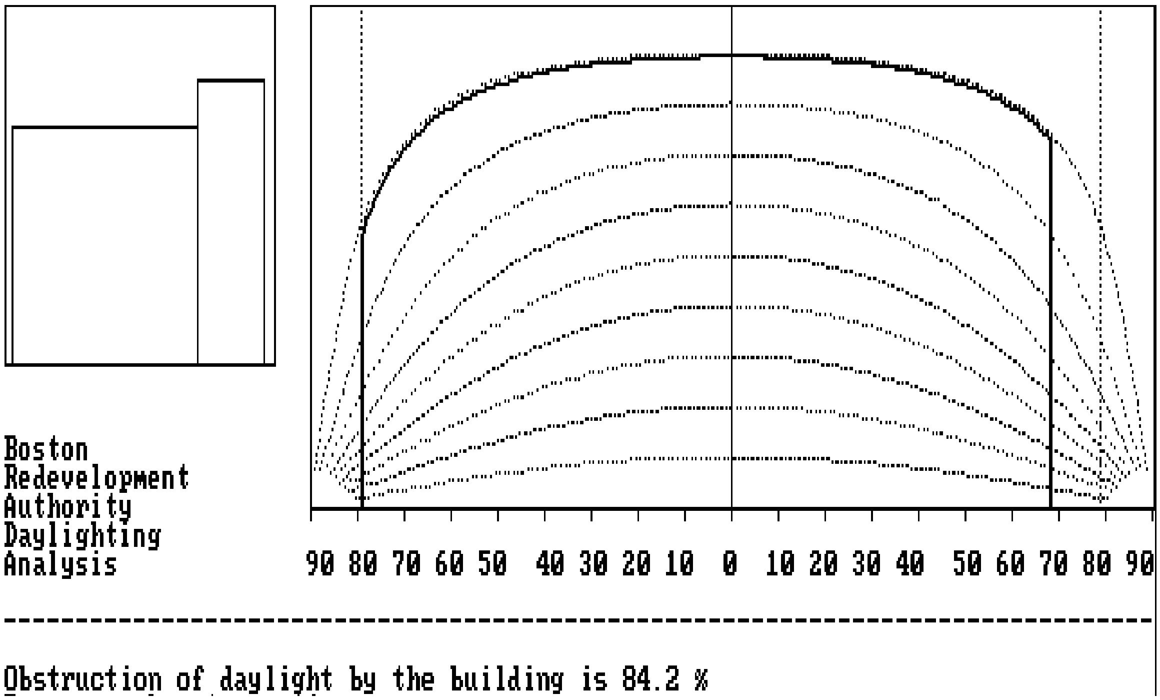
Obstruction of daylight by the building is 80.8 %

Viewpoint 2: View from Harrison Avenue facing west toward the Project site

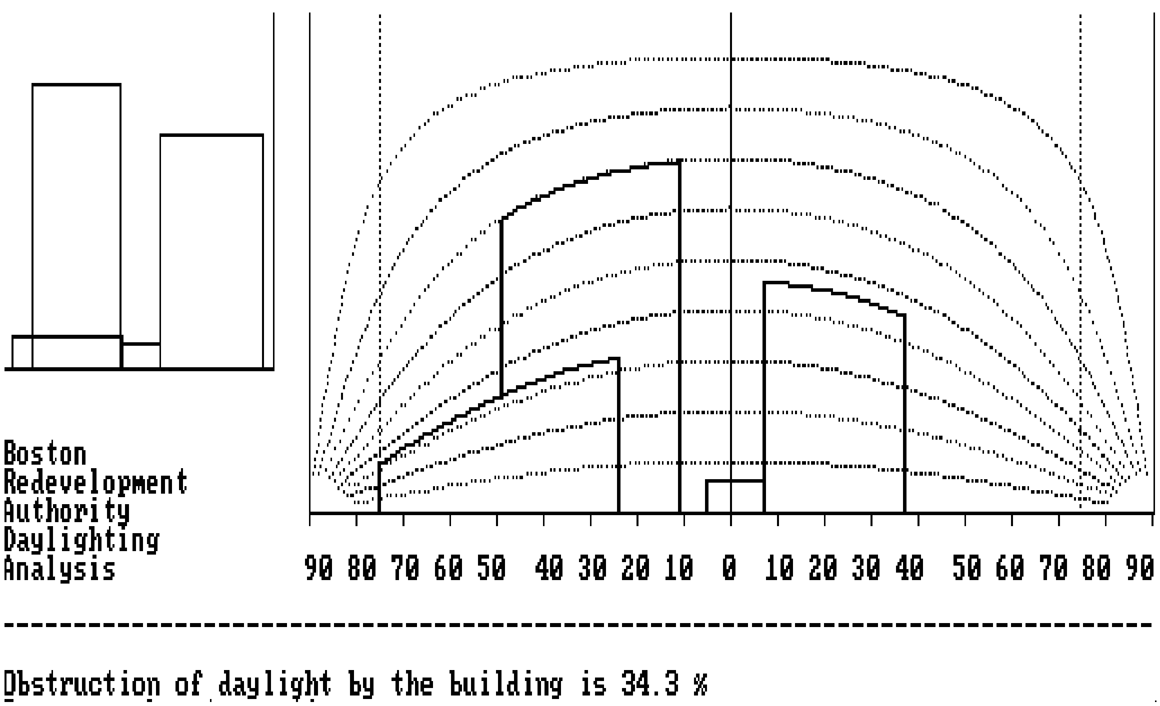


Obstruction of daylight by the building is 46.1 %

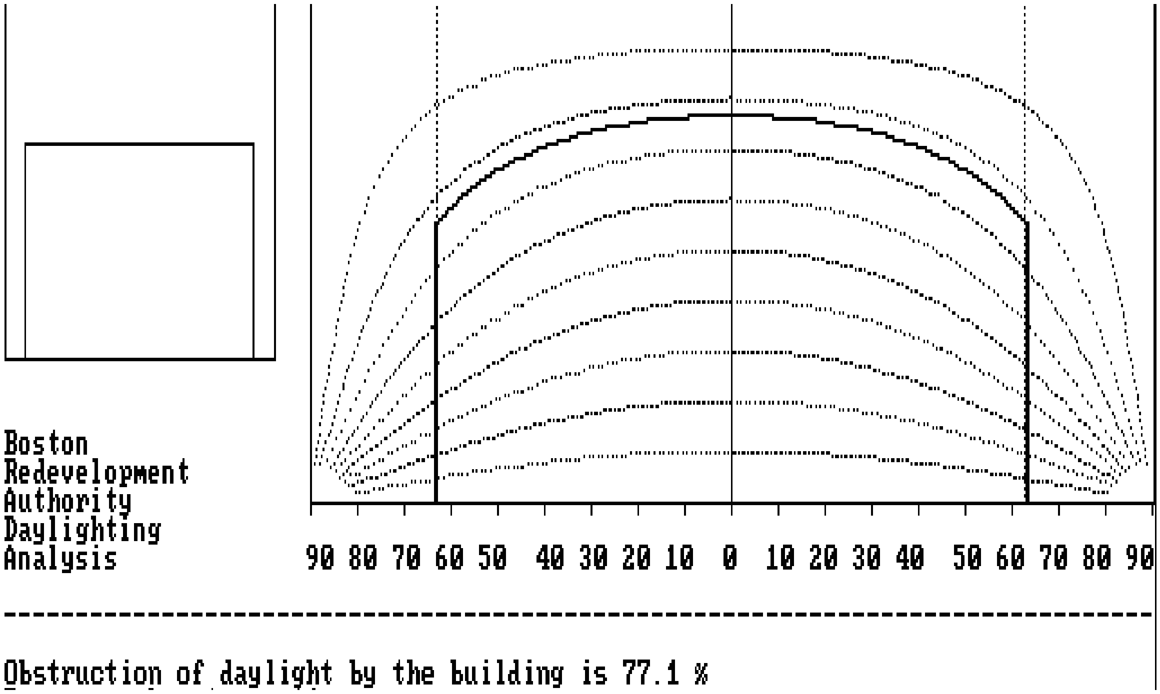
Viewpoint 3: View from Mullins Way facing north toward the Project site



Viewpoint 4: View from Washington Street facing east toward the Project site



AC 1: View from Herald Street facing south toward 100 Shawmut Avenue



AC 2: View from Washington Street facing east toward 345 Harrison Avenue

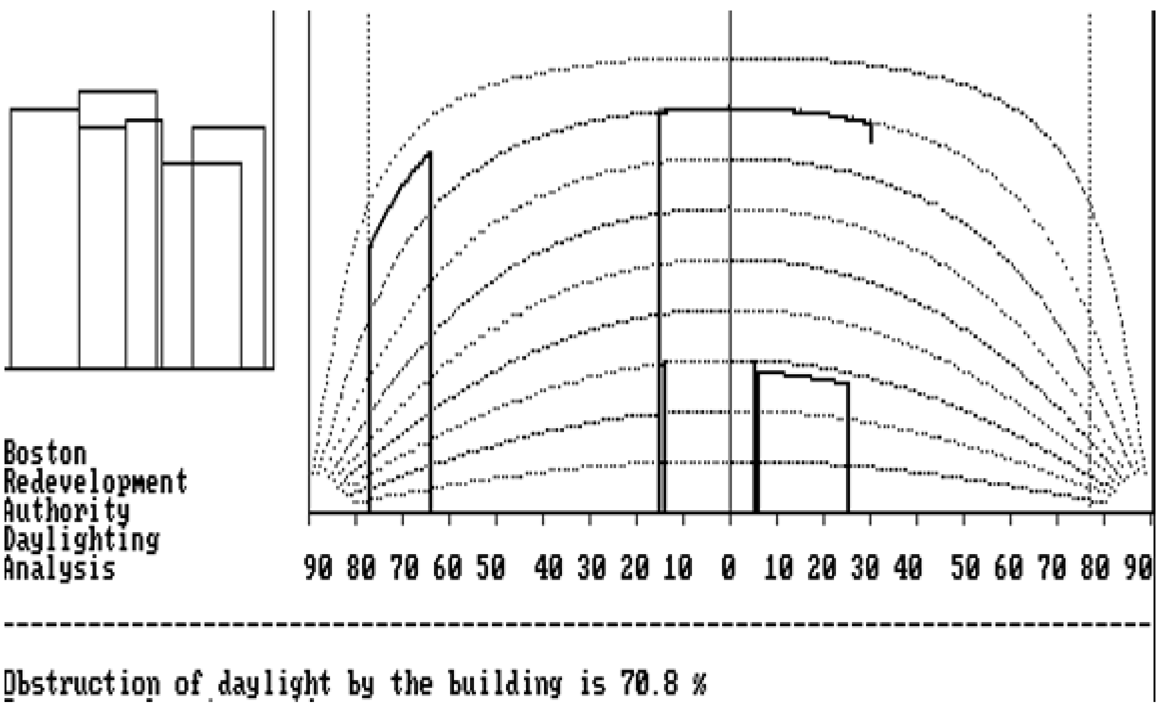


Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		*Existing Conditions*	*Proposed Conditions*
Viewpoint 1	View from Herald Street facing south toward the Project site	34.6%	80.8%
Viewpoint 2	View from Harrison Avenue facing west toward the Project site	8.7%	46.1%
Viewpoint 3	View from William E. Mullins Way facing north toward the Project site	84.2%	84.2%
Viewpoint 4	View from Washington Street facing east toward the Project site	29.9%	34.3%
Area Context Points			
AC1	View from Herald Street facing south toward 100 Shawmut Avenue	77.1%	N/A
AC2	View from Washington Street facing east toward 345 Harrison Avenue	70.8%	N/A

Herald Street – Viewpoint 1

Herald Street runs along the northern edge of the Project Site. Viewpoint 1 was taken from the center of Herald Street facing south toward the Project site. The Project site has an existing daylight obstruction of 34.6%. The development of the Project will increase the daylight obstruction value to 80.8%. While this is an increase over existing conditions, the daylight obstruction value is similar to other areas in the vicinity, including the Area Context viewpoints.

Harrison Avenue – Viewpoint 2

Harrison Avenue runs along the eastern edge of the Project site. Viewpoint 2 was taken from the center of Harrison Avenue facing west toward the Project site. The existing daylight obstruction is 8.7%. The development of the Project will increase the daylight obstruction value to 46.1%. While this is an increase over existing conditions, the daylight obstruction value for the Project is less than other areas in the Project vicinity, including the Area Context viewpoints.

William E. Mullins Way – Viewpoint 3

William E. Mullins Way runs along the southern edge of the Project site. Viewpoint 3 was taken from the center of William E. Mullins Way facing north toward the Project site. The existing site has a daylight obstruction of 84.2%. The development of the Project will not increase the daylight obstruction value and will stay consistent at 84.2% due to the existing building at 1000 Washington Street remaining in its current condition.

Washington Street – Viewpoint 4

Washington Street runs along the western edge of the Project site. Viewpoint 4 was taken from the center of Washington Street facing east toward the Project site. The existing daylight obstruction is 29.9%. The development of the Project will increase the daylight obstruction value to 34.3%. While this is an increase over existing conditions, the daylight obstruction value for the Project is less than other areas in the Project vicinity, including the Area Context viewpoints.

Area Context Views

The surrounding area around the Project site is densely populated, and proposed projects in the immediate vicinity of the Project site will increase the density of the surrounding area. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the two Area Context Viewpoints described above and shown in Figure 3.3-1. The daylight obstruction values ranged from 70.8% for AC2 to 77.1% for AC1. Daylight obstruction values for the Project site vary, but are similar to buildings in the Project vicinity, including the Area Context values.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and 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.

3.4 Solar Glare

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

3.5 Air Quality Analysis

An air quality analysis has been conducted to determine the impact of pollutant emissions from mobile sources generated by the Project. Specifically, a microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) resulting from traffic flow around the Project area. The analysis shows that with the Project in place, all predicted CO concentrations at the studied intersections will be well below the one-hour and eight-hour National Ambient Air Quality Standards.

Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection during permitting under the Environmental Results Program, as required.

3.5.1 National Ambient Air Quality Standards and Background Concentrations

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

3.5.1.1 National Ambient Air Quality Standards

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

NAAQS specify concentration levels for various averaging times and include both “primary” and “secondary” standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards were applied when comparing to the modeling results for this Project.

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

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

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

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

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

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

3.5.1.2 Background Concentrations

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

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. To attain the one-hour NO_2 standard, the three-year average of the 98^{th} percentile of the maximum daily one-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at East First Street in South Boston, roughly 1.3 miles east southeast of the Project location. However, this site only samples for SO_2 and NO_2. The next closest site is at 174 North Street (1.3 miles north northeast), but this site only samples PM-2.5. A site on Harrison Avenue is roughly 1.5 miles southwest of the Project. This site samples for the remaining pollutants. A summary of the background air quality concentrations are presented in Table 3.5-2.

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

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

Notes:
From 2012-2014 EPA's AirData Website
(1) SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
(2) CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
(3) NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
(4) O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

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

For use in the microscale analysis, background concentrations of CO in parts per million (ppm) were required. The corresponding maximum background concentrations in ppm were 2.2 ppm (2,474 $\mu g/m^3$) for one-hour and 1.9 ppm (2,177 $\mu g/m^3$) for eight-hour CO.

3.5.2 Methodology

3.5.2.1 Microscale Analysis

The BRA requires an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection (including garage entrances/exits) where 1) project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the project will generate 3,000 or more new average daily trips on roadways providing access to a single location. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

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

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

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

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 2.2 ppm (one-hour) and 1.9 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

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

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

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

Intersection Selection

Four signalized intersections included in the traffic study meet the criteria for a microscale analysis, as described above (see Chapter 2). The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The intersections found to meet the criteria for inclusion in the microscale analysis are:

- the intersection of Albany Street & I-93 SB On-Ramp & Herald Street;
- the intersection of Albany Street & Traveler Street;
- the intersection of Frontage Road & Traveler Street; and,
- the intersection of Frontage Road & West 4th Street.

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

Emissions Calculations (MOVES)

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

All link types for the modeled intersection were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (SYNCHRO) reports. A speed of 30 mph is used

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

for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[6]

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

Receptors & Meteorology Inputs

Sets of up to roughly 200 receptors were placed in the vicinity of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersections. The roadway links and receptor locations of the modeled intersections are presented in Figures 3.5-1 through 3.5-4.

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

Impact Calculations (CAL3QHC)

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

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

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

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

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

321 Harrison Avenue **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 3.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Albany Street & I-93 SB On-Ramp

321 Harrison Avenue Boston, Massachusetts

Figure 3.5-2

Link and Receptor Locations for CAL3QHC modeling of Intersection of Albany Street & Traveler Street

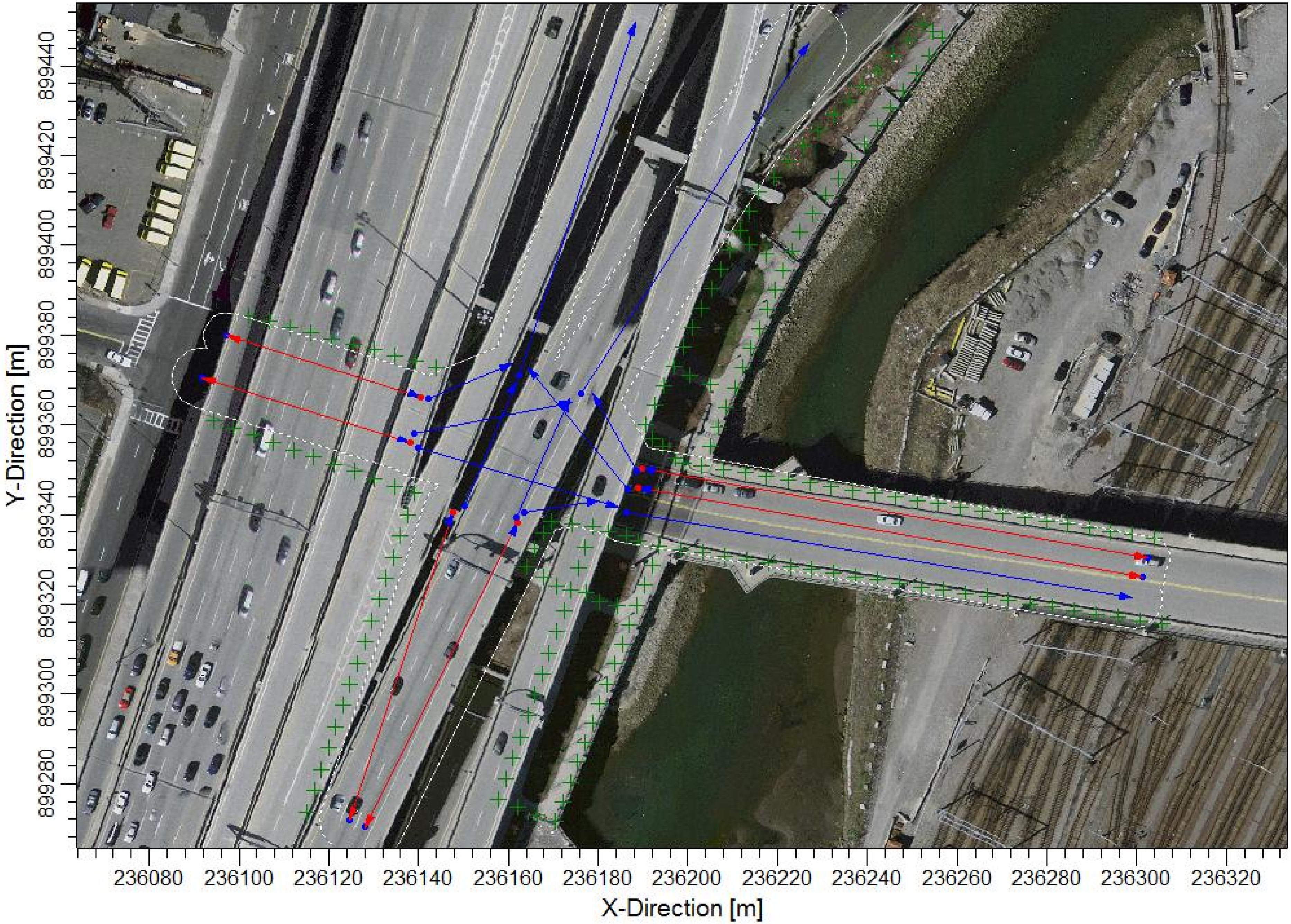
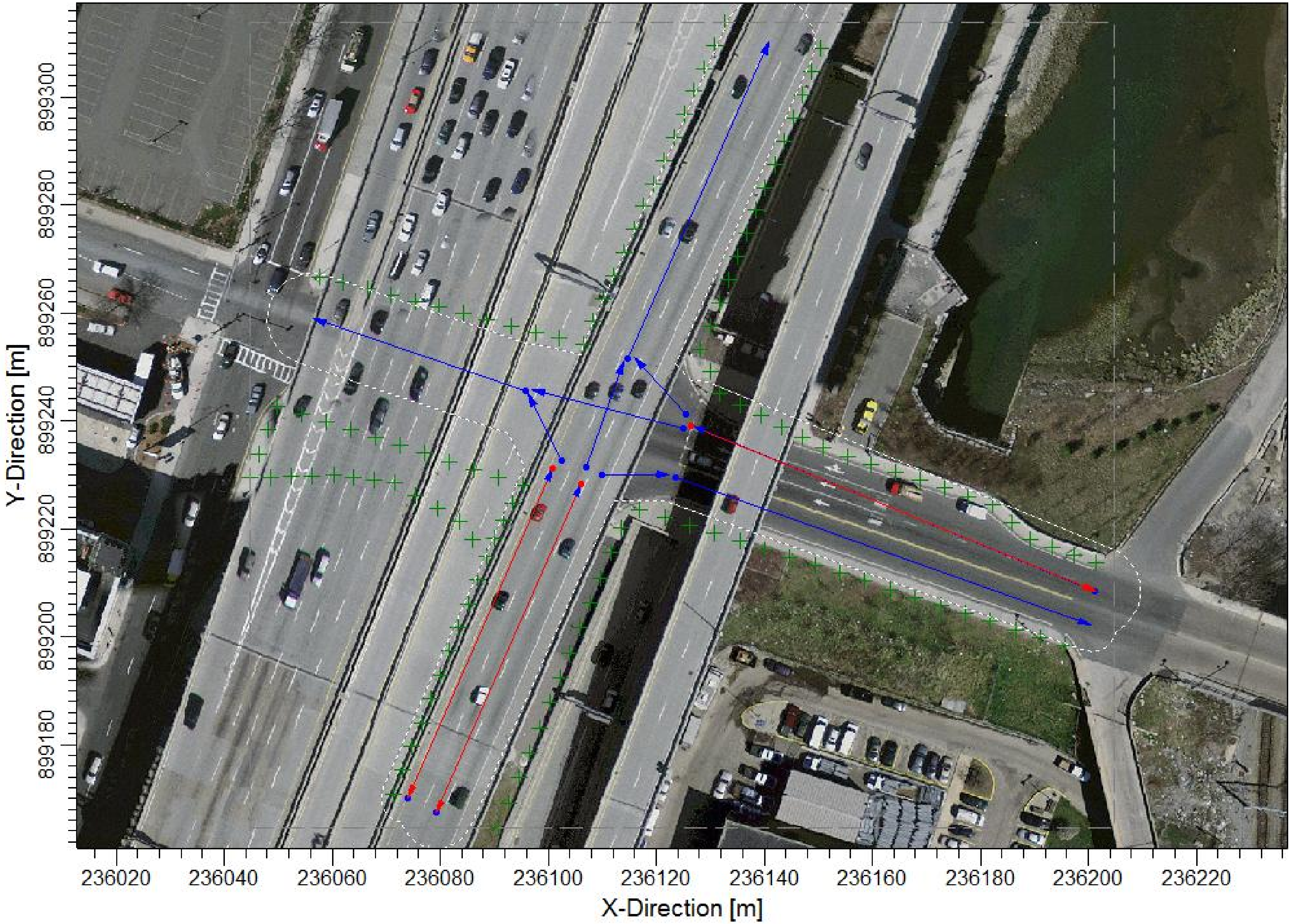


Figure 3.5-3

Link and Receptor Locations for CAL3QHC modeling of Intersection of Frontage Road & Traveler Street



321 Harrison Avenue **Boston, Massachusetts**

Figure 3.5-4

Link and Receptor Locations for CAL3QHC modeling of Intersection of Frontage Road & West 4th Street

3.5.3 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-5 for the 2016 and 2023 scenarios.

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.8 ppm) plus background (2.2 ppm) is 3.0 ppm for the existing p.m. peak case at the intersection of Frontage Road and West 4th Street. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.7 ppm) plus background (1.9 ppm) is 2.6 ppm for the same location and scenario. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

3.5.4 Conclusion

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

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2016)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.7	2.2	2.9	35
	PM	0.7	2.2	2.9	35
Albany Street & Traveler Street	AM	0.4	2.2	2.6	35
	PM	0.4	2.2	2.6	35
Frontage Road & Traveler Street	AM	0.4	2.2	2.6	35
	PM	0.4	2.2	2.6	35
Frontage Road & West 4th Street	AM	0.7	2.2	2.9	35
	PM	0.8	2.2	3.0	35
8-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.6	1.9	2.5	9
	PM	0.6	1.9	2.5	9
Albany Street & Traveler Street	AM	0.4	1.9	2.3	9
	PM	0.4	1.9	2.3	9
Frontage Road & Traveler Street	AM	0.4	1.9	2.3	9
	PM	0.4	1.9	2.3	9
Frontage Road & West 4th Street	AM	0.6	1.9	2.5	9
	PM	0.7	1.9	2.6	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.5	2.2	2.7	35
	PM	0.5	2.2	2.7	35
Albany Street & Traveler Street	AM	0.4	2.2	2.6	35
	PM	0.4	2.2	2.6	35
Frontage Road & Traveler Street	AM	0.2	2.2	2.4	35
	PM	0.2	2.2	2.4	35
Frontage Road & West 4th Street	AM	0.4	2.2	2.6	35
	PM	0.5	2.2	2.7	35
8-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.5	1.9	2.4	9
	PM	0.5	1.9	2.4	9
Albany Street & Traveler Street	AM	0.4	1.9	2.3	9
	PM	0.4	1.9	2.3	9
Frontage Road & Traveler Street	AM	0.2	1.9	2.1	9
	PM	0.2	1.9	2.1	9
Frontage Road & West 4th Street	AM	0.4	1.9	2.3	9
	PM	0.5	1.9	2.4	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.5	2.2	2.7	35
	PM	0.5	2.2	2.7	35
Albany Street & Traveler Street	AM	0.4	2.2	2.6	35
	PM	0.4	2.2	2.6	35
Frontage Road & Traveler Street	AM	0.2	2.2	2.4	35
	PM	0.2	2.2	2.4	35
Frontage Road & West 4th Street	AM	0.4	2.2	2.6	35
	PM	0.5	2.2	2.7	35
8-Hour					
Albany Street & I-93 SB On-Ramp & Herald Street	AM	0.5	1.9	2.4	9
	PM	0.5	1.9	2.4	9
Albany Street & Traveler Street	AM	0.4	1.9	2.3	9
	PM	0.4	1.9	2.3	9
Frontage Road & Traveler Street	AM	0.2	1.9	2.1	9
	PM	0.2	1.9	2.1	9
Frontage Road & West 4th Street	AM	0.4	1.9	2.3	9
	PM	0.5	1.9	2.4	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

3.6 Stormwater/Water Quality

Please see Section 7.3 for information on stormwater and water quality impacts.

3.7 Flood Hazard Zones/ Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0077Jindicates the FEMA Flood Zone Designations for the site area. The map shows that the Project is located in a Zone X, "Areas determined to be outside the 0.2% annual chance floodplain."

The site does not contain wetlands.

3.8 Geotechnical Impacts

This section describes existing site conditions, subsurface soil and groundwater conditions, planned below-grade construction activities for the Project, and procedures for monitoring and protecting adjacent structures and maintaining groundwater levels in the Project area during excavation and foundation construction, and following construction completion.

3.8.1 Existing Site Conditions

The Project site consists of a developed parcel totaling approximately two acres (approximately 83,470 square feet) bounded by Herald Street to the north, Washington Street to the west, Harrison Avenue to the east; and William E. Mullins Way to the south. An 11-story, 234,900 square foot office building with a one-story lobby (known as 1000 Washington Street) is located on the southern portion of the site and a three-story parking garage with one additional level below grade occupies most of the northern portion of the site. The area around the building is essentially paved. Existing site grades are generally level around the building perimeter at about El. 16 Boston City Base (BCB) datum.

The existing buildings on the Project site will be retained and the proposed building constructed above the existing garage.

3.8.2 Subsurface Soil and Bedrock Conditions

Based on subsurface data obtained at the site during a test boring exploration program undertaken in 1988 for the existing building, the general subsurface profile anticipated to be encountered at the site is listed in Table 3.8-1 in order of increasing depth below the ground surface:

Table 3.8-1 Subsurface Soil and Bedrock Conditions in Project Area

Generalized Subsurface Strata	Approximate Depth Below Ground Surface to Top of Stratum (ft)	Approximate Thickness (ft)
Miscellaneous (Urban) Fill	Not Applicable	9 to 20
Organic Soils	9 to 20	0 to 5
Marine (Clay) Deposits	20	70
Glacial Deposits	85 to 90	Not Defined
Bedrock	85 to 95	Not Applicable

Generalized descriptions of the strata are described below:

- *Miscellaneous (Urban) Fill* – The Project site consists of land reclaimed as part of filling undertaken in the early 1800s (South Cove). The composition of this material varies, but typically consists of loose to medium dense, brown to gray, poorly graded SAND with silt and gravel, and/ or medium dense brown silty SAND having varying amounts of concrete, cinders, metal, brick, and other miscellaneous materials.

- *Organic Soils* – The organic soils, where encountered, are generally comprised of a dark gray/black sandy silt containing varying amounts of shell fragments and wood fibers.

- *Marine (Clay) Deposits* – The clay, known locally as Boston Blue Clay, is yellow-brown and very stiff to stiff at the top of the stratum ("crust"), becoming olive gray to gray and softer with depth, and is generally described as lean CLAY with occasional seams of sandy silt/ silty sand.

- *Glacial Deposits* – Where encountered, the glacial deposits are described as a dense to medium dense gray poorly graded SAND and/or silty clayey SAND.

- *Bedrock* – Bedrock is anticipated to be encountered at depths of about 85 to 95 ft.

3.8.3 Existing Groundwater Conditions

The Project site is located in the South End neighborhood, which is part Boston's Groundwater Conservation Overlay District (GCOD), which includes those areas in Boston having wood pile supported buildings that are potentially susceptible to the possible effects of depressed groundwater levels. Groundwater levels need to be above the tops of the wood piles to keep the piles submerged and lessen the potential for the wood to decay.

Groundwater levels in the vicinity of the Project site are monitored by the Boston Groundwater Trust (BGwT), an entity that tracks and reports groundwater levels in the GCOD.

Recent groundwater level measurements in observation wells in proximity to the Project site have ranged from about El. 3.5 to El. 8.5 (BCB). Groundwater levels at and near the site could be influenced by leakage into and out of sewers, storm drains, water utilities, and other below grade structures, and environmental factors such as precipitation, season, and temperature.

3.8.4 Proposed Foundations and Below Ground Construction

The Project includes the eight story office building constructed above the existing three story above grade garage and one level below grade. New foundations within the garage footprint will be comprised of small diameter drilled in piles with new pile caps placed below the existing basement floor grade, approximately El. 6 Boston City Base (BCB). New columns beyond the garage footprint along Herald Street and Harrison Avenue will be supported on either driven piles or drilled shafts.

Although not yet selected, the foundation system for the new building as indicated will be comprised of deep foundations extending through the glacial deposits and bearing in the bedrock. Foundation types being considered include driven piles and drilled-in concrete caissons or small diameter grouted piles.

For the proposed Project, limited and relatively shallow excavations will be required for anticipated pile caps and grade beams, and site improvements.

Because of the nature of the near surface fill soils, pre-excavation may be performed in advance of installing deep foundations. The intent of the pre-excavation is to remove foundations and other buried obstructions from former site buildings that could interfere with installation of deep foundations.

3.8.5 Groundwater Protection

During the construction of new foundations limited dewatering will be required for construction of pile caps below the existing lowest level floor grade. Some local dewatering may be required during excavation and construction of grade beams and site improvements to manage and remove surface water (precipitation) runoff; most excavations, with the possible exception of elevator pits and pile caps are expected to be above groundwater levels. To the extent possible, the Project will attempt to recharge/infiltrate water into the ground on the site. New elevator pits extending below the lowest level floor slab will be waterproofed. No foundation drains or other features that could withdraw groundwater long term will be used.

The proposed construction is not anticipated to adversely impact groundwater levels on or near the site, temporarily or permanently.

The Project Site is located within the Groundwater Conservation Overlay District (GCOD) which is governed by Article 32 of the City of Boston Zoning Code. The Project shall comply with the standards and requirements set forth in Article 32 of the Code. The Proponent shall obtain a written determination from the Boston Water and Sewer Commission (BWSC) as to whether the Project meets the standards and requirements of Article 32. In addition, the Proponent shall demonstrate that the Project meets the requirements of Section 32-6 of the Code by obtaining a stamped certification from the Massachusetts registered engineer that the requirements of Section 32-6 of the Code are met. The Proponent shall provide both a copy of the written determination from BWSC and a copy of the stamped certification from a Massachusetts registered engineer to the BRA and the Boston Groundwater Trust prior to the issuance of a Certificate of Consistency. As such, the Project shall be deemed to be in compliance with Article 32 of the Code and shall not need a conditional use permit from the Board of Appeal for Article 32 purposes.

The Proponent is committed to working with the BGwT and neighborhood to ensure that the Project has no adverse impact on nearby groundwater levels.

3.8.6 Protection of Existing Structures

The proposed construction is not expected to impact foundations of adjacent or nearby structures. Only surficial, temporary excavations are required for installation of shallow building elements (pile caps, grade beams. Elevator pits, and utilities. New foundation installations will be performed in a manner that should not adversely impact any adjacent facilities.

3.8.7 Noise, Vibrations and Dust

Below-grade construction will be performed using conventional methods and procedures. New foundation installation (if deep, drilled-in elements) will use non-displacement drilling methods that will not result in significant noise or vibrations. New foundation installation (if deep, driven elements) will need to use pile driving that can sometimes generate vibration and noise in excess of background. Performance criteria will be established in the Contract Documents for controlling vibrations and noise to within City-acceptable limits.

Short-term air quality impacts from fugitive dust may be. Plans for controlling fugitive dust, including mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of any excavated soils by covered trucks will be utilized as necessary.

3.8.8 Monitoring

The Proponent recognizes the importance for maintaining and monitoring groundwater levels, as well as performance of the construction. The Proponent is committed to monitoring water levels in observation wells in the vicinity of the site at regular intervals before and during project construction, and will provide the water level data to the Boston Groundwater Trust, if requested.

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.

3.9 Solid and Hazardous Waste

3.9.1 Classification and Removal of Hazardous Materials

Prior to commencement of the work, investigations will be performed at the site and in the area of the existing building to evaluate the presence of contaminated soils, groundwater, asbestos, lead paint, or other hazardous materials that may exist. If such materials are present, they will be characterized based on the type, composition, and level of the contaminants. Work plans will be prepared by appropriately licensed professionals to identify the means and methods for safe removal and legal disposal or recycling of these materials.

Abatement and disposal of hazardous materials (or hazardous waste) discovered in the existing building will be performed prior to work within the building by specialty contractors experienced and licensed in removing and handling these materials.

Excess soils generated from excavations on site and not reused on site will be legally transported off site and disposed of in accordance with the Massachusetts Contingency Plan and other applicable regulatory requirements. Disposal of excess excavated soil materials will be tracked via Bills of Lading or other methods, as required to ensure their proper and legal transport and disposal in accordance with DEP regulations.

3.9.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of office 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 286 tons of solid waste per year.

With the exception of household hazardous wastes typical of office developments, the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials. Typical waste generated by the office use will be handled in compliance with all local, state and federal regulations.

3.9.3 Recycling

Dedicated recycling areas will be included in the design. Single stream recycling bins will be provided at each work space, making recycling for building occupants easy and convenient. The 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 standards as described in Chapter 4.

3.10 Noise Impacts

3.10.1 Introduction

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

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

3.10.2 Noise Terminology

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

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

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

The sound level meter used to measure noise is a standardized instrument.[10] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network (there are also B- and C-weighting networks), which most closely approximates how the human ear responds to sound as a function of frequency, and is the accepted scale used for community sound level measurements. Sounds are frequently reported as detected with the A-weighting network of the sound level meter in dBA. A-weighted sound levels emphasize the middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies.

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

- L_{eq}, the equivalent level, in dBA, is the level of a hypothetical steady sound that would have the same energy (i.e., the same time-averaged mean square sound pressure) as the actual fluctuating sound observed.
- L_{90} is the sound level, in dBA, exceeded 90 percent of the time in a given measurement period. The L_{90}, or residual sound level, is close to the lowest sound level observed when there are no obvious nearby intermittent noise sources.
- L_{50} is the median sound level, in dBA, exceeded 50 percent of the time in a given measurement period.
- L_{10} is the sound level, in dBA, exceeded only 10 percent of the time in a given measurement period. The L_{10}, or intrusive sound level, is close to the maximum sound level observed due to occasional louder intermittent noises, like those from passing motor vehicles.

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

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

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

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

3.10.3 Noise Regulations and Criteria

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

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

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

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

3.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project, located in the South End neighborhood of Boston. Existing noise sources in the vicinity of the Project site currently include: vehicle and truck traffic along local roadways including: East Berkeley Street, Harrison Avenue, Herald Street, and I-90), rooftop mechanical equipment, subway noise, daytime construction activity, aircraft flyovers, wind noise, birds, and pedestrian foot traffic.

3.10.4.1 Noise Monitoring Methodology

Sound level measurements were made on Thursday, March 31, 2016 during the daytime (11:00 a.m. to 12:30 p.m.) and on Thursday, April 7, 2016 during nighttime hours (12:00 a.m. to 1:30 a.m.). Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. All measurements were 20 minutes in duration.

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

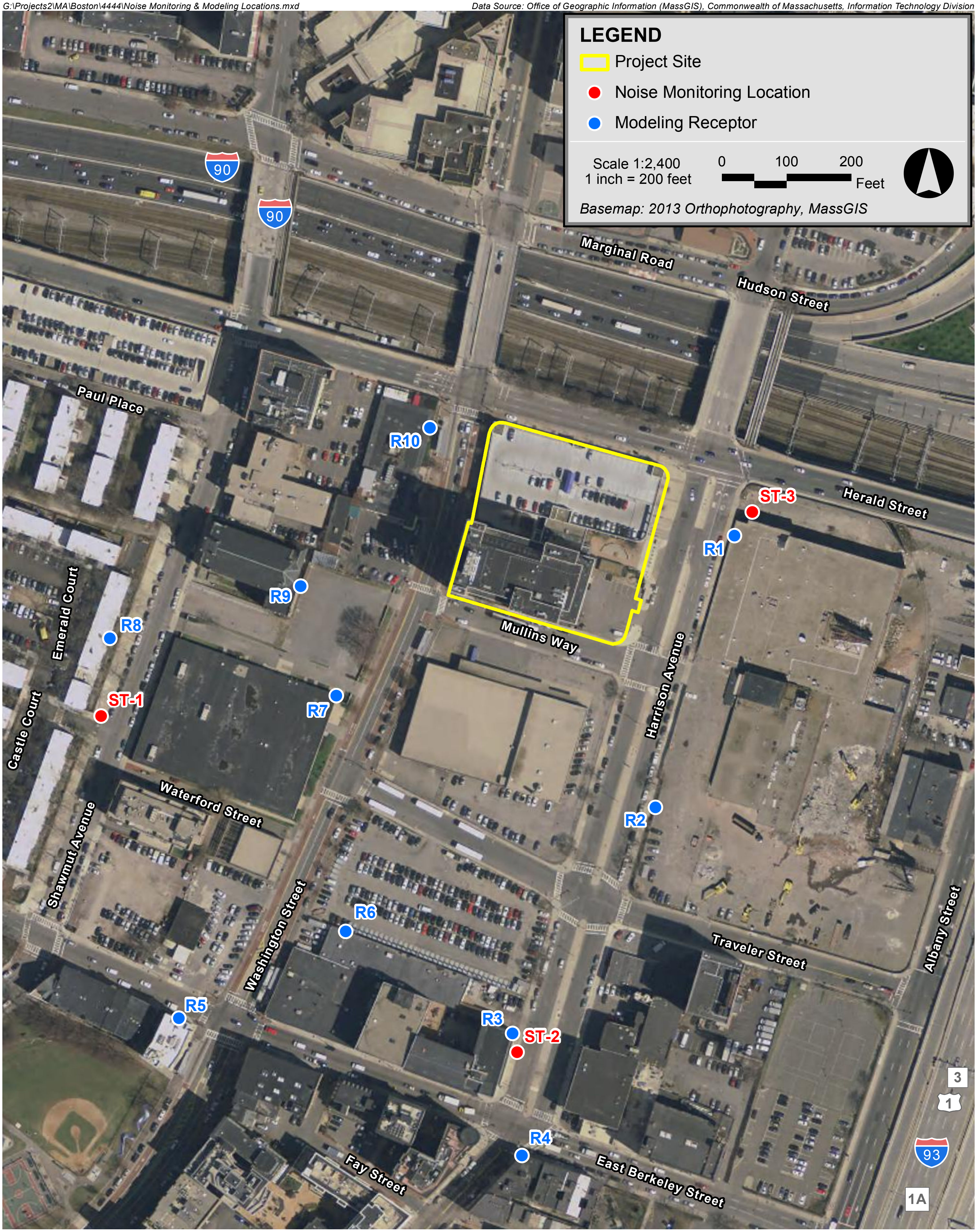
3.10.4.2 Noise Monitoring Locations

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

- **Location ST-1** is located at the northern corner of the intersection between Shawmut Avenue and Emerald Court, representative of the closest residential, commercial, and institutional receptors to the southeast and southwest of the Project along Harrison Avenue, Washington Street, and Shawmut Avenue.
- **Location ST-2** is located along the eastern façade of 160 East Berkeley Street across from 380 Harrison Avenue, representative of the closest residential and commercial receptors to the south of the Project along East Berkeley Street.
- **Location ST-3** is located in front of 310 Harrison Avenue at the eastern corner of the intersection between Harrison Avenue and Herald Street, representative of the closest residential and commercial receptors to the east and west of the Project along Herald Street.

3.10.4.3 Noise Monitoring Equipment

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



321 Harrison Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.10-1
Noise Monitoring & Modeling Locations

3.10.4.4 Measured Background Noise Levels

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

- The daytime residual background (L_{90} dBA) measurements ranged from 58 to 64 dBA;
- The nighttime residual background (L_{90} dBA) measurements ranged from 49 to 56 dBA;
- The daytime equivalent level (L_{eq} dBA) measurements ranged from 62 to 73 dBA; and
- The nighttime equivalent level (L_{eq} dBA) measurements ranged from 53 to 62 dBA,

Table 3.10-2 Summary of Measured Background Noise Levels – March 31, 2016 (Daytime) & April 7, 2016 (Nighttime)

Location	Period	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Pressure Levels by Octave-Band								
								31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST-1	Day	11:00 AM	62	76	65	60	58	69	66	62	60	58	56	50	42	34
ST-2	Day	11:26 AM	73	96	71	65	63	67	64	64	61	58	54	47	38	30
ST-3	Day	11:52 AM	69	83	71	66	64	67	66	63	62	59	57	52	44	37
ST-1	Night	12:26 AM	53	68	53	50	49	61	63	59	53	51	50	42	32	23
ST-2	Night	12:00 AM	62	76	65	58	56	62	62	55	53	49	46	39	30	22
ST-3	Night	12:51 AM	59	78	62	56	54	61	57	56	55	52	49	43	33	25

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Thursday, March 31, 2016	69 °F	35%	Mostly Sunny	Var S-W @ 3-7 mph
Nighttime	Thursday, April 07, 2016	43°F	62%	Cloudy	SW 1-2 mph

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	1992
Microphone	Larson Davis	377B20	112340
Preamp	Larson Davis	PRM831	15258
Calibrator	Larson Davis	Cal200	7147

3.10.5 Future Conditions

3.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project are expected to consist of rooftop cooling towers, outdoor air systems, and an emergency power system. This equipment is anticipated to include up to four 333-ton cooling tower cells and two 26,000 CFM dedicated outdoor air systems (DOAS) located on the roof of the proposed building, along with one 600 kW emergency generator fitted with a sound attenuating enclosure and critical grade exhaust silencer. Other secondary noise sources including pumps, heat exchangers, boilers, and domestic hot water heaters are anticipated to either be enclosed within the rooftop penthouse, within the building interior, or are assumed to have sound levels 10 dBA lower than the primary sources of noise, and were not considered in this analysis to contribute significantly to the overall sound level. Stair pressurization fans were assumed to be emergency-use only and were not included.

Mitigation will be applied to sources as needed to ensure compliance with the applicable noise regulations. The noise control features assumed in this analysis consist of an emergency generator sound attenuating enclosure and critical-grade exhaust silencer.

A tabular summary of the modeled mechanical equipment anticipated for the Project is presented below in Table 3.10-3. Sound power level data for each unit, as provided by the manufacturer or calculated from provided sound pressure level data, is presented in Table 3.10-4. Sound power levels of those units for which data was not provided were assumed based on data for similar or representative equipment. Noise reduction levels assumed in the model are provided in Table 3.10-5. The approximate locations of the mechanical equipment were provided by the Project team through a preliminary roof plan.

Table 3.10-3 Modeled Noise Sources

Noise Source	Quantity	Equipment Location	Size/Capacity per Unit
Dedicated Outdoor Air System	2	Roof	26,000 CFM
Cooling Tower	4	Roof	333 Tons
Emergency Generator	1	Roof	600 kWe / 750 kVA

Table 3.10-4 Modeled Sound Power Levels per Unit

Noise Source	Broad-band	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
Dedicated Outdoor Air System[1]	103	89[5]	89	91	101	99	100	93	90	89
Cooling Tower[2]	100	104[5]	104	102	103	98	94	87	83	80
Emergency Generator - Mechanical (enclosed)[3]	73	89[5]	89	79	75	71	65	62	57	59
Emergency Generator - Exhaust (open)[4]	122	120[5]	120	128	121	115	116	114	114	104

Notes:

1. Annexair Model ERP-E-25-EW-C-H-WM96
2. BAC New Series 3000 Model XES3E-1020-06L
3. Caterpillar Diesel Generator Set (C18DE6E), 600 kW, SA Level 1 Canopy, 100% load
4. Caterpillar Diesel Generator Set (EMCP-IVR Generator / C18 TA Engine), 600 kW Open Exhaust, 100% load
5. No data available in 32 Hz band. Assumed equal to 63 Hz band.

Table 3.10-5 Modeled Noise Reduction Levels

Noise Source	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
	dB	dB	dB	dB	dB	dB	dB	dB	dB
Emergency Generator Exhaust Silencer[1]	20[2]	20	35	35	27	20	20	20	20

Notes:

1. Silex JB-18 Critical Grade Silencer, or similar
2. No data available in 32 Hz band. Assumed equal to 63 Hz band.

3.10.5.2 Noise Modeling Methodology

Noise impacts from mechanical equipment associated with the Project were predicted using Cadna/A noise calculation software (DataKustik Corporation, 2015). This software, which uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation), offers a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, diffraction around building edges, reflection off building facades, and atmospheric absorption of sound from multiple noise sources.

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

3.10.5.3 Noise Modeling Results

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

The predicted sound levels, presented in Table 3.10-6, from all mechanical equipment operating simultaneously (except the emergency generator) at rated load are expected to range from 35 to 44 dBA at nearby receptors (36 to 44 dBA at the closest residences). Table 3.10-7 presents predicted sound levels from all mechanical equipment including the emergency generator during routine daytime testing periods which are expected to range from 41 to 50 dBA at nearby receptors including the closest residences.

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

Table 3.10-6 Modeled Project-Only Sound Levels – Typical Nighttime Operation (No Emergency Generator)

Modeling Location ID	Zoning / Land Use	Evaluation Period	Broadband (dBA)	Sound Pressure Level (dB) per Octave-band Center Frequency								
				32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
R1	Residential	Night	44	57	54	49	47	41	38	30	25	15
R2[1]	Residential	Night	40	53	51	47	45	37	31	21	13	0
R3	Residential	Night	40	49	48	44	44	38	34	24	13	0
R4	Residential	Night	40	48	47	44	43	38	34	25	13	0
R5	Residential	Night	36	48	46	42	41	34	29	17	2	0
R6	Business	Night	35	49	46	41	40	33	28	16	6	0
R7	Business	Night	37	49	45	40	41	34	31	22	13	0
R8	Residential	Night	42	48	46	43	45	40	38	28	17	0
R9	Church[2]	Night	39	49	47	42	43	37	34	25	18	4
R10	Business	Night	43	53	50	45	45	39	38	31	25	15
City of Boston Limits	**Residential**	**Night**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Business	**Night**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Night**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

1. R2 represents the new Ink Block apartment complex along Harrison Avenue (not shown in Figure 3.10-1)
2. Daytime use only

Table 3.10-7 Modeled Project-Only Sound Levels – Typical Daytime Operation + Routine Emergency Generator Testing

Modeling Location ID	Zoning / Land Use	Evaluation Period	Broadband (dBA)	Sound Pressure Level (dB) per Octave-band Center Frequency								
				32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
R1	Residential	Day	44	59	54	49	47	41	38	31	26	15
R2[1]	Residential	Day	41	56	52	47	45	38	34	27	20	0
R3	Residential	Day	43	52	48	45	44	38	39	34	26	0
R4	Residential	Day	46	56	49	45	44	39	43	40	32	0
R5	Residential	Day	44	56	49	43	41	36	41	37	29	0
R6	Business	Day	46	58	50	44	41	37	43	40	34	5
R7	Business	Day	48	55	47	41	42	39	45	42	37	11
R8	Residential	Day	50	61	52	47	46	42	47	44	38	8
R9	Church[2]	Day	42	59	52	45	43	38	38	32	25	6
R10	Business	Day	43	60	52	46	45	39	40	33	28	16
City of Boston Limits	**Residential**	**Day**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**
	Business	**Day**	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**
	Industrial	**Day**	**70**	**83**	**82**	**77**	**73**	**67**	**61**	**57**	**53**	**50**

1. R2 represents the new Ink Block apartment complex along Harrison Avenue (not shown in Figure 3.10-1)
2. Compare to daytime 'residential' limits

3.10.6 Conclusions

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

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

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

3.11 Construction Impacts

3.11.1 Introduction

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

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

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

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

3.11.2 Construction Methodology/Public Safety

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

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

3.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the first quarter of 2017 and last for approximately 18 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.

3.11.4 Construction Staging/Access

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

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

3.11.5 Construction Mitigation

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

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

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

3.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 300 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50% of the total employee work hours be for Boston residents, at least 25% of total employee work hours be for minorities and at least 10% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

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

3.11.7 Construction Truck Routes and Deliveries

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

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

3.11.8 Construction Air Quality

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

- ♦ Using wetting agents on areas of exposed soil on a scheduled basis;
- ♦ Using covered trucks;

- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

3.11.9 Construction Noise

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

Mitigation measures are expected to include:

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

3.11.10 Construction Vibration

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

3.11.11 Construction Waste

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

3.11.12 Protection of Utilities

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

3.11.13 Rodent Control

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

3.11.14 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 Preparedness

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

4.1 Sustainable Design

The Project team is committed to developing a building that is sustainably designed, energy efficient, environmentally conscious and healthy for occupants. As required under Article 37 of the Boston Zoning Code, projects that are subject to Article 80B, Large Project Review, shall be U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) certifiable. The Project will use the LEED v2009 for Core and Shell Development to show compliance with Article 37. There are seven categories in the LEED certification guidelines: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Design Process and the additional Regional Priority Credits.

The following is a detailed credit-by-credit analysis of the Project team's approach for achieving LEED certifiability at the Silver level. The Project is targeting several credits which span the seven categories and enable the Project to meet the requirements as described below. Credits listed in italics are under consideration at this time and will be reviewed as the Project design develops. The preliminary LEED checklist is included at the end of this section. Please note that this is an initial credit checklist and applicable credits may change as the building design advances.

Sustainable Sites (SS)

SS Prerequisite 1 Construction Activity Pollution Prevention: The Construction Manager (CM) will compile and submit an Erosion and Sedimentation Control (ESC) Plan, specific to the Project, for construction activities related to the demolition of the existing lobby and the construction of the new building. The ESC Plan will conform to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit.

SS Credit 1 Site Selection: The Project site is located on a previously developed parcel in Boston on the edge of the South End, Theater District, Chinatown and Downtown Crossing. The Project is not a habitat for threatened or endangered species, is not within 100 feet of wetlands, and is not public parkland.

SS Credit 2 Development Density and Community Connectivity: The Project site is in downtown Boston; the surrounding community is replete with services including restaurants, shops, theaters, colleges, galleries, medical offices, hospitals, places of worship, daycares, pharmacies, and post offices.

SS Credit 4.1 Alternative Transportation, Public Transportation Access: The Tufts Medical Center station on the MBTA Orange Line is located approximately 0.3 miles from the Project site; the Broadway station on the MBTA Red Line is located 0.5 miles from the Project site. Several MBTA bus routes stop within less than 0.1 mile of the Project site, including the number 9 and 11 buses.

SS Credit 4.2 Alternative Transportation, Bicycle Storage and Changing Rooms: Secure bicycle storage will be incorporated into the proposed Project and there are existing shower facilities located in the fitness center in the 1000 Washington Street building. There are enough showers to support 0.5% of the Full Time Equivalent occupants and they are located within 200 yards of the entrance. Access to these showers will be provided to cyclists.

SS Credit 4.3 Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles: Electric vehicle fueling stations will be provided for 3% of the total vehicle parking capacity associated with the 321 Harrison Project.

SS Credit 4.4 Alternative Transportation, Parking Capacity: There is no new parking planned for the site. The new building will be constructed above the existing parking structure.

SS Credit 5.2 Site Development – Maximize Open Space: Sites with Zoning Ordinances but no Open Space Requirements can achieve this credit by providing vegetated open space equal to 20% of the project site area. The Project team will evaluate the feasibility of meeting this credit with a combination of vegetated areas and pedestrian-oriented hardscape.

SS Credit 6.1 Stormwater Design, Quantity Control: The Project will decrease stormwater runoff by 25% from the two-year 24-hour design storm.

SS Credit 6.2 Stormwater Design, Quality Control: The Project is located within the Groundwater Conservation Overlay District. Stormwater will be captured from the roofs and channeled to a recharge storage tank where it will be recharged into the groundwater table through a recharge system. The groundwater recharge system will both reduce the amount of stormwater channeling directly to the stormwater system and treat the stormwater being recharged into the groundwater. The BMPs used to treat the runoff will remove 80% of the total suspended solids (TSS).

SS Credit 7.1 Heat Island Effect, Non-Roof: The Project will be constructed above an existing parking garage, a majority of which will be covered by the new building. Greater than 50% of the parking would be located under cover. The Project team will evaluate the Project's eligibility for this credit.

SS Credit 7.2 Heat Island Effect, Roof: The roof will be a high-albedo material (minimum SRI of 78) to help minimize solar heat gain and urban heat island effects.

SS Credit 9 Tenant Design and Construction Guidelines: The Project will publish an illustrated document that provides tenants with information on the sustainable features of the core and shell building, information on how the core and shell building supports LEED for Commercial Interiors certification, and recommendations on sustainable strategies, products, and materials that can be incorporated into tenant projects.

Water Efficiency (WE)

WE Prerequisite 1 Water Use Reduction, 20% Reduction: Through the use of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

WE Credit 1.1 Water Efficient Landscaping, Reduce by 50%: The Project will reduce potable water consumption used for irrigation by using native or adapted plant species and high efficiency irrigation systems.

WE Credit 3.1 Water Use Reduction: Specified fixtures will include high efficiency toilets and low-flow lavatory and kitchen faucets. The Project is targeting an overall water savings of 35% above the calculated baseline.

Energy and Atmosphere (EA)

EA Prerequisite 1 Fundamental Commissioning of the Building Energy Systems: A Commissioning Agent (CxA) will be engaged by the owner for purposes of providing fundamental commissioning services for the building energy related systems including Heating Ventilation Air Conditioning & Refrigeration (HVAC & R), lighting and domestic hot water systems. The CxA will verify the building systems are installed, calibrated and perform to the building owners' Project requirements.

EA Prerequisite 2 Minimum Energy Performance: The building performance rating will demonstrate a minimum of a 10% improvement in energy cost when compared to the baseline building performance when calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007.

EA Prerequisite 3 Fundamental Refrigerant Management: The specifications for refrigerants used in the building HVAC & R systems will not permit the use of CFC based refrigerants.

EA Credit 1 Optimize Energy Performance: The designed building systems will target a performance level of up to a 20% improvement in energy cost over a baseline building performance rating, (as established in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007). The team will develop a whole building energy model to demonstrate the expected performance rating of the designed building systems.

EA Credit 3 Enhanced Commissioning: The Project will commission the buildings energy systems. The CxA may be part of the Project team from early on in the Project process. The CxA's role may include reviewing the owner's Project requirements, creating, distributing and implementing a commissioning plan, and performing a design review of the design development and construction documents.

EA Credit 4 Enhanced Refrigerant Management: The Project will consider the feasibility of achieving this credit. Long life, high efficiency mechanical equipment will be specified for the HVAC & R systems and the refrigerants specified for the systems will have low ozone-depletion and global warming potentials.

EA Credit 5.1 Measurement and Verification – Base Building: The Project will pursue Option 3 of this credit by registering an account with Energy Star Portfolio Manager and sharing the project energy and water use data with the USGBC.

EA Credit 5.2 Measurement and Verification – Tenant Submetering: The Project will provide a centrally monitored electronic metering network that is capable of being expanded to accommodate future tenant submetering. A tenant measurement and verification plan will be developed to advise tenants of this opportunity, along with a process for corrective action if savings are not being achieved.

EA Credit 6 Green Power: The Project will engage in at least a 2-year renewable energy contract to provide a minimum of 35% of the building's electricity.

Materials and Resources (MR)

MR Prerequisite 1 Storage and Collection of Recyclables: There will be a recycling program and adequate storage for collected recyclable materials within the building, including but not limited to paper, corrugated cardboard, glass, plastic and metals.

MR Credits 2.1 and 2.2 Construction Waste Management: Prior to the start of construction, the Construction Manager (CM) will prepare a Construction Waste Management plan which will endeavor to divert as much demolition debris and construction waste from area landfills as possible.

MR Credits 4.1 Recycled Content: The Project specifications will target materials to include pre- and/or post-consumer recycled content. During construction, material submittals will include a document indicating the percentage of both pre- and postconsumer recycled content. The CM will track the recycled content for each material with a Project target to achieve 10% recycled content materials based on overall Project material costs.

MR Credit 5.1 Regional Materials: The Project specifications will target materials to be extracted, harvested, recovered and manufactured within a 500 mile radius of the job site. The CM will track the source location for each material with a Project target to achieve 10% regional materials based on overall Project material costs.

MR Credit 6 Certified Wood: The Project will specify at least 50% FSC-Certified wood products.

Indoor Environmental Quality (EQ)

EQ Prerequisite 1 Minimum Indoor Air Quality (IAQ) Performance: The building mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and/or applicable building codes in order to comply with the prerequisites.

EQ Prerequisite 2 Environmental Tobacco Smoke (ETS) Control: Smoking will be prohibited within the building and within 25 feet of entries and outdoor air intakes.

EQ Credit 1 Outdoor Air Delivery Monitoring: The Project will incorporate permanent CO2 sensors and measuring devices to provide feedback on the performance of the HVAC system. Devices will be programmed to generate an alarm when the conditions vary by 10% from a set point.

EQ Credit 3.1 Construction IAQ Management Plan (during construction): The CM will develop an Indoor Air Quality Management Plan for the construction phases of the Project to meet or exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied buildings Under Construction 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter3). Absorptive materials stored on site will be protected from moisture damage.

EQ Credits 4.1-4.4 Low Emitting Materials: The Project specifications will set Volatile Organic Compound (VOC) limits for adhesives and sealants, paints and coatings, and may also include flooring systems.

EQ Credit 5 Indoor Chemical and Pollutant Source Control: The Project will be designed to minimize and control the entry of pollutants into the building and to contain chemical use areas. All janitors' closet doors will be constructed to minimize leakage, and the wall around each closet will not have openings above to prevent leakage. At every main, high volume entryway there will be grates, grills or mats to prevent outside materials from being carried into the building.

EQ Credit 7.1 Thermal Comfort Design: The building HVAC design will be in compliance with ASHRAE 55.

EQ Credit 8.1 Daylight and Views, Daylight for 75% of spaces: The Project will evaluate the potential to provide daylighting for a minimum of 75% of the regularly occupied spaces. It is the intent of the design to locate a majority of regularly occupied spaces along the perimeter.

EQ Credit 8.2 Daylight and Views, Views: *The Project will evaluate the potential to provide direct line of sight views to a minimum of 90% of all regularly occupied spaces. It is the intent of the design to locate a majority of regularly occupied spaces along the perimeter.*

Innovation in Design (ID)

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

ID Credit 1.1 Low Mercury Lamps: Building Facilities/Maintenance will establish a lighting purchasing plan to limit the levels of mercury containing lamps purchased for the building.

ID Credit 1.2 Exemplary Performance for SSc4.1: The Project site is located within 0.5 miles of existing multiple commuter rail lines and two subway lines (Orange and Red), with a frequency of service of over 200 transit rides per day.

ID Credit 1.3 Exemplary Performance for MRc6: The project will specify a minimum of 95% FSC-certified wood products.

ID Credit 2 LEED Accredited Professional (required ID credit for LEED certification): A LEED AP will provide administrative services to oversee the LEED credit documentation process.

Regional Priority

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 point is awarded to the project. RPCs applicable to the Boston area include: SSc3, SSc6.1 SSc7.1, SSc7.2, EAc2 and MRc1.1. The Project anticipates two RPCs for SSc6.1 Stormwater Design, Quantity Control, and SSc7.2 – Heat Island Effect, Roof, and potentially a third RPC for SSc7.1-Heat Island Effect, Non-Roof.

4.2 Renewable Energy and Energy Efficiency

The Project has considered renewable energy technologies for their applicability and feasibility for this site. Solar photovoltaic electricity generation is generally the most appropriate for building applications. However, the potential for renewable energy generation on this site is extremely limited. The site area is very small and highly shaded, and the proposed roof will be primarily occupied with building equipment. While some area appears to be available based on the current roof plans, the equipment represented is only for the base building systems. As tenant space is designed, more equipment will be installed in the remaining roof area.

Combined Heat and Power systems (CHP) are not well suited to a stand-alone office building. From an economic feasibility perspective, CHP works well with building types or campuses that have occupancy patterns that create a fairly constant electrical demand 24-hours a day. The variability in typical energy demands associated with an office building make it a poor match for CHP. Energy savings can be achieved more economically by investing in energy efficiency.

The Project team will reach out to the utility companies regarding potential project incentives at the start of Design Development. SMMA is a preferred vendor for technical assistance studies for both Eversource and National Grid, and is very familiar with the incentive programs.

4.3 Climate Change Preparedness

The BRA requires that projects subject to Article 80, Large Project Review complete the Climate Change Preparedness Checklist. Climate change conditions considered include higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe rainfall events, and increased wind events. Due to the Project's location, elevation and topography, the Project site is not considered susceptible to the impacts of a reasonable-assumed sea level rise.

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

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:

- New street trees;
- Significant new landscaped areas;
- High performance building enclosure; and

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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.

- High-albedo roofing materials to minimize the heat island effect.

Energy modeling for the Project has not yet been completed; however, as indicated on the LEED Checklist, 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 will also help to lessen fossil fuel consumption.

Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. These measures include:

- New landscaped areas to increase stormwater infiltration compared to the existing site;
- Water tight utility conduits;
- Locating critical mechanical and electrical equipment at the highest elevation possible to prevent exposure to flood waters; and
- Wastewater and stormwater back flow prevention.

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 a reduction in potable water use for irrigation when compared to a mid-summer baseline. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

LEED 2009 for Core and Shell Development

Project Checklist

321 Harrison - SILVER DRAFT

April 18,2016

Sustainable Sites — Possible Points: 28

Y	?	N			
23	3	2		**Sustainable Sites**	**28**
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
2			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	2
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
1			Credit 9	Tenant Design and Construction Guidelines	1

Water Efficiency — Possible Points: 10

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

Energy and Atmosphere — Possible Points: 37

Y	?	N			
8	7	22		**Energy and Atmosphere**	**37**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
	5	16	Credit 1	Optimize Energy Performance	3 to 21
		4	Credit 2	On-Site Renewable Energy	4
2			Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
1		2	Credit 5.1	Measurement and Verification—Base Building	3
3			Credit 5.2	Measurement and Verification—Tenant Submetering	3
2			Credit 6	Green Power	2

Materials and Resources — Possible Points: 13

Y	?	N			
4	3	6		**Materials and Resources**	**13**
Y			Prereq 1	Storage and Collection of Recyclables	
		5	Credit 1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 5
2			Credit 2	Construction Waste Management	1 to 2
		1	Credit 3	Materials Reuse	1
1	1		Credit 4	Recycled Content	1 to 2
	2		Credit 5	Regional Materials	1 to 2
1			Credit 6	Certified Wood	1

Indoor Environmental Quality — Possible Points: 12

Y	?	N			
8	2	2		**Indoor Environmental Quality**	**12**
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	Construction IAQ Management Plan—During Construction	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	Controllability of Systems—Thermal Comfort	1
1			Credit 7	Thermal Comfort—Design	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	?	N			
4	2			**Innovation and Design Process**	**6**
1			Credit 1.1	Innovation in Design: Low Mercury Lamps	1
1			Credit 1.2	Innovation in Design: SSc4.1 Exemplary Performance	1
1			Credit 1.3	Innovation in Design: MRc6 Exemplary Performance (95%)	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
	1		Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	?	N			
2	1	1		**Regional Priority Credits**	**4**
1			Credit 1.1	Regional Priority: Specific Credit SSC6.1 Stormwater quantity	1
	1		Credit 1.2	Regional Priority: Specific Credit SSC7.1 Heat Island - Non Roof	1
1			Credit 1.3	Regional Priority: Specific Credit SSC7.2 Heat Island - Roof	1
		1	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

Y	?	N		
53	19	38	**Total**	**110**

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Urban Design and Architectural Style

The portion of the Project site at 321 Harrison Avenue currently consists of a three-story parking garage (one-story below grade). Adjoining the existing garage is an office lobby serving the adjacent 11-story office building known by the address, 1000 Washington Street. The nearby area includes a one-story grocery store to the west, a new residential and retail development being constructed to the south at 345 Harrison Avenue, and a large mixed-use development to the east known as Ink Block consisting of residential units, retail, and parking.

As previously noted, the site will be transformed with the addition of the Project; an eight-story office building to be constructed over the existing parking garage. The Project will complement the existing office use on the block as well as the abundance of new residential units currently being built the immediate neighborhood. The office use will fit well with the activity of Herald Street and the Massachusetts Turnpike a little further to the north and will create a stronger connection between Downtown Boston and the South End (see Figures 5-1 and 5-2). The pedestrian connectivity and circulation will be increased as the Project brings additional workers to the area for a richer mix of 18/7 uses. Along with the Ink Block development and the soon to be constructed 345 Harrison, the Project has great potential to change and revitalize this area, serving as a vital physical and economic link between Downtown, Chinatown, and South End neighborhoods.

The primary urban design goal of the Project is to enhance the public realm around and inside the Project site with the intended use and an appropriately scaled building and streetscape. At the ground level, the massing of the Project is meant to activate the street as much as possible. There will be a cultural/gallery space at the corner of Herald Street and Harrison Avenue intended to be shared for community use (see Figure 5-3). This engaging program, and the appropriately scaled storefront architecture will enhance the dynamic pedestrian experience. On the southern portion of the site along Harrison Avenue, a new landscaped open space adjacent to the existing 1000 Washington Street building will provide residents and workers in the neighborhood with a place to relax or have lunch outside (see Figure 5-4). The open space will be designed with features and seating to support the community's need for an outdoor gathering and social space.

The garage will be clad with an architectural screen to unify the base of the new addition and the larger complex, while still allowing for a great deal of openings for natural ventilation(see Figure 5-5). Rising above the garage, the new office building at 321 Harrison Avenue is intended to address the Downtown central business district as well as vistas of the Back Bay to the west, and the Seaport and South Boston to the east. The materials are insulated glass in a metal panel system that will echo the design of the existing building, with occasional curtainwall systems that allow for larger floor to ceiling glazing.

321 Harrison Avenue Boston, Massachusetts

SMMA

Figure 5-1
View from the I-90 On-ramp

Figure 5-2

View from the Washington Street Bridge Crossing

321 Harrison Avenue Boston, Massachusetts

SMMA

Figure 5-3

View from the Corner of Herald Street and Harrison Avenue

Figure 5-4

View of Harrison Avenue Lobby

Figure 5-5

View from Harrison Avenue

5.2 Streetscape/Landscape Design

The streetscapes around the Project are designed to tie together buildings, trees, street lights, and furniture to enhance the character of the area with the intent of creating enriching public spaces and supporting the community and multi-modal transportation network. The design will follow the Boston Complete Streets guidelines. In addition, the streetscape design has incorporated the most recent redesign of Harrison Avenue to include bike lanes and crosswalks.

Pedestrian paving around the site will mostly be cast in place concrete. Special pavement may be included around the new lobby entrances and in the proposed open space along Harrison Avenue to celebrate those specific places. Street trees will be installed along Harrison Avenue consistent with the new curb alignment planned by the City of Boston that expands the width of the sidewalk. Street trees along Washington Street will be maintained or replaced in kind, as necessary. Along Herald Street, trees will be removed to accommodate building construction activities and replaced with new trees consistent with the block. Existing light fixtures will be maintained to the extent possible and supplemented with new light poles and bollards when necessary. Within the courtyards at each entrance to the lobby, new trees may be added along with customized low planter systems that will avoid existing utilities. Bicycle racks and trash receptacles will be selected and located to coordinate with the aesthetic of the other site furnishings.

The new open space along Harrison Avenue adjacent to the existing 1000 Washington Street building will provide a fresh, welcoming look to the area, incorporating new site furniture, planting, and lighting designed to work with the existing streetscape elements. The paving materials will vary in texture and color to create interest and soften the hardscape. Plant materials will be appropriately scaled to the space and consist of species that are well-adapted/indigenous to our region to minimize irrigation requirements and promote biodiversity and sustainability in the neighborhood. Permanent seating features will be included, in addition to seasonal furniture.

5.3 Use Corridors

The Harrison-Albany Corridor Strategic Plan envisions William E. Mullins Way as a cross connector street that is less busy than the other streets surrounding the Project. Sidewalks will be consistent with the existing character and scale of the local streets. The overall streetscape quality will be improved by adding lighting and trees as the width permits. Careful consideration will be paid to the overlap of pedestrians, bicyclists, and vehicles along this block. The Project will provide new bicycle facilities designed around the City of Boston Transportation Department Bicycle Parking Guidelines.

The Strategic Plan envisions Washington Street as a "Retail Corridor" and Harrison Avenue as a "Creative Use Corridor". Congruous with these visions, the development of the Project will revitalize an existing parking structure and will transform a concrete dominated block into a prominent, mixed-use destination that will greatly enhance the public realm. The multimodal purposes of the Project will complement the existing and proposed developments in the vicinity, including 345 Harrison Avenue, 300 Harrison Avenue, 80 East Berkeley Street, and 275 Albany Street, among others that will collectively enhance the Harrison Albany Corridor. Public transportation, Interstates 90 and 93, wide sidewalks and multiple pedestrian accesses will allow pedestrians and commuters to easily access the site. Furthermore, the street level experience will be activated by the new cultural/gallery space, green space, and outdoor furniture designed for enjoying the vistas of Boston.

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. Reviews of the State and National Registers of Historic Places, as well as the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory), were undertaken to identify historic and archaeological resources.

6.1 Project Site

The Project site is occupied by a late 20th century three-story parking garage and a late 20th century eleven-story office building (1000 Washington Street). The Project site is located within the South End Landmark District's Harrison/Albany Protection Area. Acting as a visual buffer to the more architecturally significant portion of the South End that comprises the Landmark District proper, this is a sub-area within the larger designation. As described further below, design-review standards and criteria within the Harrison/Albany Protection Area are considerably more lenient than those applicable within the Landmark District proper.

The Project site is also located within the South End Industrial Area, as surveyed by the Boston Landmarks Commission. This is a concentration of late nineteenth and early twentieth century brick industrial buildings with related tenement and worker housing. Its boundaries are similar to those of the Protection Area but do not extend west of Washington Street. The South End Industrial Area is included in the Inventory maintained by the MHC. Although identified as potentially eligible for listing in the National Register of Places, neither the South End Industrial Area nor the South End Landmark District's Harrison/Albany Protection Area are included in the State or National Registers. A petition to designate a South End Light Industrial District has been pending before the Boston Landmarks Commission since the mid-1990s. In that this effort has not advanced in the past twenty years, during which time the area has evolved markedly, its future adoption seems doubtful at best. More recently, however, the eastern periphery of the Protection Area was re-zoned into several contiguous sub-districts. Thus, under Appendix C of Article 64, as adopted in 2012, the Project site is located within Area 1, in which a height of 150 feet and an F.A.R. of 6.5 are identified as the allowable maximums.

As a visual buffer to the South End Landmark District itself, to which it is immediately adjacent, the Protection Area is generally characterized by large-scale industrial buildings. These are not only markedly different in scale and use from the historically residential portion of the South End, but often lacking in historic and aesthetic significance as well. Whereas the Landmark District is typified by blocks of three- to five-story rowhouses built in the nineteenth century, the Protection Area is dominated by architecturally undistinguished factories and warehouses, many of which date only from the postwar period. Most of its few earlier buildings have been altered beyond recognition. Nonetheless, while its built character is not significant in its own right, the Protection Area is important to the preservation of the Landmark District, as its associated regulation protects views of the District; ensures that new development is architecturally compatible in its massing, setback and height; and protects light and air circulation within the District.

Under the review authority of the South End Landmark District Commission, properties within the boundaries of the Landmark District are subject to rigorous standards of design and materials in order to protect and promote the historic aesthetic integrity of the area. By contrast, the Commission's regulatory authority within the Protection Area is more limited. Corresponding to its lesser historic and architectural significance, review of proposed projects within the Protection Area is confined to five areas: demolition, land coverage, height, topography and landscape features.

The demolition policy within the Protection Area specifically states that "In general, the demolition of structures in the Protection Area may be allowed subject to prior approval by the Commission." This general statement has been clarified to indicate the manner in which the South End Landmark District Commission will approach proposed demolitions. Thus, if the Commission should determine that a specific building contributes to the architectural or historic character of the District or the Protection Area, the Commission will then apply certain criteria to evaluate an application for that building's demolition. The first of these addresses the physical condition of the building, to be demonstrated by evidence of current and ongoing deterioration and/or immediate danger of collapse. The second considers whether the cost of restoration or reuse is prohibitive, as quantified by an independent consultant.

The most demanding criterion, however, is whether the demolition will allow a development that will make a greater contribution to the Protection Area than may be achieved by the retention of the existing building. In that event, the Commission may consider both the plans for the redevelopment of the property and the effects these plans may exert on the architectural, social, aesthetic, historic and urban design character of the Landmark District. Most importantly in this circumstance, should the Commission deem the building identified for demolition as significant, it may invoke the far more rigorous design criteria that apply within the Landmark District rather than those of the Protection Area.

To the extent that the project's objectives include the retention of the existing garage as a base for additional stories of new construction, the South End Landmark District Commission will have no occasion to initiate the interpretive exercise summarized above. The Commission has consistently declined to invoke the Landmark District standards for a number of nearby projects involving demolitions of similar, marginally contributory resources. The rapidly changing scale and distinctive materials vocabulary of the Protection Area reflect the Commission's recognition that the character of Harrison/Albany has been both historically and architecturally dissimilar from that of the Landmark District. Given the limited criteria by which the Commission may judge the appropriateness of a project in the protection area not involving demolition, it is anticipated that the Project is likely to be deemed acceptable insofar as its height and F.A.R. remain consistent with the applicable standards (150 ft./6.5).

6.2 Historic Resources in the Vicinity of the Project Site

The South End Landmark District and the South End National Register Historic District are located south and west of the Project site. The South End Harrison/Albany Protection Area and the South End Industrial Area have similar boundaries; however, the South End Industrial Area does not extend west of Washington Street, thereby excluding Shawmut Avenue.

Table 6-1 below and Figure 6-1 identify the State and National Register listed properties and historic district located within a quarter mile radius of the Project site.

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

Map	State & National Register-listed Properties & Historic Districts	Address	Designation
1	South End National Register Historic District	Roughly bound by Yarmouth Street, Columbus Avenue, Mass. Turnpike, Berkeley Street, Tremont Street, Dwight Street	National Register Historic District
2	South End Landmark District	Roughly bound by Claremont Street, Camden Street, Harrison Avenue, East Berkeley Street, Mass. Turnpike	Local Historic District, State Register District
3	South End Harrison/Albany Protection Area	Roughly bound by Mass. Turnpike, Rt. 93, Washington Street, Malden Street, Harrison Avenue, Albany Street, Camden Street	Protection Area
4	South End Industrial Area	Roughly bound by Albany Street, Herald Street, Shawmut Avenue, Harrison Avenue, Union Park Street	MHC Inventory

6.3 Archaeological Resources

The project site is a previously developed urban parcel. It is not believed that significant archaeological resources remain within the project site. No impacts to archaeological resources are anticipated as a result of the project.

6.4 Impacts to Historic Resources

6.4.1 Urban Design

Given the dearth of historic buildings within the immediate context of the Project site, compatibility of scale rather than material or detail has been the chief urban design objective. The public realm around the Project site will also be enhanced by the

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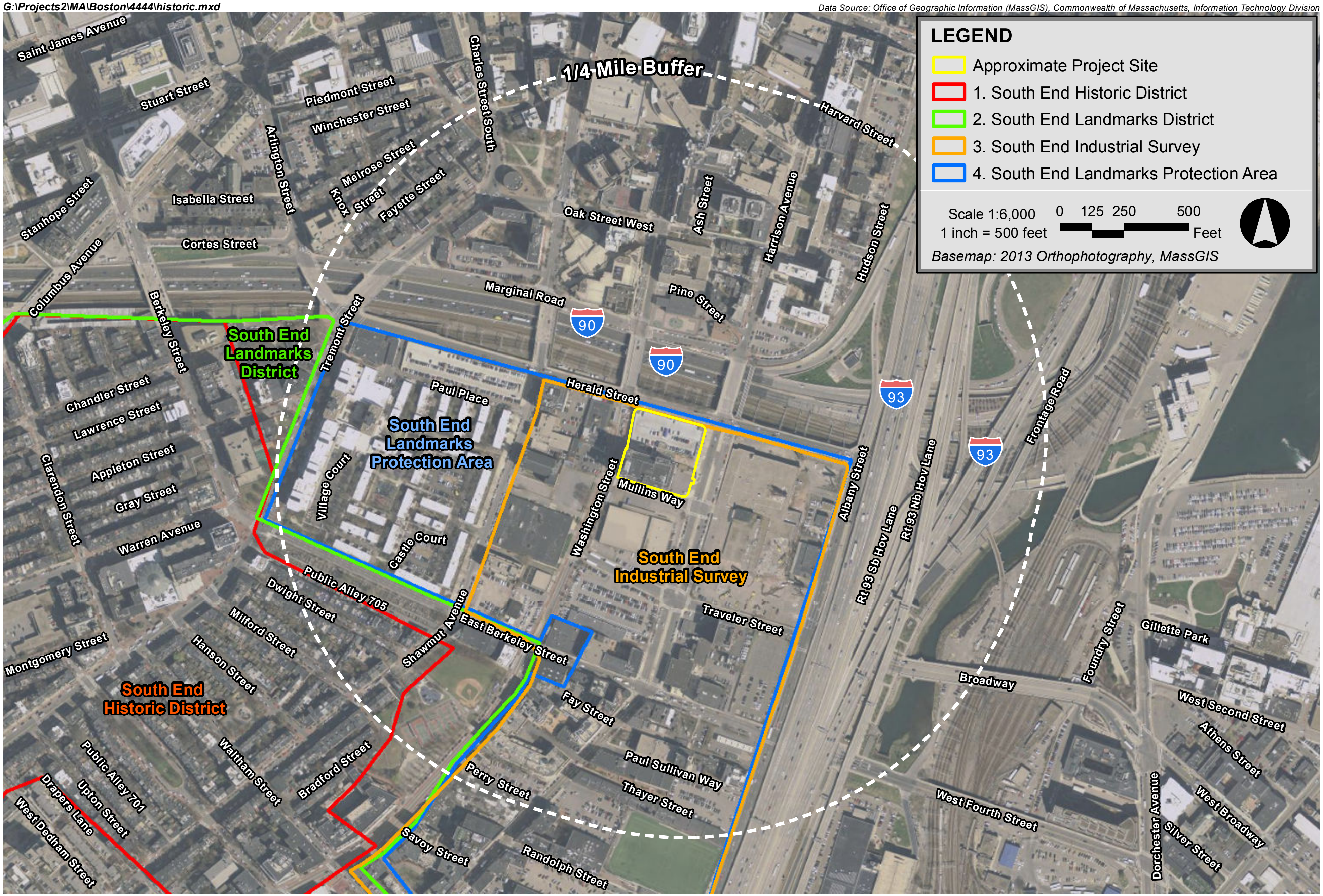
Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division



321 Harrison Avenue **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources

introduction of an appropriately scaled building. At the ground level, the massing of the Project is meant to activate the street as much as possible. The architecture will accordingly be scaled to enhance the pedestrian experience, establishing a two-story base along the sidewalk. This will incorporate welcoming entries and comfortably proportioned glazing modules, while the parking levels will receive decorative screening to soften their presence.

The main lobby entrance will provide a through-block connection to Washington Street, thereby avoiding the creation of a "mega-block" that residents would have to circumnavigate (see Figure 5-4). Farther to the south along the Harrison Avenue elevation, a new open space adjacent to the existing 1000 Washington Street building will allow residents and workers in the neighborhood a place to relax or have lunch outside. This amenity will be designed with seating and other features to support the community's need for an open-air social space.

6.4.2 Shadow Impacts

The Project will be similar in height to currently constructed and approved buildings in the area. Therefore, daylight impacts are anticipated to be similar to the impacts created by other buildings in the area. The vicinity of the site will continue to include a mix of heights and densities that will allow for view of the sky.

6.5 Status of Project Review with Historical Agencies

6.5.1 Massachusetts Historical Commission

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

6.5.2 South End Landmark District Commission

As noted above, the Project Site is located within the South End Harrison/Albany Protection Area. Building demolitions, the height and setback of new construction, and changes to topography and landscaping within the Protection Area are subject to review by the South End Landmark District (SELD) Commission. At the appropriate time the Proponent will file a Design Review application for the Project with the SELD Commission and will provide follow-up with the Boston Landmarks Commission staff.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

The Infrastructure Component includes a description of the utility infrastructure supporting the Project. The infrastructure systems will be designed to continue servicing the existing 1000 Washington Street building and garage as well as the proposed building at 321 Harrison Avenue. The evaluated utility infrastructure includes:

- Wastewater,
- Potable Water,
- Stormwater,
- Electrical Services,
- Telecommunication Services, and
- Gas Services

The systems discussed below are owned and operated by Boston Water and Sewer Commission (BWSC) and other private utilities in Boston. These systems will connect with on site utility systems, and will be designed in accordance with the utility owners' standards and code requirements. The Project architects and engineers will coordinate closely with the utility owners throughout the design process.

7.1 Wastewater

7.1.1 Existing Sewer System

Sanitary sewer service is provided by the BWSC. BWSC has dedicated sewer lines in Washington Street (12-inch, 1990), Mullins Way (15-inch, 2010) and Harrison Avenue (16-inch, 2010). The existing 1000 Washington Street office building connects to the Harrison Avenue sewer line with a 10-inch sewer connection, and an 8-inch line to William E. Mullins Way.

When the existing garage at 321 Harrison Avenue was constructed in 1988, only a combined sewer was available for discharge. The garage was built with separate sanitary sewer (6-inch) and storm drain (12-inch) lines that combined at an on-site manhole to discharge to the Washington Street combined sewer via a 15-inch line. Only interior garage floor drains contribute to the sanitary sewer; the garage does not include septic flow.

7.1.2 Project Generated Sanitary Sewer Flow

The proposed 321 Harrison Avenue building will primarily include office uses. Table 7-1 includes the anticipated sewer flows from both the existing and proposed office building. Sewer generation rates are based upon 310 CMR 15.203. The net increase in sanitary sewer flows is 17,250 gallons per day (GPD).

Table 7-1 Proposed Project Sanitary Wastewater Generation

Building	Area	Generation Rate	Sewer Generation
Existing 1000 Washington Street Office	236,000 sf	75 GPD / 1,000 sf	17,700 GPD
Proposed 321 Harrison Avenue Office	230,000 sf	75 GPD / 1,000 sf	17,250 GPD
Total	466,000 sf		34,950 GPD
Net Change	230,000 sf		+17,250 GPD

7.1.3 Sanitary Sewer Connection

The new 321 Harrison Avenue office building is planned to connect to the BWSC system in Washington Street. In doing so, the Project will also reconnect the garage sanitary sewer and storm drain lines to the now separated services in Washington Street.

7.2 Water System

7.2.1 Existing Water Service

Potable and fire protection water is provided by the BWSC. BWSC has low pressure piping in Herald Street (12-inch, 1957), Washington Street (16-inch, 1974), William E. Mullins Way (8-inch, 2009) and Harrison Avenue (12-inch, 1983). BWSC has high pressure piping in Washington Street (8-inch, 2003), Mullins Way (6-inch, 1972; does not connect to Harrison Avenue) and two lines in Harrison Avenue (12-inch, 1983 and 30-inch, 1977). In addition to these high pressure lines, there is an 8-inch (1902) high pressure line connecting the Washington Street 8-inch and Harrison Avenue 12-inch that bisects the Project site, between the office building and garage, beneath the lobby.

The domestic service connects to the 8-inch low pressure line in William E. Mullins Way. The fire protection service connects the 8-inch high pressure line in Washington Street with a dual connection and a gate in between providing redundant protection. There are three hydrants around the building in the public sidewalk on Herald Street, William E. Mullins Way and Harrison Avenue.

7.2.2 Anticipated Water Consumption

The projected sanitary sewer flows (Table 7-1) provides the basis for determining anticipated water consumption. The 17,250 GPD increase in sewer flows, plus 10% to account for consumption and system losses, results in an anticipated increase in domestic water consumption of 18,975 GPD.

The Project is targeting a 35% reduction in water use by implementing high efficiency toilets and low-flow lavatory and kitchen faucets in the new office building. This water use reduction is part of the Project's sustainable design commitments under Boston Zoning Article 37 – Green Buildings.

7.2.3 Proposed Water Service

The proposed design utilizes the water supply for the existing 1000 Washington Street office building to also supply the proposed 321 Harrison Avenue office building. To accommodate the increased domestic flow, the existing service connection on William E. Mullins Way will be reconstructed at a larger size. The existing fire protection service is large enough to protect both the existing and proposed buildings.

7.3 Storm Drainage System

7.3.1 Existing Storm Drainage System

Storm drain service is provided by the BWSC. BWSC has dedicated drain lines in Herald Street (12-inch), Washington Street (24-inch, 1990), Mullins Way (15-inch, 2010) and Harrison Avenue (15-inch, 2010). The existing 1000 Washington Street office building, loading dock and plazas discharge to the Harrison Avenue drain line via a 12-inch connection. Prior to discharge, this drain line contributes to a 2,448 cubic-foot infiltration system located beneath the loading dock. The infiltration system was sized to infiltrate 1-inch over the existing building roof area in accordance with the Groundwater Conservation Overlay District (GCOD, Article 32) regulations. The GCOD infiltration system was installed in 2010 during renovations to the existing 1000 Washington Street building.

When the existing garage was constructed (1988) at 321 Harrison Avenue, only a combined sewer was available for discharge. The garage was built with separate sanitary sewer (6-inch) and storm drain (12-inch) lines that combined at an on-site manhole to discharge to the Washington Street combined sewer via a 15-inch line.

7.3.2 Proposed Storm Drainage System

As a result of the proposed GCOD infiltration system and the increased pervious areas created by the landscape and urban design, a net reduction in stormwater flows will result. In addition, the use of Best Management Practices (BMPs) and Low Impact Development (LID) practices will result in improved water quality. The Project will utilize the existing stormwater connections to the municipal system at Washington Street and Harrison Avenue.

7.3.3 Groundwater Conservation Overlay District

The Project Site is located within the Groundwater Conservation Overlay District (GCOD) which is governed by Article 32 of the City of Boston Zoning Code. The Project shall comply with the standards and requirements set forth in Article 32 of the Code. This zoning article requires the infiltration of one inch over the impervious areas of the proposed Project site. To meet this requirement the existing GCOD infiltration system will be enlarged to meet these requirements. The Proponent shall obtain a written determination from the Boston Water and Sewer Commission (BWSC) as to whether the Project meets the standards and requirements of Article 32. In addition, the Proponent shall demonstrate that the Project meets the requirements of Section 32-6 of the Code by obtaining a stamped certification from the Massachusetts registered engineer that the requirements of Section 32-6 of the Code are met. The Proponent shall provide both a copy of the written determination from BWSC and a copy of the stamped certification from a Massachusetts registered engineer to the BRA and the Boston Groundwater Trust prior to the issuance of a Certificate of Consistency. As such, the Project shall be deemed to be in compliance with Article 32 of the Code and shall not need a conditional use permit from the Board of Appeal for Article 32 purposes.

The Proponent is committed to working with the BGwT, BWSC and neighborhood to ensure that the Project has no adverse impact on nearby groundwater levels.

7.3.4 State Stormwater Standards

MassDEP revised the Stormwater Management Standards and Handbook in 2009. The Project seeks to meet the standards. To illustrate the Project's compliance, each standard is discussed below.

Standard 1

No new stormwater conveyances (e.g. outfalls) will discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance

Stormwater generated on site will be managed and treated prior to discharge.

Standard 2

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Compliance

Infiltration systems and increased pervious area will result in reduced stormwater flows during storms.

Standard 3

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This condition 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 greatest infiltration requirement in the Stormwater Management Handbook is 0.6″ of runoff over impervious areas for type A soils. The GCOD infiltration requirement of 1″ is more stringent, thus this requirement will be met.

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 long-term pollution prevention plan, and thereafter 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

Through water quality BMPs, LID techniques and the GCOD infiltration system, 80% TSS removal will be met.

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.

Compliance

The Project is not considered a Land Use with Higher Potential Pollutant Load (LUHPPL).

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.

Compliance

The Project is not within a Zone II or Interim Wellhead Protection Area, nor will it discharge to a critical 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 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 Project is considered a redevelopment and will meet these standards to the maximum extent practicable.

Standard 8

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

Compliance

The Project seeks to meet both Boston Zoning Article 87 – Green Buildings and USGBC LEED requirements. Accordingly the Project will implement an approved Stormwater Pollution Prevention Plan (SWPPP).

Standard 9

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Compliance

An Operations and Maintenance plan for construction and post-construction operations will be developed and implemented.

Standard 10

All illicit discharges to the stormwater management system are prohibited.

Compliance

No illicit dischargers are known to exist on site, nor will the proposed Project include any illicit discharges.

7.4 Electrical Service

The electrical system in this neighborhood is owned and operated by Eversource. The existing 1000 Washington Street building is serviced from electrical manholes in Harrison Avenue with on-site transformers. The proposed Project will continue to receive electricity from the Harrison Avenue branch of the electrical network through an expanded on-site transformer system. The team is in contact with Eversource to verify sufficient capacity and design requirements.

7.5 Telecommunication Systems

The Project will connect to one or more private telecommunications networks located in the vicinity for telephone, cable and data services. The Project will coordinate service locations with the selected providers and obtain all required approvals prior to connection.

7.6 Gas Systems

National Grid provides gas service on both Washington Street and Harrison Avenue. The existing 1000 Washington Street building is currently connected to the gas system on Harrison Avenue. The precise gas load for the proposed 321 Harrison Avenue office building is not yet determined. Once determined the Project team will coordinate with National Grid to determine the best connection point for the gas system and the Project.

7.7 Utility Protection During Construction

Existing utilities, both public and private, will be protected throughout the duration of the project. All utility installation will be conducted in coordination with the Dig-Safe Program and the public and private utility's requirements. All necessary permits will be obtained prior to utility installation.

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. See Appendix G for the Accessibility Checklist

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. Current plans do not call for the Project to receive any state permits, state funding or involve any state land transfers.

8.3 Massachusetts Historical Commission

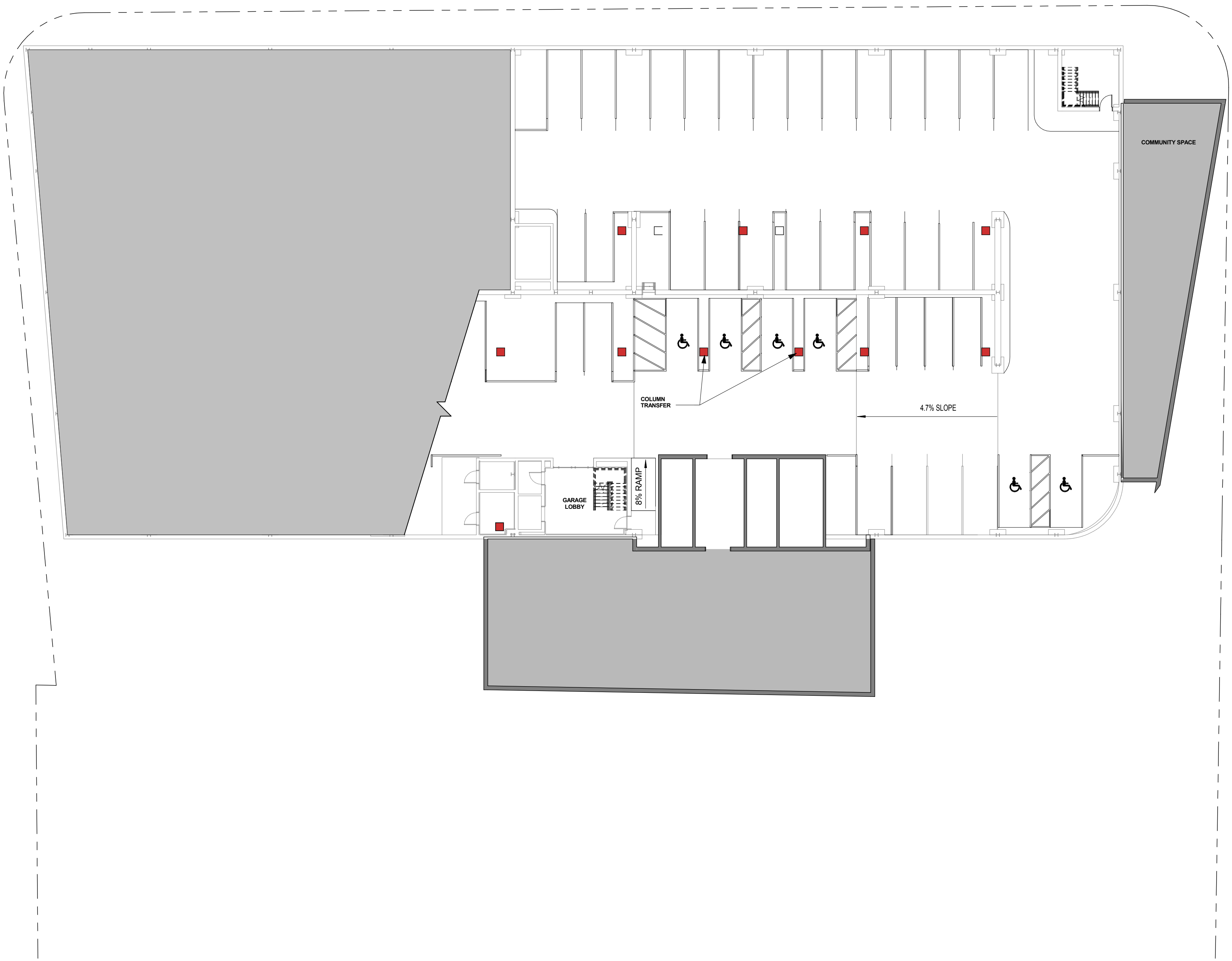
The Proponent does not anticipate that the Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state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

8.4 Boston Civic Design Commission

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

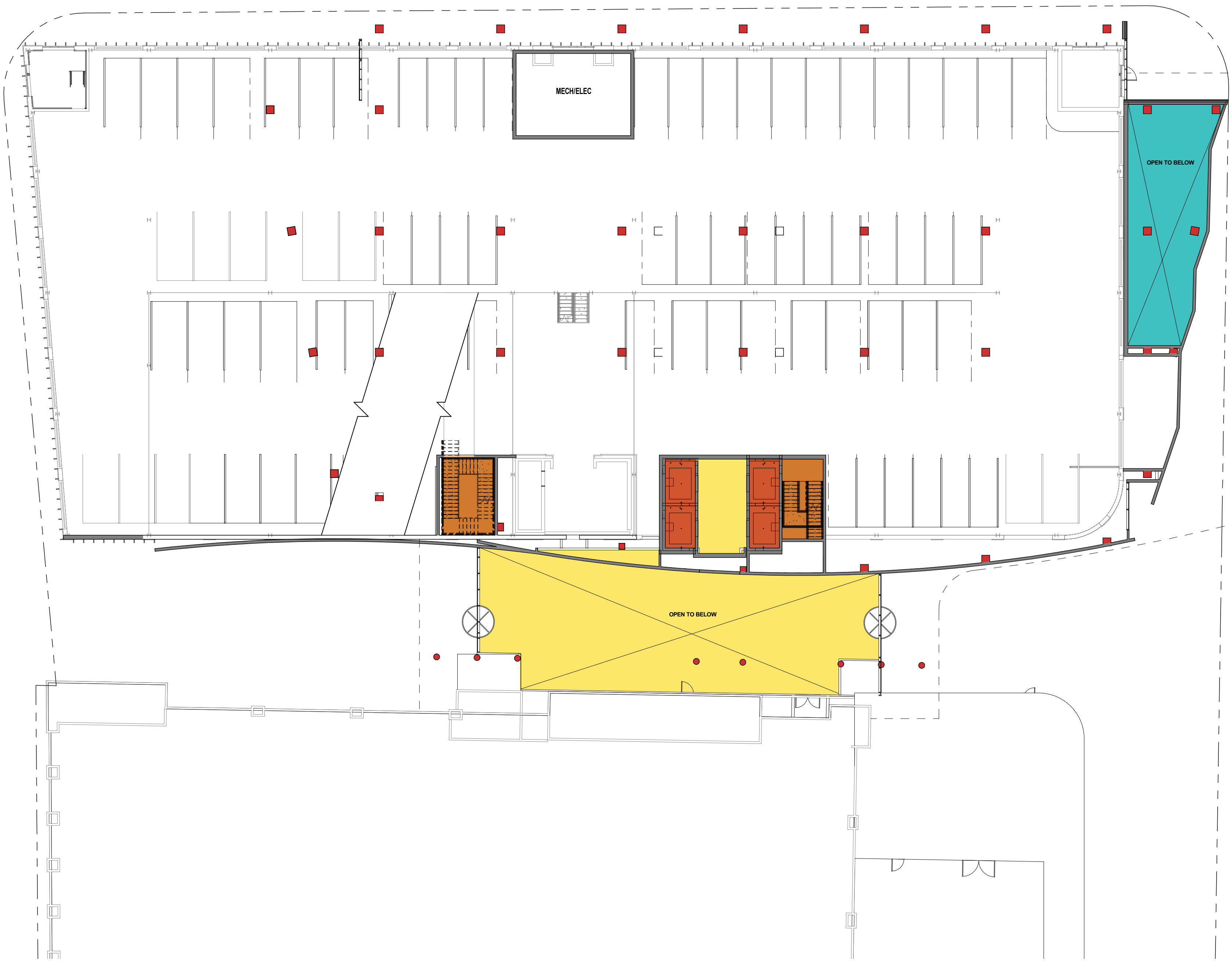
Appendix A

Floor Plans


COMMUNITY SPACE
COLUMN TRANSFER
4.7% SLOPE
GARAGE LOBBY
8% RAMP

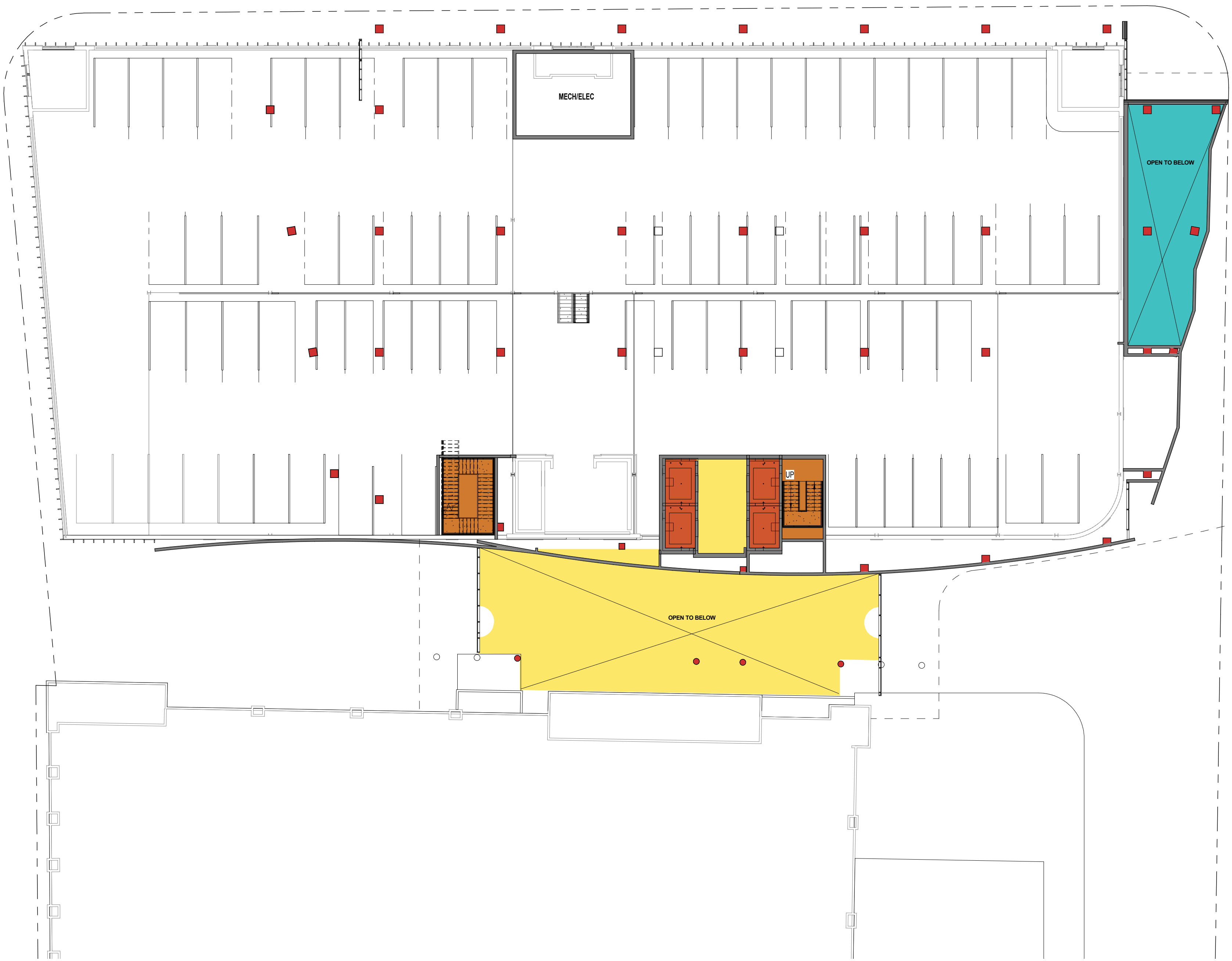
1 BASEMENT

1 LOBBY LEVEL

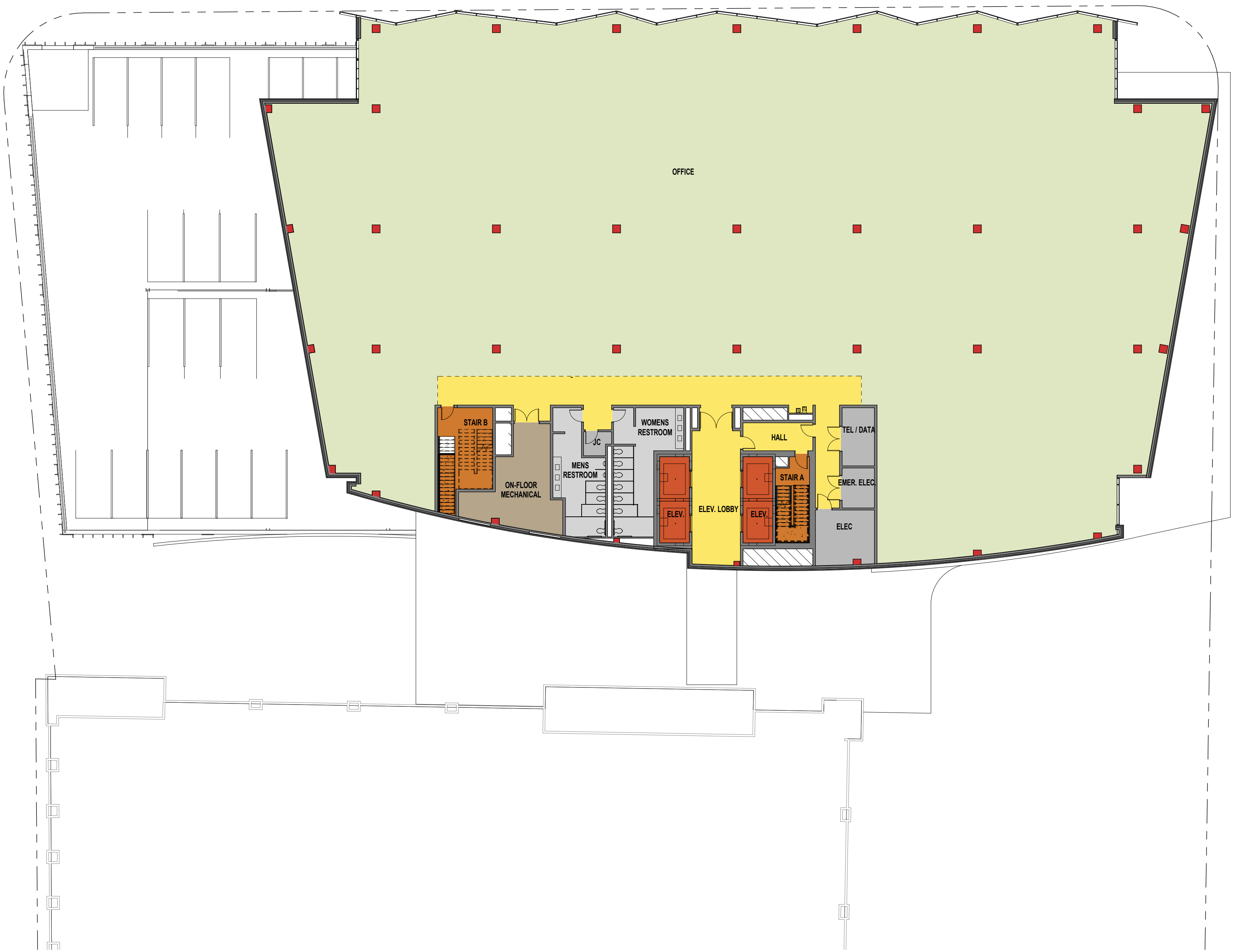


1 GARAGE LEVEL 2

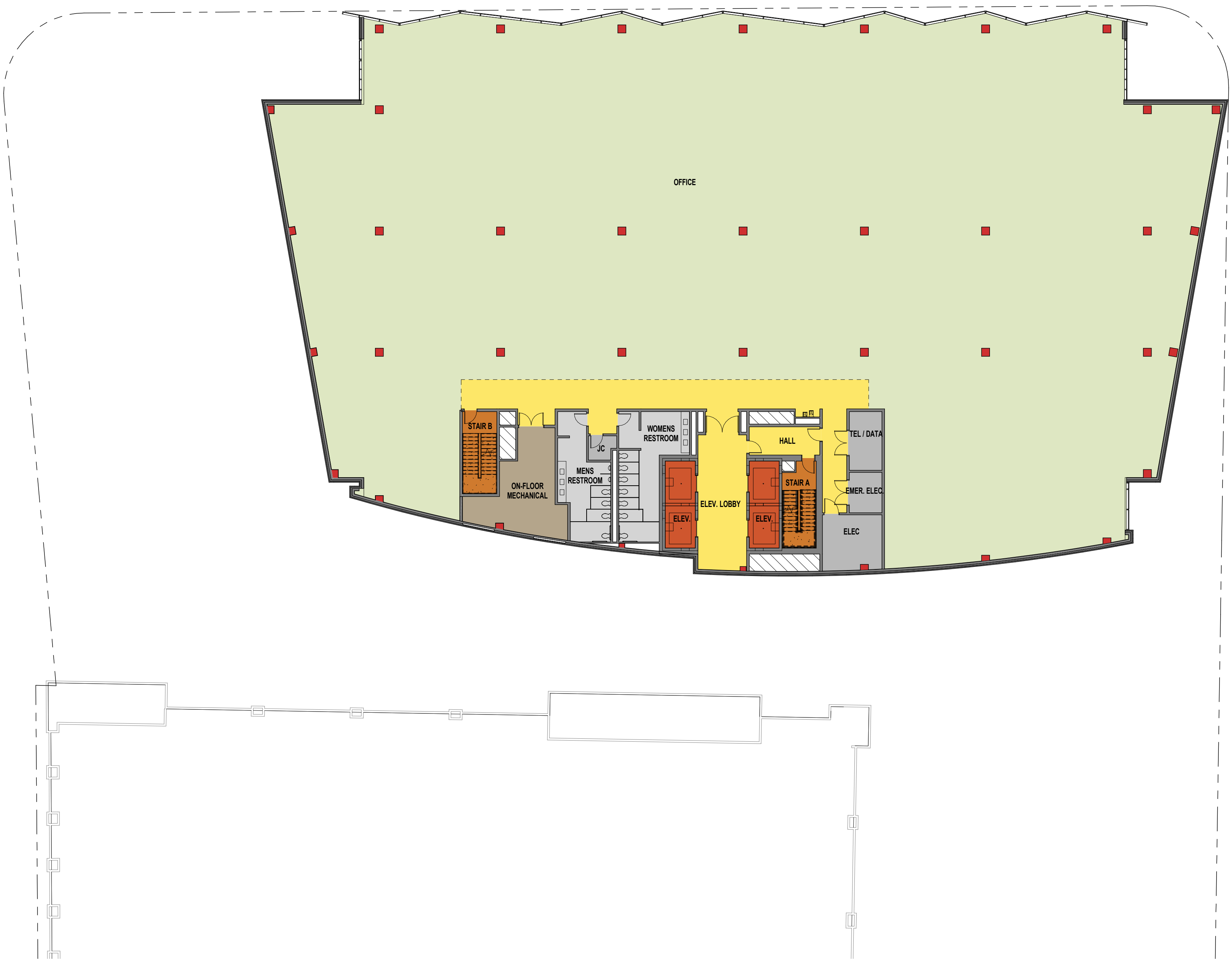
SMMA



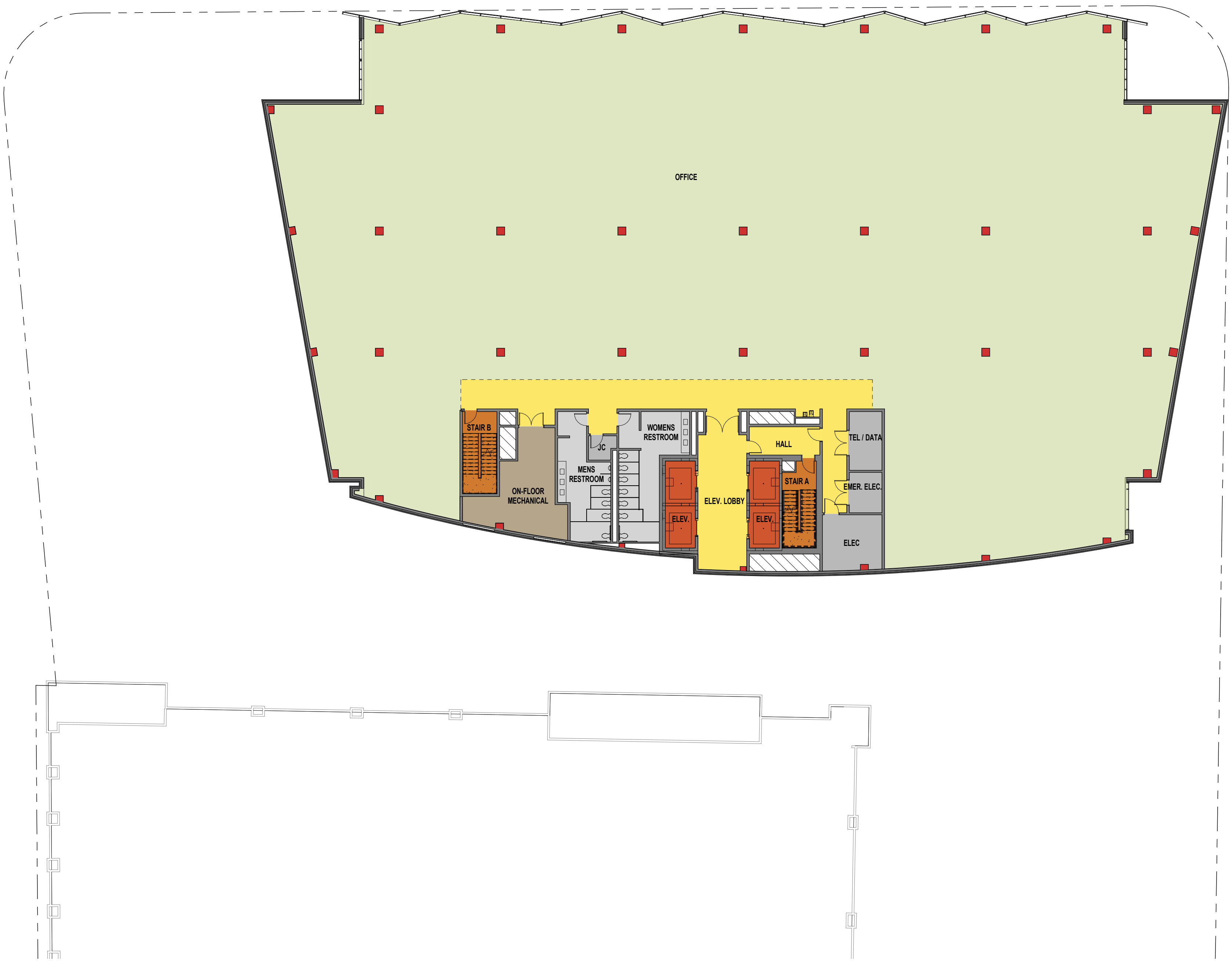
1 GARAGE LEVEL 3



1 OFFICE LEVEL 1



1 OFFICE LEVEL 2



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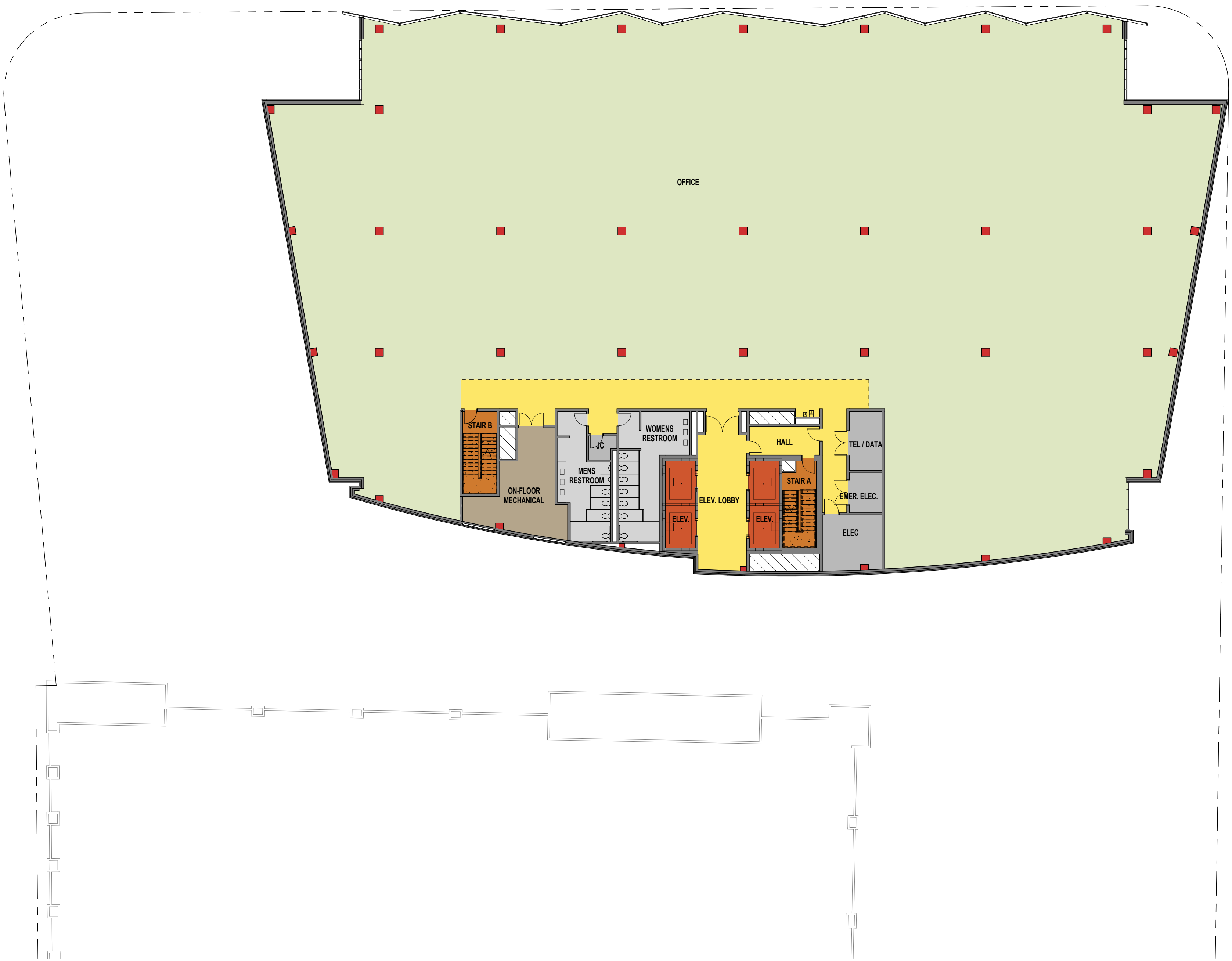
SMMA



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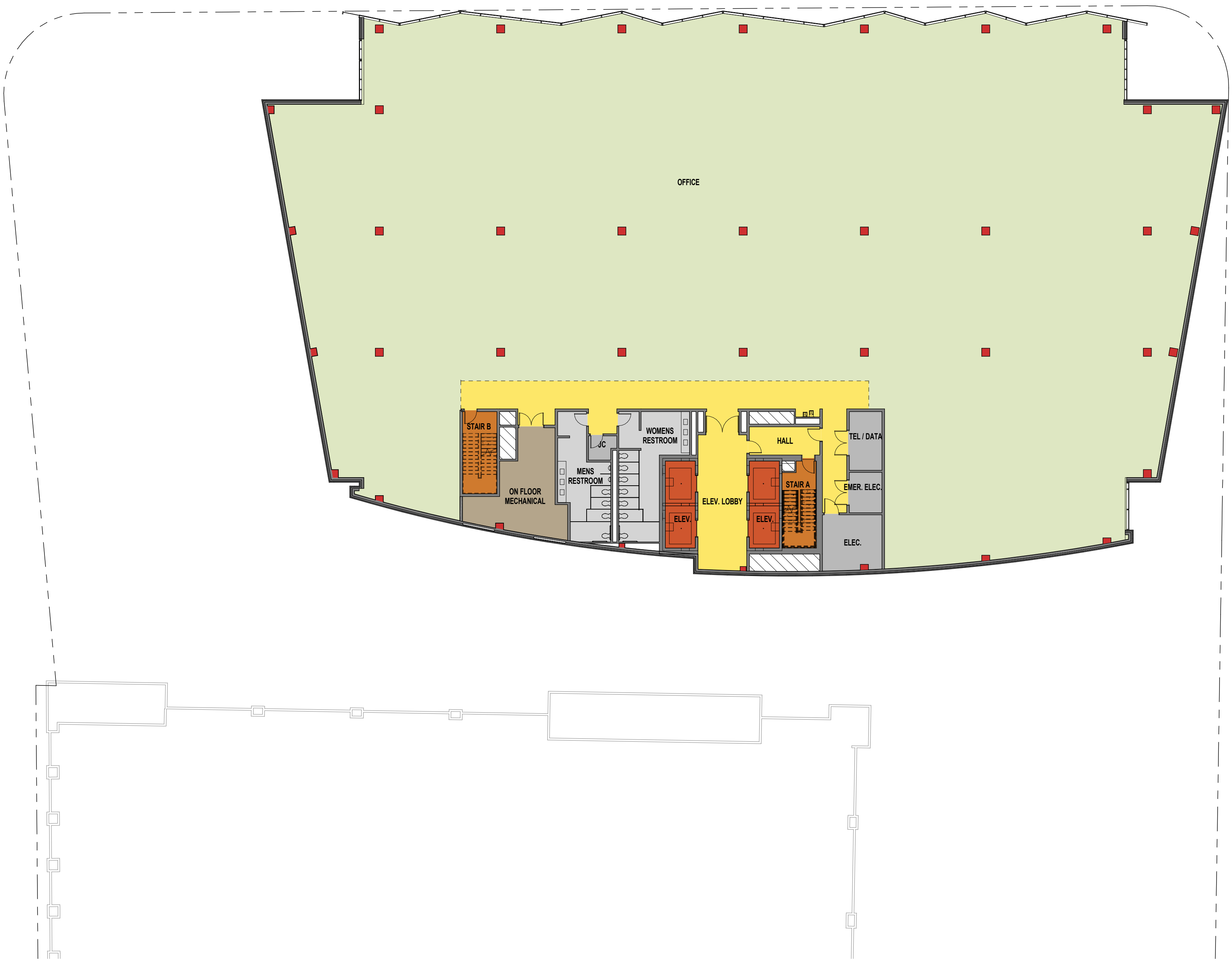

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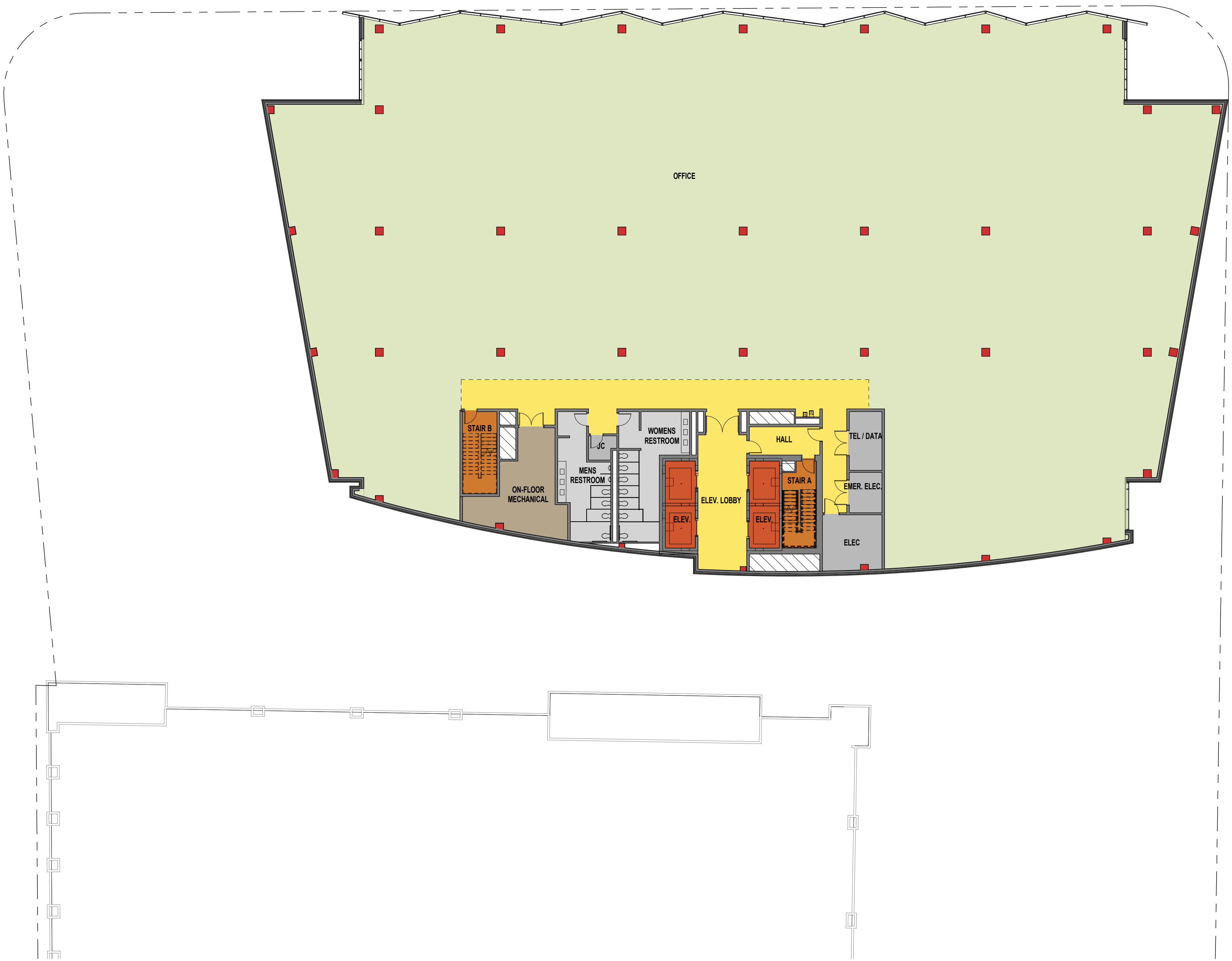

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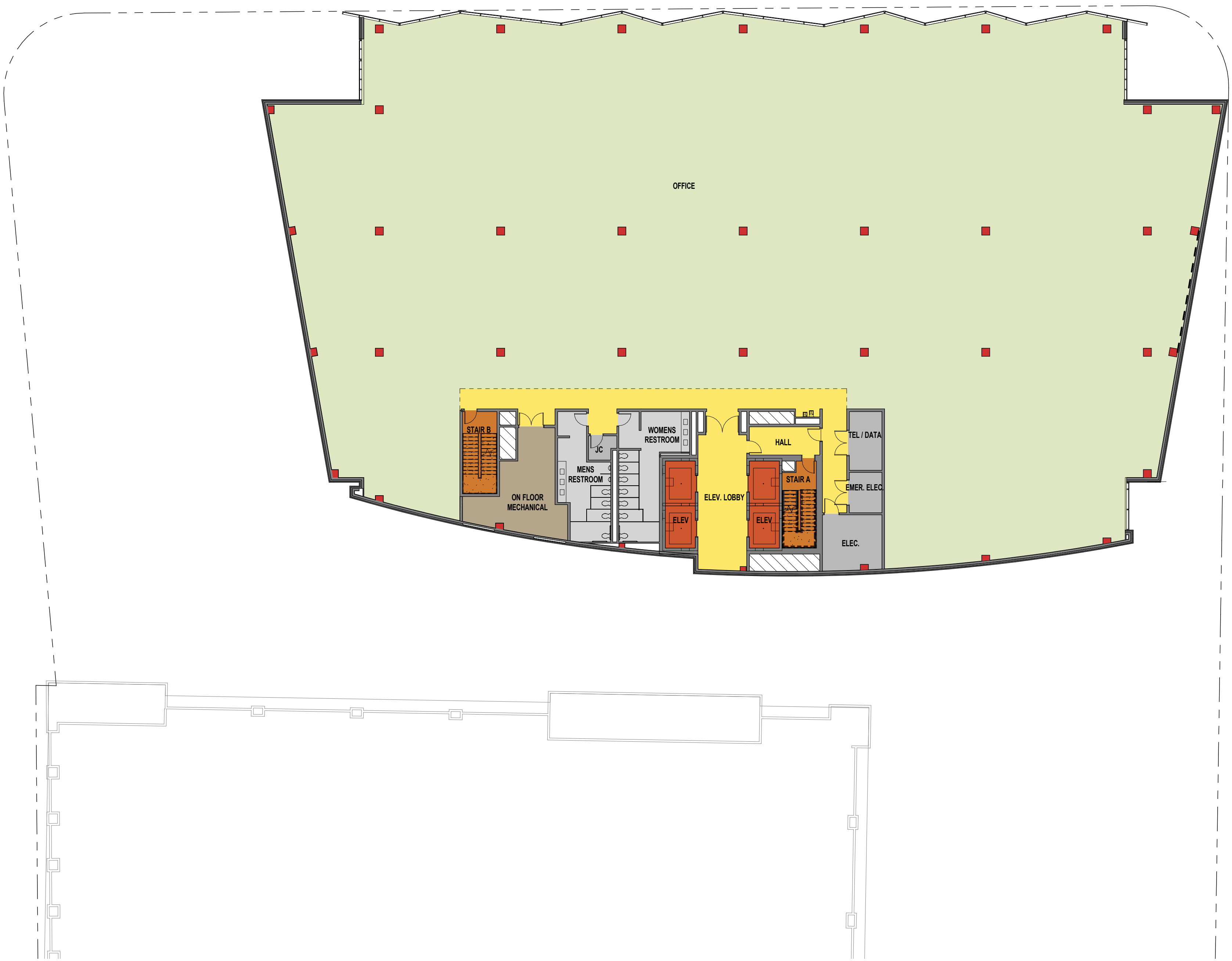

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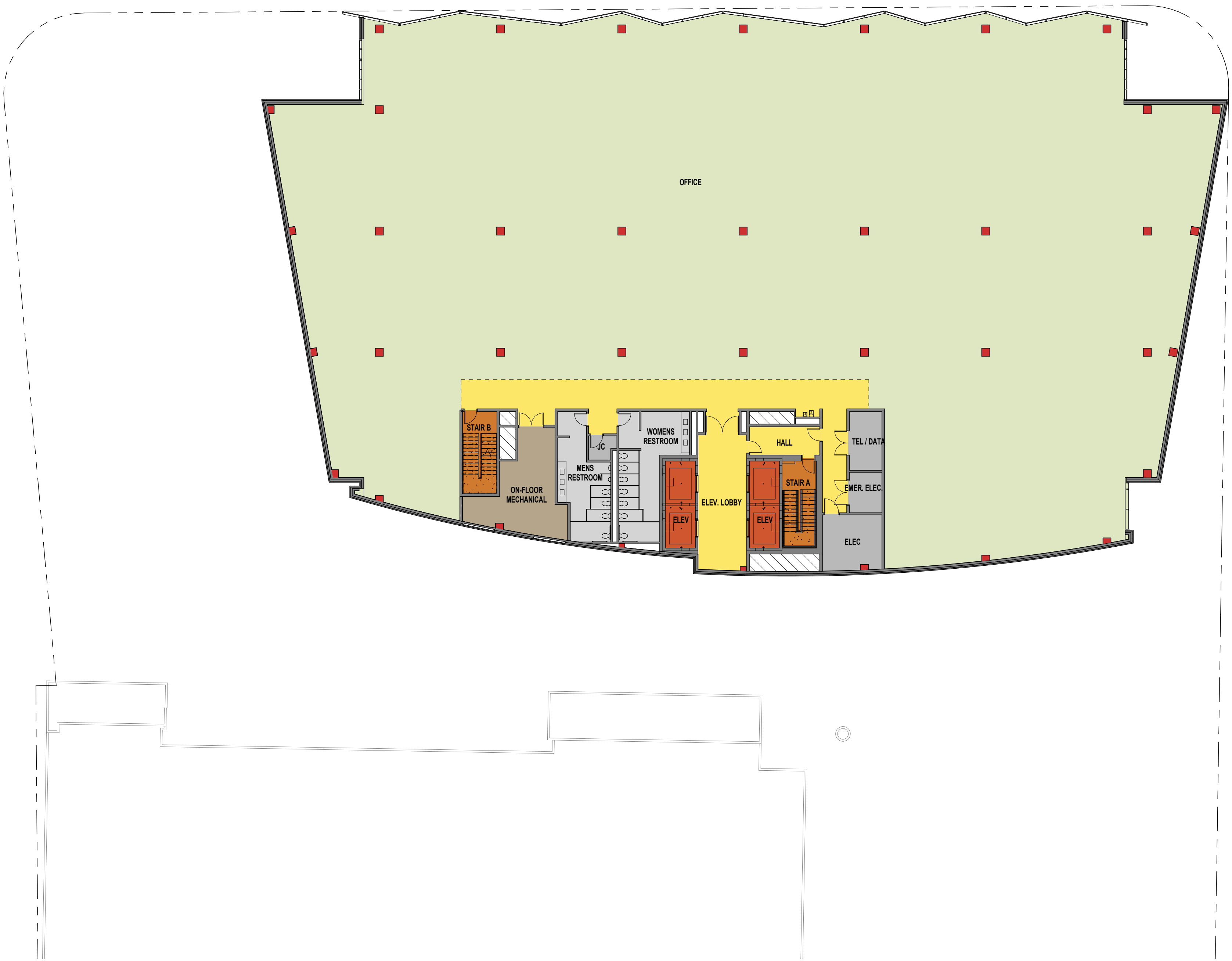


1 OFFICE LEVEL 8

Appendix B

Site Survey

PLAN REFERENCES

PLAN OF LAND ENTITLED "ALTA/ACSM LAND TITLE SURVEY PLAN OF LAND, SURVEY OF THE FIDELITY BLOCK, IN BOSTON MASSACHUSETTS", PREPARED BY BSC GROUP, INC. FOR FWR CORPORATION, DATED DECEMBER 17, 2001 AND LAST REVISED ON APRIL 8, 2003. (BSC DRAWING #2923-3)

GENERAL NOTES:

1. THIS PLAN IS BASED ON AN ON-THE-GROUND SURVEY PERFORMED ORIGINALLY BY THE BSC GROUP, INC. IN OCTOBER 1993, UPDATED BY VISUAL INSPECTION ON JULY 11, 2006, AND AGAIN ON OCTOBER 24, 2014.

2. THE PREMISES IS PART OF SOUTH END LANDMARK DISTRICT (BOOK 11841, PAGE 82).

3. THE ENTIRE PREMISES LIES WITHIN ZONE X (UNSHADED) AS GRAPHICALLY DEPICTED ON FEMA FLOOD INSURANCE RATE MAP NUMBER 25025C0077G FOR COMMUNITY NUMBER 250286, EFFECTIVE DATE SEPTEMBER 25, 2009.

4. ALL UNDERGROUND UTILITIES SHOWN WERE PROVIDED BY OTHERS AND ARE APPROXIMATE ONLY. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD BEFORE DESIGNING, EXCAVATING, BLASTING, INSTALLING, BACKFILLING, GRADING, PAVEMENT RESTORATION OR REPAIRING ALL UTILITY COMPANIES, PUBLIC AND PRIVATE, MUST BE CONTACTED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF 1963, MASSACHUSETTS. CALL "DIG SAFE" AT 1-888-344-7233 OR AT WWW.DIGSAFE.COM. BSC ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY ENGINEERING DEPARTMENT MUST BE CONSULTED.

5. THE PROPERTY SHOWN HEREON IS THE SAME AS DESCRIBED IN SCHEDULE A OF STEWART TITLE GUARANTY COMPANY COMMITMENT NUMBER 14000071438, WITH AN EFFECTIVE DATE OF OCTOBER 6, 2014.

RECORD OWNER:

TERAVIEW INVESTMENTS LLC
BOOK 40461, PAGE 103
CERTIFICATE OF TITLE #123841

PARCEL DESCRIPTION

A CERTAIN PARCEL OF LAND WITH BUILDINGS THEREON NUMBERED 311-321 HARRISON AVENUE, SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK IN THE COMMONWEALTH OF MASSACHUSETTS, WHICH PARCEL IS SHOWN ON A PLAN BY BSC GROUP, INC. ENTITLED, "CONSOLIDATION PLAN OF LAND; 311-321 HARRISON AVENUE IN BOSTON, MASSACHUSETTS (SUFFOLK COUNTY)", DATED AUGUST 21, 2006 AND RECORDED WITH SAID DEEDS AS PLAN NO. 882 OF 2006, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE PARCEL, SAID CORNER BEING THE INTERSECTION OF THE EASTERLY LINE OF WASHINGTON STREET WITH THE NORTHERLY LINE OF WILLIAM E. MULLINS WAY, SAID POINT BEING THE POINT OF BEGINNING, THENCE

N 14°38'41" E	A DISTANCE OF ONE HUNDRED TWELVE AND TEN HUNDREDTHS FEET (112.10) TO A POINT; THENCE
S 73°22'25" E	A DISTANCE OF FIVE AND THREE HUNDREDTHS FEET (5.03) TO A POINT; THENCE
N 10°15'59" E	A DISTANCE OF TWENTY-FOUR AND FOURTEEN HUNDREDTHS FEET (24.14) TO A POINT; THENCE
N 10°19'19" E	A DISTANCE OF ONE HUNDRED TWENTY AND EIGHTY HUNDREDTHS FEET (120.80) TO A POINT OF CURVATURE.

THE PREVIOUS FOUR (4) COURSES BOUNDING ON THE EASTERLY LINE OF SAID WASHINGTON STREET; THENCE

NORTHEASTERLY	AND CURVING TO THE RIGHT ALONG THE ARC OF A CURVE HAVING A RADIUS OF TWENTY AND NO HUNDREDTHS FEET (20.00), A LENGTH OF THIRTY-THREE AND FIVE HUNDREDTHS FEET (33.05) TO A POINT ON THE SOUTHERLY SIDELINE OF HERALD STREET; THENCE
S 74°59'19" E	A DISTANCE OF TWO HUNDRED SIXTY-TWO AND FIFTY-FIVE HUNDREDTHS FEET (262.55) ALONG SAID SOUTHERLY LINE OF HERALD STREET TO A POINT OF CURVATURE; THENCE
SOUTHEASTERLY	AND CURVING TO THE RIGHT ALONG THE ARC OF A CURVE HAVING A RADIUS OF TWENTY AND NO HUNDREDTHS FEET (20.00), A LENGTH OF THIRTY-ONE AND EIGHTY-SIX HUNDREDTHS FEET (31.86) TO A POINT ON THE WESTERLY SIDELINE OF HARRISON STREET; THENCE
S 16°17'05" W	A DISTANCE OF ONE HUNDRED NINETY-TWO AND TWENTY-NINE HUNDREDTHS FEET (192.29) TO A POINT; THENCE
S 72°50'03" E	A DISTANCE OF TEN AND NO HUNDREDTHS FEET (10.00) TO A POINT; THENCE

PARCEL DESCRIPTION - CONTINUES

S 16°17'05" W	A DISTANCE OF NINETEEN AND THIRTY-ONE HUNDREDTHS FEET (19.31) TO A POINT; THENCE
N 72°45'55" W	A DISTANCE OF TEN AND NO HUNDREDTHS FEET (10.00) TO A POINT; THENCE
S 16°17'05" W	A DISTANCE OF THIRTY-EIGHT AND NO HUNDREDTHS FEET (38.00) TO A POINT OF CURVATURE;

THE PREVIOUS FIVE (5) COURSES BOUNDING ON SAID WESTERLY LINE OF HARRISON AVENUE; THENCE

SOUTHWESTERLY	AND CURVING TO THE RIGHT ALONG THE ARC OF A CURVE HAVING A RADIUS OF TWENTY AND NO HUNDREDTHS FEET (20.00), A LENGTH OF THIRTY-ONE AND EIGHTY-TWO HUNDREDTHS FEET (31.82) TO A POINT ON THE NORTHERLY LINE OF WILLIAM E. MULLINS WAY; THENCE
N 72°33'10" W	A DISTANCE OF TWO HUNDRED SIXTY-NINE AND FORTY-TWO HUNDREDTHS FEET (269.42) ALONG SAID NORTHERLY LINE OF WILLIAM E. MULLINS WAY TO THE POINT OF BEGINNING.

A PORTION OF THE ABOVE DESCRIBED PARCEL (TRACT I, PARCEL D) IS REGISTERED LAND AND IS SHOWN ON LAND COURT PLAN NUMBER 2213A.

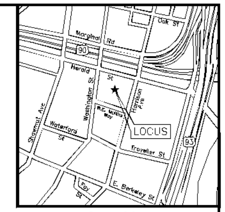
THE ABOVE DESCRIBED PARCEL OF LAND CONTAINS AN AREA OF 83,470 SQUARE FEET, MORE OR LESS.

ZONING SUMMARY: CITY OF BOSTON

ZONING CLASSIFICATION: "EDA NORTH" ECONOMIC DEVELOPMENT AREA NORTH WITHIN THE SOUTH END NEIGHBORHOOD DISTRICT

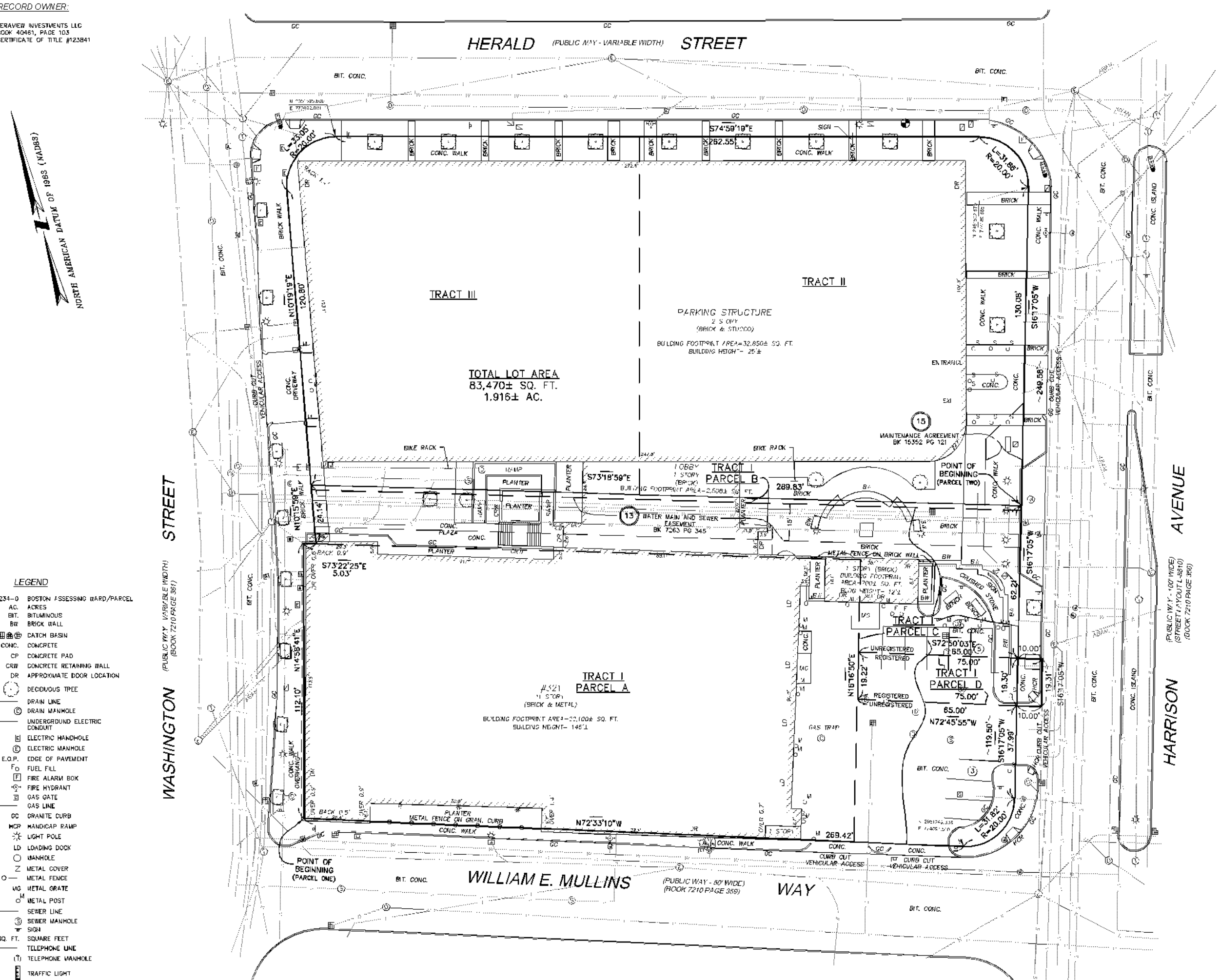
DIMENSIONAL REQUIREMENTS:	REQUIRED	PROVIDED
MINIMUM FRONT SETBACK	NONE	--
MINIMUM SIDE SETBACK	NONE	--
MINIMUM REAR SETBACK	20'	--
MAXIMUM BUILDING HEIGHT	100'	146'±
PARKING REQUIREMENT	NONE	320 TOTAL

NOTE: ZONING SUMMARY IS BASED ON PZR REPORT FOR WASHINGTON AND HARRISON, 1000 WASHINGTON STREET AND 311 TO 321 HARRISON AVENUE, BOSTON, MASSACHUSETTS, PREPARED FOR LEDGEWOOD, DATED 12/17/2014. PZR SITE NUMBER 80994-1.



Locus Map
(NOT TO SCALE)

PARKING SPACE TABLE		
TYPE OF SPACE	REGULAR	HANDICAP
GARAGE BASEMENT:	25	0
GARAGE FIRST:	90	6
GARAGE SECOND:	94	0
GARAGE ROOF:	95	2
SITE	8	0
TOTAL:	312	8



LEGEND

3//6234-0	BOSTON ASSESSING WARD/PARCEL
AC.	ACRES
BIT.	BITUMINOUS
BW	BRICK WALL
	CATCH BASIN
CONC.	CONCRETE
CP	CONCRETE PAD
CRW	CONCRETE RETAINING WALL
DR	APPROXIMATE DOOR LOCATION
	DECIDUOUS TREE
D	DRAIN LINE
	DRAIN MANHOLE
E	UNDERGROUND ELECTRIC CONDUIT
	ELECTRIC HANDHOLE
	ELECTRIC MANHOLE
E.O.P.	EDGE OF PAVEMENT
	FUEL FILL
	FIRE ALARM BOX
	FIRE HYDRANT
	GAS GATE
G	GAS LINE
GC	GRANITE CURB
HCR	HANDICAP RAMP
	LIGHT POLE
LD	LOADING DOCK
	MANHOLE
	METAL COVER
	METAL FENCE
MG	METAL GRATE
	METAL POST
S	SEWER LINE
	SEWER MANHOLE
	SIGN
SQ. FT.	SQUARE FEET
T	TELEPHONE LINE
	TELEPHONE MANHOLE
	TRAFFIC LIGHT
	WATER GATE
W	WATER LINE
	WATER MANHOLE
	WATER STANDPIPE

SCHEDULE B - SECTION 2 (EXCEPTIONS)

THE FOLLOWING EXCEPTIONS ARE ITEMIZED IN SCHEDULE B - SECTION 2 OF STEWART TITLE GUARANTY COMPANY COMMITMENT NUMBER 14000071438, WITH AN EFFECTIVE DATE OF OCTOBER 6, 2014.

7. INTENTIONALLY DELETED

8. INTENTIONALLY DELETED.

9. TERMS AND PROVISIONS OF THE LAND ASSEMBLY AND REDEVELOPMENT PLAN, NEW YORK STREETS PROJECT BY THE BOSTON HOUSING AUTHORITY RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7244, PAGE 18. (AFFECTS TRACTS I & II - NOT PLOTTABLE).

10. RIGHTS, CONDITIONS, EASEMENTS, COVENANTS AND AGREEMENTS SET FORTH IN DEED FROM CEREL-DRUKER REDEVELOPMENT CORPORATION TO CLARA R. DRUCKER DATED AUGUST 28, 1959, AND FILED WITH SAID REGISTRY DISTRICT AS DOCUMENT NO. 240328, AND SHOWN ON LAND DISPOSITION PLAN RECORDED IN BOOK 7263, PAGE 345. (AFFECTS PARCEL D ONLY - NOT PLOTTABLE).

11. RIGHTS, CONDITIONS, EASEMENTS, COVENANTS AND AGREEMENTS SET FORTH IN DEED FROM CEREL- DRUKER REDEVELOPMENT CORPORATION TO CLARA R. DRUCKER DATED JUNE 30, 1959 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7424, PAGE 161, AND SHOWN ON LAND DISPOSITION PLAN RECORDED IN BOOK 7263, PAGE 345. (AFFECTS PARCEL B OF TRACT I ONLY - NOT PLOTTABLE)).

12. LAYOUTS AND TAKINGS HARRISON AVENUE, ASYLUM STREET AND WASHINGTON STREET BY THE CITY OF BOSTON RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7210, PAGES 356, 359 AND 361. (AFFECTS TRACT I - LAYOUTS SHOWN)

13. WATER MAINS AND SEWER EASEMENT SHOWN ON PLAN ENTITLED "LAND DISPOSITION PLAN, URBAN RENEWAL DIVISION BOSTON REDEVELOPMENT AUTHORITY, NEW YORK STREETS PROJECT U.R. MASS. 2-1" DATED MARCH 6, 1957 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7263, PAGE 345. ALSO SHOWN ON PLAN RECORDED WITH SAID REGISTRY OF DEEDS AS PLAN NO. 882 OF 2006. (AFFECTS PARCEL C OF TRACT I - PLOTTED).

14. DESIGNATION OF THE SOUTH END HISTORIC DISTRICT BY VOTE OF THE BOSTON LANDMARKS COMMISSION, PURSUANT TO C. 772 OF THE ACTS OF 1975, DATED NOVEMBER 14, 1983, RECORDED WITH SAID REGISTRY OF DEEDS ON JUNE 6, 1985 IN BOOK 11841, PAGE 82. (LOCUS IS ON PAGE 79 OF DOCUMENT) (AFFECTS TRACT - I - NOT PLOTTABLE).

15. MAINTENANCE AGREEMENT BY AND BETWEEN THE CITY OF BOSTON AND TERADYNE, INC. RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 15352, PAGE 121. (AFFECTS TRACT I - PLOTTED).

16. AGREEMENT BY AND BETWEEN TERADYNE, INC. AND BOSTON WATER AND SEWER COMMISSION DATED MARCH 2, 1990 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 16167, PAGE 82. (AFFECTS TRACT I - NOT PLOTTED, LOCATION UNKNOWN).

17. COVENANTS, RESTRICTIONS AND CONDITIONS SET FORTH IN A DEED FROM BOSTON REDEVELOPMENT AUTHORITY TO CEREL-DRUKER REDEVELOPMENT CORPORATION DATED DECEMBER 26, 1957 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7285, PAGE 21. (AFFECTS TRACT II AND III - NOT PLOTTABLE).

18. TERMS AND CONDITIONS CONTAINED IN AN AGREEMENT BY AND BETWEEN CITY REDEVELOPMENT CORPORATION AND THE BOSTON HOUSING AUTHORITY, AS AFFECTED BY COMPLETION AND SATISFACTION CERTIFICATE TO THE BOSTON REDEVELOPMENT AUTHORITY DATED AUGUST 11, 1965 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 7995, PAGE 243. (AFFECTS TRACT II - NOT PLOTTABLE).

19. INTENTIONALLY DELETED

20. INTENTIONALLY DELETED.

21. PLAN ENTITLED, "ALTA/ACSM LAND TITLE SURVEY 311-321 HARRISON AVENUE IN BOSTON, MA (SUFFOLK COUNTY) DATED NOVEMBER 4, 2014, LAST REVISED ______, 2014, PREPARED FOR NORDBLOM COMPANY 15 THIRD STREET, BURLINGTON, MA 01803 BY BSC GROUP, SCALE 1"=20', AND IDENTIFIED AT JOB NO. 1-2004.02" DISCLOSES THE FOLLOWING:

A. UTILITY LINES EXTEND INTO THE INSURED PREMISES FROM HARRISON AVENUE, WILLIAM E. MULLINS WAY, WASHINGTON STREET, AND HERALD STREET.
B. CONCRETE WALK RUNS ALONG THE OUTSIDE PERIMETER OF THE INSURED PREMISES.
C. HANDICAP RAMPS EXTEND INTO HARRISON AVENUE, WASHING STREET AND HERALD STREET.
D. PLANTER METAL FENCE EXTENDS INTO WILL E. MULLINS WAY.
E. OVERHANG EXTENDS INTO WASHINGTON STREET.
F. BUILDING EXTENDS OVER WASHINGTON STREET BOUND BY APPROXIMATELY .6 FEET.
G. TREE PLANTERS EXTEND OVER THE HERALD STREET BOUNDARY.
H. BUILDING EXTENDS OVER WILLIAM E. MULLINS WAY BOUND BY UP TO 1.4 FEET.

SURVEY CERTIFICATION

TO: 1000 W ACQUISITIONS, LLC;
STEWART TITLE GUARANTY COMPANY;
RUBENSTEIN PARTNERS ACQUISITIONS LLC; AND
EAST BOSTON SAVINGS BANK:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 7(A), 7(B)(1), 7(C), 8, 9, 11(A), 13, AND 14 OF TABLE A THEREOF.
THE FIELD WORK WAS COMPLETED ON NOVEMBER 4, 2014.

DATE OF PLAT OR MAP: NOVEMBER 4, 2014

SEAN EWALD No. 47143 PROFESSIONAL LAND SURVEYOR

REGISTERED LAND SURVEYOR FOR BSC GROUP, INC. — DATE 12/18/2014

ALTA/ACSM LAND TITLE SURVEY

311 - 321 HARRISON AVENUE
IN
BOSTON
MASSACHUSETTS
(SUFFOLK COUNTY)

NOVEMBER 4, 2014

PREPARED FOR:

NORDBLOM COMPANY
15 THIRD STREET
BURLINGTON, MA 01803

BSC GROUP
15 Elkins Street
Boston, Massachusetts
02127
617 896 4300

SCALE: 1" = 20'
0 2.5 5 10 METERS
0 10 20 40 FEET

PROJ. MGR.: S. EWALD		
FIELD: L. ZANCA / J. DOTOLO		
CALC./DESIGN: S. EWALD		
DRAWN: D. THERIAULT/M. HASSANOVA		
CHECK: M. HASSANOVA		
FILE: P:\Prj\1200402\BasePlan\1200402TI.dwg		
DWG. NO: 1200402TI	FILED:	SHEET
JOB. NO: 1-2004.02		1 OF 1

Appendix C

Transportation

Transportation Appendix is Available Upon Request

Appendix D

Wind

CONSULTING ENGINEERS & SCIENTISTS

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
1	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	9	-25%	Sitting	14	-22%	Acceptable
		Summer	7	-22%	Sitting	11	-21%	Acceptable
		Fall	8	-27%	Sitting	13	-24%	Acceptable
		Winter	10	-23%	Sitting	15	-25%	Acceptable
		Annual	9	-25%	Sitting	14	-22%	Acceptable
2	A	Spring	13		Standing	21		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	9	-31%	Sitting	15	-29%	Acceptable
		Summer	7	-22%	Sitting	12	-20%	Acceptable
		Fall	9	-25%	Sitting	15	-21%	Acceptable
		Winter	10	-29%	Sitting	17	-26%	Acceptable
		Annual	9	-31%	Sitting	15	-29%	Acceptable
3	A	Spring	23		Uncomfortable	34		Unacceptable
		Summer	17		Walking	25		Acceptable
		Fall	21		Uncomfortable	32		Unacceptable
		Winter	25		Uncomfortable	38		Unacceptable
		Annual	23		Uncomfortable	34		Unacceptable
	B	Spring	13	-43%	Standing	24	-29%	Acceptable
		Summer	10	-41%	Sitting	18	-28%	Acceptable
		Fall	12	-43%	Sitting	22	-31%	Acceptable
		Winter	15	-40%	Standing	26	-32%	Acceptable
		Annual	13	-43%	Standing	23	-32%	Acceptable
4	A	Spring	22		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	21		Uncomfortable	31		Acceptable
		Winter	24		Uncomfortable	36		Unacceptable
		Annual	22		Uncomfortable	32		Unacceptable
	B	Spring	18	-18%	Walking	27	-16%	Acceptable
		Summer	17		Walking	23	-12%	Acceptable
		Fall	18	-14%	Walking	26	-16%	Acceptable
		Winter	19	-21%	Walking	29	-19%	Acceptable
		Annual	18	-18%	Walking	27	-16%	Acceptable
5	A	Spring	20		Uncomfortable	30		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	21		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable

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

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	18		Walking	27		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	19		Walking	29	-12%	Acceptable
		Annual	18		Walking	27		Acceptable
6	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	18		Walking	25		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	25	19%	Uncomfortable	34	17%	Unacceptable
		Summer	20	11%	Uncomfortable	27		Acceptable
		Fall	24	14%	Uncomfortable	32		Unacceptable
		Winter	25	14%	Uncomfortable	34		Unacceptable
		Annual	24	14%	Uncomfortable	32		Unacceptable
7	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	19	36%	Walking	26	24%	Acceptable
		Summer	14	27%	Standing	19	19%	Acceptable
		Fall	18	50%	Walking	24	26%	Acceptable
		Winter	19	46%	Walking	26	30%	Acceptable
		Annual	18	38%	Walking	24	26%	Acceptable
8	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
9	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	12	20%	Sitting	18	13%	Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable

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

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

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

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
10	A	Spring	16		Walking	26		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	17		Walking	27		Acceptable
		Annual	15		Standing	25		Acceptable
	B	Spring	18	13%	Walking	25		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	17	13%	Walking	24		Acceptable
		Winter	17		Walking	24	-11%	Acceptable
		Annual	17	13%	Walking	23		Acceptable
11	A	Spring	14		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	20	43%	Uncomfortable	27	23%	Acceptable
		Summer	15	50%	Standing	20	25%	Acceptable
		Fall	19	36%	Walking	26	24%	Acceptable
		Winter	18	38%	Walking	26	24%	Acceptable
		Annual	19	46%	Walking	25	25%	Acceptable
12	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	17	21%	Walking	25	19%	Acceptable
		Summer	13	30%	Standing	18	20%	Acceptable
		Fall	16	23%	Walking	23	15%	Acceptable
		Winter	18	50%	Walking	25	25%	Acceptable
		Annual	17	31%	Walking	23	21%	Acceptable
13	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	19	19%	Walking	27	13%	Acceptable
		Summer	14	17%	Standing	20	11%	Acceptable
		Fall	17	13%	Walking	25		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17	13%	Walking	25		Acceptable
14	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
15	A	Spring	16		Walking	24		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	10	-38%	Sitting	16	-33%	Acceptable
		Summer	8	-27%	Sitting	12	-25%	Acceptable
		Fall	10	-33%	Sitting	16	-27%	Acceptable
		Winter	10	-23%	Sitting	16	-24%	Acceptable
		Annual	9	-36%	Sitting	15	-29%	Acceptable
16	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	10	-29%	Sitting	17	-19%	Acceptable
		Summer	8	-33%	Sitting	14	-18%	Acceptable
		Fall	10	-17%	Sitting	16	-16%	Acceptable
		Winter	11	-21%	Sitting	17	-19%	Acceptable
		Annual	10	-23%	Sitting	17	-15%	Acceptable
17	A	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
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
18	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18	13%	Walking	27		Acceptable
		Annual	16		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
B – Build	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
19	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	14		Standing	20	-13%	Acceptable
		Summer	11		Sitting	16	-11%	Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
20	A	Spring	8		Sitting	14		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	10	25%	Sitting	16	14%	Acceptable
		Summer	7	17%	Sitting	12	20%	Acceptable
		Fall	9	13%	Sitting	15	15%	Acceptable
		Winter	10	11%	Sitting	16	14%	Acceptable
		Annual	9	13%	Sitting	15	15%	Acceptable
21	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	14	17%	Standing	21		Acceptable
		Summer	11	22%	Sitting	16	14%	Acceptable
		Fall	13	18%	Standing	20	11%	Acceptable
		Winter	14	17%	Standing	21		Acceptable
		Annual	13	18%	Standing	19		Acceptable
22	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	21		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
23	A	Spring	17		Walking	25		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	27		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	18		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	26		Acceptable
24	A	Spring	22		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	24		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	32		Unacceptable
	B	Spring	21		Uncomfortable	32		Unacceptable
		Summer	19		Walking	27		Acceptable
		Fall	21		Uncomfortable	31		Acceptable
		Winter	23		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	32		Unacceptable
25	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	27		Acceptable
26	A	Spring	15		Standing	25		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	17		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	15		Standing	24		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable
27	A	Spring	25		Uncomfortable	34		Unacceptable
		Summer	21		Uncomfortable	28		Acceptable
		Fall	24		Uncomfortable	33		Unacceptable
		Winter	26		Uncomfortable	37		Unacceptable
		Annual	24		Uncomfortable	34		Unacceptable
	B	Spring	19	-24%	Walking	28	-18%	Acceptable
		Summer	18	-14%	Walking	25		Acceptable
		Fall	19	-21%	Walking	27	-18%	Acceptable
		Winter	20	-23%	Uncomfortable	30	-19%	Acceptable
		Annual	19	-21%	Walking	28	-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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
28	A	Spring	22		Uncomfortable	32		Unacceptable
		Summer	17		Walking	25		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
	B	Spring	14	-36%	Standing	22	-31%	Acceptable
		Summer	11	-35%	Sitting	18	-28%	Acceptable
		Fall	13	-35%	Standing	21	-28%	Acceptable
		Winter	14	-42%	Standing	23	-32%	Acceptable
		Annual	13	-41%	Standing	21	-32%	Acceptable
29	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	18		Walking	26		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	30		Acceptable
	B	Spring	24	14%	Uncomfortable	31		Acceptable
		Summer	18		Walking	24		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	31		Acceptable
		Annual	22		Uncomfortable	29		Acceptable
30	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	15		Standing	21	-13%	Acceptable
		Summer	11		Sitting	15	-17%	Acceptable
		Fall	14		Standing	20	-13%	Acceptable
		Winter	14	-18%	Standing	21	-16%	Acceptable
		Annual	14	-13%	Standing	20	-13%	Acceptable
31	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	16	14%	Walking	24	14%	Acceptable
		Summer	12		Sitting	18	13%	Acceptable
		Fall	15	15%	Standing	22	16%	Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	22		Acceptable
32	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
33	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
34	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
35	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
36	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable

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

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
37	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
38	A	Spring	12		Sitting	21		Acceptable
		Summer	9		Sitting	16		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	23		Acceptable
		Annual	12		Sitting	21		Acceptable
	B	Spring	13		Standing	22		Acceptable
		Summer	10	11%	Sitting	17		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
39	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	24		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	23		Uncomfortable	31		Acceptable
		Annual	21		Uncomfortable	28		Acceptable
40	A	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	22		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
41	A	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	25		Acceptable
42	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
43	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	24		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
44	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	22		Uncomfortable	30		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	22		Uncomfortable	30		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
45	A	Spring	18		Walking	25		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	21	17%	Uncomfortable	29	16%	Acceptable
		Summer	17	13%	Walking	23		Acceptable
		Fall	20	11%	Uncomfortable	28	12%	Acceptable
		Winter	22	16%	Uncomfortable	30	11%	Acceptable
		Annual	20	11%	Uncomfortable	28	12%	Acceptable

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

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
46	A	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	20	25%	Uncomfortable	28	22%	Acceptable
		Summer	14	17%	Standing	21	24%	Acceptable
		Fall	18	29%	Walking	26	24%	Acceptable
		Winter	21	31%	Uncomfortable	30	25%	Acceptable
		Annual	19	27%	Walking	27	23%	Acceptable
47	A	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	18	20%	Walking	26	18%	Acceptable
		Summer	13	18%	Standing	20	25%	Acceptable
		Fall	17	21%	Walking	25	25%	Acceptable
		Winter	20	25%	Uncomfortable	28	22%	Acceptable
		Annual	18	20%	Walking	26	24%	Acceptable
48	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	24	14%	Acceptable
		Summer	12	20%	Sitting	19	19%	Acceptable
		Fall	15	15%	Standing	24	20%	Acceptable
		Winter	16		Walking	26	18%	Acceptable
		Annual	15		Standing	24	20%	Acceptable
49	A	Spring	19		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	21		Uncomfortable	28		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	21		Uncomfortable	29	16%	Acceptable
		Summer	16	14%	Walking	21		Acceptable
		Fall	20	18%	Uncomfortable	27	13%	Acceptable
		Winter	23		Uncomfortable	32	14%	Unacceptable
		Annual	21	17%	Uncomfortable	29	16%	Acceptable
50	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	23		Uncomfortable	31		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
51	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	23		Acceptable
	B	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	23		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	25		Acceptable
52	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
53	A	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
	B	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
54	A	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		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

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
55	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19	-14%	Walking	28		Acceptable
		Annual	17	-15%	Walking	26		Acceptable
56	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	25		Acceptable
57	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
58	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	18	-18%	Walking	26	-19%	Acceptable
		Annual	18		Walking	26		Acceptable
59	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		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
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	19	46%	Walking	28	40%	Acceptable
		Summer	14	40%	Standing	21	31%	Acceptable
		Fall	18	50%	Walking	25	32%	Acceptable
		Winter	20	43%	Uncomfortable	29	32%	Acceptable
		Annual	19	46%	Walking	27	35%	Acceptable
60	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable
61	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
	B	Spring	14	-33%	Standing	22	-27%	Acceptable
		Summer	11	-31%	Sitting	17	-26%	Acceptable
		Fall	13	-32%	Standing	21	-25%	Acceptable
		Winter	15	-35%	Standing	23	-32%	Acceptable
		Annual	14	-30%	Standing	21	-30%	Acceptable
62	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
63	A	Spring	24		Uncomfortable	33		Unacceptable
		Summer	18		Walking	25		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	26		Uncomfortable	36		Unacceptable
		Annual	23		Uncomfortable	33		Unacceptable
	B	Spring	25		Uncomfortable	34		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	23		Uncomfortable	31		Acceptable
		Winter	28		Dangerous	37		Unacceptable
		Annual	25		Uncomfortable	33		Unacceptable

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

Configurations

A – No Build
B – Build

Mean Wind Speed Criteria

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

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
64	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		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	24		Acceptable
		Annual	15		Standing	23		Acceptable
65	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	17		Acceptable
66	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	17	-15%	Walking	25		Acceptable
		Summer	13	-13%	Standing	19		Acceptable
		Fall	16	-11%	Walking	23	-12%	Acceptable
		Winter	17	-19%	Walking	26	-13%	Acceptable
		Annual	16	-16%	Walking	24	-14%	Acceptable
67	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	21		Uncomfortable	28		Acceptable
		Annual	19		Walking	26		Acceptable
68	A	Spring	22		Uncomfortable	31		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable

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

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

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

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	23		Uncomfortable	32		Unacceptable
		Summer	17		Walking	24		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	25		Uncomfortable	34		Unacceptable
		Annual	23		Uncomfortable	31		Acceptable
69	A	Spring	23		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	24		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	32		Unacceptable
	B	Spring	22		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	24		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
70	A	Spring	15		Standing	25		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable
	B	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable
71	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
72	A	Spring	21		Uncomfortable	33		Unacceptable
		Summer	17		Walking	25		Acceptable
		Fall	20		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	36		Unacceptable
		Annual	21		Uncomfortable	32		Unacceptable
	B	Spring	20		Uncomfortable	32		Unacceptable
		Summer	16		Walking	24		Acceptable
		Fall	19		Walking	30		Acceptable
		Winter	22		Uncomfortable	35		Unacceptable
		Annual	20		Uncomfortable	31		Acceptable

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

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

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

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
73	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
74	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	14	-13%	Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13	-13%	Standing	21		Acceptable
		Winter	14	-13%	Standing	22		Acceptable
		Annual	13	-13%	Standing	21		Acceptable
75	A	Spring	20		Uncomfortable	31		Acceptable
		Summer	16		Walking	24		Acceptable
		Fall	19		Walking	29		Acceptable
		Winter	22		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
	B	Spring	19		Walking	29		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable
76	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	15	-21%	Standing	23	-18%	Acceptable
		Summer	13	-13%	Standing	19	-14%	Acceptable
		Fall	15	-17%	Standing	22	-15%	Acceptable
		Winter	16	-20%	Walking	25	-14%	Acceptable
		Annual	15	-17%	Standing	23	-15%	Acceptable
77	A	Spring	14		Standing	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		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.

<u>Configurations</u>

A – No Build
B – Build

<u>Mean Wind Speed Criteria</u>

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

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	14		Standing	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	24		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
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Appendix E

Air Quality

APPENDIX E AIR QUALITY

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.2.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2015 and 2020 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

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

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

CAL3QHC

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

321 Harrison Avenue, Boston
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2012	2013	2014	Units	ppm/ppb to µg/m³ Conversion Factor	2012-2014 Background Concentration (µg/m³)	Location
SO_2 (1)(6)	1-Hour (5)	99th %	12	14	28	ppb	2.62	47.2	531A E. 1st St., Boston
	3-Hour	H2H	10.6	16.3	24.3	ppb	2.62	63.7	531A E. 1st St., Boston
	24-Hour	H2H	4.5	6.5	8.1	ppb	2.62	21.2	531A E. 1st St., Boston
	Annual	H	1.65	1.53	1.74	ppb	2.62	4.6	531A E. 1st St., Boston
PM-10	24-Hour	H2H	32.0	34	61	µg/m³	1	61	Harrison Ave., Boston
	Annual	H	14.2	15.1	13.9	µg/m³	1	15.1	Harrison Ave., Boston
PM-2.5	24-Hour (4)	98th %	20.9	19.9	14.5	µg/m³	1	18.4	174 North St, Boston
	Annual (4)	H	9.5	8.8	7.1	µg/m³	1	8.5	174 North St, Boston
NO_2 (3)	1-Hour (5)	98th %	43	47	62	ppb	1.88	95.3	531A E. 1st St., Boston
	Annual	H	9.7	12.2	14	ppb	1.88	26.3	531A E. 1st St., Boston
CO (2)	1-Hour	H2H	2.2	1.9	1.7	ppm	1146	2474.2	Harrison Ave., Boston
	8-Hour	H2H	1.9	1.2	1.3	ppm	1146	2177.4	Harrison Ave., Boston
Ozone (4)	8-Hour	H4H	0.062	0.059	0.054	ppm	1963	121.7	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.014	0.006	0.014	µg/m³	1	0.014	Harrison Ave., Boston

Notes:
From 2012-2014 EPA's AirData Website
[1] SO_2 reported ppb. Converted to µg/m³ using factor of 1 ppm = 2.62 µg/m³.
[2] CO reported in ppm. Converted to µg/m³ using factor of 1 ppm = 1146 µg/m³.
[3] NO_2 reported in ppb. Converted to µg/m³ using factor of 1 ppm = 1.88 µg/m³.
[4] O_3 reported in ppm. Converted to µg/m³ using factor of 1 ppm = 1963 µg/m³.
[5] Background level is the average concentration of the three years.
[6] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

321 Harrison Avenue

Intersections (Signalized Only)	Existing 2016 Weekday AM Peak LOS	Existing 2016 Weekday AM Peak Delay (Sec)	Existing 2016 Weekday AM Peak Traffic Volume	Existing 2016 Weekday PM Peak LOS	Existing 2016 Weekday PM Peak Delay (Sec)	Existing 2016 Weekday PM Peak Traffic Volume
1: Washington Street & Herald Street	C	20.6	2052	C	23.1	1898
2: Harrison Avenue & Herald Street	C	22.1	2102	B	11.4	1468
3: Albany Street & I-93 SB On-Ramp & Herald Street	F	134.6	2987	D	40.7	2272
6: Washington Street & Traveler Street	A	3.0	538	A	4.7	669
9: Harrison Avenue & Traveler Street	C	22.8	1208	C	24.9	954
10: Albany Street & Traveler Street	E	64.1	2188	D	35.1	1832
11: Albany Street & East Berkeley Street/West 4th Street	C	27.6	1768	C	28.8	2166
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	D	38.4	2837	D	36.6	2680
13: Frontage Road & West 4th Street	F	207.8	2522	E	61.5	2391
17: Harrison Avenue & East Berkeley Street	D	51.5	1823	D	35.2	2007

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.

Color Code:

Red = Signalized intersections at LOS D or worse.

Green = Top 3 signalized intersections based on volume.

Dark Blue = Volume increase >20%

Light Blue = Volume increase > 10%

Yellow = New intersection to be constructed.

321 Harrison Avenue

Intersections (Signalized Only)	2023 No Build Weekday AM Peak LOS	2023 No Build Weekday AM Peak Delay (Sec)	2023 No Build Weekday AM Peak Traffic Volume	2023 No Build Weekday PM Peak LOS	2023 No Build Weekday PM Peak Delay (Sec)	2023 No Build Weekday PM Peak Traffic Volume
1: Washington Street & Herald Street	E	76.7	2627	D	44.6	2182
2: Harrison Avenue & Herald Street	C	30.6	2545	D	45.2	1696
3: Albany Street & I-93 SB On-Ramp & Herald Street	F	189.8	3490	E	56.1	2601
6: Washington Street & Traveler Street	A	4.4	1086	A	7.7	1113
9: Harrison Avenue & Traveler Street	F	420.5	2074	E	64.7	1615
10: Albany Street & Traveler Street	F	250.8	2840	F	120.9	2410
11: Albany Street & East Berkeley Street/West 4th Street	D	49.9	2272	D	49.3	2807
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	D	52.6	3145	D	52.8	2970
13: Frontage Road & West 4th Street	F	267.4	2869	F	81.4	2653
17: Harrison Avenue & East Berkeley Street	F	104.5	2649	F	153.4	2580

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.
Color Code:
Red = Signalized intersections at LOS D or worse.
Green = Top 3 signalized intersections based on volume.
Dark Blue = Volume increase >20%
Light Blue = Volume increase > 10%
Yellow = New intersection to be constructed.

321 Harrison Avenue

Intersections (Signalized Only)	2023 Build Weekday AM Peak LOS	Delay (Sec)	Traffic Volume	No-Build to Build Volume % Increase	2023 Build Weekday PM Peak LOS	Delay (Sec)	Traffic Volume	No-Build to Build Volume % Increase
1: Washington Street & Herald Street	F	80.1	2671	2%	D	44.7	2212	1%
2: Harrison Avenue & Herald Street	C	31.1	2570	1%	D	44.6	1733	2%
3: Albany Street & I-93 SB On-Ramp & Herald Street	F	195.4	3504	0%	E	57.0	2605	0%
6: Washington Street & Traveler Street	A	4.4	1094	1%	A	7.8	1122	1%
9: Harrison Avenue & Traveler Street	F	444.4	2115	2%	E	68.4	1650	2%
10: Albany Street & Traveler Street	F	272.8	2870	1%	F	124.4	2418	0%
11: Albany Street & East Berkeley Street/West 4th Street	D	50.2	2279	0%	D	49.8	2830	1%
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	E	58.4	3175	1%	D	54.2	2978	0%
13: Frontage Road & West 4th Street	F	267.8	2876	0%	F	85.8	2676	1%
17: Harrison Avenue & East Berkeley Street	F	105.7	2660	0%	F	160.3	2607	1%

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.
Color Code:
Red = Signalized intersections at LOS D or worse.
Green = Top 3 signalized intersections based on volume.
Dark Blue = Volume increase >20%
Light Blue = Volume increase > 10%
Yellow = New intersection to be constructed.

321 Harrison Avenue

Intersections (Signalized)	Existing 2016 Weekday AM Peak LOS RANK	Existing 2016 Weekday AM Peak COMB. RANK	Existing 2016 Weekday AM Peak Traffic Volume RANK	Existing 2016 Weekday PM Peak LOS RANK	Existing 2016 Weekday PM Peak COMB. RANK	Existing 2016 Weekday PM Peak Traffic Volume RANK
1: Washington Street & Herald Street	6	12	6	6	12	6
2: Harrison Avenue & Herald Street	6	11	5	9	17	8
3: Albany Street & I-93 SB On-Ramp & Herald Street	1	2	1	2	5	3
6: Washington Street & Traveler Street	10	20	10	10	20	10
9: Harrison Avenue & Traveler Street	6	15	9	6	15	9
10: Albany Street & Traveler Street	3	7	4	2	9	7
11: Albany Street & East Berkeley Street/West 4th Street	6	14	8	6	10	4
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	4	6	2	2	3	1
13: Frontage Road & West 4th Street	1	4	3	1	3	2
17: Harrison Avenue & East Berkeley Street	4	11	7	2	7	5

321 Harrison Avenue

Intersections (Signalized)	2023 No Build Weekday AM Peak LOS RANK	2023 No Build Weekday AM Peak COMB. RANK	2023 No Build Weekday AM Peak Traffic Volume RANK	2023 No Build Weekday PM Peak LOS RANK	2023 No Build Weekday PM Peak COMB. RANK	2023 No Build Weekday PM Peak Traffic Volume RANK
1: Washington Street & Herald Street	6	12	6	6	13	7
2: Harrison Avenue & Herald Street	9	16	7	6	14	8
3: Albany Street & I-93 SB On-Ramp & Herald Street	1	2	1	4	8	4
6: Washington Street & Traveler Street	10	20	10	10	20	10
9: Harrison Avenue & Traveler Street	1	10	9	4	13	9
10: Albany Street & Traveler Street	1	5	4	1	7	6
11: Albany Street & East Berkeley Street/West 4th Street	7	15	8	6	8	2
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	7	9	2	6	7	1
13: Frontage Road & West 4th Street	1	4	3	1	4	3
17: Harrison Avenue & East Berkeley Street	1	6	5	1	6	5

321 Harrison Avenue

Intersections (Signalized)	2023 Build Weekday AM Peak			2023 Build Weekday PM Peak		
	LOS RANK	COMB. RANK	Traffic Volume RANK	LOS RANK	COMB. RANK	Traffic Volume RANK
1: Washington Street & Herald Street	1	6	5	2	10	8
2: Harrison Avenue & Herald Street	9	16	7	4	13	9
3: Albany Street & I-93 SB On-Ramp & Herald Street	1	2	1	8	13	5
6: Washington Street & Traveler Street	10	20	10	6	16	10
9: Harrison Avenue & Traveler Street	1	10	9	1	5	4
10: Albany Street & Traveler Street	1	5	4	3	5	2
11: Albany Street & East Berkeley Street/West 4th Street	8	16	8	9	16	7
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	7	9	2	5	11	6
13: Frontage Road & West 4th Street	1	4	3	10	13	3
17: Harrison Avenue & East Berkeley Street	1	7	6	7	8	1

321 Harrison Avenue

Intersections (Signalized)	All Modeled Cases Worst 3 By LOS	Worst 3 By Comb Rank	Worst 3 By Volume	Overall
1: Washington Street & Herald Street	27	65	38	65
2: Harrison Avenue & Herald Street	43	87	44	87
3: Albany Street & I-93 SB On-Ramp & Herald Street	17	32	15	32
6: Washington Street & Traveler Street	56	116	60	116
9: Harrison Avenue & Traveler Street	19	68	49	68
10: Albany Street & Traveler Street	11	38	27	38
11: Albany Street & East Berkeley Street/West 4th Street	42	79	37	79
12: Frontage Road & Traveler Street/Broadway Bridge & I-90 WB Ramp	31	45	14	45
13: Frontage Road & West 4th Street	15	32	17	32
17: Harrison Avenue & East Berkeley Street	16	45	29	45

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

Appendix F

Climate Change Preparedness Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

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

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

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

Climate Change Analysis and Information Sources:

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

Checklist

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

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

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

A.1 - Project Information

Project Name:	321 Harrison Avenue
Project Address Primary:	321 Harrison Avenue
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Todd Fremont-Smith, Senior Vice President and Director of Mixed-Use Projects, Nordblom Company, tfremont-smith@nordblom.com, 781-272-4000

A.2 - Team Description

Owner / Developer:	1000 W Acquisitions, LLC/ Nordblom Company
Architect:	SMMA
Engineer (building systems):	SMMA
Sustainability / LEED:	SMMA
Permitting:	Epsilon Associates, Inc
Construction Management:	John Moriarty & Associates
Climate Change Expert:	

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:	Office, parking
List the First Floor Uses:	*Entrance Lobby, Office, Parking, and accessory loading dock.*

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

☐ Wood Frame	☐ Masonry	☑ Steel Frame	☐ Concrete

Describe the building?

Site Area:	*83, 470 SF*	Building Area:	*230,000 SF*
Building Height:	*150 Ft.*	Number of Stories:	*11 Flrs.*
First Floor Elevation (reference Boston City Base):	*21.33 Elev.*	Are there below grade spaces/levels, if yes how many:	*1 level*

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:	*918 (kW)*	Heating:	*2.9 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*10.96 (kWh/SF)* *37.4 kBtu/SF*	Cooling:	*425 (Tons/hr)*

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

Electric:	*350 (kW)*	Heating:	*0 (MMBtu/hr)*
		Cooling:	*0 (Tons/hr)*

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

Electrical Generation:	*600 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*1 (Units)*

B - Extreme Weather and Heat Events

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

B.1 - Analysis

What is the full expected life of the project?

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

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

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

What time span of future Climate Conditions was considered?

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

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

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:	*21%*
How is performance determined:	Whole building 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 = 30*	Walls / Curtain Wall Assembly:	*R = 22 0.38/0.4 SHGC Curtainwall*
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:

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

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

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

	No	If yes, for how long:	*Days*
If Yes, is building "Islandable?	The emergency generator will support life safety equipment for a period of at least 12 hours.		
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:	The project is currently evaluating shading options for the east, west, and south facades, as well as optimizing the glazing by façade to minimize energy use.			

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?

	No

Describe site conditions?

Site Elevation – Low/High Points:	*21.33 Boston City Base Elev.(Ft.)*
Building Proximity to Water:	*1,050 Ft.*

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

Coastal Zone:	*No*	Velocity Zone:	*No*
Flood Zone:	*No*	Area Prone to Flooding:	*No*

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

2013 FEMA Prelim. FIRMs:	*No*	Future floodplain delineation updates:	*No*

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

	580 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:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*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	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

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

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

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

	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

Appendix G

Accessibility Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

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

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

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

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

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

Accessibility Analysis Information Sources:

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

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	321 Harrison Avenue
Project Address Primary:	321 Harrison Avenue, Boston, MA 02118
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Todd Fremont-Smith, Senior Vice President and Director of Mixed-Use Projects, Nordblom Company, tfremont-smith@nordblom.com, 781-272-4000

Team Description

Owner / Developer:	One Thousand W Acquisitions / Nordblom Company
Architect:	SMMA | Symmes Maini & McKee Associates
Engineer (building systems):	Strucural: McNamara/Salvia; MEP, Site: SMMA
Sustainability / LEED:	SMMA
Permitting:	Epsilon Associates
Construction Management:	To be named.

Project Permitting and Phase

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

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

Building Classification and Description

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

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

First Floor Uses (List)	*Entrance Lobby, Office, Parking, and accessory loading dock.*

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	☑Steel Frame	Concrete

Describe the building?

Site Area:	*83,470 SF*	Building Area:	*230,000 SF*
Building Height:	*150 Ft.*	Number of Stories:	*11 Flrs.*
First Floor Elevation:	*21.32' Elev.*	Are there below grade spaces:	*Yes*

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.	The site is in a rapidly developing urban neighborhood characterized by high-rise commercial office buildings, high-rise multi-family apartment and residential condominium buildings, and hotels, with some retail and mixed uses.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Back Bay Station: Orange line, commuter rail, Amtrak. (0.8 mile) South Station: Red line, commuter rail, Amtrak, Intercity buses (0.7 mile) Broadway Station: Red line, buses (0.5 mile) Tufts Medical Center MBTA Station: Orange Line (0.3 mile) Arlington Station: Green Line (0.6 mile) Silver Line bus: Silver line. Stops at property (Washington Street side)

	Bus stops: The following MBTA bus lines stop within one mile of the site: 9, 11, 15,39, 43, 55, 57, 171, 501, 504, 504, 505, 553, 554, 556
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	Tufts new England Medical Center (0.3 mile) Boston Medical Center / BU Medical Center (1.0 mile). Pine Street Inn (0.2 mile). Castle Square Apartments (0.4 mile) Tent City Apartments (0.7 mile) Cathedral Housing (BHA) (0.6 mile), Frederick Douglass Housing, 755 Tremont Street (BHA) 1.0 mile) Numerous subsidized and elderly housing on Tremont St. and Columbus Ave within 1.0 miles. Nearby residential developments such as Ink Block, Troy, 75 Clarendon, and 345 Harrison Ave (not yet completed) include affordable and accessible units. Josiah Quincy Upper School (Boston Public) is directly across the Mass Pike, at Washington St. and Marginal Way. Cathedral High School is 0.6 miles. ABCD South End Head Start is one block away at Shawmut Ave and Herald St.
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	The site is not on a priority accessible route to a key public use facility. Rotch Playground is 0.4 miles. Peter's Park is 0.4 miles. Eliot Norton Park is 0.3 miles. The theater district is 0.4 miles.

Surrounding Site Conditions – Existing:

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

Are there sidewalks and pedestrian ramps existing at the development site?	Yes.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	Harrison Avenue: concrete sidewalk and concrete ramps; compliant width & slope, no tactile warning provided. Mullins Way: concrete sidewalk, non-compliant width, and no ramps at driveway. Washington Street: brick sidewalks and brick ramps; compliant width & slope, no tactile warning provided. Herald Street: concrete sidewalk and concrete ramps; compliant width & slope, no

	tactile warning provided.
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	Approximately half of the Washington Street sidewalk, half of the Mullins Way sidewalk and the ramp at Washington & Mullins intersection are existing-to-remain. The remaining sidewalks and ramps will be reconstructed. The Washington Street sidewalk and ramp are compliant, refer to the attached property survey. The Mullins Way sidewalk is non-compliant as to width, due to the space between the existing building and the curb.
Is the development site within a historic district? If yes, please identify.	The site is within the South End Landmark District Protection Area, but not within the South End Landmark District proper.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	To comply with both the Boston Complete Streets Guidelines and the Harrison – Albany Strategic Plan: Washington Street (portion being reconstructed), Herald Street and Harrison Avenue will be designed as Neighborhood Main streets. Mullins Way (portion being reconstructed) will be designed as a Back/Industrial Street.
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	Washington Street (at garage): 6’ landscaped frontage zone (private property) + 10.5’ pedestrian zone + 5.5’ furnishing zone + 0.5’ curb = 22’ building face to curb line Herald Street: 6’ landscaped & paved frontage zone (private property) + 5’ pedestrian zone (1.5’ private property) + 3’ furnishing zone + 0.5’ curb = 22’

	building face to curb line Harrison Avenue (at garage): 1'-24' landscaped frontage zone (private property) + 10' pedestrian zone + 6' furnishing zone + 0.5' curb = 17.5'-40.5' building face to curb line Harrison Avenue (at garage): 43.5' pocket park (private property) + 10' pedestrian zone + 6' furnishing zone + 0.5' curb = 60' loading zone to curb line Mullins Way (at pocket park): 0' frontage zone (private property) + 5' pedestrian zone (private property) + 6' furnishing zone (3' private property) + 0.5' curb = 11.5' pocket park to curb line
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	All curbs are vertical granite. All furnishing zones are brick/concrete pavers, tree grates and tree planters. All pedestrian zones are concrete, except Washington Street that remains brick. All frontage zones are concrete paved (Washington Street remains brick) and landscape planters
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	All pedestrian zones are in the public right-of-way, except Herald Street. No pedestrian zone is required on Herald St. A minimum of 36" width is provided at each tree, and the furnishing zone is otherwise accessible providing 6.5' wide accessible route.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	No.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking	240 garage spaces, subject to final structural column and bracing locations.

spaces provided at the development site parking lot or garage?	
What is the total number of accessible spaces provided at the development site?	7 accessible spaces, of which one van accessible.
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	On street parking spaces currently exist on Mullins Way. Five spaces will be provided on Harrison Ave. None of these are required to be accessible.
Where is accessible visitor parking located?	In the garage. Six accessible spaces, including one van accessible, on the lower level of the garage. One accessible space on the ground level of the garage. (Note that the lower level is accessed directly from the Washington Street entrance, whereas the ground level is accessed directly from Harrison Ave, and the levels also connect internally.
Has a drop-off area been identified? If yes, will it be accessible?	Yes (On Harrison Ave), and yes. This will be designed in conjunction with the city's redevelopment of Harrison Ave. public way.
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	See attached Figures– Accessible Parking Routes, 2 pages

Circulation and Accessible Routes:

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

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

Provide a diagram of the accessible route connections through the site.	See attached Figure – Accessible Routes
Describe accessibility at each entryway: Flush Condition, Stairs,	On the Harrison Ave side of main lobby, flush condition. On the Washington Street side of the main lobby, exterior sloped walkway <5% grade. From the garage to main lobby, elevator. On the Washington Street side of existing building, flush

Ramp Elevator.	condition at sidewalk to lobby served by elevator and stair.
Are the accessible entrance and the standard entrance integrated?	Yes.
If no above, what is the reason?	N/A
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	There will be a pocket park near the corner of Mullins Way and Harrison Avenue. The pocket park is located on accessible routes; see attached Figure – Accessible Routes
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	The existing building has existing accessible routes way finding and signage. Signage for the addition and renovated areas is to be developed.

Accessible Units: (If applicable)

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

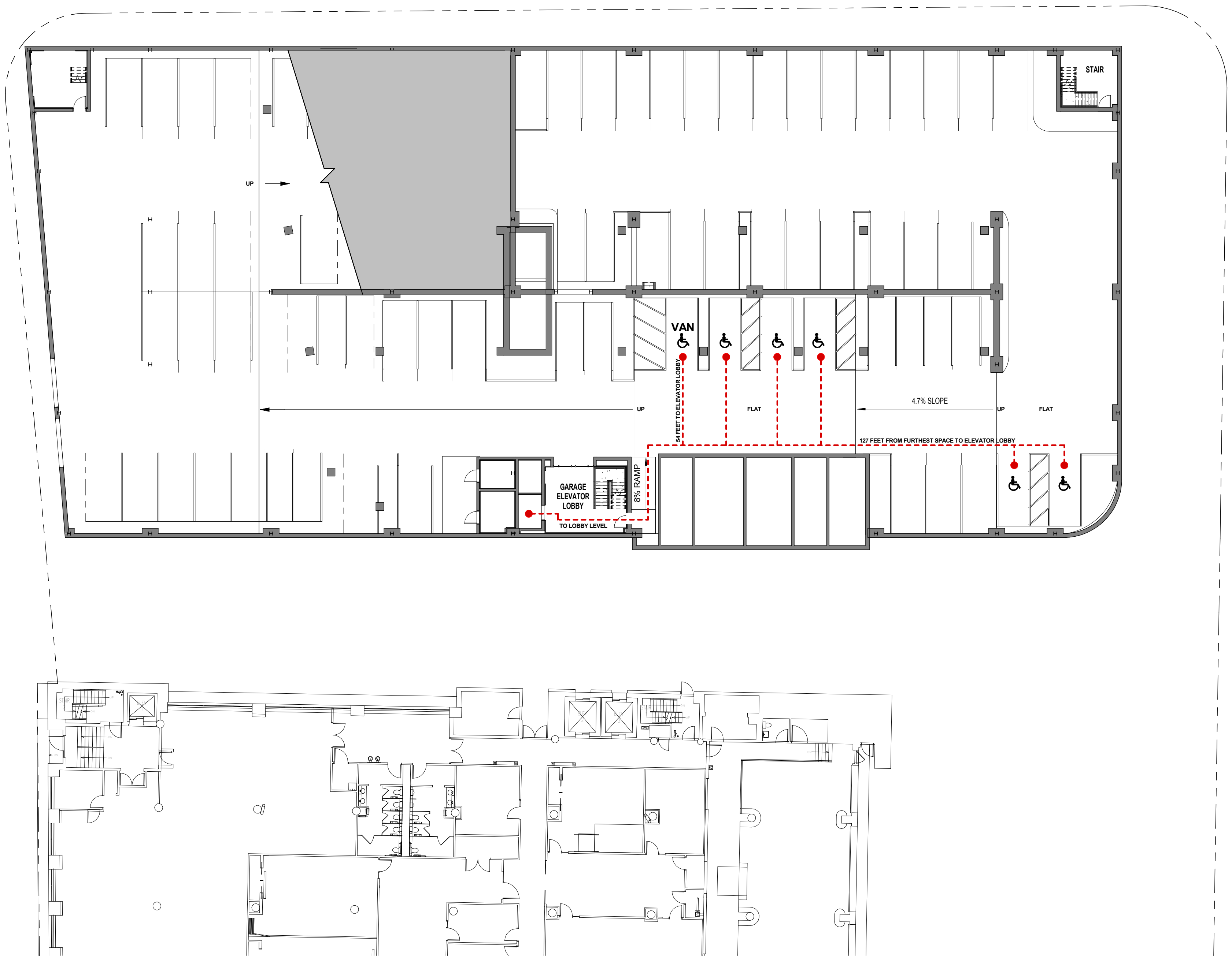
What is the total number of proposed units for the development?	
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	
How many accessible units are being proposed?	
Please provide plan and diagram of the accessible units.	
How many accessible units will also be affordable? If none, please describe reason.	
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at	

entry or step to balcony. If yes, please provide reason.	
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	

Thank you for completing the Accessibility Checklist!

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

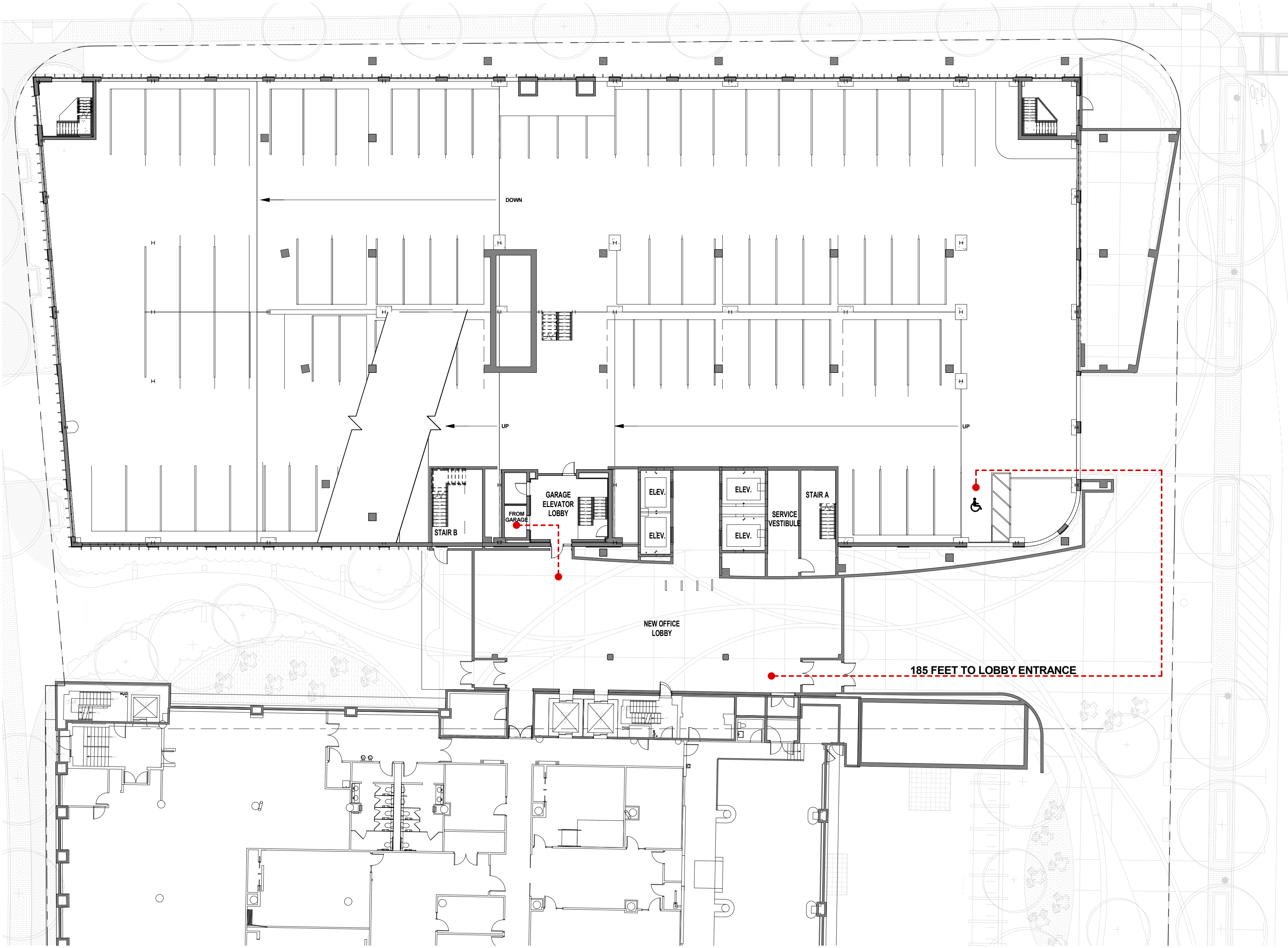
kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities



1 LOWER LEVEL- ACCESSIBILITY

FIGURE W - PAGE 1

SMMA



1 LOBBY LEVEL - ACCESSIBILITY

FIGURE W - PAGE 2

SMMA

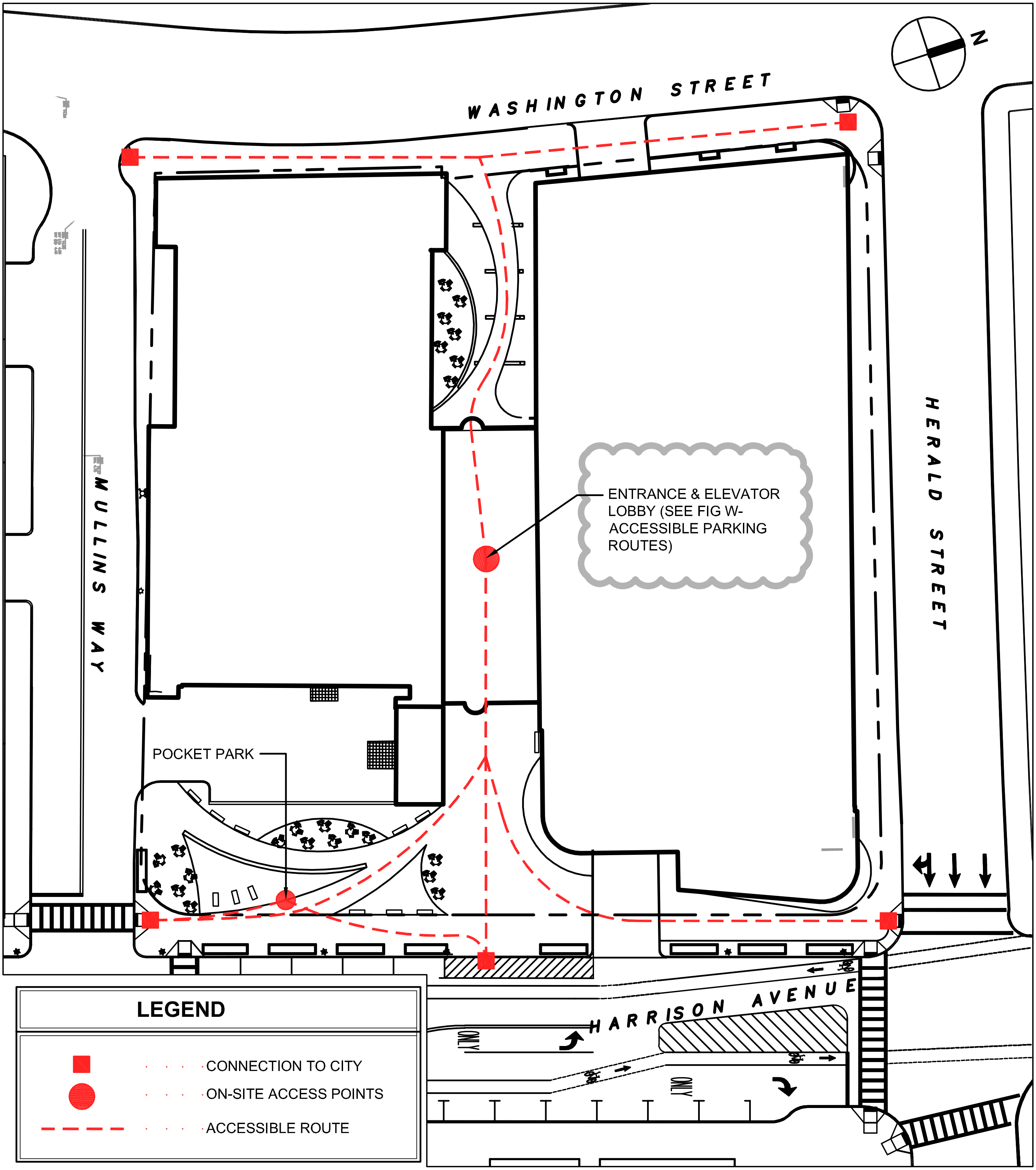


FIG Z

ACCESSIBLE ROUTES

DATE:	03/10/2016
ISSUE:	
SCALE:	1"=50'
REF:	
DR BY:	SEB
CK BY:	BCP

321 HARRISON AVE

321 HARRISON AVE
BOSTON, MA 02118

JOB NO.: 15103.00

SMMA

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