PROJECT NOTIFICATION FORM

32 Cambridge Street

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

Submitted by:
Berkeley Investments, Inc.
280 Congress Street, Suite 1350
Boston, MA 02210

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

In Association with:
ICON Architecture
Goulston & Storrs
Howard Stein Hudson
Nitsch Engineering
Haley & Aldrich, Inc.

February 22, 2016

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Introduction / Project Description

1.0 INTRODUCTION / PROJECT DESCRIPTION

1.1 Introduction

Berkeley Investments, Inc. (the "Proponent") proposes to redevelop two parcels in the Charlestown neighborhood of Boston into a new residential development with approximately 171 residential apartments, approximately 2,500 square feet (sf) of ground-floor retail or restaurant space and approximately 114 parking spaces (the "Project"). The L-shaped Project site is comprised of 32 Cambridge Street and 572 Rutherford Avenue, and is bounded by Cambridge Street to the north; Rutherford Avenue to the east a Massachusetts Port Authority-owned, paved right-of-way sometimes known as "D Street" to the south; property owned by others to the northeast; and existing industrial buildings to the west. The site currently includes two buildings: one building on Cambridge Street that will be renovated, and one building on Rutherford Avenue that will be demolished and replaced with a new structure.

The Project will transform the site and create a link between the residential neighborhood to the southeast and Sullivan Square Station to the northwest. This connection will be strengthened by street-level retail and an improved streetscape, including new landscaping. In addition, the new residents will enliven the streetscape and improve safety in this area. The size and location of the site make the Project a key component of the redevelopment of Sullivan Square.

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

1.2 Project Identification and Project Team

Address/Location:	32 Cambridge Street, Charlestown
Proponent:	Berkeley Investments, Inc. 280 Congress Street, Suite 1350 Boston, MA 02210 (617) 439-0088 Eric Ekman Jennifer Rosenberg

Architect:	ICON Architecture 101 Summer Street Boston MA, 02110 (617) 451-3333 Steve Heikin Kendra Halliwell
Legal Counsel:	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110 (617) 482-1776 Peter Kochansky Kristofer Machado
Permitting Consultant:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Geoff Starsiak
Transportation Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Keri Pyke Michael Tremblay
Civil Engineer:	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 Deb Danik Ryan Gordon
Landscape Architect:	Richard Burck Associates, Inc. 7 Davis Square Somerville, MA 02144 (617) 623-2300 Skip Burck Robyn Reed

Geotechnical Consultant:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Boston, MA 02129 (617) 886-7400 Mark Haley Michael Weaver
MEP/FP Engineer:	Wozny/Barber & Associates, Inc. 1090 Washington Street Hanover, MA 02339 (781) 826-4144 Zbigniew Wozny Greg Wozny

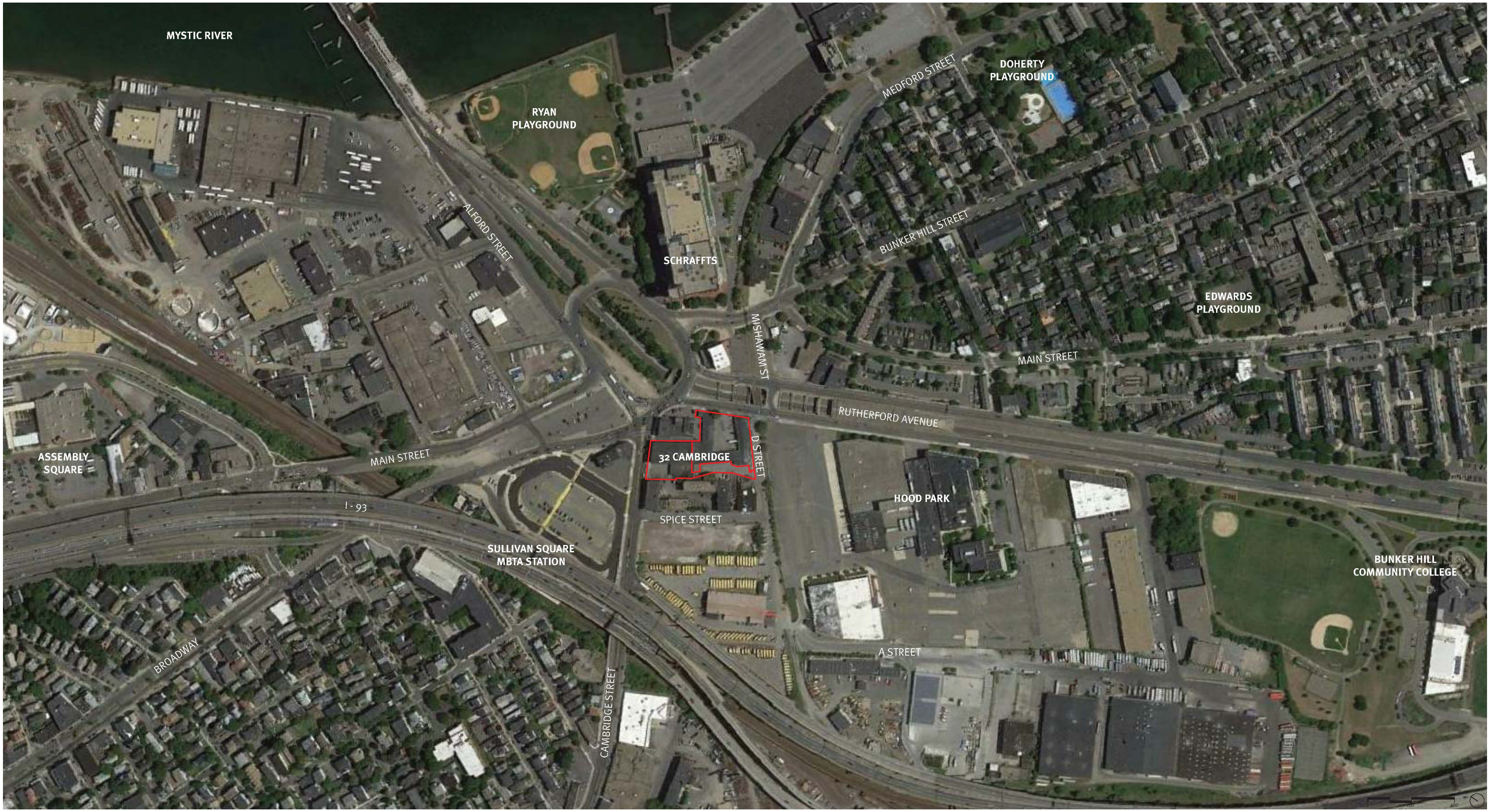
1.3 Project Description

1.3.1 Project Site

The site is bounded to the east by Rutherford Avenue, to the south by D Street, to the north by Cambridge Street, and to the west by existing buildings (see Figure 1-1). The site wraps around a former schoolhouse, previously the Benjamin Tweed School, recently renovated for office and residential use that sits at the intersection of these two streets at Sullivan Square. The western edge of the site is currently used for parking and loading access and includes a shared easement providing access to parking used by the adjacent industrial parcel to the west of the site. This easement will remain in place and continue to be used for service access. Figure 1-2 includes photographs of the existing site.

D Street, on the south side of the site, is owned by the Massachusetts Port Authority (Massport) and is a paved rail right-of-way. Recent proposals for traffic mitigation around Sullivan Square in anticipation of the proposed development of the Wynn Everett Casino include the use of D Street and Spice Street to route traffic away from Sullivan Square, and will result in improvements to these streets by other developers. A current version of this plan proposes creating a new street adjacent and to the south of the rail corridor, aligned with Mishawum Street on the opposite side of Rutherford Avenue. This right-of-way would be on the Hood property to the south of the site.

The site is relatively level, dropping from an elevation of approximately 23.5 feet Boston City Base (BCB) at its northwest corner along Cambridge Street to approximately 16 feet BCB at the southeast corner along D Street, a 7.5-foot grade change over a distance of approximately 400 feet.

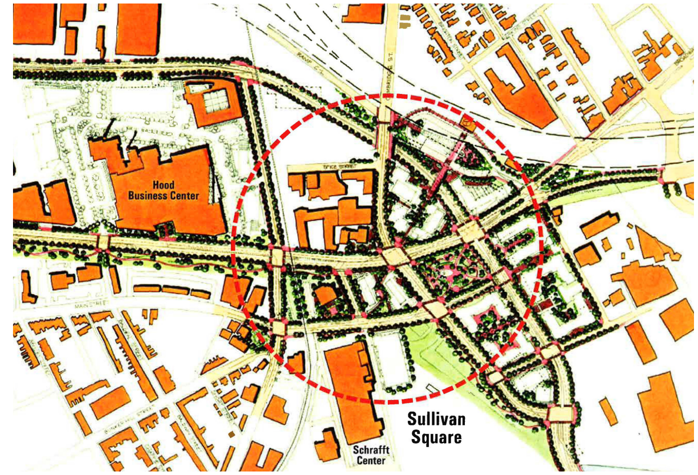


32 Cambridge Street   Boston, MA

ICON ARCHITECTURE

Richard Burck Associates, Inc.

Figure 1-1
Site Locus



Rutherford Avenue Disposition Study 1999

From left: Existing aerial view of Sullivan Square from the south (photo by Don Kindsvatter); aerial overview of the conceptual vision for the District described in this chapter.

32 Cambridge Street   Boston, MA

ICON
ARCHITECTURE

Figure 1-2
Site Context

Located on the site are two buildings:

- 32 Cambridge Street, a three-story building with a one-story loading dock currently used for management offices and light manufacturing. Graphic Arts Finishers (GAF) has operated at the site since the 1950s providing a range of printed material finishing options such as UV coating, die cutting, laminating, folding/gluing, and mounting. GAF currently operates in the basement, first floor, and second floor. The third floor is mostly vacant with some storage use and an area leased by Hub Powderworks, a bicycle painting business.

- 572 Rutherford Avenue, a single story, U-shaped building that is predominantly used by GAF as an extension of its 32 Cambridge Street operations. In addition, small subdivided spaces along Rutherford Avenue are leased by Alcoholics Anonymous and Perfection Studio, an audio recording establishment.

1.3.2 Area Context

The area surrounding the Project site includes large vacant parcels, some publicly owned and part of the BRA's December 2013 Sullivan Square Disposition Study (discussed in Section 1.4), industrial uses, and former industrial uses in transition. Adjacent to the Project site to the west is a series of commercial and industrial buildings fronting Spice Street. These buildings share an easement with the Project site that provides access to their parking and service area. A former industrial building at the corner of Spice and Cambridge Streets has been converted to office and residential use.

Immediately to the south of the Project site is the Hood Business Park, the 20-acre former Hood Dairy site at 480-570 Rutherford Avenue which is now the home of a variety of businesses and is also in the process of expanding. Current plans, approved by the BRA Board, include a total of over 1.1 million square feet of mixed industrial, manufacturing, office, and retail development, with a total of six buildings and three parking garages. The current plan includes the siting of two of these garages along D Street opposite the Project site.

To the southeast of the site is a large residential neighborhood. To the northeast, across Rutherford Avenue and Main Street, is the one million square foot Schrafft Center, home to a number of businesses and educational uses. This long-established re-use of the former Schraffts Candy Company is scheduled to undergo a major improvement program in 2015.

To the northwest of the site is the Massachusetts Bay Transportation Authority's (MBTA) Sullivan Square Station which provides access to the Orange Line and bus routes 86, 89, 91, 92, 93 and 109.

1.3.3 Proposed Development

The Project includes the renovation of the existing 32 Cambridge Street building to include approximately 52 residential apartments and approximately 2,500 sf of retail space, which could potentially include a bakery, coffee shop or small restaurant, and the construction of a new building to include approximately 119 residential units and approximately 98 parking spaces in a partially below-grade parking level. The number of units and parking spaces within the new building will depend on the location of the parking garage entrance/exit. The Proponent is considering two alternative access locations. The preferred location would, with Massport approval, provide access over the improved D Street right-of-way, allowing for construction of approximately 171 residential units and approximately 98 parking spaces. The alternative location would provide access on Rutherford Avenue. Due to site challenges, the alternative Rutherford Avenue location would result in the loss of one residential unit and one parking space, as addressed in more detail in the discussion of Parking below. The surface parking area on the west side of the 32 Cambridge Street building will be accessed from Cambridge Street and include approximately 16 parking spaces, as well as a drop-off area. The existing building on Rutherford Street and the one-story loading addition on the west side of 32 Cambridge Street building will be demolished, but the existing chimney stack will be retained as a visual feature. Table 1-1 includes the Project program. Figures 1-3 to 1-7 include a site plan, perspectives, floor plans and a building section.

Table 1-1 Project Program

Project Element	Approximate Dimension
32 Cambridge Street (Renovation)	
Residential	52 units / 35,500 sf
Retail	2,500 sf
Surface Parking	16 spaces
Height	3 Stories / 43 Feet
Project Element	**Approximate Dimension**
572 Rutherford Avenue (New Construction)	
Residential	119 units / 96,500 sf
Amenity/Common Space	6,000 sf
Garage Parking	98 Spaces
Height	4 Stories above parking / 59 feet
TOTAL PROJECT	
Residential	**171 units / 138,000 sf**
Retail	**2,500 sf**
Parking	**111 residential spaces and 3 retail parking spaces**

32 Cambridge Street Boston, MA

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Figure 1-3

Site Plan

Figure 1-4
Aerial View of Proposed

Entry Court - Cambridge Street

Rutherford Avenue

32 Cambridge Street   Boston, MA

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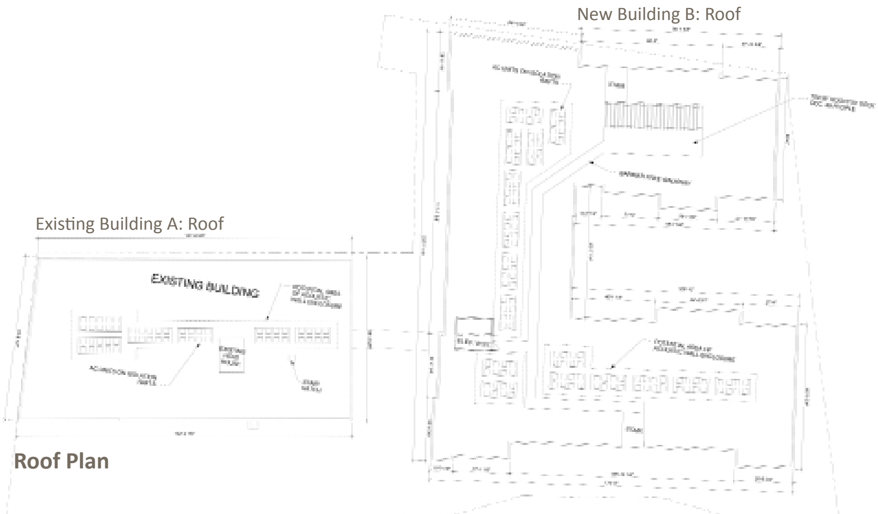
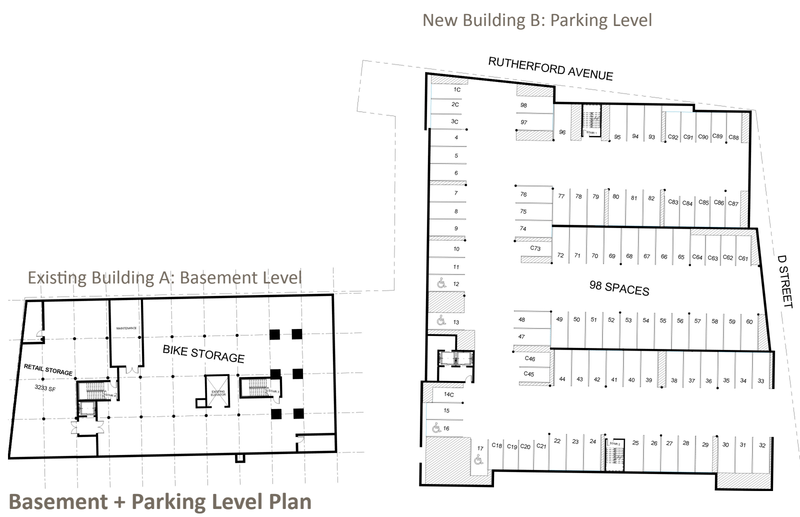
Figure 1-5
Street-Level Views of Proposed





32 Cambridge Street Boston, MA

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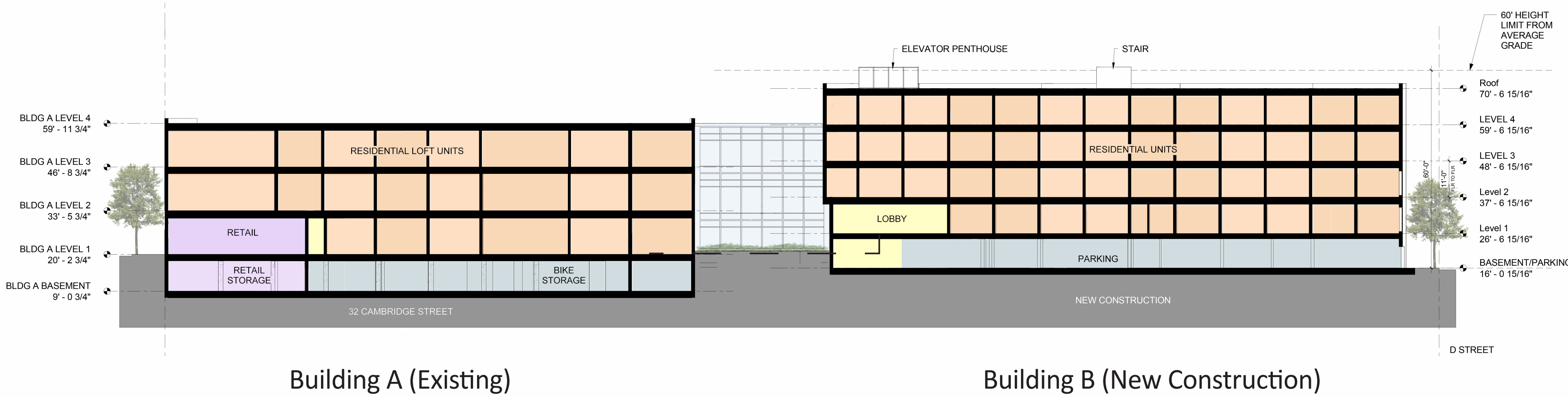
Figure 1-6
Building Floor Plans



32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 1-7

Section through Proposed Buildings

Proposed Buildings

The Project has been conceived as a blend of the old and the new: the adaptive reuse of the industrial structure fronting Cambridge Street, in combination with a new structure at the rear of the site with frontage on Rutherford Avenue. The scale and design of the new structure are intended to complement the existing building at 32 Cambridge Street, and to acknowledge the industrial character of the area. The existing building at 32 Cambridge Street is designed to provide retail space along its street frontage, helping to enliven this stretch of the street across from the MBTA's Sullivan Square Station.

The building at 32 Cambridge Street is three stories with a basement, and will be renovated to include three stories of loft-style residential units. The residential units include approximately 10 studios, approximately 39 one bedroom lofts, and approximately 3 one bedroom-plus units. The basement of will provide storage space for the retail use, certain MEP/FP equipment, and maintenance and management space. Resident amenities in the basement could include such spaces as a personal storage locker area and a dog wash room. The basement will also accommodate significant facilities for bicycles: sufficient storage for one bicycle per unit (a minimum of 171 bikes), plus a bike maintenance and repair/lounge area. A separate elevator will serve the basement and ground floor of 32 Cambridge Street, providing convenient access for the retail space and bicycle users. Apartment "lofts" in the existing building will feature tall ceilings and large windows. Plan layouts will include efficient kitchens, sliding panel doors, in-unit washer/dryers and individual heat and cooling systems. Interior unit walls will be partial-height to maximize daylight.

The new building consists of four stories above the parking garage in a U-shaped structure surrounding a light-filled landscaped courtyard. The residential floors will include mix of unit types, including approximately 40 studios; approximately 64 one- and one-plus bedrooms; approximately 12 two-bedrooms; and approximately 3 three-bedrooms. The building construction will consist of 4 stories of modular wood (type 5A) construction over a one-story steel and concrete podium containing the structured parking. The exterior envelope and the first floor amenity spaces of the new building will be constructed on-site.

Amenity spaces in the new structure, adjacent to the main entry and lobby space staffed by a concierge, will include several lounge areas and a coffee bar. Interior finishes in common areas will employ industrial materials, where possible, to highlight the site's previous uses. Just beyond the lobby and elevator core serving both buildings are a fitness space and a clubroom which will open with overhead garage doors onto the building's landscaped courtyard. The full barrier-free courtyard, including both landscaped areas and hardscape, will provide several sitting areas, an outdoor grill and a firepit. Units at the courtyard level will have their own private patios, separated from the common courtyard by railings or plantings. Other uses clustered around the main entry and lobby include the mail and package rooms, management offices, and the trash room. A roof deck will be located on the east wing of the building, accessible by elevator overlooking Rutherford Avenue with views to downtown Boston.

Parking

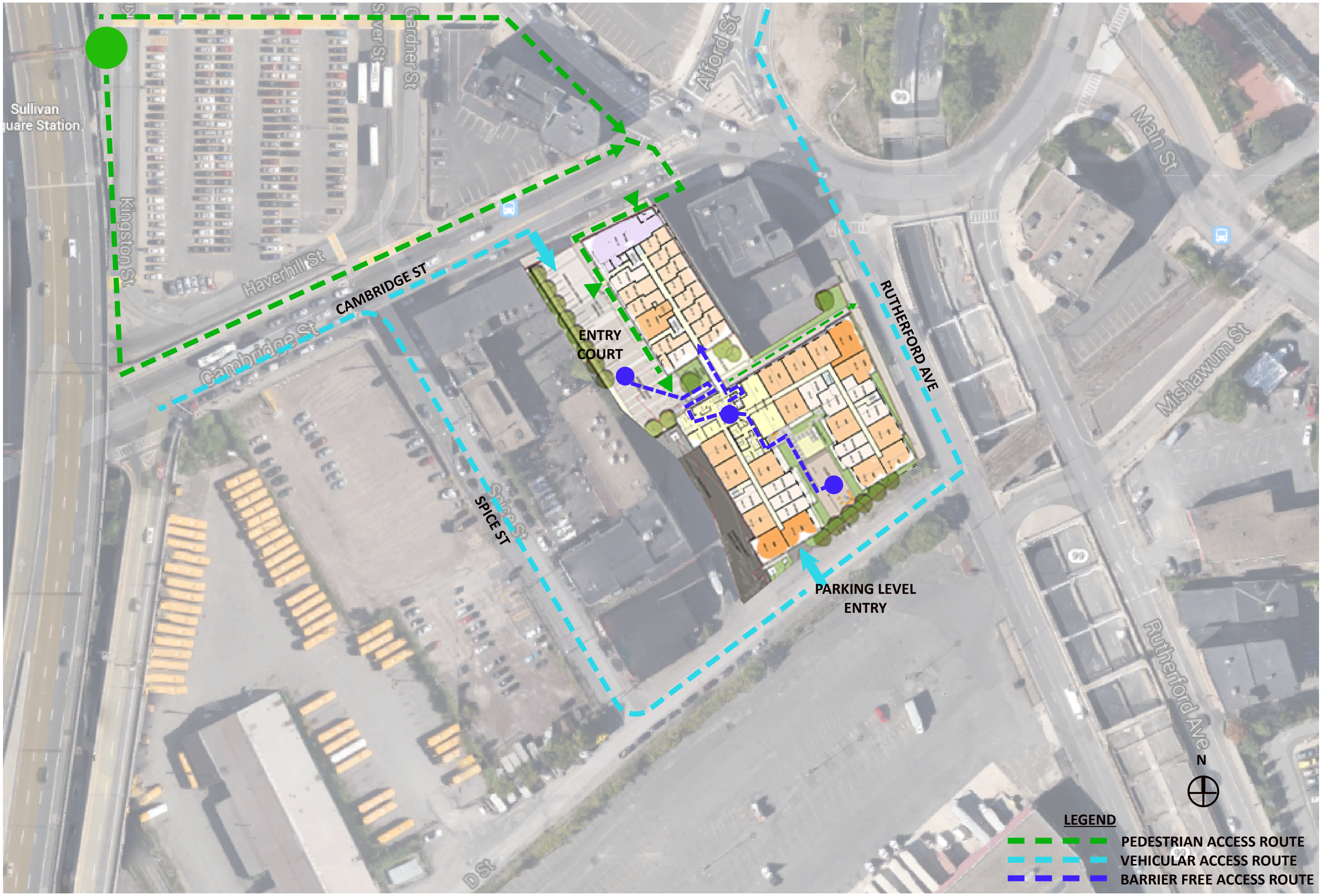
All structured parking for the Project—a total of approximately 98 spaces—will be provided at ground level in an open parking level under the new building, entered from either the paved "D Street" right-of-way (Option A) or Rutherford Avenue (Option B). The Proponent is working with Massport to develop an agreement regarding a potential entrance/ exit from the garage on D Street. Vehicle access from D Street is the preferred alternative for the Project because the slope of the site allows access to the garage at grade at the back of the building, while the Rutherford Avenue vehicle access point requires an access ramp into the parking level and results in the loss of a residential unit and a parking space. The D Street vehicle access point is also preferred because it resolves concerns from Boston Transportation Department about queuing on Rutherford Avenue. Pedestrian access to the garage will be via the main elevator core as well as stairs. Surface parking in the entry court off Cambridge Street will add approximately 13 resident and approximately 3 retail parking spaces, for a total of approximately 114 spaces. Plans for the redevelopment of Rutherford Avenue at this time also indicate the availability of on-street parking along Rutherford Avenue proximate to the site. See Chapter 2 for more information about vehicles services.

Pedestrian Access

The main pedestrian entry to the site will be from Cambridge Street via a paved plaza providing both vehicular and pedestrian access. This plaza area, paved primarily with concrete pavers, will include vehicular parking spaces (as described above), bicycle parking for visitors and retail customers, and a drop off area. A clearly defined pedestrian route sloping up to the main building entry, constructed with materials that meet accessibility standards, will be provided.

The existing and new buildings will be linked and served by a common residential entry in the corner of the new building, clearly visible from Cambridge Street. The buildings will therefore feel like a single community with shared amenity spaces and vehicular and bicycle parking, all reachable by residents of both structures without going outside. All three residential levels of the existing building will be linked to the new structure with a glass connector. Bicycle and retail storage will be served via a two-stop elevator linking the ground and basement level of the existing building (32 Cambridge Street).

Figure 1-8 includes a pedestrian and vehicle access plan.



32 Cambridge Street   Boston, MA

ICON ARCHITECTURE

Figure 1-8
Pedestrian and Vehicular Access

Evolution of Design

The initial design options considered for the site included the possibility of all new construction, with all existing structures being demolished. A range of building heights and construction methods were considered, including a single high rise steel building. With the early decision to retain the existing structure at 32 Cambridge Street, consideration was given to adding one or two stories to the existing building to create penthouse-type units with patios or decks. Early options also involved keeping the development as two separate structures, each with their own entries and elevator cores, and utilizing the basement of 32 Cambridge Street for additional vehicular parking.

The new building was also looked at as a five-story structure above at-grade structured parking, resulting in a total project with approximately 200 residential units. After evaluation of these options, including the cost-effectiveness of the additional stories, possibly requiring additional structured parking, and the additional zoning relief required, the current proposal emerged as the appropriate response when considered from both a neighborhood context as well as a market and financial perspective. Connecting the two buildings with a single common entry and shared amenity spaces was also seen as a way to create a more inclusive community environment for all residents of the development.

1.4 Sullivan Square Disposition Study

In 2013, the BRA partnered with the Metropolitan Area Planning Council and a consultant team to undertake the Sullivan Square Disposition Study. The Study "establishes a framework and community vision for the future of seven publically-owned parcels at the heart of Sullivan Square, Charlestown." Although the Project site is not one of the identified parcels, many of the goals identified in the Study are relevant to the site. The Study seeks to improve pedestrian connections between the Sullivan Square Station and residential neighborhood to the east, improve the streetscape, and provide a mix of uses, including street-level retail.

The 32 Cambridge Street site, at 1.62 acres, is larger than any of the individual parcels included in the Study, attesting to its significance in the redevelopment of Sullivan Square. It is ideally located as a transit-oriented development, approximately one-tenth of a mile from Sullivan Square Station.

The Project will include improved streetscapes and is designed to include retail space along Cambridge Street to improve the pedestrian connection between the Sullivan Square Station and residential neighborhood to the east. The mixed-use concept and massing of the development are both consistent with the design guidelines of the Study. The Study recommends keeping taller structures and more commercial uses to the western portion of the study area closer to the Sullivan Square Station, with more residential uses and lower building heights to the east, at parcels 4 and 7 as identified in the Study, which are most proximate to 32 Cambridge Street. Proposed uses on these parcels are residential, with ground floor retail, and building heights are typically at five stories – similar to the proposed height of the new construction at the Project.

1.5 Public Benefits

The Project will include numerous benefits for the neighborhood and the City of Boston, including:

- Providing approximately 171 housing units, consistent with the Mayor's initiative to create more housing in Boston, adjacent to an MBTA station;

- Providing approximately 23 affordable units consistent with the Inclusionary Development Policy, dated February 29, 2000, as has been amended;

- Strengthening the City's real estate tax base through increased property values resulting from the Project;

- Creating an estimated 186 construction jobs;

- Rehabilitating and preserving the three-story Graphic Arts Finishers building at 32 Cambridge Street, which is designed with an attractive industrial aesthetic that acknowledges the area's historic uses;

- Providing an improved streetscape between the residential neighborhood to the east and Sullivan Square Station; and

- Reducing the existing peak rates and volumes of stormwater runoff from the site, and promoting runoff recharge, reducing the site's impact on the combined sewer system.

1.6 City of Boston Zoning

The Project site is located in two separate zoning subdistricts of the Charlestown Neighborhood District, which is governed by Article 62 of the City of Boston Zoning Code (the "Code"). The 32 Cambridge Street parcel is located within the Cambridge Street Local Convenience Subdistrict (the "LC Subdistrict"), while the 572 Rutherford Avenue parcel is located within the New Rutherford Avenue Local Industrial Subdistrict (the "LI Subdistrict"). No portion of the Project site is located within any overlay district. The Project has been designed to comply with the requirements of the Code for Planned Development Areas (PDAs) in the Charlestown Neighborhood District, and the Proponent intends to seek approval of a PDA Plan for the Project. PDAs are allowed in the LI Subdistrict, which encompasses a majority of the Project site. PDAs are not currently allowed in the LC

Subdistrict, so the Project will require a zoning amendment to incorporate the 32 Cambridge Street parcel into the LI Subdistrict and provide uniform zoning controls across the Project site.

As described in more detail above, the Project is anticipated to include multifamily residential use, accessory services for apartment residents, and approximately 114 accessory parking spaces, including approximately 98 spaces in a parking garage and approximately 16 surface spaces at grade. The Project has also been designed to include ground-floor local retail use in the 32 Cambridge Street parcel along Cambridge Street which could potentially include a bakery, coffee shop or small restaurant.

Residential uses and local retail uses are allowed by right in the LC Subdistrict, but multifamily residential uses and accessory services for apartment residents are forbidden in the LI Subdistrict. Accessory services for apartment residents is a conditional use in the LC Subdistrict, as are bakeries and restaurants (including take-out). Accessory parking is allowed by right in both subdistricts. Once adopted, the PDA Plan will permit all of the Project's proposed uses.

Section 62-21 of the Code provides for a maximum floor area ratio (FAR) of 2.0, and a maximum building height of 75 feet for PDA projects in the Charlestown Neighborhood District, provided that the last habitable floor of any such project may not exceed a height of 60 feet. Measured from the average elevation of the 32 Cambridge Street parcel, the rehabilitated existing building will have a height of approximately 43 feet, while the new building at 572 Rutherford Avenue will have a height of approximately 59 feet. The current development plans call for approximately 140,620 sf of gross floor area on a site comprising approximately 70,462 sf, resulting in an FAR of approximately 2.0. Accordingly, the Project will conform to the maximum height and FAR allowed for PDA projects in the Charlestown Neighborhood District.

Pursuant to Section 62-29 of the Code, off-street parking and loading requirements will be determined by the BRA during Large Project Review, and reflected in the PDA Development Plan.

1.7 Legal Information

1.7.1 Legal Judgments Adverse to the Proposed Project

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

1.7.2 History of Tax Arrears on Property

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

1.7.3 Site Control / Public Easements

The Project site comprises two parcels of land. The Proponent has entered into a development agreement with the property owner of both parcels that authorizes the Proponent to seek public approvals for the Project. The current landowner will be a partner with the Proponent in the joint venture that will own and redevelop the subject parcels.

There are no public easements on the Project site, with the exception of those easements shown on the survey included as Appendix A. In addition, it is anticipated that the Project will require an agreement with Massport for access over the paved "D Street" right-of-way.

1.8 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. It is possible that only some of these permits or actions will be required, or that additional permits or actions will be required.

As discussed in Section 8.2, review under the Massachusetts Environmental Policy Act (MEPA) is not anticipated.

Table 1-2 List of Anticipated Permits and Approvals

AGENCY	APPROVAL
Local	
Boston Redevelopment Authority	Article 80B Large Project Review; Article 80C Planned Development Area Review
Boston Zoning Commission	Map Amendment; Approval of PDA Development Plan
Boston Civic Design Commission	Advisory Review
Boston Committee on Licenses	Parking Garage License; Flammable Storage License
Boston Water and Sewer Commission	Water and Sewer Connection Permits; Temporary Construction Dewatering Permit; General Service Application; Site Plan Review
Boston Transportation Department	Construction Management Plan; Transportation Access Plan Agreement
Boston Public Improvement Commission/Boston Department of Public Works	Curb Cut Permit; Street/Sidewalk Specific Repair Plan; Permits for street occupancy and opening permit

Table 1-2 List of Anticipated Permits and Approvals (Continued)

AGENCY	APPROVAL
Boston Fire Department	Approval of Fire Safety Equipment; Fuel Oil Storage Permit
Boston Inspectional Services Department	Building Permit; Certificate of Occupancy
Boston Landmarks Commission	Article 85 Demolition Delay
State	
Department of Environmental Protection	Notification of Demolition and Construction
Massachusetts Department of Transportation	Section 54A Approval (Former Railroad Rights-of-Way)
Massachusetts Historical Commission	State Register Review/Memorandum of Agreement
Massachusetts Port Authority	Agreement for access to the D Street right-of-way
Federal	
Environmental Protection Agency	National Pollution Discharge Elimination System

1.9 Public Participation

Since March 2015, the Proponent has been holding informal one-on-one meetings with a number of elected officials and residents from the Charlestown neighborhood. The purpose of these meetings has been to assess initial public sentiment on the Project and receive recommendations for additional people to meet with on a preliminary basis.

1.10 Schedule

The Proponent anticipates commencement of construction in December 2016 with completion in March 2018.

Chapter 2.0

Transportation

2.0 TRANSPORTATION

2.1 Introduction

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the Project proposed in the Charlestown neighborhood of Boston. The following transportation study adheres to the Boston Transportation Department's (BTD's) ***Transportation Access Plan Guidelines*** and BRA's ***Development Review Guidelines (2006).*** This study includes an evaluation of existing transportation conditions; future transportation conditions with and without the Project; roadway, pedestrian, and bicycle conditions; transportation issues; parking and loading; pedestrian and bicycle circulation; proposed mitigation; and transportation goals for the Project. The Project will have minimal impact on the study area intersections, public transportation, and pedestrian facilities in the area.

2.1.1 Project Description

The Project site is located on two existing parcels on the eastern half of the block bounded by Spice Street to the west, Rutherford Avenue to the east, Cambridge Street to the north, and D Street to the south (see Figure 2-1). The parcel located on the northeast portion of the block is not included in the Project site. The existing, three-story northern structure will be preserved and refurbished, and will consist of approximately 52 residential units and approximately 2,500 sf of ground-floor retail or restaurant space. The southern structure will be demolished and replaced with a four-story structure consisting of approximately 119 residential units. Approximately 16 parking spaces will be provided in a surface lot accessible to Cambridge Street, including three spaces reserved for retail activity. A subsurface garage containing approximately 98 parking spaces will be located in the southern structure. Currently, the Proponent is exploring two alternative access points for the parking garage. The first alternative (Option A) would provide an access point along the northern side of a Massport-owned, paved right-of-way sometimes known as "D Street.". The second alternative (Option B) would provide an access to the garage along Rutherford Avenue southbound. An easement/service area will be maintained on the southwestern portion of the site that will provide access to both the Project site and the adjacent property. The Project site is located just a three-minute walk from the Sullivan Square MBTA Orange Line and bus station.

2.1.2 Study Methodology

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

The Existing (2014) Conditions analysis includes an inventory of the transportation conditions such as roadway capacities, traffic characteristics, parking and curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. As required by

BTD, existing counts were conducted for vehicles, bicycles, and pedestrians at the study area intersections. The traffic counts form the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2019, based on a five-year horizon from the existing year (2014). Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capacities and deficiencies are identified. This section includes the following scenarios:

- The No Build (2019) Conditions scenario includes general background traffic growth, traffic growth associated with specific developments, and transportation improvements that are planned in the vicinity of the Project site.

- The Build (2019) Conditions scenario 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 (2019) Conditions analysis. Expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies are defined.

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.

2.1.2 Study Area

The transportation study area is generally bound by the Sullivan Square rotary and Rutherford Avenue to the east, the I-93 Northbound off-ramp to the west, Cambridge Street to the north, and D Street to the south. The study area includes the following six intersections (see Figure 2-1):

1. Cambridge Street/I-93 Northbound Off-ramp (signalized);

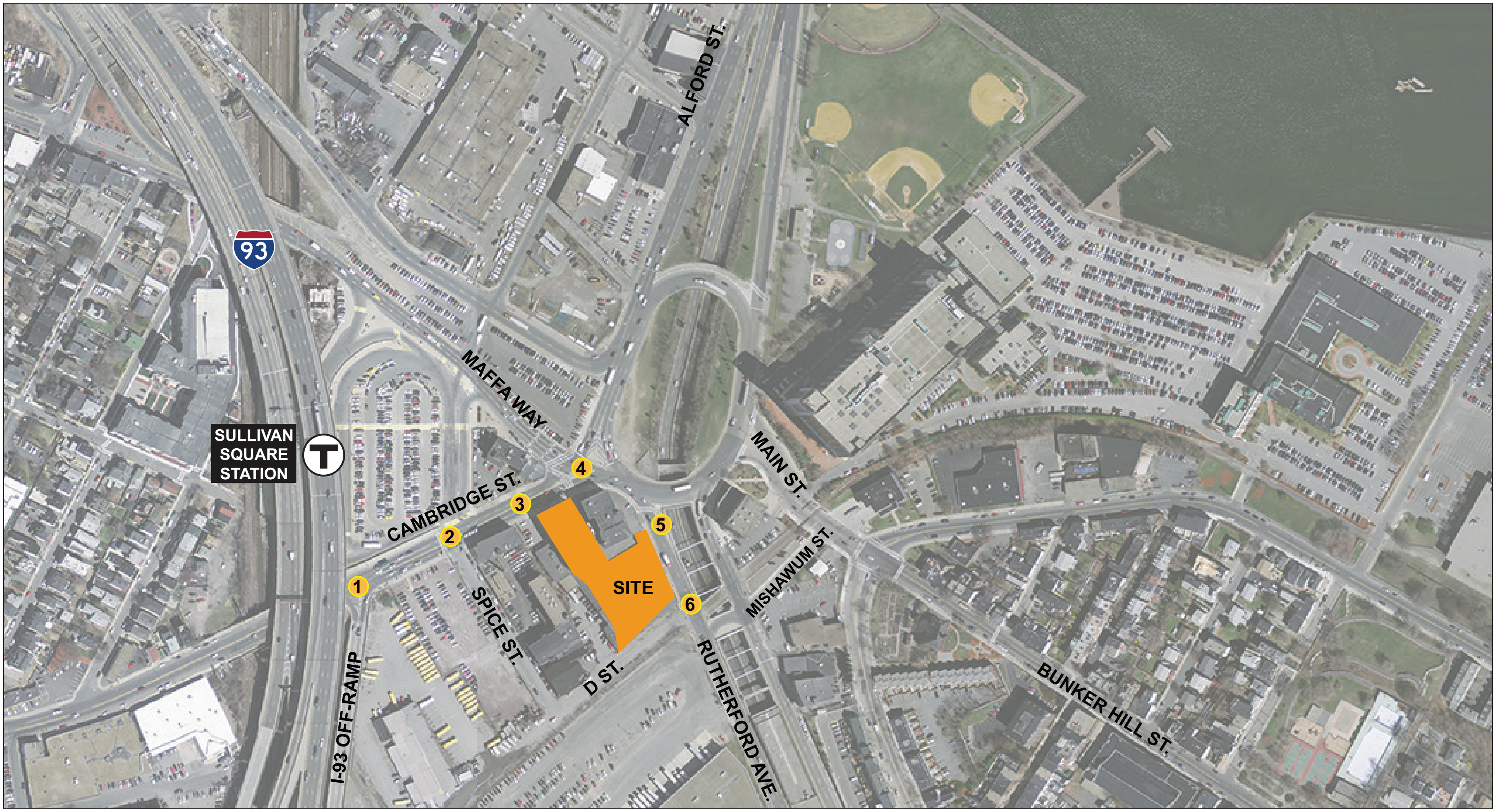
2. Cambridge Street/Spice Street/MBTA Driveway (unsignalized);

3. Cambridge Street/32 Cambridge Street Driveway (unsignalized);

4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square) (signalized);

5. Rutherford Avenue/Driveway (unsignalized); and

6. Rutherford Avenue/D Street/Mishawum Avenue (unsignalized).



Not to scale.

32 Cambridge Street **Boston, Massachusetts**

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Figure 2-1
Locus Map

2.2 Existing Conditions

This section includes descriptions of existing study area roadway geometries; intersection traffic control; peak-hour vehicular, bicycle, and pedestrian volumes; public transportation availability; parking; curb usage; and availability of car and bicycle sharing services.

2.2.1 Existing Roadway Conditions

The major study area roadways are described below. The descriptions reflect functional classifications by the Massachusetts Department of Transportation (MassDOT) Highway Division's Office of Transportation Planning.

Cambridge Street borders the Project site to the north, and is classified by MassDOT as an urban principal arterial. Cambridge Street runs east-west between the Sullivan Square rotary to the east, and the Somerville City Line to the west, where it becomes Washington Street. Cambridge Street consists of two travel lanes in each direction. On-street parking is not permitted on Cambridge Street within the study area; however, some on-street parking is provided west of the I-93 off-ramp. Due to its proximity to Sullivan Square Station, several buses run along Cambridge Street, including MBTA buses CT2, #86, and #91. Sidewalks are provided along Cambridge Street, but dedicated bicycle accommodations are not provided within the study area.

Rutherford Avenue borders the Project site to the east and is classified by MassDOT as an urban principal arterial. Rutherford Avenue runs north-south between the Sullivan Square rotary to the north, where it becomes Alford Street, and New Rutherford Avenue to the south; New Rutherford Avenue runs northwest-southeast, terminating at the North Washington Street Bridge to the southeast. Rutherford Avenue consists of two travel lanes in each direction within the study area, with an underpass consisting of two travel lanes in each direction running under the Sullivan Square rotary. On-street parking is not permitted on Rutherford Avenue. No MBTA buses run along Rutherford Avenue; MBTA #92 and #93 buses can be accessed on nearby Main Street and Bunker Hill Street, respectively, each located to the north of Rutherford Avenue. Sidewalks are provided along Rutherford Avenue. Dedicated bicycle accommodations are not provided.

D Street borders the Project site to the south. D Street is a paved rail right-of-way that is not classified by MassDOT and is under the jurisdiction of the Massachusetts Port Authority (Massport). D Street runs east-west between Rutherford Avenue to the east and Spice Street to the west. West of the study area, D Street curves in a southerly direction, running north-south for about 900 feet before curving eastward and terminating at Rutherford Avenue opposite Baldwin Street. D Street is an unmarked right-of-way, but generally operates with one travel lane in each direction. Parking is not permitted on D Street; however, the edges of the right-of-way are typically used by Massport to park maintenance vehicles. There are no sidewalks or bicycle accommodations along D Street.

2.2.2 Existing Intersection Conditions

1. Cambridge Street/I-93 Off-ramp is a three-legged signalized intersection with three approaches. The Cambridge Street eastbound and westbound approaches each consist of two through lanes. The I-93 Northbound off-ramp northbound approach consists of a left-turn lane and a right-turn lane. Parking is not permitted on Cambridge Street east of the I-93 Northbound off-ramp. Signalized pedestrian crossings are provided across the western leg of Cambridge Street and across the I-93 Northbound off-ramp. Right turns on red from the I-93 Northbound off-ramp northbound approach are prohibited. A painted crosswalk is provided across the eastern leg of Cambridge Street, but no signal indication is provided. The roadway and pavement markings are in good condition.

2. Cambridge Street/Spice Street/MBTA Driveway is a four-legged unsignalized intersection with three approaches. The Cambridge Street eastbound approach consists of a through lane and a shared through/right-turn lane. The Cambridge Street westbound approach consists of a shared left-turn/through lane and a through lane. The Spice Street stop-controlled northbound approach consists of a single travel lane. An MBTA driveway is located on the northern leg of the intersection. MBTA buses and other MBTA vehicles may turn into the MBTA Driveway, but general traffic may not enter. Painted pedestrian crossings are provided across Spice Street, the MBTA driveway, and the western leg of Cambridge Street. The pavement and pavement markings are in good condition at the intersection.

3. Cambridge Street/32 Cambridge Street Driveway is a four-legged unsignalized intersection with three approaches. The Cambridge Street eastbound and westbound approaches each consist of two general purpose lanes. The 32 Cambridge Street driveway and the driveway on the northern side of Cambridge Street each operate as a single travel lane. Each of these driveways currently have little to no entering or exiting volume in the Existing Condition; therefore, traffic on Cambridge Street is rarely interrupted at this intersection. The pavement and pavement markings are in good condition at this intersection.

4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square), including the Rutherford Avenue southbound departure from the intersection, is a signalized five-legged intersection with three approaches. The Maffa Way eastbound approach consists of a left-turn lane to continue around the rotary, a shared left-turn/through lane, through lane to proceed to Rutherford Avenue southbound, and a right-turn lane to access Cambridge Street. The Cambridge Street northbound approach consists of a right-turn lane to continue around the rotary and a shared right-turn/hard right-turn lane, which can be used to continue around the rotary or turn onto Rutherford Avenue southbound. Right turns on red are not permitted from Cambridge Street. The Alford Street southbound approach consists of a left-turn lane to continue around the rotary, and a shared left-turn/through lane to either continue around the rotary or proceed to Rutherford Avenue southbound, both located on the left side of a splitter island. Turns on red are prohibited from Alford Street. On the right side of the splitter island, Alford Street southbound consists of two through lanes to access Cambridge Street. Signalized pedestrian crossings are provided across Maffa Way, Cambridge Street, and Rutherford Avenue. The pavement and pavement markings are in good condition at the intersection.

5. Rutherford Avenue/Driveway is an unsignalized intersection with two approaches. The Driveway eastbound approach operates as a single travel lane. The Rutherford Avenue southbound approach consists of two travel lanes. Crosswalks are not provided across Rutherford Avenue at this location. The driveway serves the existing site uses.

6. Rutherford Avenue/D Street/Mishawum Avenue is an unsignalized intersection with four legs. The D Street eastbound approach consists of a single travel lane. The Mishawum Street westbound approach consists of a single travel lane. The Rutherford Avenue northbound approach consists of a shared U-turn/through lane and a shared through/right-turn lane. The Rutherford Avenue southbound approach consists of a through lane and a shared through/right-turn lane.

A U-turn lane in the median between the northbound and southbound directions of Rutherford Avenue allows northbound vehicles to reverse direction and travel southbound. However, based on the turning movement counts, nearly all vehicles exiting Mishawum Street westbound used this U-turn lane to turn left onto Rutherford Avenue southbound. The location of the U-turn lane is located about 65 feet south of D Street, and is curved in such a way that would discourage U-turns and left turns from Rutherford Avenue southbound, as well as left-turns and through movements from D Street. Therefore, D Street generally operates as a right-in, right-out roadway at Rutherford Avenue.

2.2.3 Existing Traffic Conditions

Traffic movement data was collected at the study area intersections in September 2014. Manual Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and p.m. peak periods (7:00-9:00 a.m. and 4:00-6:00 p.m., respectively) at each study area intersection. Based on the TMCs, the peak hours of vehicular traffic throughout the study area are 7:15-8:15 a.m. and 4:00-5:00 p.m. The detailed traffic counts are provided in Appendix B.

Seasonal Adjustment

In order to account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT were reviewed. Typically, nearby continuous traffic count stations are used to determine monthly fluctuations in traffic volumes. However, monthly traffic counts for the nearby continuous count stations located on I-93 were not available at the time of this study. Therefore, the most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the September 2014 TMCs.

The 2011 seasonal adjustment factor for September for roadways similar to the study area is 0.93, which indicates that average month traffic volumes are approximately 93 percent of typical September traffic volumes. To provide a conservative analysis, the September counts were not adjusted downward to reflect average month conditions.

The Existing (2014) Conditions weekday a.m. peak hour traffic volumes are shown in Figure 2-2A and Figure 2-2B. The Existing (2014) Conditions weekday p.m. peak hour traffic volumes are shown in Figure 2-3A and Figure 2-3B.

2.2.4 Existing Traffic Operations

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 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 2-1 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with moderate to significant traffic delay.

Table 2-1 Level of Service Criteria

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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

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.

32 Cambridge Street Boston, Massachusetts

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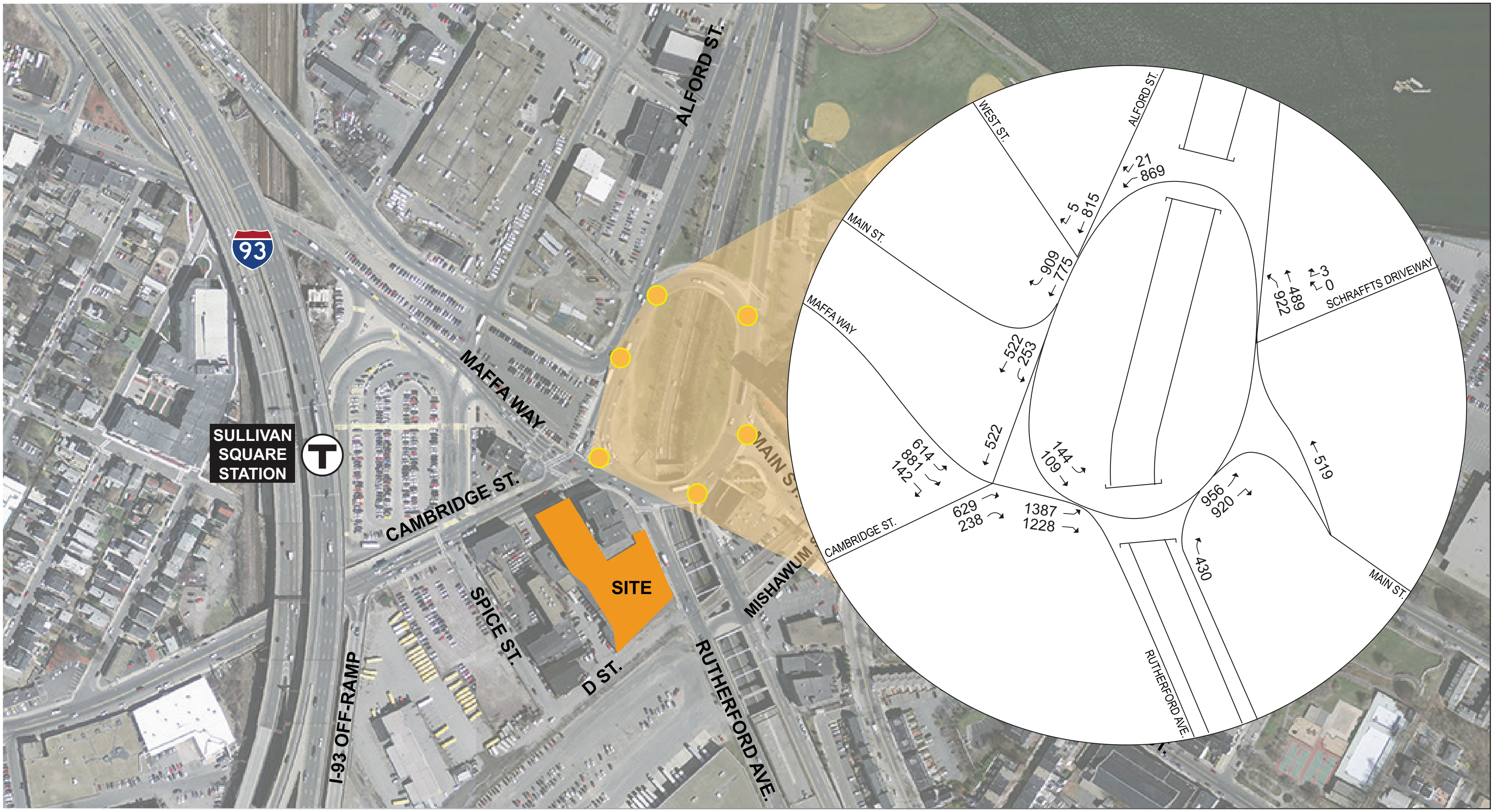
Figure 2-2A
Existing Conditions (2014) Traffic Volumes, a.m. Peak Hour (7:15-8:15 a.m.)



32 Cambridge Street Boston, Massachusetts

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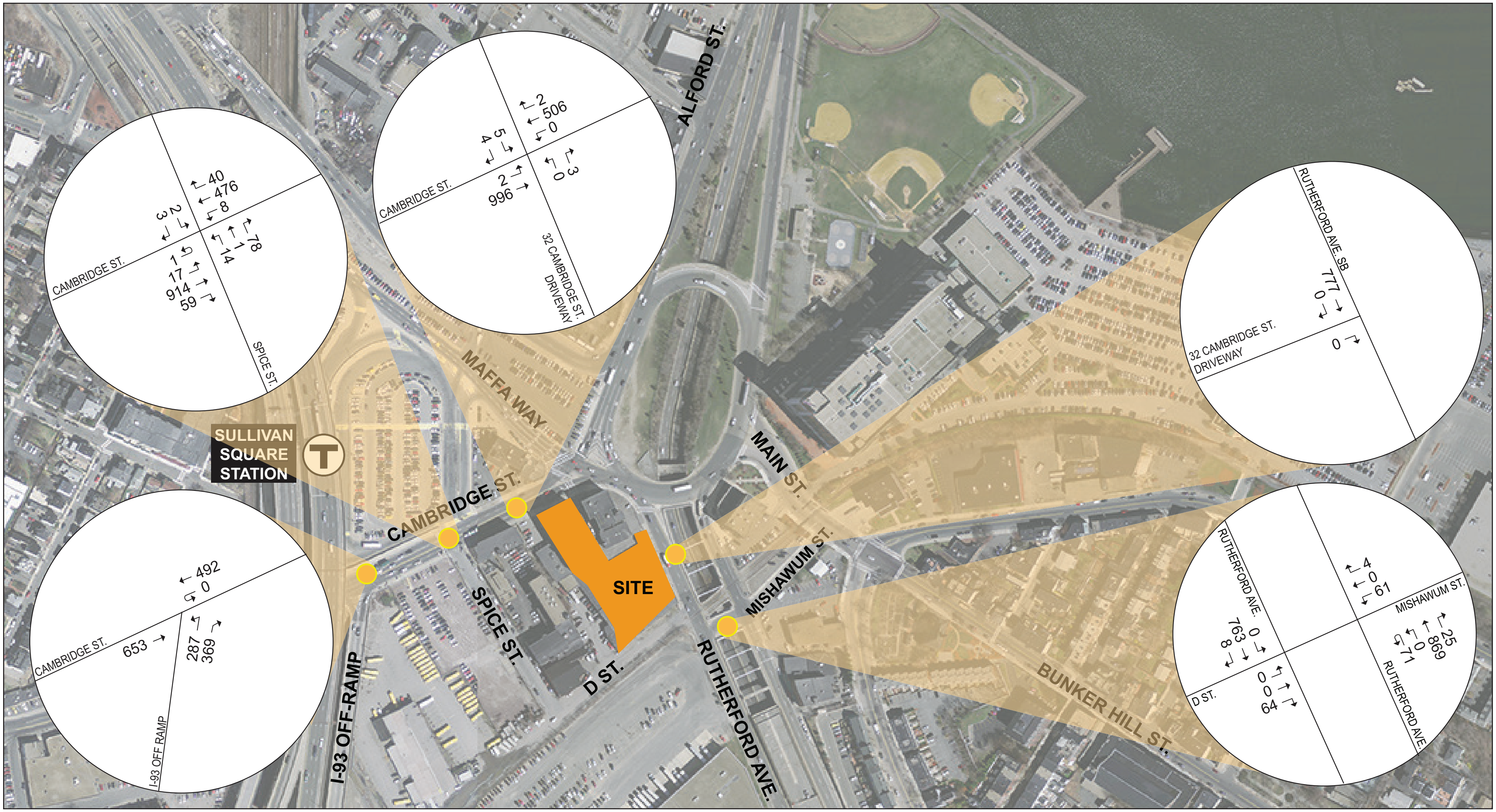
Figure 2-2B

Existing Conditions (2014) Traffic Volumes, a.m. Peak Hour (7:15-8:15 a.m.)



Not to scale.

32 Cambridge Street **Boston, Massachusetts**

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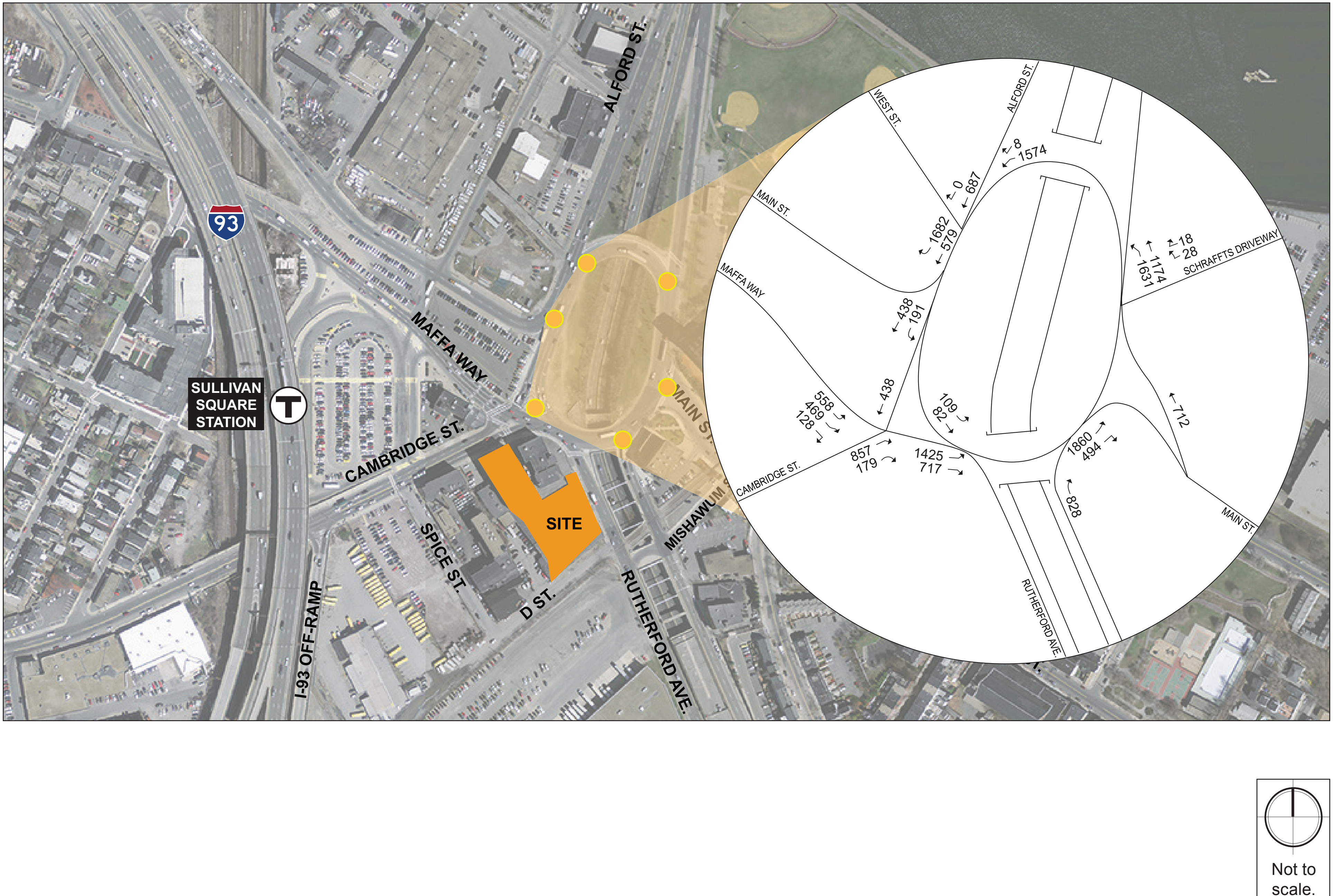
Figure 2-3A

Existing Conditions (2014) Traffic Volumes, p.m. Peak Hour (4:00-5:00 p.m.)



32 Cambridge Street Boston, Massachusetts

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Figure 2-3B

Existing Conditions (2014) Traffic Volumes, p.m. Peak Hour (4:00-5:00 p.m.)

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

The 50^{th} percentile queue length, measured in feet, represents the maximum queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes and is only used for analysis of signalized intersections.

The 95th percentile queue length, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during five percent of all signal cycles for signalized intersections and five percent of the time for unsignalized intersections. The 95th percentile queue will not be seen during each cycle. The queue would be this long only five percent of the time and would typically not occur during off-peak hours. Since volumes fluctuate throughout the hour, the 95^{th} percentile queue represents what can be considered a "worst case" scenario. Queues at the intersection are generally below the 95^{th} percentile queue throughout the course of the peak hour. It is also unlikely that the 95^{th} percentile queues for each approach to the intersection will occur simultaneously.

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

Table 2-2 and Table 2-3 present the Existing (2014) Conditions Capacity Analysis for the study area intersections during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix B.

As shown in Table 2-2, during the a.m. peak hour, the intersection of Cambridge Street/I-93 Northbound Off-ramp operates at LOS C. The intersection of Cambridge Street/Maffa Way/Alford Street (Sullivan Square) operates at LOS E. At that intersection, several movements operate at worse than LOS D: the Maffa Way eastbound through and bear right movements each operate at LOS F; and the Alford Street southbound left-turn movements operate at LOS E. All other movements at the unsignalized intersections operate at LOS B or better during the a.m. peak hour.

As shown in Table 2-3, during the p.m. peak hour, both signalized intersections operate at LOS C or better. At Sullivan Square, the Alford Street southbound left-turn movements operate at LOS E. All other movements at signalized and unsignalized intersections operate at LOS D or better during the p.m. peak hour.

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

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 Off-ramp	**C**	**32.7**	**—**	—	**—**
Cambridge EB thru | thru	B	15.2	0.33	101	127
Cambridge WB thru | thru	B	16.2	0.42	137	182
I-93 NB left	C	30.4	0.58	184	274
I-93 NB right	E	73.1	1.00	~334	#545
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**E**	**68.0**	**—**	—	**—**
Maffa EB thru | thru/bear right	F	115.5	1.14	~556	#696
Maffa EB bear right	F	122.4	1.13	~501	#735
Maffa EB right	A	6.9	0.27	4	53
Cambridge NB right/hard right	C	33.9	0.77	343	461
Alford SB hard left | hard left/bear left	E	58.3	0.54	60	93
Alford SB thru | thru	B	13.3	0.36	136	175
Unsignalized Intersections					
2. Cambridge Street/Spice Street/MBTA Drive	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.3	0.29	—	1
Cambridge WB left/thru | thru/right	A	0.3	0.20	—	1
Spice NB left/thru/right	C	17.5	0.10	—	8
MBTA Drive SB left/thru/right	A	9.7	0.01	—	0
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.1	0.34	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.27	—	0
32 Cambridge NB left/thru/right	A	0.0	0.00	—	0
Driveway SB left/thru/right	B	14.4	0.01	—	1
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.54	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	C	15.9	0.15	—	13
Mishawum WB left/thru/right	C	22.2	0.27	—	26
Rutherford NB u-turn/thru | thru/right	A	0.0	0.20	—	0
Rutherford SB thru | thru/right	A	0.0	0.51	—	0

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

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

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 Off-ramp	**C**	**22.6**	**—**	—	**—**
Cambridge EB thru | thru	B	11.4	0.34	108	160
Cambridge WB thru | thru	B	10.8	0.27	79	120
I-93 NB left	C	31.8	0.60	160	242
I-93 NB right	D	48.6	0.86	230	345
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**D**	**36.1**	**—**	—	**—**
Maffa EB thru | thru/bear right	D	48.1	0.82	287	366
Maffa EB bear right	D	54.1	0.79	251	376
Maffa EB right	A	6.1	0.26	0	44
Cambridge NB right/hard right	D	35.7	0.87	414	#637
Alford SB hard left | hard left/bear left	E	56.6	0.41	43	74
Alford SB thru | thru	B	12.1	0.28	100	144
Unsignalized Intersections					
2. Cambridge Street/Spice Street/MBTA Drive	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.3	0.33	—	2
Cambridge WB left/thru | thru/right	A	0.3	0.18	—	1
Spice NB left/thru/right	C	18.5	0.34	—	37
MBTA Drive SB left/thru/right	C	19.0	0.04	—	3
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.0	0.33	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.16	—	0
32 Cambridge NB left/thru/right	B	11.5	0.01	—	1
Driveway SB left/thru/right	B	14.9	0.04	—	3
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.33	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	B	13.2	0.17	—	15
Mishawum WB left/thru/right	D	33.8	0.37	—	40
Rutherford NB u-turn/thru | thru/right	A	0.0	0.44	—	0
Rutherford SB thru | thru/right	A	0.0	0.34	—	0

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

2.2.5 Existing Parking and Curb Usage

On-street parking is not permitted on the two primary study area roadways, Cambridge Street and Rutherford Avenue. On-street parking is also not permitted on D Street, though Massport vehicles are typically staged there. Unrestricted on-street parking is permitted on the east side of Spice Street.

Approximately 222 off-street parking spaces are provided in an MBTA-owned surface lot at Sullivan Square Station. Parking is $6 for the day. Additionally, approximately 172 spaces are provided in a City-owned lot at 50 Maffa Way operated by Patriot Parking, located adjacent to Maffa Way near Sullivan Square. Parking rates are $6 on weekdays, $5 on weekends or weekdays after 1:00 p.m., $6 for Bruins and Celtics playoff games, and $10 for Red Sox games. Monthly parking for commuters and residents is also available. Three spaces in the lot at 50 Maffa Way are reserved for Zipcar vehicles.

2.2.6 Existing Public Transportation

The Project site is well served by public transportation, with access to rapid transit and a dozen bus routes within a three-minute walk. The MBTA public transportation services are summarized in Table 2-4.

Sullivan Square Station is located approximately 0.1 miles from the Project site and provides access to the Orange Line and 12 MBTA bus routes. The Orange Line provides connections to Somerville and Malden to the north, and downtown Boston, North Station, Back Bay, Roxbury, and Jamaica Plain to the south. Commuters can transfer to MBTA commuter rail trains at North Station for points north of Boston, and Back Bay for points south of Boston. The MBTA Green Line is accessible via North Station and Haymarket Station; the Blue Line is accessible via State Station; and the Red and Silver lines are accessible from Downtown Crossing station along the Orange Line.

Sullivan Square is one of the major bus terminals in the MBTA's network. The 12 MBTA bus routes connect the Project site to locations such as Harvard Square, Cleveland Circle, Davis Square, Clarendon Hill, Malden Center, Linden Square, and Ruggles Station, among others.

Table 2-4 MBTA Transit Service in the Study Area

Transit Service	Description	Peak-hour Headway (in minutes) [1]
	Rapid Transit Routes	
Orange Line	Forest Hills – Oak Grove	6
	Local Bus Routes	
CT2	Sullivan Square Station – Ruggles Station via Kendall/MIT	
86	Sullivan Square Station – Reservoir (Cleveland Circle) via Harvard Square	8-17
89	Clarendon Hill or Davis Square – Sullivan Square Station via Broadway	7-10
90	Davis Square – Wellington Station via Sullivan Square Station/Assembly Sq.	~40
91	Sullivan Square Station – Central Square, Cambridge via Washington St.	~30
92	Assembly Square Mall – Downtown via Sullivan Square Station	~15
93	Sullivan Square Station – Downtown via Bunker Hill Street and Haymarket	~7
95	West Medford – Sullivan Square Station via Mystic Avenue	~25
101	Malden Center Station – Sullivan Square Station via Salem St./Main St.	6-12
104	Malden Center Station – Sullivan Square Station via Ferry St. and Broadway	~15
105	Malden Center Station – Sullivan Square Station via Newland St. Housing	~40
109	Linden Square – Sullivan Square Station via Linden Square	~15

1 Headway is the scheduled time between trains or buses, as applicable. Source: MBTA.com, March 2015.

2.2.7 Existing Pedestrian Conditions

Sidewalks in the study area currently range from good to poor condition and generally supply adequate capacity. Sidewalks along Cambridge Street are in good condition. Sidewalks are in poor condition along Rutherford Avenue; the concrete is cracked and uneven, and driveways are not flush with the sidewalk. On Spice Street, sidewalks are in poor condition; they are narrow, with numerous obstructions, such as bent sign posts, vegetation, utility poles, and parked cars, blocking the pedestrian way. Sidewalks are not provided on D Street.

The primary pedestrian route to and from the Project site will be across Cambridge Street. Pedestrians are expected to cross Cambridge Street at Spice Street or at the I-93 off-ramp.

Pedestrian counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-4 for the a.m. and p.m. peak hours.

As shown in Figure 2-4, pedestrian activity is highest in the p.m. peak hour. The heaviest crossings across Cambridge Street are west of the Sullivan Square rotary and west of Spice Street. Crossings were also heavy at Rutherford Avenue near the Sullivan Square rotary.

32 Cambridge Street Boston, Massachusetts

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Figure 2-4
Existing Conditions (2014) Pedestrian Volumes

2.2.8 Existing Bicycle Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is located in proximity to bicycle lanes on Cambridge Street, west of the I-93 Northbound off-ramp, which extend into the City of Somerville. Bicycle lanes and other accommodations, such as bike boxes and areas to make two-stage left turns, were installed within the Sullivan Square rotary in Fall 2014. Bike lanes are also provided on Main Street, south of Bunker Hill Street. According to the Boston Bikes Network Plan, the City of Boston plans to install bicycle lanes on Main Street extending to Sullivan Square and on Bunker Hill Street, as well as formalize the Rutherford Trail shared-use path adjacent to Rutherford Avenue and Alford Street, by 2018.

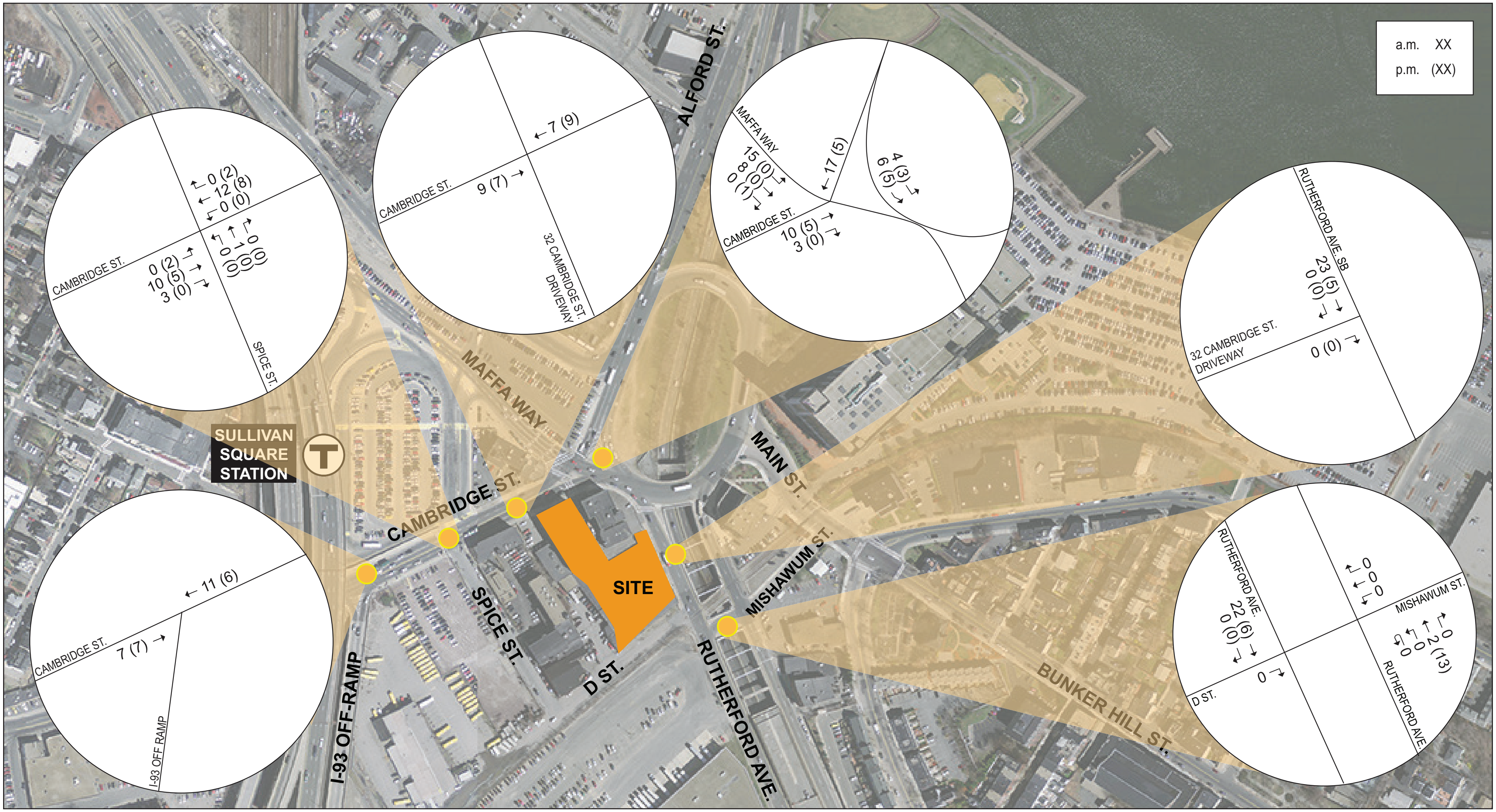
Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 140 stations and 1,300 bicycles. There are currently no Hubway stations in proximity of the Project site.

Bicycle counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-5 for the a.m. and p.m. peak hours.

2.2.9 Car Sharing Services

Car sharing enables east access to short-term vehicular transportation. Car sharing services allow nearby residents access to a vehicle for a short amount of time, reducing dependence on personal vehicles and personal vehicle ownership and strain on local parking supply. 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 predominant car sharing service in the City of Boston, but Enterprise and Hertz also have car sharing services.

There are three car sharing locations within ¼ mile of the Project site. Zipcar vehicles are located in a parking lot at 50 Maffa Way, north of Sullivan Square Station and at the Hood Business Park at 500 Rutherford Avenue. Four Enterprise Car Share stations are located within the MBTA's parking lot at Sullivan Square Station. Car share locations are shown in Figure 2-6.



Not to scale.

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Figure 2-5
Existing Conditions (2014) Bicycle Turning Movement Volumes

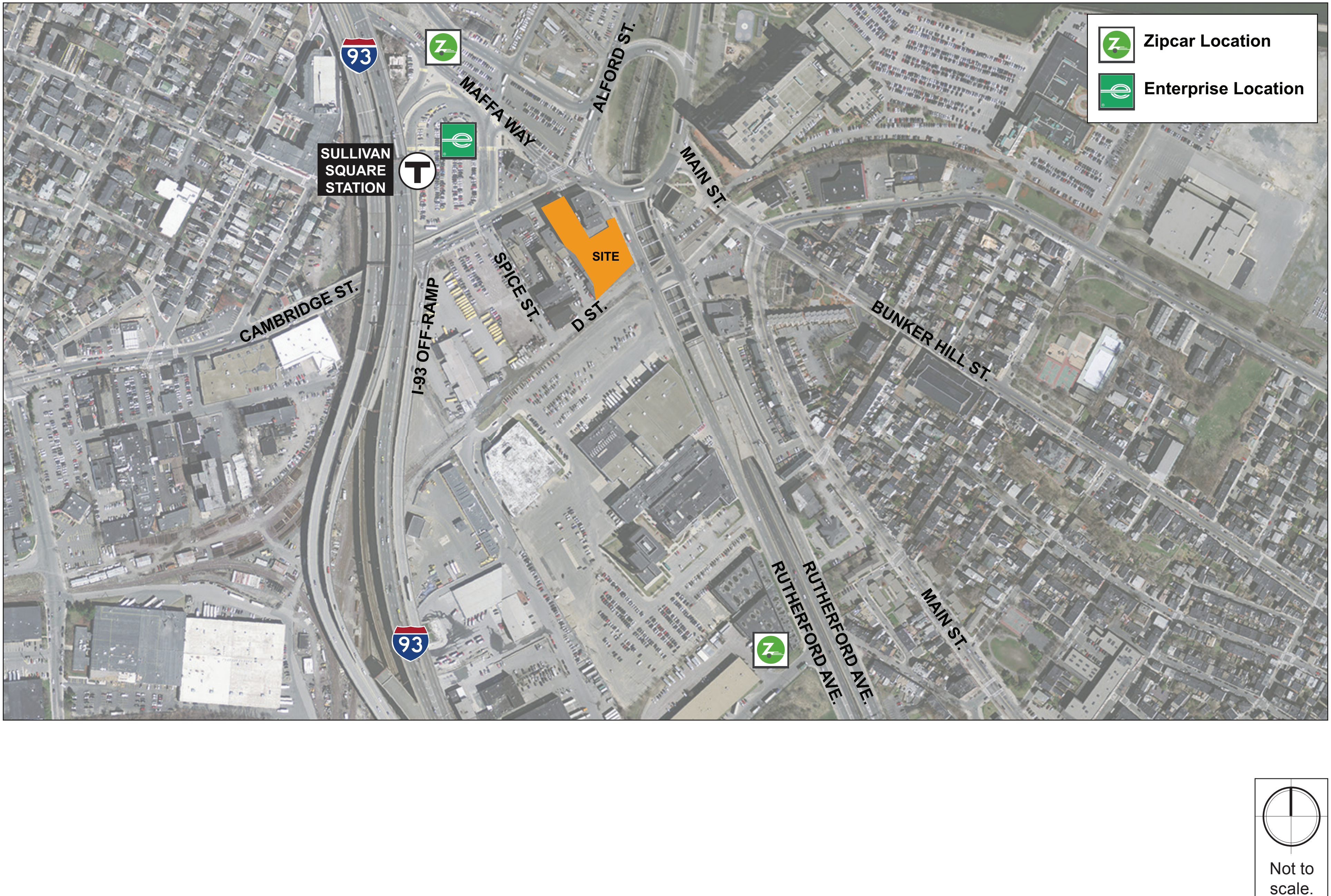

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Figure 2-6

Existing Car Share Locations

2.3 Future Conditions

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

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

2.3.1 No Build Conditions

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

2.3.1.1 Traffic Growth

Two methodologies are used to account for future traffic growth, independent of the Project. The first methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. The second methodology accounts for specific developments proposed in the vicinity of the Project site. Based on a review of recent traffic studies conducted for nearby projects and to account for any additional unforeseen traffic growth, a one-half percent (0.5%) per year annual traffic growth rate was used to develop the future conditions traffic volumes.

The second methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. The following projects are located in the vicinity of the study area and traffic volumes associated with these projects were also incorporated into the future conditions traffic volumes. Three projects which are located closest to the Project site and have a particularly high trip generation have been discussed in greater detail below.

- **Hood Business Park –** Located off Rutherford Avenue in Charlestown, the Hood Business Park will consist of approximately 780,000 sf of office space, 380,000 sf of research and development space, and 11,000 sf of retail space. The trips expected to be generated by this project were distributed to the study area intersections.

- **Wynn Resort in Everett** – The Wynn Resort, located on Lower Broadway (Route 99) in Everett, is scheduled to open by 2018, and will consist of 4,142 gaming positions, 629 hotel rooms, and about 67,000 sf of retail space. The Wynn project will generate significantly more trips during the p.m. peak hour than the a.m. peak hour, though the peak hour of the resort will take place much later than the p.m. peak hour of the roadways near Sullivan Square. The trips expected to be generated by this project were distributed to the study area intersections.

- **Assembly Row (Partners Healthcare)** – Located in Somerville approximately ½ mile northeast of the Project site, Assembly Row is a large mixed-use, transit-oriented development. Assembly Row was mostly constructed and occupied during traffic counts. Trips that will be generated by the upcoming Partners Healthcare site were distributed to the study area intersections in the No Build Condition.

- **Other projects** – Also included in the background trips for the Project's No Build scenario include: **River Green Technology Park**, a 500,000 sf mixed-use development in Everett; **Riverside Lofts**, a residential development in Everett consisting of 190 residential units; **The Batch Yard**, a residential development in Everett consisting of 329 residential units; **Everett High School**, a mixed-use development in Everett; the **Beach/Carter Hotel**, a 152-room hotel in Chelsea; the **FBI Relocation to Everett Avenue**, a 250,000 sf office space on Everett Avenue in Chelsea. The **Charlestown Armory Redevelopment** is a residential development consisting of 42 units and 78 parking spaces located at 380 Bunker Hill Street in Charlestown. While smaller in scale and/or farther in distance than the three above projects, each of these projects send vehicles through Sullivan Square.

2.3.1.2 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby infrastructure projects in the vicinity of the study area. The following improvements are planned for the study area, and will be implemented as mitigation for the Wynn Resort Casino:

- **Cambridge Street Signal Coordination** – As part of the Wynn Resort project in Everett, the signalized intersections on Cambridge Street will be coordinated and retimed to allow for smoother flow of traffic along Cambridge Street. The intersection of Cambridge Street/Spice Street will be signalized to help improve this coordination. A left-turn lane will be provided on the Cambridge Street eastbound approach to Beacham Street extension.

- **Spice Street/D Street Reconstruction** – Spice Street, and the segment of D Street between Rutherford Avenue and Spice Street, will be reconstructed as part of the Wynn Resort project in Everett. Spice Street will be repaved and its sidewalks will be reconstructed. D Street will be reconstructed in its current location, and a sidewalk will be constructed on the north side of the roadway. As a result of this reconstruction, all Cambridge Street eastbound trips destined to Rutherford Avenue southbound were reassigned to use Spice Street and D Street, avoiding the Sullivan Square rotary.

- **Ramp CL Lane Reassignment** – The lane use of the I-93 Northbound off-ramp at Cambridge Street will be changed as part of the Wynn Resort project in Everett. The existing left-turn lane will be converted to a shared left-turn/right-turn lane.

- **Sullivan Square Recirculation** – As part of the Wynn Resort project in Everett, a reconfiguration of the parking and bus circulation in and around Sullivan Square has been proposed. The proposed changes include providing a bus egress driveway on Cambridge Street opposite the I-93 Northbound off-ramp, and opening Beacham Street (the MBTA Driveway) to general traffic, removing some vehicles from the Sullivan Square rotary.

The City of Boston is also in the process of conducting long-term planning for Rutherford Avenue and Sullivan Square. These projects have no definitive timetable, and are not included in the No Build Conditions.

- **Sullivan Square Revitalization** – As outlined in the Sullivan Square Disposition Study (December 2013), the BRA has outlined a long-term vision for Sullivan Square which includes removal of the rotary in favor of a grid of pedestrian- and bicycle-friendly roadways. The study also outlines a vision for land use in the area. The Project, which features street-facing ground floor retail, street trees, and 1:1 bicycle parking, is aligned with the BRA's long-term goals for the area. In the Project study area, D Street would be reconstructed as a public way south of the Massport railroad tracks, and Spice Street would be extended to intersect the relocated D Street. The intersection of D Street/Mishawum Street/Rutherford Avenue would be signalized.

- **Rutherford Avenue** – The City of Boston is exploring converting Rutherford Avenue into a "complete street" which would be safe and attractive to pedestrians and bicyclists as well as motorists. In general, the project would reduce the cross-section from six lanes to four, with turning lanes at intersections and a landscaped median. The City is also exploring removal of the Austin Street underpass, which would further reduce the cross-section of the roadway.

2.3.1.3 No Build Conditions Traffic Operations

The one-half percent (0.5%) per year annual growth rate was applied to the Existing (2014) Conditions traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the No Build (2019) Conditions traffic volumes. The No Build (2019) Conditions a.m. and p.m. peak hour traffic volumes are shown on Figure 2-7 and Figure 2-8, respectively.

The No Build (2019) Conditions scenario analysis uses the same methodology as the Existing (2014) Conditions scenario analysis. Table 2-5 and Table 2-6 present the No Build (2019) Conditions capacity analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening to LOS E or LOS F between the Existing (2014) Conditions and the No Build (2019) Conditions. The detailed analysis sheets are provided in Appendix B.

As shown in Table 2-5, the I-93 Northbound off-ramp left/right turn lane worsens from LOS C in the Existing Conditions, when it was a dedicated left-turn lane, to LOS E. The I-93 northbound off-ramp right-turn lane worsens from LOS E in the Existing Conditions to LOS F in the No Build Conditions. At the intersection of Cambridge Street/Maffa Way/Alford Street (Sullivan Square), the overall LOS worsens from LOS E to LOS F. The Alford Street southbound approach worsens from LOS B to LOS F. These reductions in LOS are attributable to additional traffic from background projects through the study area. At the intersection of D Street/Mishawum Street/Rutherford Avenue, a high delay was reported for the Mishawum Street westbound approach due to the increase in D Street eastbound right-turning traffic; however, it is likely that gaps in Rutherford Avenue southbound traffic will occur due to the signalized upstream intersection, allowing left turns to be completed from Mishawum Street. All other study area intersections and approaches continue to operate at LOS D or better.

As shown in Table 2-6, the intersection of Cambridge Street/I-93 Northbound off-ramp worsens from LOS C to LOS E in the p.m. peak hour. The I-93 Northbound off-ramp northbound left/right-turn lane worsens from LOS C to LOS F, and the I-93 Northbound off-ramp northbound right-turn movement worsens from LOS D to LOS F. At the intersection of Cambridge Street/Spice Street, all approaches continue to operate at LOS D or better, except the Spice Street northbound approach, which worsens from LOS C to LOS F. At Sullivan Square, the overall LOS worsens from LOS D in the Existing Conditions to LOS E in the No Build Conditions. The Cambridge Street northbound approach worsens from LOS D to LOS F. These reductions in LOS are attributable to additional traffic from background projects through the study area. All approaches at unsignalized intersections continue to operate at LOS D or better.

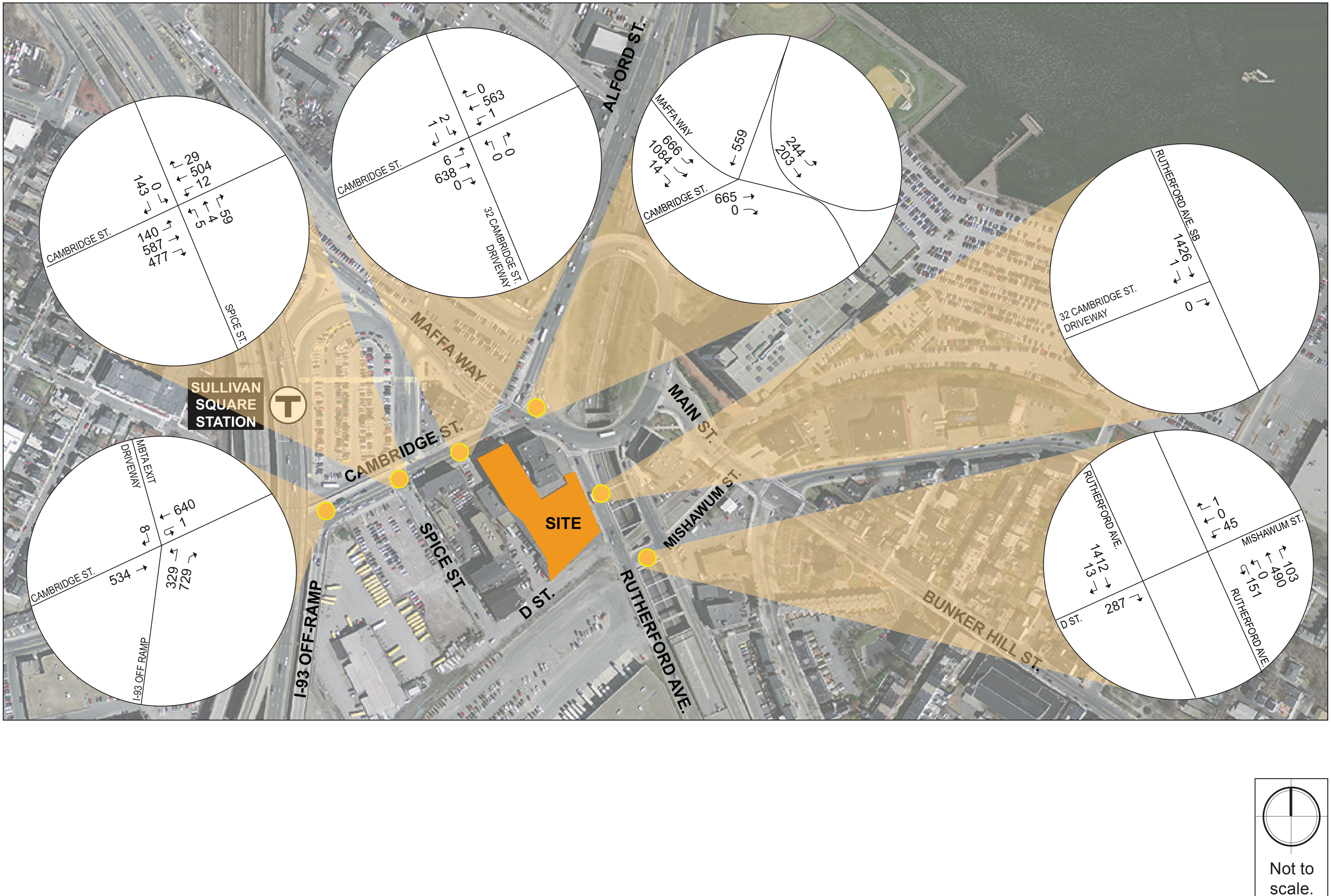

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Figure 2-7
No-Build Conditions (2019) Traffic Volumes, a.m. Peak Hour

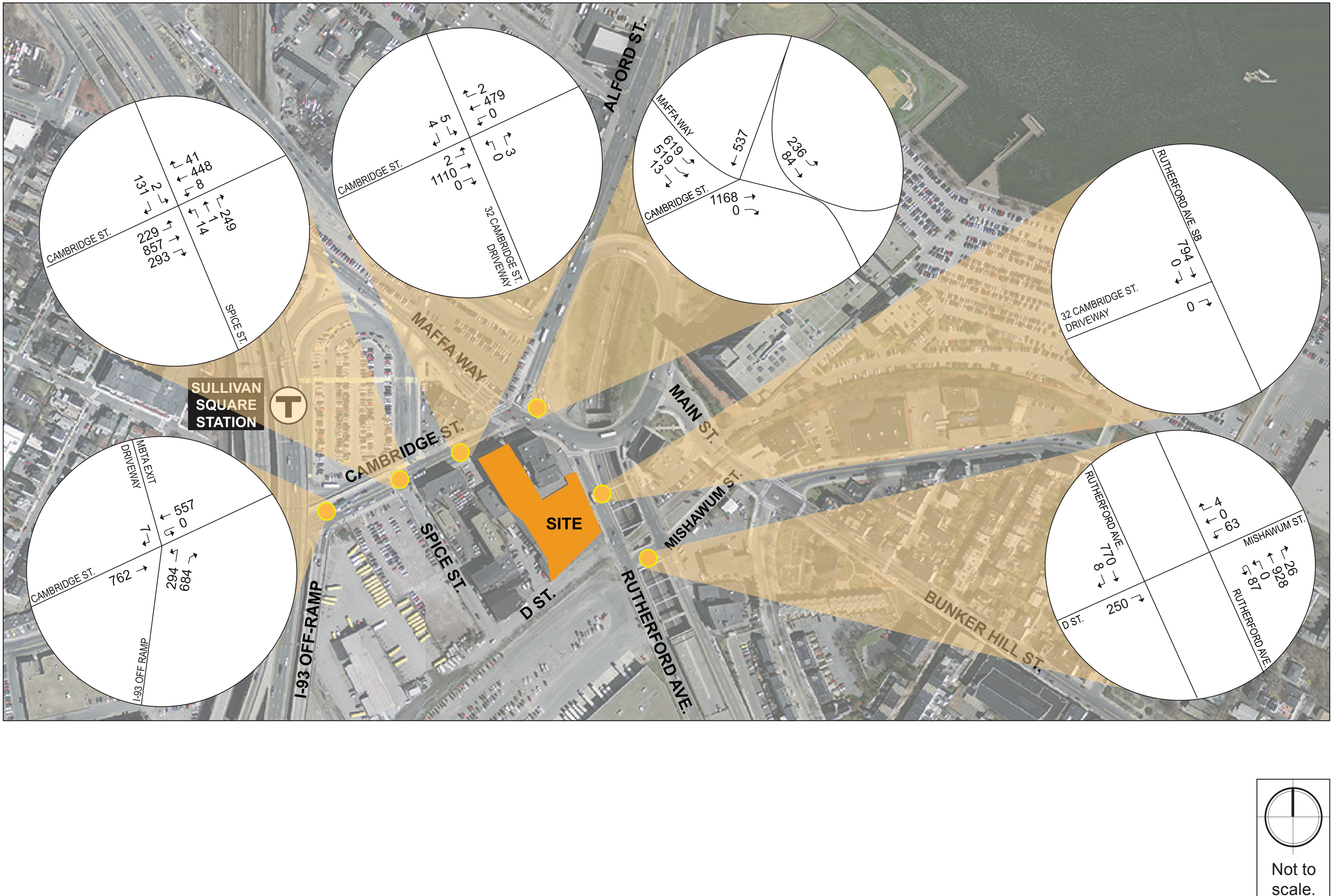

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Figure 2-8
No-Build Conditions (2019) Traffic Volumes, p.m. Peak Hour

Table 2-5 No Build (2019) Conditions, Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	**D**	**43.9**	—	—	—
Cambridge EB thru | thru	B	19.4	0.40	119	194
Cambridge WB thru | thru	C	21.4	0.47	81	258
I-93 NB left/right	E	65.7	0.99	389	#633
I-93 NB right	F	75.2	1.02	~381	#610
MBTA Busway SB right	A	0.2	0.03	0	0
2. Cambridge Street/Spice Street/MBTA Drive	**B**	**17.5**	—	—	—
Cambridge EB left	A	6.9	0.31	23	m50
Cambridge EB thru | thru/right	A	6.6	0.50	112	m122
Cambridge WB left/thru | thru/right	C	31.9	0.40	120	m152
Spice NB left/thru/right	C	25.6	0.61	5	m25
MBTA Drive SB left/thru/right	C	25.4	0.87	50	0
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**F**	**152.1**	—	—	—
Maffa EB thru | thru/bear right	F	193.3	1.35	~581	#726
Maffa EB bear right	F	197.2	1.35	~536	#773
Maffa EB right	A	0.1	0.02	0	m0
Cambridge NB right/hard right	C	21.8	0.65	122	242
Alford SB hard left | hard left/bear left	E	62.2	0.80	86	#148
Alford SB thru | thru	F	199.5	1.37	~271	#388
T*Unsignalized Intersections*					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.1	0.26	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.23	—	0
32 Cambridge NB left/thru/right	A	0.0	0.00	—	0
Driveway SB left/thru/right	B	11.8	0.01	—	0
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.61	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	F	64.6	0.91	—	228
Mishawum WB left/thru/right	F	N/A	3.71	—	N/A
Rutherford NB u-turn/thru | thru/right	A	0.0	0.22	—	0
Rutherford SB thru | thru/right	A	0.0	0.58	—	0

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

Table 2-6 No Build (2019) Conditions, Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	E	**60.6**	—	—	—
Cambridge EB thru | thru	D	36.4	0.75	238	310
Cambridge WB thru | thru	C	21.1	0.58	133	m171
I-93 NB left/right	F	98.2	0.94	353	#580
I-93 NB right	F	100.8	0.94	330	#541
MBTA Busway SB right	A	0.1	0.02	0	0
2. Cambridge Street/Spice Street/MBTA	**C**	**28.2**	—	—	—
Cambridge EB left	B	12.8	0.54	69	m103
Cambridge EB thru | thru/right	C	17.6	0.54	185	m305
Cambridge WB left/thru | thru/right	B	14.5	0.55	97	113
Spice NB left/thru/right	F	104.9	0.93	141	148
MBTA Drive SB left/thru/right	B	10.7	0.57	35	8
Signalized Intersections					
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	E	**64.9**	—	—	—
Maffa EB thru | thru/bear right	E	60.6	1.01	~286	#417
Maffa EB bear right	E	66.5	0.97	206	#440
Maffa EB right	A	0.1	0.03	0	m0
Cambridge NB right/hard right	F	93.2	1.07	~524	m#675
Alford SB hard left | hard left/bear left	D	48.6	0.60	77	118
Alford SB thru | thru	C	21.5	0.71	95	127
Unsignalized Intersections					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.0	0.35	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.15	—	0
32 Cambridge NB left/thru/right	B	10.5	0.01	—	1
Driveway SB left/thru/right	B	10.1	0.02	—	2
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.34	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	C	19.0	0.52	—	73
Mishawum WB left/thru/right	F	60.6	0.55	—	68
Rutherford NB u-turn/thru | thru/right	A	0.0	0.47	—	0
Rutherford SB thru | thru/right	A	0.0	0.34	—	0

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

2.3.2 Build Conditions

As previously summarized, the Project will consist of approximately 171 residential units and approximately 2,500 sf of retail space. Parking will be provided in an approximately 16-space surface lot accessible from Cambridge Street, where three spaces will be reserved for retail parking. Parking will also be provided in approximately 98-space parking structure accessible from D Street (Option A) or Rutherford Avenue (Option B). The Build (2019) Conditions reflect a future scenario that adds anticipated Project-generated trips to the No Build (2019) Conditions traffic volumes.

2.3.2.1 Site Access and Circulation

Approximately 20 percent of the vehicular traffic, including all traffic destined to the higher-turnover retail use, is expected to access the site's surface parking lot from Cambridge Street. The remaining 80 percent of the vehicular traffic is expected to utilize the site's underground garage. The subsurface garage containing approximately 98 parking spaces will be located in the southern structure. Currently, the Proponent is exploring two alternative access points for the parking garage. The first alternative (Option A) would provide an access point to the garage along the northern side of D Street. The second alternative (Option B) would provide an access point along Rutherford Avenue southbound. Users entering either parking area will have access to both buildings on the Project site.

Site access Option A would provide a driveway off of D Street to provide access/egress for the underground garage. Option A would require approval from Massport, which owns the right-of-way along D Street. Site access Option B would provide a driveway off of Rutherford Avenue southbound to provide access/egress for the underground garage. Both site access alternatives were studied and are included in the Build (2019) conditions traffic operations analysis.

2.3.2.2 Sight Distance

Sight distance measurements were collected along Rutherford Avenue for the location of the driveway in site access Option B. The Project's below-grade parking garage will be accessible via a driveway on Rutherford Avenue in Option B. The driveway will be located on the southern edge of the Project property line.

Vehicles turning onto Rutherford Avenue southbound from Maffa Way or Cambridge Street at the Sullivan Square rotary must navigate a horizontal curve between Cambridge Street and Rutherford Avenue. On this curve, a chain link fence and parked vehicles in the adjacent parking lot obstruct sight lines on Rutherford Avenue. In order to determine whether sight distance is sufficient to locate a driveway for the Project on Rutherford Avenue, sight distance measurements were conducted for five potential driveway locations along the site frontage with Rutherford Avenue. Measurements were conducted along the western curb line of Rutherford Avenue, so measurements are conservative, as motorists would be at least several more feet away from the obstructions that block sight lines. A motorist's viewpoint would be in the middle of the travel lane and not along the curb line, and therefore is less obstructed by the fence and parked cars adjacent to the sidewalk.

Sight distance is greatest at the southerly potential driveway locations. For a driveway at the southern end of the Project property, the sight distance for vehicles entering Rutherford Avenue is approximately 270 feet, sufficient for vehicles traveling at speeds of 35 mph. For a driveway in a similar location as the existing driveway on Rutherford Avenue, sight distance is about 197 feet, sufficient for vehicles entering Rutherford Avenue at 30 mph. More northerly driveway locations would provide shorter sight distances for entering vehicles. A driveway located close to the southern property line, as proposed by the Project, therefore provides the greatest possible sight distance from the north, and would be an improvement to sight lines compared to the existing structure's driveway location.

2.3.2.3 Trip Generation

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

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[1] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are made to account for other travel mode shares such as walking, bicycling, and transit.

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

LUC 220 – Apartment. The residential apartment is defined as rental dwelling units located within the same building with at least three other dwelling units. This LUC does not distinguish whether apartments are low-rise, mid-rise, or high-rise; however, this LUC has a much higher sample size than other similar LUC's, providing for a more conservative estimate in trip generation. Trip generation estimates are based on average vehicular rates per dwelling unit.

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

LUC 820 – Shopping Center. A shopping center is defined as an integrated group of commercial establishments that is developed, owned, and managed as a unit. It is typically used for general retail establishments. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross floor area.

2.3.2.4 Mode Share

The BTD publishes vehicle, transit, and walking/bicycling mode split rates for different areas of Boston. The Project site is located within BTD's designated Area 11, which includes the entirety of Charlestown. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The person trips were then distributed to different travel models according to the mode shares shown in Table 2-7.

Table 2-7 Travel Mode Shares

Land Use	Direction	Walk/ Bicycle Share	Transit Share	Auto Share	Local Vehicle Occupancy Rate
Daily					
Apartment	In	35%	19%	46%	1.13
	Out	35%	19%	46%	1.13
Retail	In	35%	15%	50%	1.78
	Out	35%	15%	50%	1.78
a.m. Peak Hour					
Apartment	In	42%	23%	35%	1.13
	Out	32%	31%	37%	1.13
Retail	In	43%	19%	38%	1.78
	Out	34%	25%	41%	1.78
p.m. Peak Hour					
Apartment	In	35%	18%	47%	1.13
	Out	37%	9%	54%	1.13
Retail	In	32%	13%	55%	1.78
	Out	35%	15%	50%	1.78

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

2.3.2.5 Existing Site Trip Generation

In order to determine the existing site vehicle trip generation, each of the site's two driveways, including one on Cambridge Street (Intersection #3) and one on Rutherford Avenue (Intersection #5) were counted, and these intersections were included in the study area. Volumes entering and exiting these driveways were removed from the traffic network, as their parking lots and associated land uses will be removed as part of the Project.

2.3.2.6 Vehicle Trip Generation

To develop the overall trip generation characteristics of the Project, the adjusted vehicular trips associated with both the existing uses on the Project site and the proposed Project were estimated. The new Project-generated vehicle trips are summarized in Table 2-8, with the detailed trip generation information provided in Appendix B.

Table 2-8 Project Vehicle Trip Generation

Time Period	Direction	Apartment [1]	Retail [2]	Total	Existing Uses[3]	Net New Trips
Daily	In	260	18	278	--	--
	Out	260	18	278	--	--
	Total	**520**	**36**	**556**	**–**	**–**
a.m. Peak Hour	In	6	1	7	2	5
	Out	26	1	27	0	27
	Total	**32**	**2**	**34**	**2**	**32**
p.m. Peak Hour	In	32	2	34	0	34
	Out	19	2	21	3	18
	Total	**51**	**4**	**55**	**3**	**52**

1 Based on ITE LUC 220 – Apartment for 171 units.
2 Based on ITE LUC 820 – Shopping Center for 2,500 sf.
3 Based on traffic counts conducted in September 2014.

As shown in Table 2-8, the Project is expected to generate approximately 556 daily vehicle trips (278 entering, 278 exiting) with 32 net new vehicle trips (5 entering and 27 exiting) during the a.m. peak hour and 52 net new vehicle trips (34 entering and 18 exiting) during the p.m. peak hour.

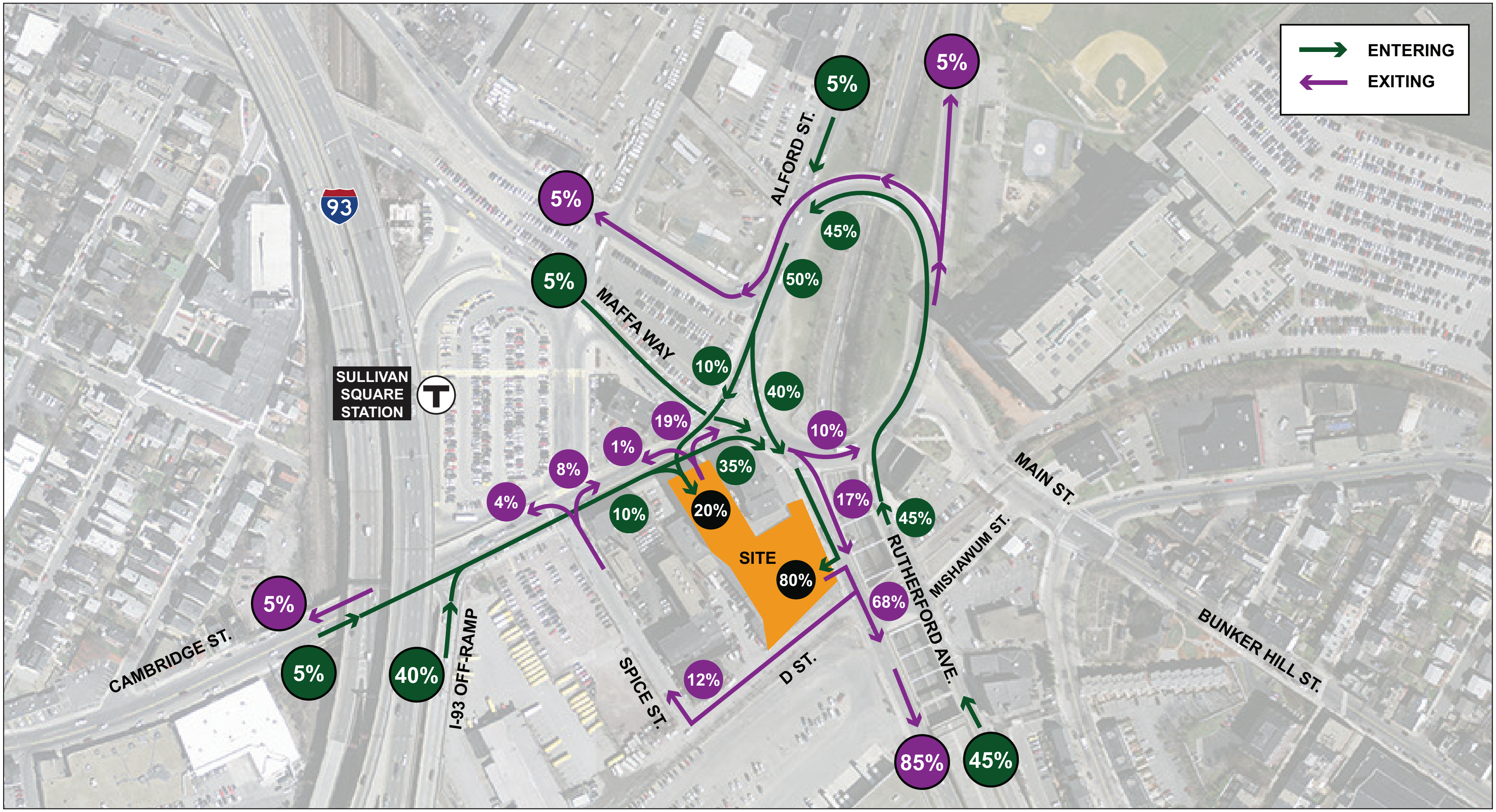
2.3.2.7 Trip Distribution

The trip distribution identifies the various travel paths for vehicles arriving and leaving the Project site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 11 and 2010 US Census Journey-to-Work data. The trip distribution patterns for the Project are illustrated in Figure 2-9A and Figure 2-9B for site access Option A and Option B, respectively.

The Project-generated vehicle trips were assigned to the study area roadway network based on the trip distribution patterns shown in Figure 2-9A and Figures 2-9B. The weekday a.m. peak hour Project-generated vehicle trips are shown in Figure 2-10A and Figure 2-10B for Option A and Option B, respectively. The weekday p.m. peak hour Project-generated vehicle trips are shown in Figure 2-11A and Figure 2-11B for Option A and Option B, respectively. The weekday a.m. peak hour Project-generated trips were added to the No Build (2019) Conditions traffic volumes to develop the Build (2019) Conditions peak hour traffic volume networks and are shown in Figure 2-12A and Figure 2-12B for Option A and Option B, respectively. The weekday p.m. peak hour Project-generated trips were added to the No Build (2019) Conditions traffic volumes to develop the Build (2019) Conditions peak hour traffic volume networks and are shown in Figure 2-13A and Figure 2-13B for Option A and Option B, respectively.

2.3.2.8 Build Conditions Traffic Operations

The Build (2019) Conditions scenario analyses use the same methodology as the Existing (2014) and No Build (2019) Conditions scenario analyses. The results of the Build (2019) Conditions traffic analysis for Option A at the study area intersections are presented in Table 2-9A and Table 2-10A for the a.m. and p.m. peak hours, respectively. The results of the Build (2019) Conditions traffic analysis for Option B at the study area intersections are presented in Table 2-9B and Table 2-10B for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix B.



Not to scale.

32 Cambridge Street Boston, Massachusetts

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Figure 2-9A
Vehicle Trip Distribution - Option A

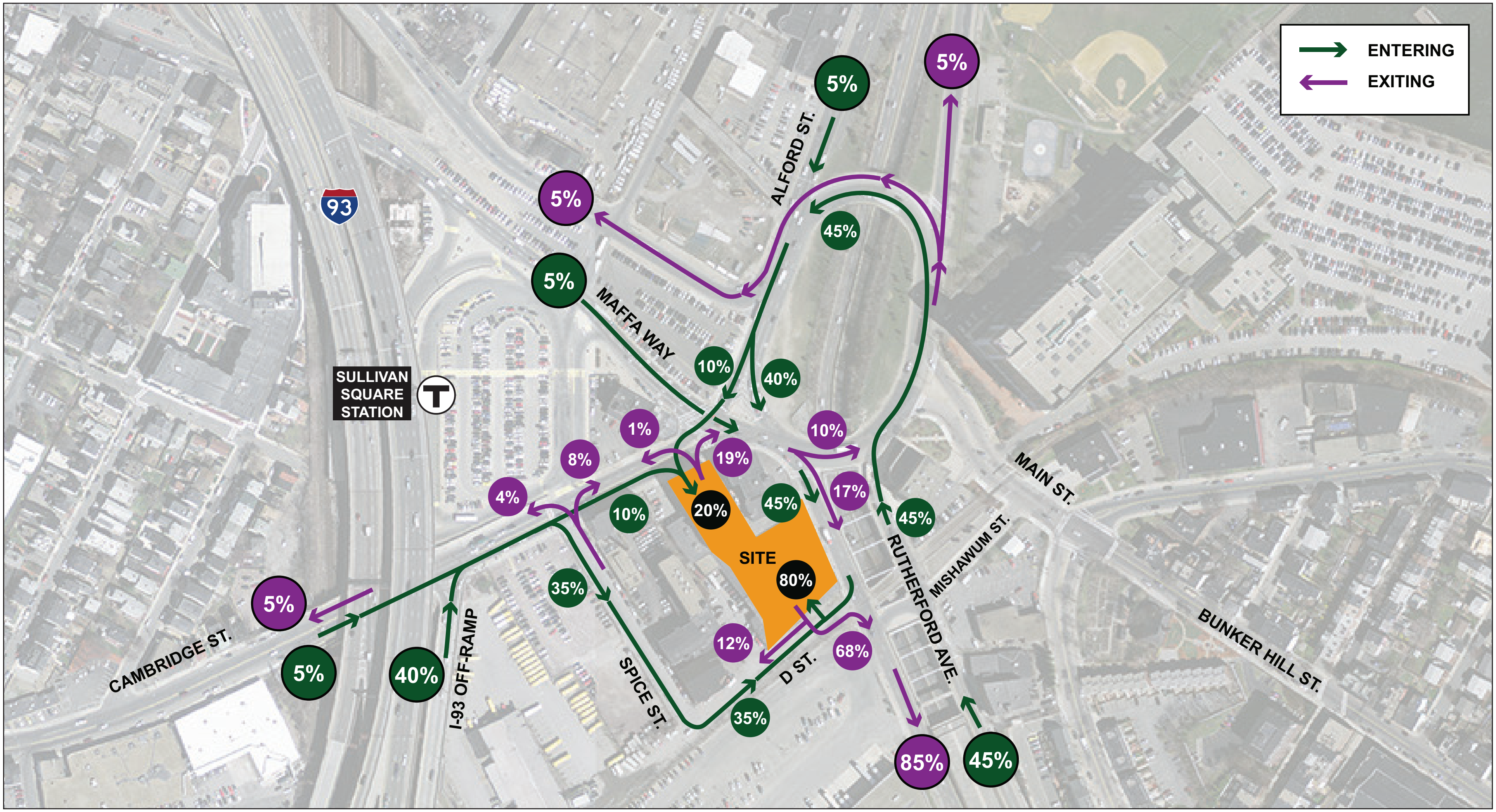

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Figure 2-9B
Vehicle Trip Distribution - Option B

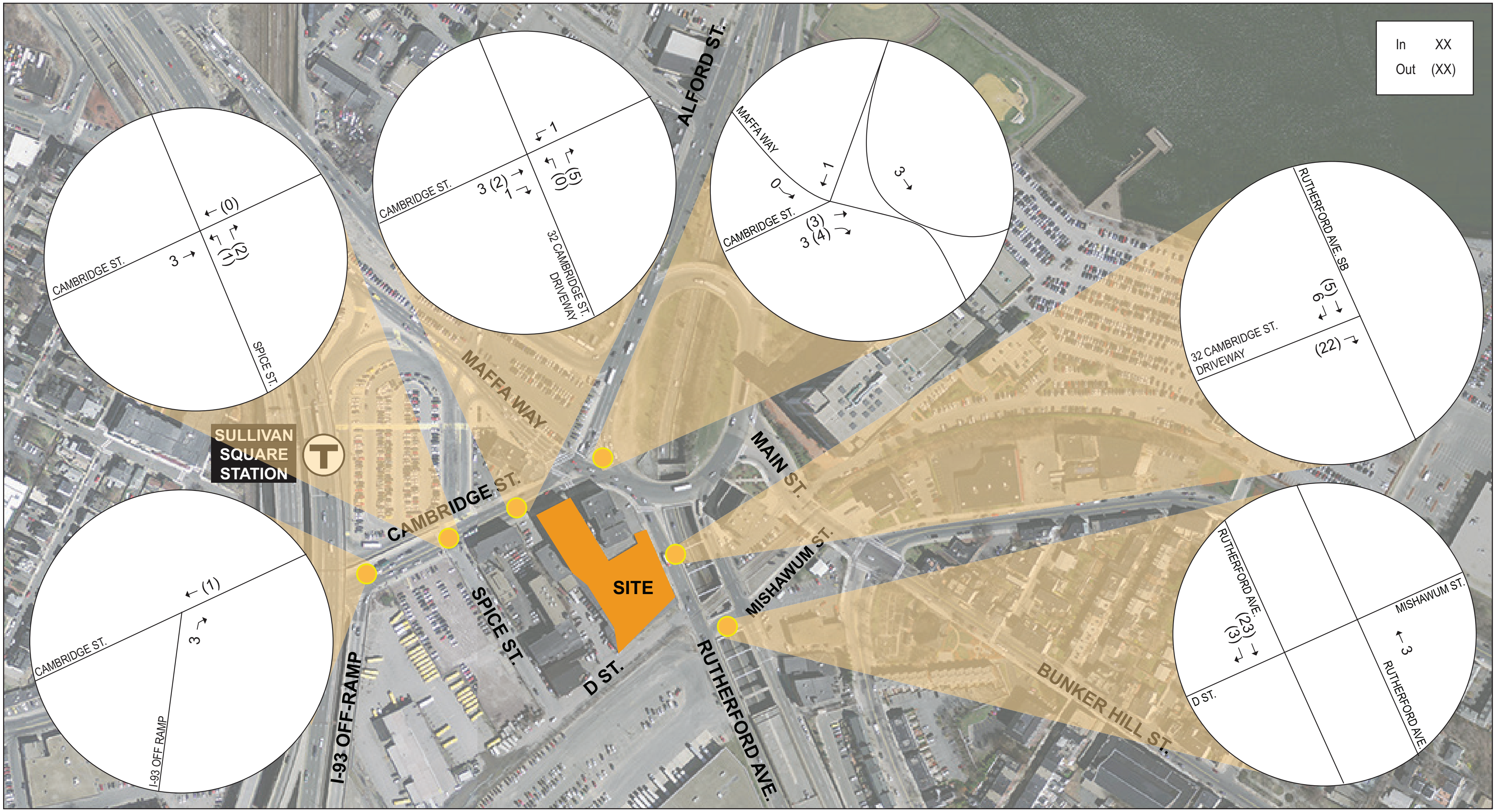

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Figure 2-10A

Project-generated Trips, a.m. Peak Hour - Option A

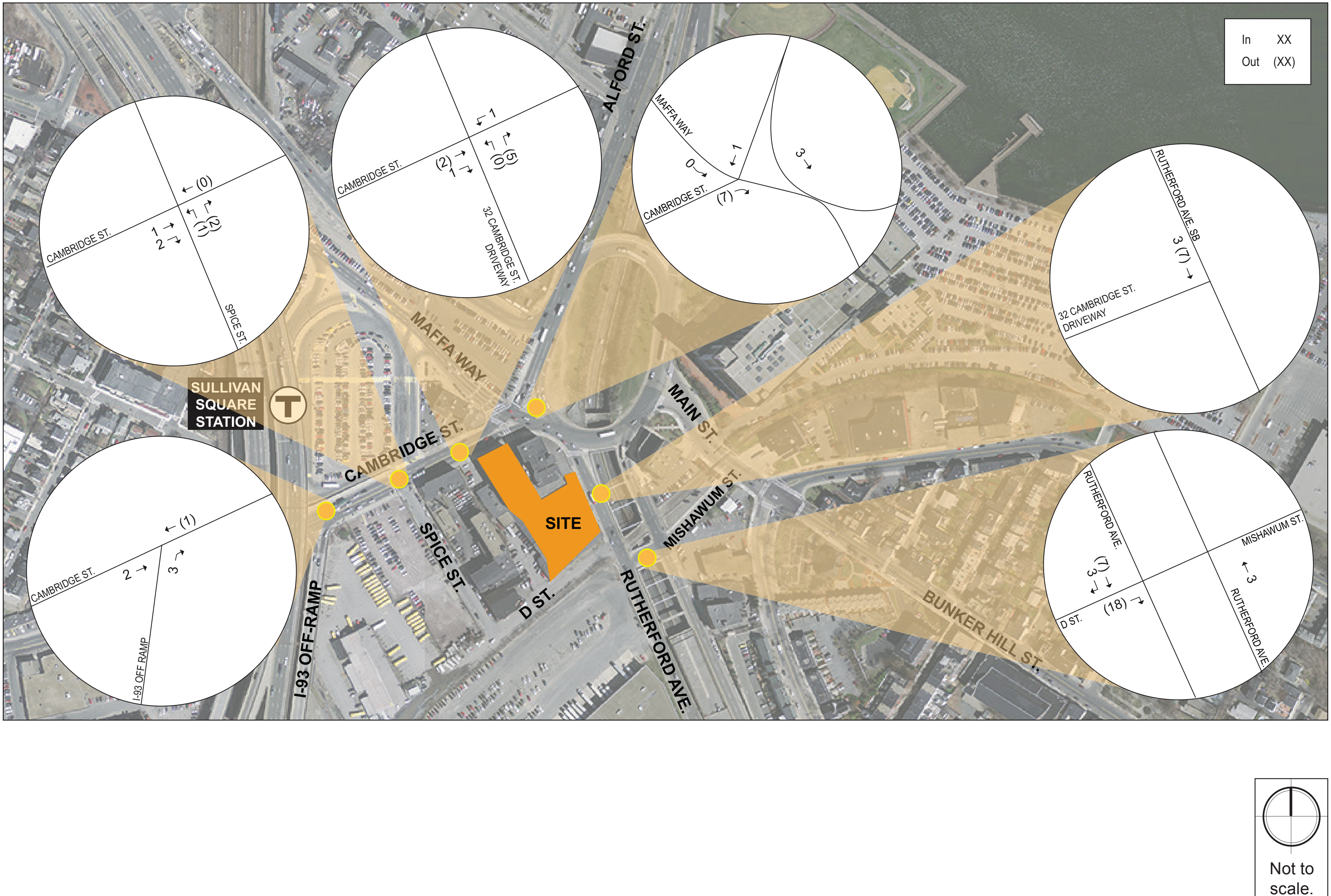

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Figure 2-10B

Project-generated Trips, a.m. Peak Hour - Option B

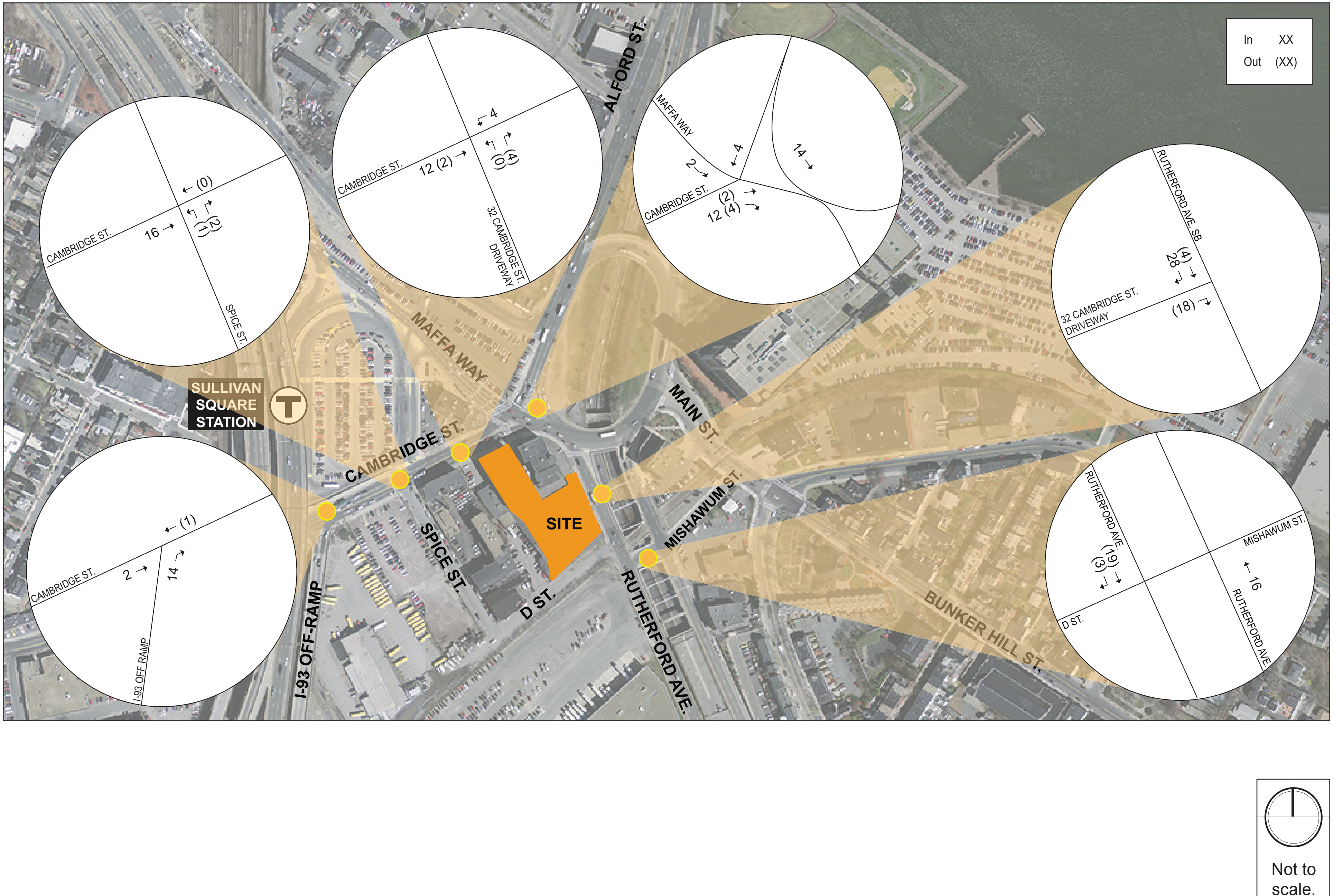

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Figure 2-11A
Project-generated Trips, p.m. Peak Hour - Option A

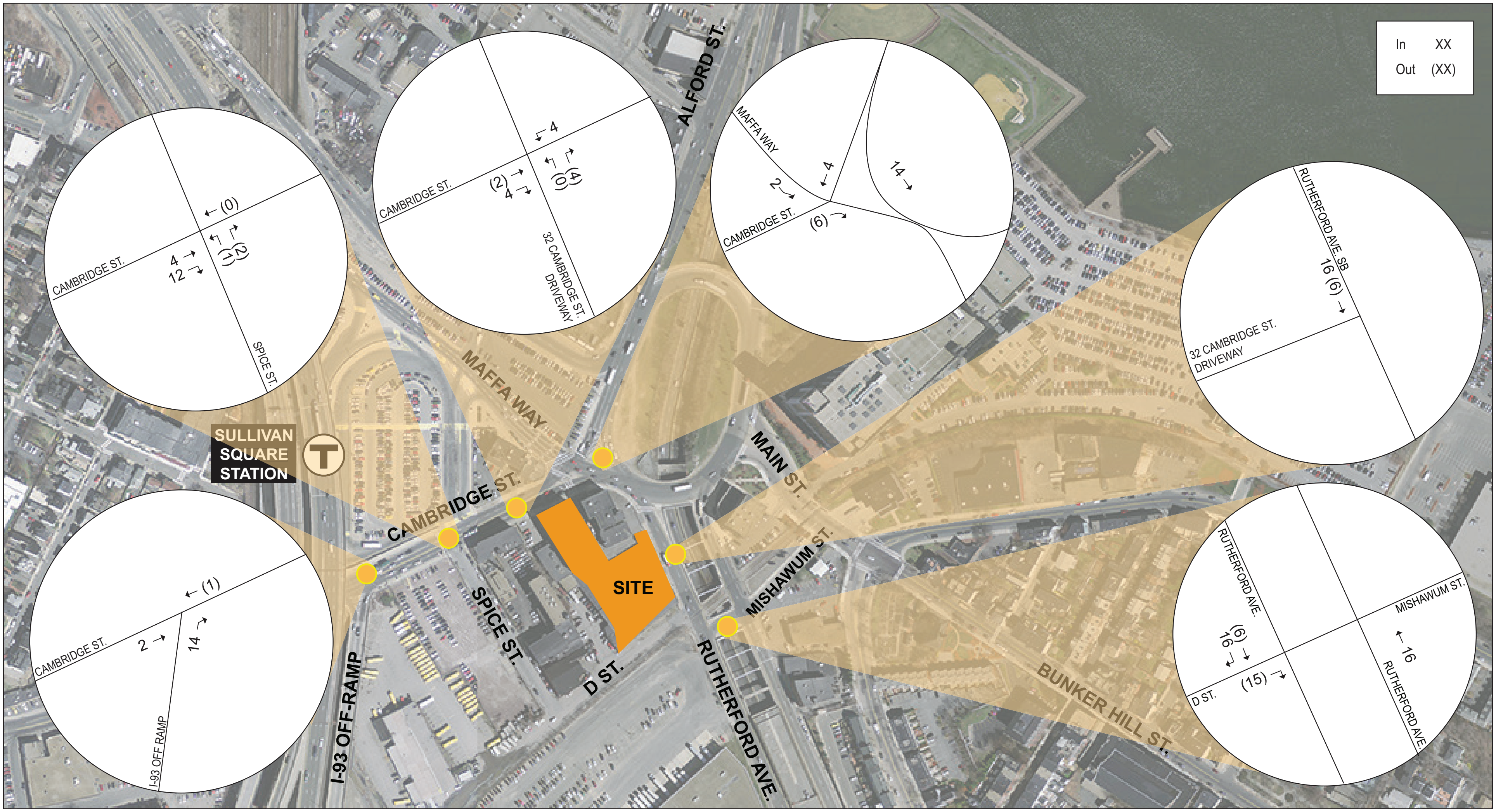

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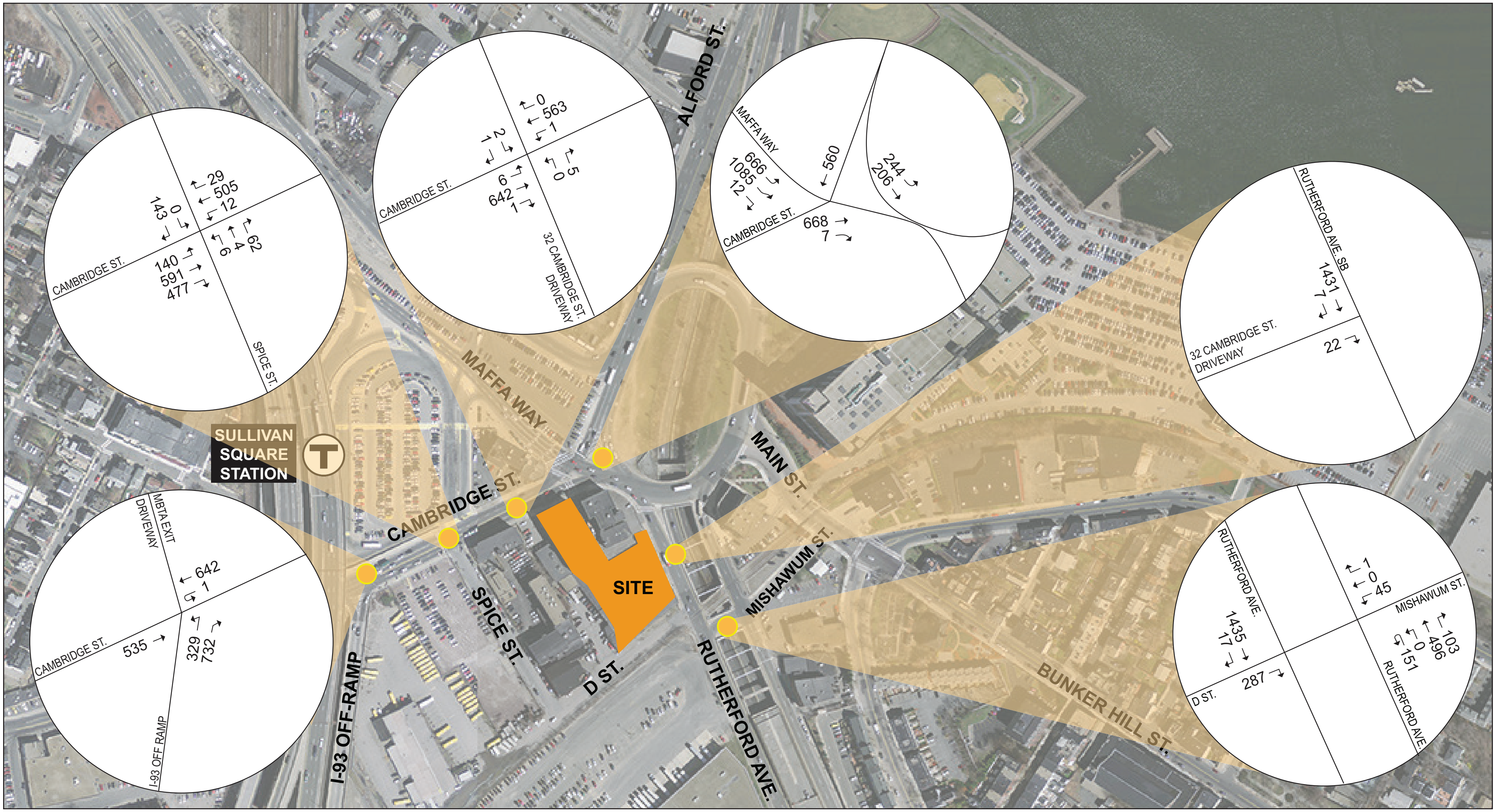
Figure 2-11B

Project-generated Trips, p.m. Peak Hour - Option B



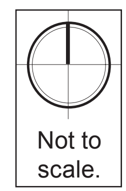


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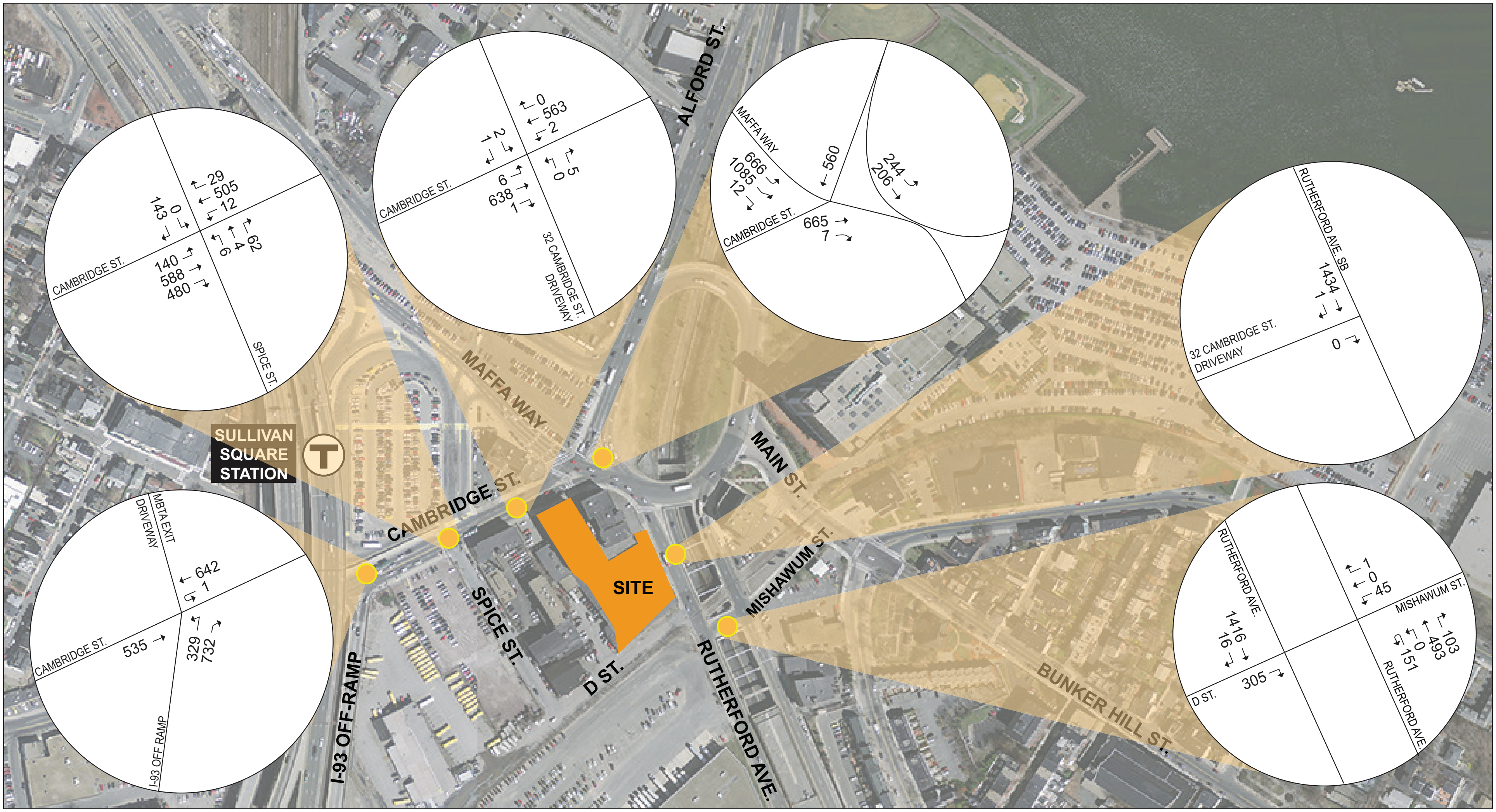
Figure 2-12A

Build Conditions (2019) Traffic Volumes, a.m. Peak Hour - Option A



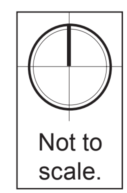


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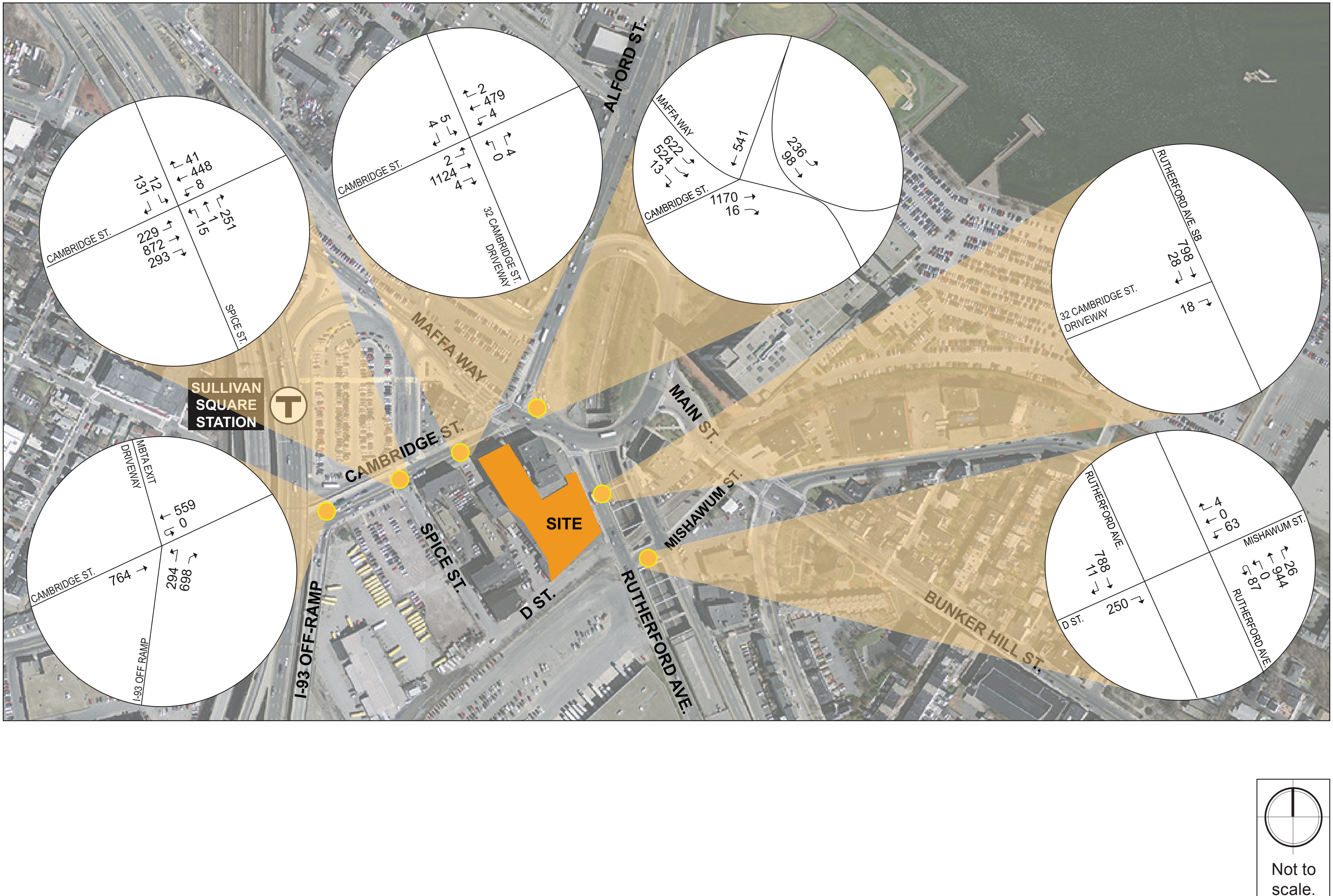
Figure 2-12B

Build Conditions (2019) Traffic Volumes, a.m. Peak Hour - Option B



Not to scale.

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Figure 2-13A

Build Conditions (2019) Traffic Volumes, p.m. Peak Hour - Option A

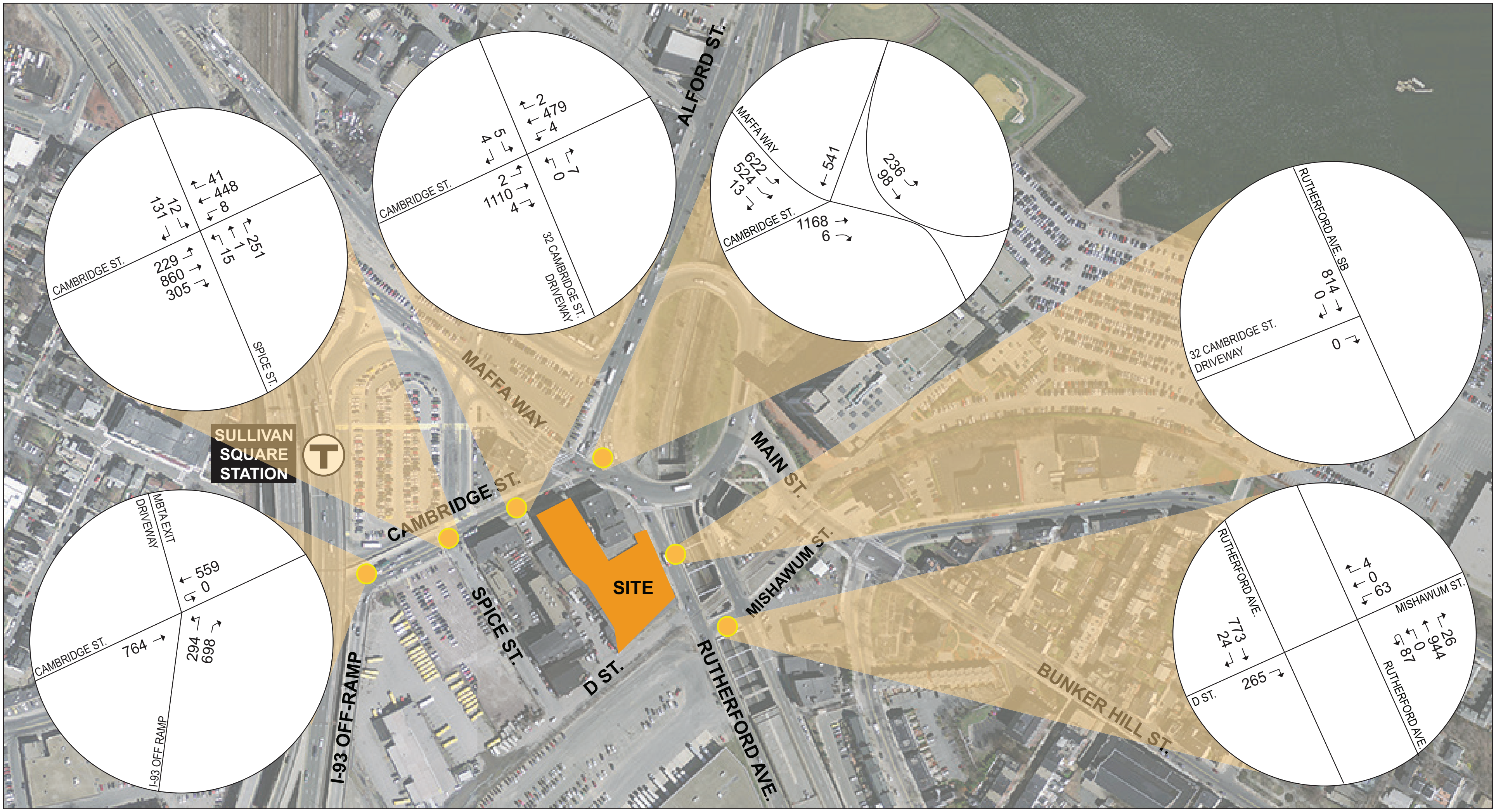

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Figure 2-13B

Build Conditions (2019) Traffic Volumes, p.m. Peak Hour - Option B

Table 2-9A Build (2019) Conditions, Capacity Analysis Summary, a.m. Peak Hour – Option A

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	**D**	**48.5**	—	—	—
Cambridge EB thru | thru	B	19.9	0.43	132	197
Cambridge WB thru | thru	C	21.7	0.48	84	264
I-93 NB left/right	E	74.4	1.02	~442	#653
I-93 NB right	F	85.9	1.06	~425	#633
MBTA Busway SB right	A	0.2	0.03	0	0
2. Cambridge Street/Spice Street/MBTA Drive	**B**	**17.7**	—	—	—
Cambridge EB left	A	6.7	0.31	22	m49
Cambridge EB thru | thru/right	A	6.3	0.50	105	m117
Cambridge WB left/thru | thru/right	C	32.1	0.41	121	m152
Spice NB left/thru/right	C	28.0	0.64	5	m26
MBTA Drive SB left/thru/right	C	26.0	0.87	50	0
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**F**	**152.7**	—	—	—
Maffa EB thru | thru/bear right	F	193.7	1.35	~581	#726
Maffa EB bear right	F	197.2	1.35	~536	#773
Maffa EB right	A	0.1	0.02	0	m0
Cambridge NB right/hard right	C	22.1	0.65	124	246
Alford SB hard left | hard left/bear left	E	62.2	0.80	86	#148
Alford SB thru | thru	F	202.3	1.37	~274	#391
Unsignalized Intersections					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.1	0.19	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.23	—	0
32 Cambridge NB left/thru/right	A	10.5	0.01	—	1
Driveway SB left/thru/right	B	11.9	0.01	—	0
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.61	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	F	78.6	0.98	—	266
Mishawum WB left/thru/right	F	N/A	13.77	—	N/A
Rutherford NB u-turn/thru | thru/right	A	0.0	0.22	—	0
Rutherford SB thru | thru/right	A	0.0	0.58	—	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

Table 2-10A Build (2019) Conditions, Capacity Analysis Summary, p.m. Peak Hour – Option A

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	**E**	**62.3**	—	—	—
Cambridge EB thru | thru	D	36.5	0.75	239	311
Cambridge WB thru | thru	C	22.0	0.58	133	m169
I-93 NB left/right	F	101.6	0.95	358	#587
I-93 NB right	F	104.0	0.96	341	#556
MBTA Busway SB right	A	0.0	0.02	0	0
2. Cambridge Street/Spice Street/MBTA Drive	**C**	**30.0**	—	—	—
Cambridge EB left	B	12.7	0.55	68	m101
Cambridge EB thru | thru/right	C	21.2	0.55	188	m311
Cambridge WB left/thru | thru/right	B	14.5	0.55	97	111
Spice NB left/thru/right	F	106.0	0.94	144	m149
MBTA Drive SB left/thru/right	B	10.6	0.57	35	8
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**E**	**64.7**	—	—	—
Maffa EB thru | thru/bear right	E	60.6	1.01	~292	#419
Maffa EB bear right	E	66.5	0.97	210	#445
Maffa EB right	A	0.1	0.03	0	m0
Cambridge NB right/hard right	F	92.9	1.07	~491	m#641
Alford SB hard left | hard left/bear left	D	48.6	0.60	77	118
Alford SB thru | thru	C	22.3	0.73	98	132
Unsignalized Intersections					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.0	0.36	—	0
Cambridge WB left/thru | thru/right	A	0.1	0.15	—	1
32 Cambridge NB left/thru/right	B	10.4	0.01	—	1
Driveway SB left/thru/right	B	10.0	0.02	—	2
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	A	0.0	0.00	—	0
Rutherford SB thru | thru/right	A	0.0	0.35	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	C	20.4	0.56	—	84
Mishawum WB left/thru/right	F	69.3	0.59	—	75
Rutherford NB u-turn/thru | thru/right	A	0.0	0.48	—	0
Rutherford SB thru | thru/right	A	0.0	0.34	—	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

Table 2-9B Build (2019) Conditions, Capacity Analysis Summary, a.m. Peak Hour – Option B

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	**D**	**48.5**	—	—	—
Cambridge EB thru | thru	B	19.9	0.43	132	197
Cambridge WB thru | thru	C	21.7	0.48	84	264
I-93 NB left/right	E	74.4	1.02	~442	#653
I-93 NB right	F	85.9	1.06	~425	#633
MBTA Busway SB right	A	0.2	0.03	0	0
2. Cambridge Street/Spice Street/MBTA Drive	**B**	**17.7**	—	—	—
Cambridge EB left	A	6.7	0.31	22	m49
Cambridge EB thru | thru/right	A	6.3	0.50	106	m117
Cambridge WB left/thru | thru/right	C	32.1	0.41	121	m152
Spice NB left/thru/right	C	27.9	0.64	5	m25
MBTA Drive SB left/thru/right	C	26.0	0.87	50	0
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	**F**	**152.6**	—	—	—
Maffa EB thru | thru/bear right	F	193.7	1.35	~581	#726
Maffa EB bear right	F	197.2	1.35	~536	#773
Maffa EB right	A	0.1	0.02	0	m0
Cambridge NB right/hard right	C	22.2	0.66	124	247
Alford SB hard left | hard left/bear left	E	62.2	0.80	86	#148
Alford SB thru | thru	F	202.3	1.37	~274	#391
Unsignalized Intersections					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.1	0.19	—	0
Cambridge WB left/thru | thru/right	A	0.0	0.23	—	0
32 Cambridge NB left/thru/right	B	10.5	0.01	—	1
Driveway SB left/thru/right	B	11.9	0.01	—	0
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	C	16.9	0.07	—	6
Rutherford SB thru | thru/right	A	0.0	0.61	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	F	69.9	0.98	—	266
Mishawum WB left/thru/right	F	N/A	4.90	—	N/A
Rutherford NB u-turn/thru | thru/right	A	0.0	0.22	—	0
Rutherford SB thru | thru/right	A	0.0	0.59	—	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

Table 2-10B Build (2019) Conditions, Capacity Analysis Summary, p.m. Peak Hour – Option B

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
1. Cambridge Street/I-93 NB Off-ramp	E	**62.3**	—	—	—
Cambridge EB thru | thru	D	36.5	0.75	239	311
Cambridge WB thru | thru	C	22.0	0.58	133	m169
I-93 NB left/right	F	101.6	0.95	358	#587
I-93 NB right	F	104.0	0.96	341	#556
MBTA Busway SB right	A	0.0	0.02	0	0
2. Cambridge Street/Spice Street/MBTA Drive	C	**30.8**	—	—	—
Cambridge EB left	B	12.8	0.55	68	m101
Cambridge EB thru | thru/right	C	21.7	0.56	191	m312
Cambridge WB left/thru | thru/right	B	14.7	0.56	97	111
Spice NB left/thru/right	F	106.5	0.94	148	154
MBTA Drive SB left/thru/right	B	10.6	0.57	35	8
4. Cambridge Street/Maffa Way/Alford Street (Sullivan Square)	E	**64.8**	—	—	—
Maffa EB thru | thru/bear right	E	61.3	1.01	~292	#419
Maffa EB bear right	E	67.7	0.98	210	#445
Maffa EB right	A	0.1	0.03	0	m0
Cambridge NB right/hard right	F	91.9	1.08	~540	m#687
Alford SB hard left | hard left/bear left	D	48.6	0.60	77	220
Alford SB thru | thru	C	22.3	0.73	98	132
Unsignalized Intersections					
3. Cambridge Street/32 Cambridge St. Driveway	—	—	—	—	—
Cambridge EB left/thru | thru/right	A	0.0	0.36	—	0
Cambridge WB left/thru | thru/right	A	0.1	0.15	—	1
32 Cambridge NB left/thru/right	B	10.4	0.01	—	1
Driveway SB left/thru/right	B	10.0	0.02	—	2
5. Rutherford Avenue SB/Driveway	—	—	—	—	—
Driveway EB right	B	11.9	0.04	—	3
Rutherford SB thru | thru/right	A	0.0	0.34	—	0
6. Rutherford Avenue/D Street/Mishawum Street	—	—	—	—	—
D EB right	C	19.5	0.53	—	76
Mishawum WB left/thru/right	F	64.2	0.57	—	71
Rutherford NB u-turn/thru | thru/right	A	0.0	0.48	—	0
Rutherford SB thru | thru/right	A	0.0	0.35	—	0

~ = 50th percentile volume exceeds capacity. Queue may be longer.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.

As shown in Table 2-9A and Table 2-10A, the intersections will continue to operate at the same LOS as under the No Build Conditions during both the a.m. and p.m. peak hours under site access Option A. As shown in Table 2-9B and Table 2-10B, the intersections will continue to operate at the same LOS as under the No Build Conditions during both the a.m. and p.m. peak hours under site access Option B.

Based on the capacity analysis results, the Project will have minimal impact on the study area intersections and both site access Option A (D Street) and Option B (Rutherford Avenue) will be able to accommodate the Project needs. No specific intersection improvements are necessary to accommodate the Project-generated traffic volumes.

2.3.2.9 Compatibility with Sullivan Square/Rutherford Avenue Long-term Plan

As discussed in Section 2.3.1.2, the City of Boston has a long-term plan for Sullivan Square and Rutherford Avenue which includes removal of the existing rotary and the construction of a neighborhood grid network with new mixed-use development. While the Project site is not included in the study area of the Sullivan Square Disposition Study, the Project's mixed land use and building height are compatible with the City's vision.

The Project's traffic impacts are compatible with the City's long-term vision for Sullivan Square and Rutherford Avenue. The Project will not generate significant vehicle trips (about one vehicle every two minutes in the a.m. peak hour, about one vehicle every minute in the p.m. peak hour). Approximately 10 percent of the Project-generated trips are expected to use Alford Street, Main Street, and Maffa Way to access the site, as shown in Figures 2-9A and 2-9B. The impact on the proposed grid system in Sullivan Square would be minimal. About 45 percent of entering vehicles and 85 percent of exiting vehicles are expected to use Rutherford Avenue; however, this represents just 25 southbound trips and three northbound trips in the a.m. peak hour, and just 16 northbound trips and 21 southbound trips in the p.m. peak hour. This represents a minimal impact to a high-volume roadway like Rutherford Avenue.

Part of the City's long-term plan is to shift the existing D Street to the south of the existing railroad tracks, lining up with the existing Mishawum Street to the east of Rutherford Avenue. As a result, Spice Street would be extended to cross the railroad tracks and intersect the new D Street. The Project can be made to be compatible with this concept. The Project-generated volumes along D Street are minimal compared to the current levels of traffic volumes. If and when the City's long term plan of shifting D Street to the south occurs, the site driveway to the underground garage will need to be modified.

2.3.2.10 Parking

This section presents the Project's parking supply and an evaluation of the Project's parking demand. The Project will provide approximately 114 parking spaces, including approximately three surface-level spaces reserved for retail, approximately 13 surface-level residential spaces, and approximately 98 spaces in a garage below the site. The surface-level parking spaces will be accessible via a driveway on Cambridge Street, while the parking garage will be accessible via D Street (Option A) or Rutherford Avenue (Option B).

The three retail parking spaces represent slightly more than one parking space per 1,000 sf of retail area. The remaining approximately 111 parking spaces will be used by the approximately 171 residential units at the Project site, representing a 0.65 parking ratio for the residential spaces. The City of Boston recommends a *maximum* parking ratio of 0.75-1.25 spaces per residential unit in Charlestown at developments within a 10-minute walk of an MBTA station; as such, the Project's proposed 0.65 parking ratio approaches, but does not exceed, the lower end of this recommended maximum ratio. Furthermore, while these recommended maximum parking ratios govern projects within a 10-minute walk of an MBTA station, the Project site is within a 3-minute walk of Sullivan Square Station. It is likely that the Project will attract tenants that do not own a personal vehicle, or families that own just one vehicle, due to the Project site's proximity to a major transit station.

2.3.2.11 Public Transportation

Based on the transit mode shares presented earlier, the future transit trips associated with the Project were estimated and are summarized in Table 2-11.

Table 2-11 Project Transit Trips

Time Period	Direction	Apartment	Retail	Total
	In	121	10	131
Daily	Out	121	10	131
	Total	**242**	**20**	**262**
	In	4	0	4
a.m. Peak Hour	Out	24	0	24
	Total	**28**	**0**	**28**
	In	14	1	15
p.m. Peak Hour	Out	4	1	5
	Total	**18**	**2**	**20**

As shown in Table 2-11, the Project will generate an estimated 262 transit trips on a daily basis. Approximately 28 transit trips (4 alighting and 24 boarding) will occur during the a.m. peak hour and 20 trips (15 alighting and 5 boarding) will occur during the p.m. peak hour.

2.3.2.12 Pedestrians and Bicycles

Based on the walk/bicycle mode shares presented earlier, the future walk/bike trips were estimated and are summarized in Table 2-12.

Table 2-12 Project Pedestrian/Bicycle Trips

Time Period	Direction	Apartment	Retail	Total
Daily	In	223	22	245
	Out	223	22	245
	Total	**446**	**44**	**490**
a.m. Peak Hour	In	8	1	9
	Out	25	1	26
	Total	**33**	**2**	**35**
p.m. Peak Hour	In	27	2	29
	Out	15	2	17
	Total	**42**	**4**	**46**

Over the course of a day, the Project will generate an estimated 490 pedestrian/bicycle trips and an additional 262 transit trips that will require a walk to or from the site. This results in an additional 752 new pedestrian/bicycle trips per day. Approximately 35 pedestrian/bicycle trips will occur during the a.m. peak hour and 46 pedestrian/bicycle trips will occur during the p.m. peak hour, in addition to the transit trips that will also require a walk to or from the site. The existing pedestrian and bicycle facilities that serve the Project site will accommodate all additional pedestrian and bicycle trips generated by the Project.

2.3.2.13 Bicycle Parking

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements (TAPAs) to provide secure bicycle parking for residents and employees, and short-term bicycle racks for visitors. The Project will provide at least 171 covered and secure bicycle storage spaces on-site for residents and employees of the site. Additional outdoor bicycle racks will be provided that are accessible to visitors to the site in accordance with BTD guidelines. They will be located proximate to the retail use at the Project site.

All bicycle racks, signs, and parking areas will conform to BTD guidelines and will 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 TAPA process.

2.3.2.14 Build Conditions Loading and Service Activity

Loading and service operations will occur on-site, within a shared easement/service area adjacent to D Street or at the surface parking lot's parking court/drop-off area. The loading bay is sized to serve a 36-foot long single-unit box truck (SU-36). Vehicles will access the loading bay area from Cambridge Street via Spice Street, or from D Street via Rutherford Avenue southbound. All trash and recycling pick-up activity will occur in this service area.

Deliveries to the retail use on-site will occur in the parking court/drop-off area of the surface lot, which is accessed via Cambridge Street.

A summary of anticipated loading/service activity by land use is presented in Table 2-13; the sources of the assumptions are presented below. Delivery trip estimates were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[3]. Deliveries to the Project site will be mostly limited to SU-36 trucks and smaller delivery vehicles.

Retail. Storefront retail locations primarily generate delivery trips related to maintaining the inventory of the storefront. Based on the CTPS report, storefront retail uses generate approximately 0.15 light truck trips per 1,000 sf of gross floor area, and 0.02 heavy truck trips per 1,000 sf of gross floor area.

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

Table 2-13 Delivery Activity by Land Use

Land Use	Number of Deliveries			General Delivery Times
	SU-30 or smaller	*Larger than SU-30*	*Total*	
Retail	1	0	1	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.
Residential	1	0	1	
Total	**2**	**0**	**2**	

The Project is expected to generate approximately two deliveries per day. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. These numbers do not include trash truck trips. For this area, trash truck trips generally occur between 5:00 a.m. and 7:00 a.m. and do not coincide with the regular delivery activities. The low number of anticipated deliveries will have minimal impact on the vehicular operations along Cambridge Street and Rutherford Avenue, which both already experience high rates of heavy vehicle traffic.

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

2.4 Transportation Mitigation Measures

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

The Proponent has committed to making improvements to the pedestrian realm. The Proponent will reconstruct the sidewalks adjacent to the Project site, which includes sections of Cambridge Street and Rutherford Avenue. The Proponent will, where possible, plant trees along Rutherford Avenue adjacent to the Project site to provide a buffer for pedestrians.

The Proponent is responsible for preparation of the TAPA, a formal legal agreement between the Proponent and BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The Proponent will work closely with BTD to determine the level of additional transportation mitigation that will be necessary to accommodate the Project. Any transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

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

2.5 Transportation Demand Management

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

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

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

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

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

- **Bicycle Accommodation**: The Proponent will provide bicycle storage in secure, sheltered areas for residents. Secure bicycle storage will also be made available to employees to encourage bicycling as an alternative mode of transportation. Subject to necessary approvals, public use bicycle racks for visitors will be placed near building entrances.

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

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

- **Electric Vehicle Charging:** The Proponent will provide electric vehicle charging stations at a total of four of the below-grade parking spaces..

- **Shared-car Services:** The Proponent will explore the feasibility of providing a shared car service (e.g., Zipcar) on-site to help reduce the need for residents to own a vehicle.

2.6 Evaluation of Short-term Construction Impacts

Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a CMP to be filed with BTD in accordance with the City's transportation management plan requirements. The CMP will also address the need for pedestrian detours, lane closures, and/or parking restrictions, if necessary, to accommodate a safe and secure work zone.

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

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

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

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

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

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

The Project is similar in height to surrounding existing buildings, and no building is proposed to be significantly taller than surrounding buildings. As a result, the Project is not anticipated to create pedestrian level wind conditions that are unsuitable for the proposed uses around the site.

3.2 Shadow

3.2.1 Introduction and Methodology

A shadow impact analysis was conducted to investigate shadow impacts from the proposed Project. The study tracked the sun and resulting shadow 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 the winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

The shadow analysis presents new shadow from the Project, as well as shadows of the existing neighborhood, and illustrates the impact of the Project (see Figures 3.2-1 to 3.2-14). The analysis focuses on the public spaces and major pedestrian areas adjacent to and in the vicinity of the site.

New shadow is generally limited to the Project site and immediately surrounding area. No new shadow will be cast across public open spaces or bus stops.

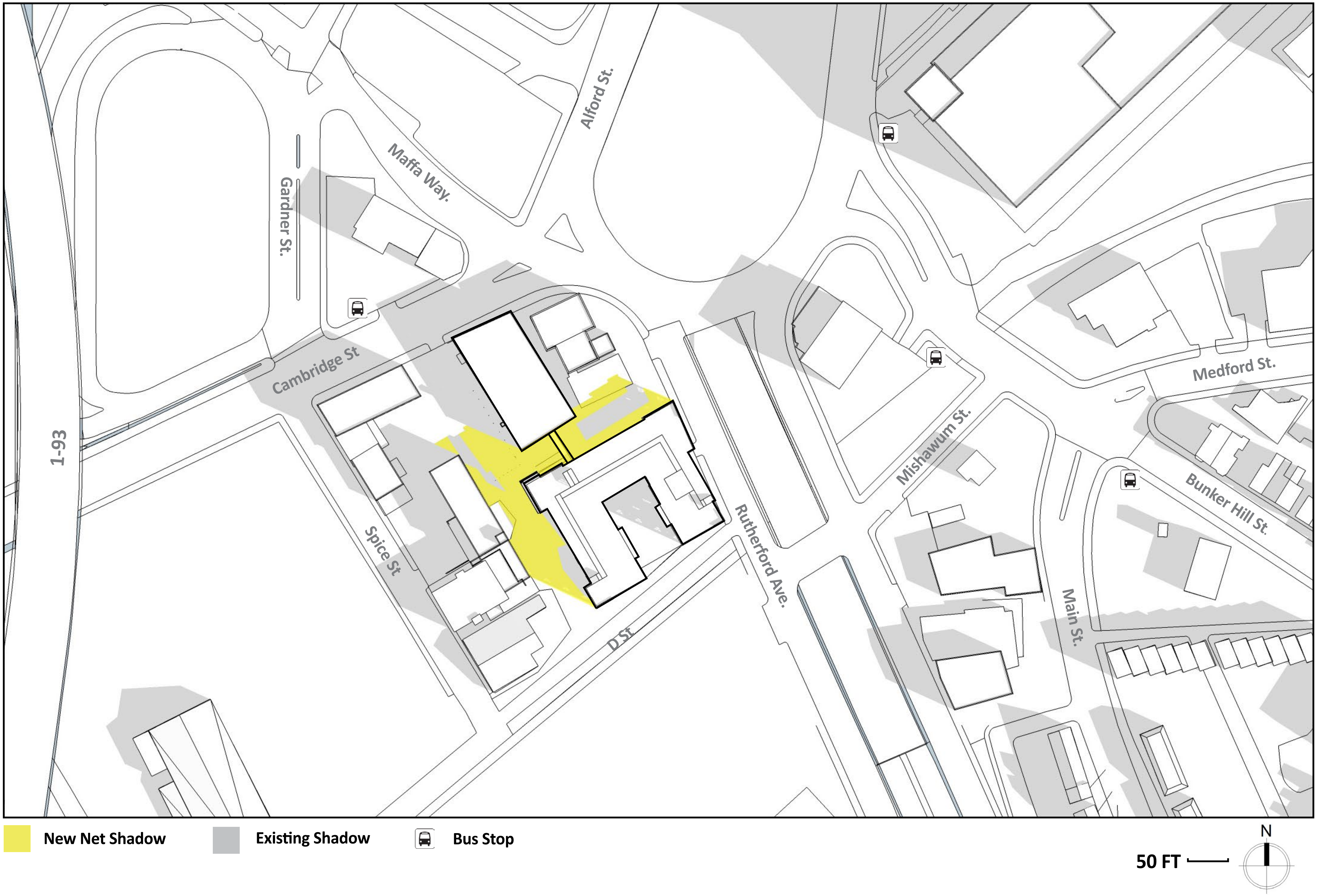
3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. on the vernal equinox, new shadow will be cast to the northwest and fall across the Project site and parcels immediately to the west and north of the site.

At 12:00 p.m., new shadow will be cast to the north and generally fall on the Project site, a small portion of the parcel to the north, and small portions of the Rutherford Avenue sidewalk adjacent to the site.

At 3:00 p.m., new shadow will be cast to the northeast and fall across portions of the Project site, the parcel to the north of the site and across the western side of Rutherford Avenue and its sidewalk.

No new shadow will be cast onto public open spaces or bus stops in the surrounding area during the vernal equinox at the time periods studied.

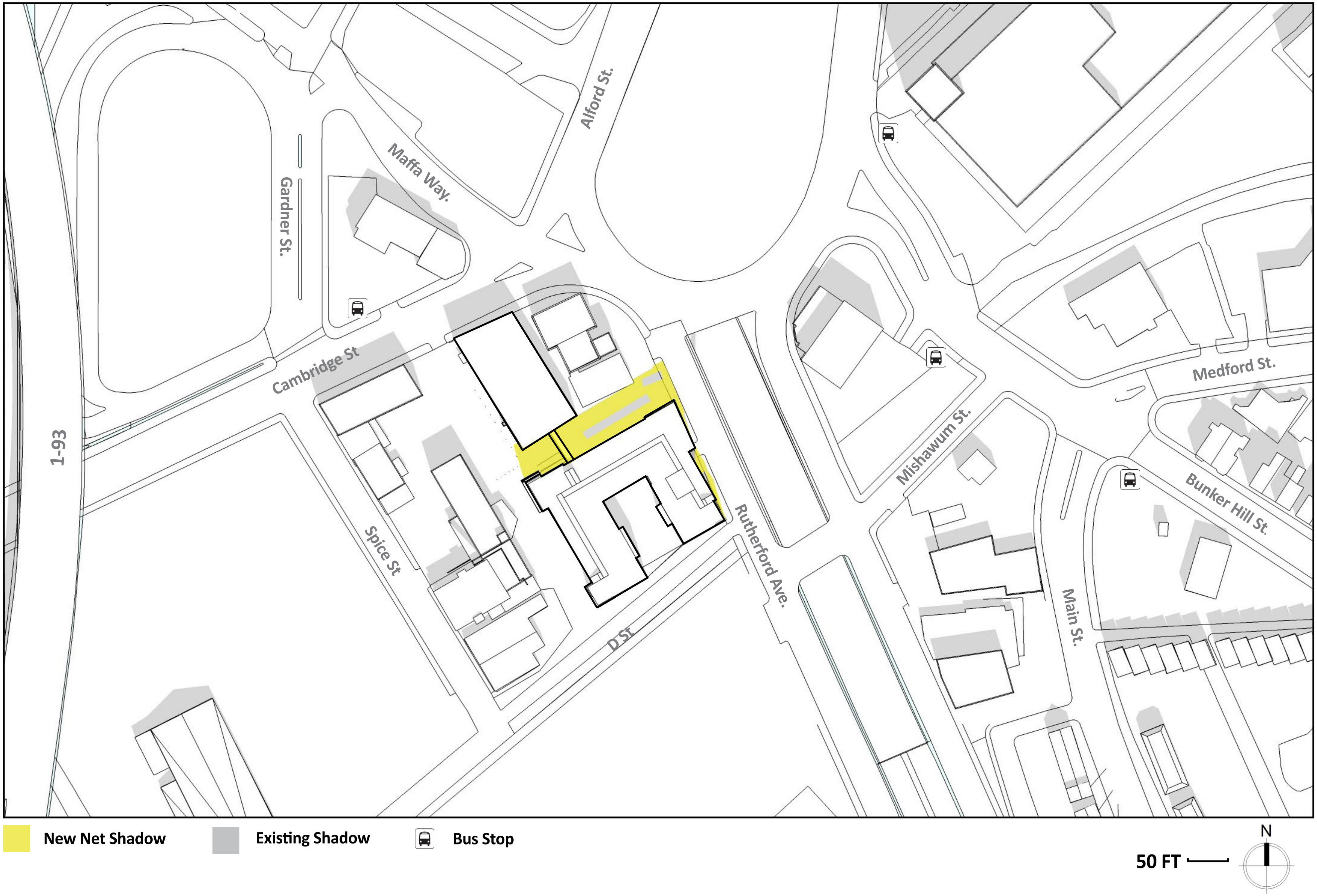


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-1

Sun Study: March 21 (Vernal Equinox) 9:00 AM

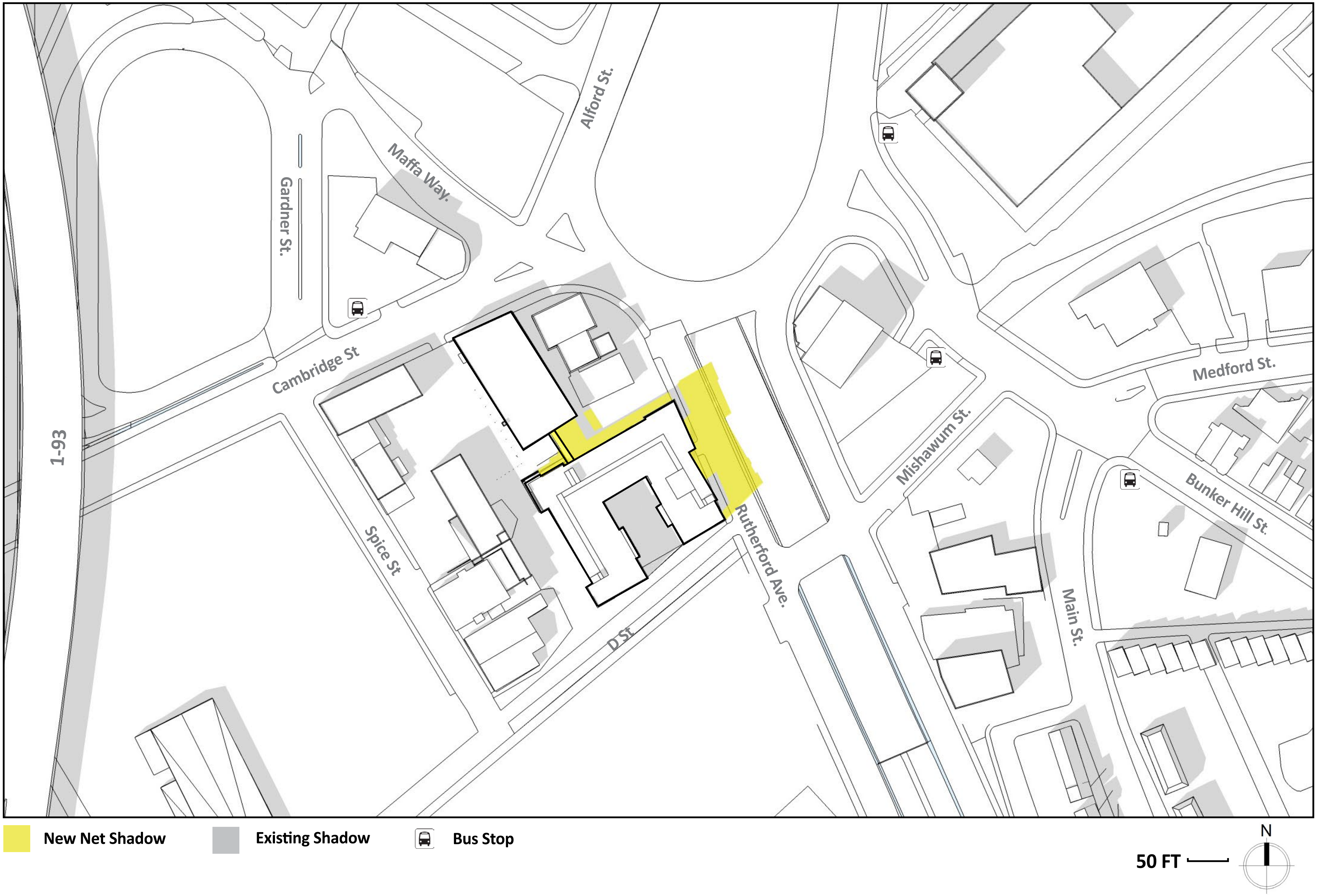


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-2

Sun Study: March 21 (Vernal Equinox) 12:00 PM

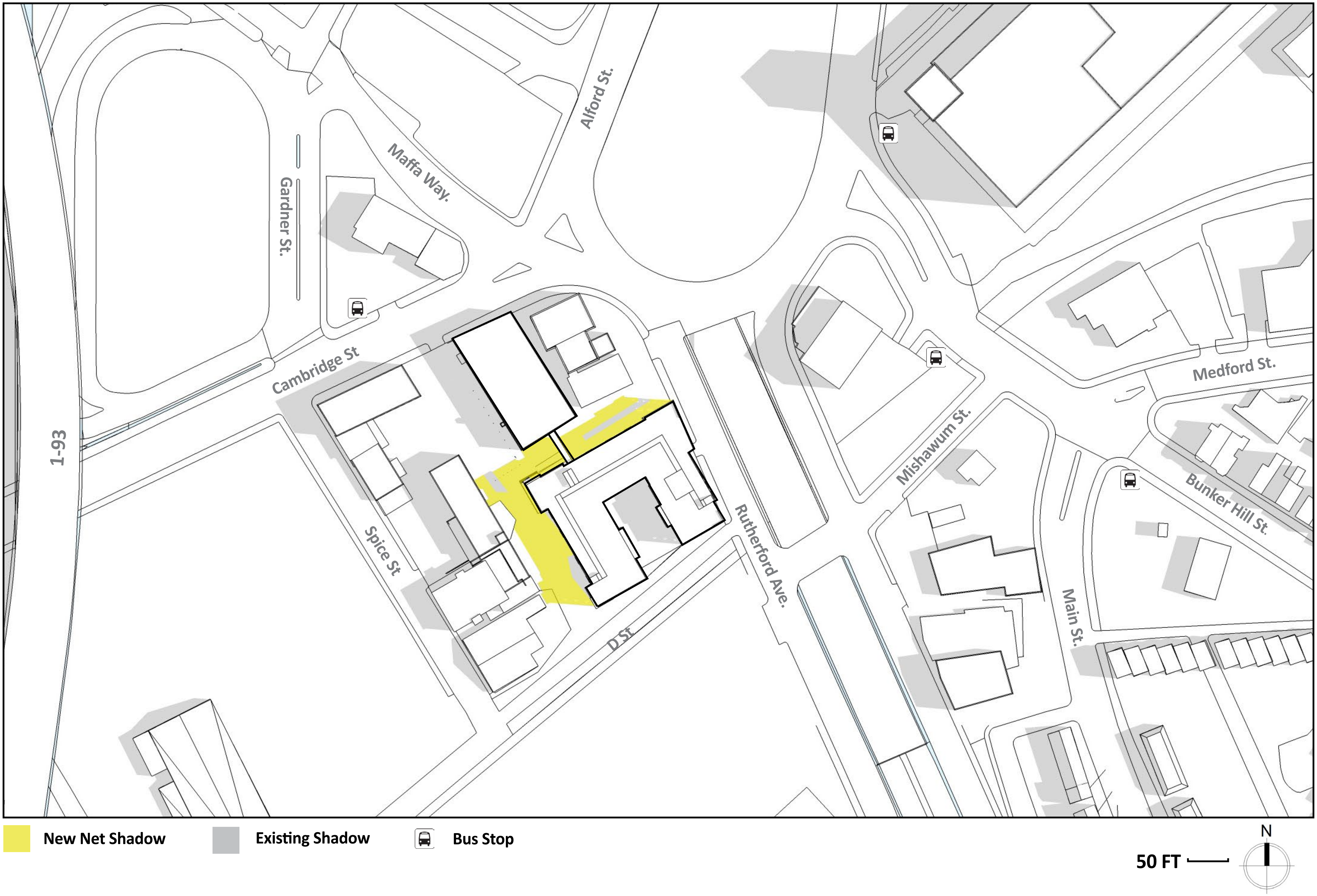


32 Cambridge Street   Boston, MA

ICON ARCHITECTURE

Figure 3.2-3

Sun Study: March 21 (Vernal Equinox) 3:00 PM

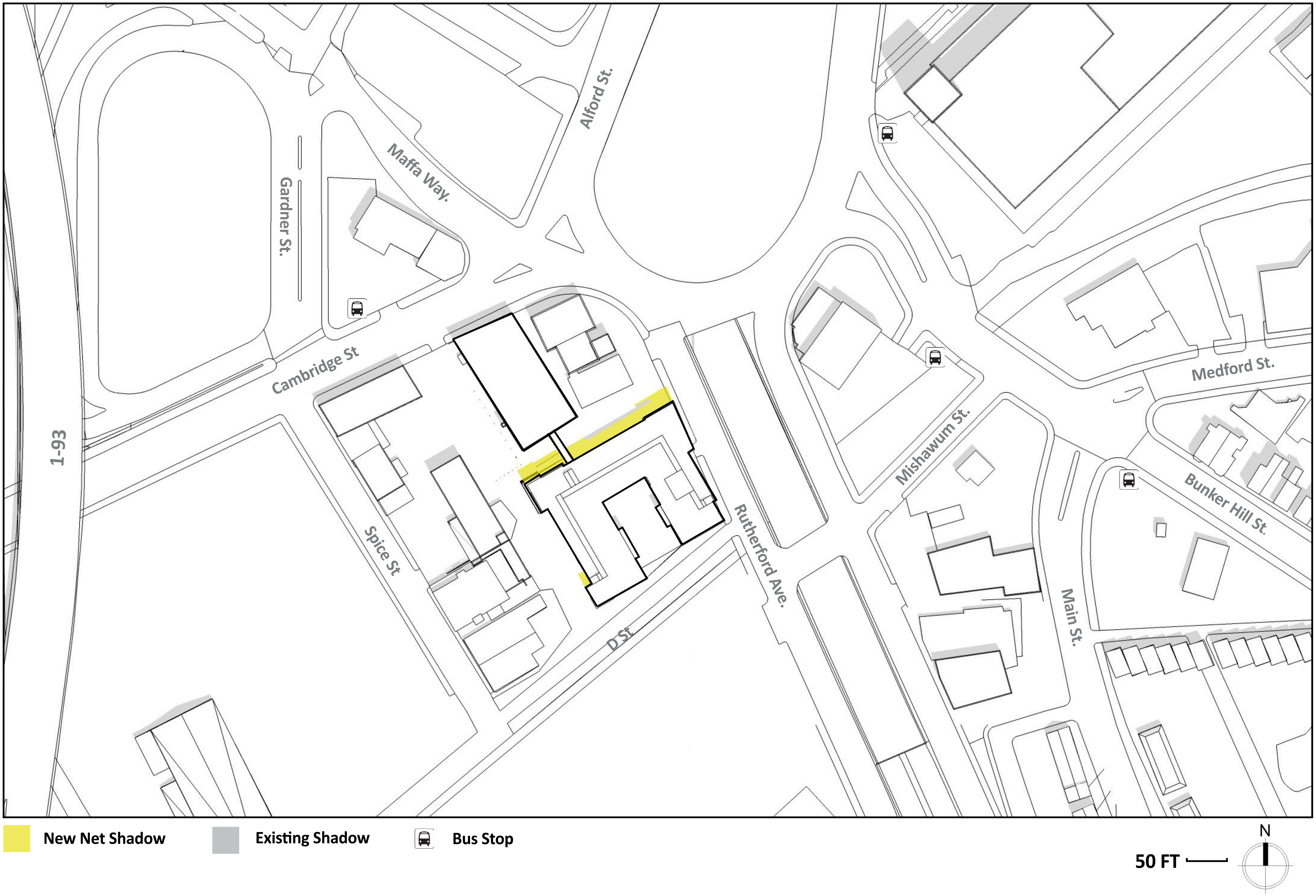


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-4

Sun Study: June 21 (Summer Solstice) 9:00 AM

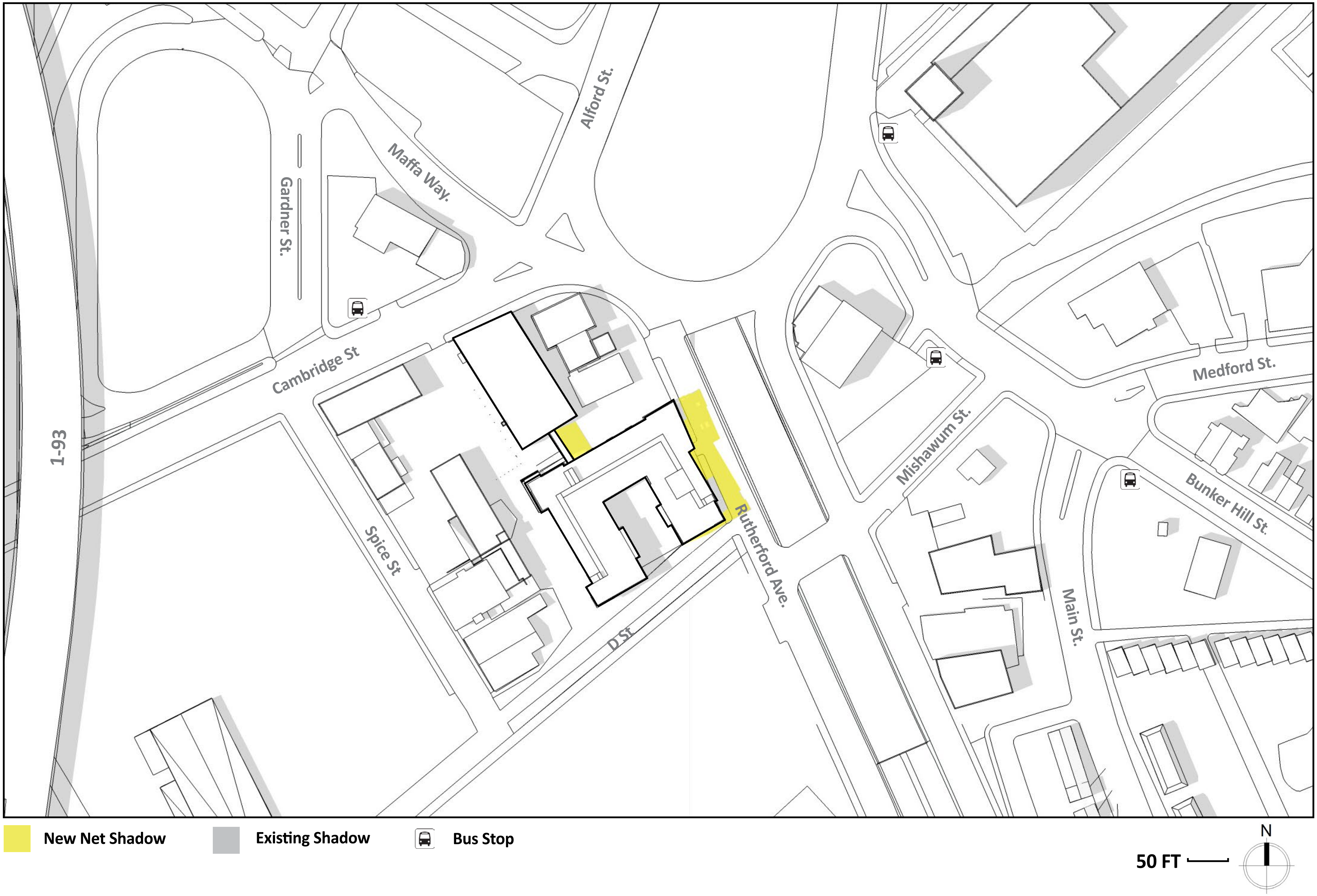


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-5

Sun Study: June 21 (Summer Solstice) 12:00 PM

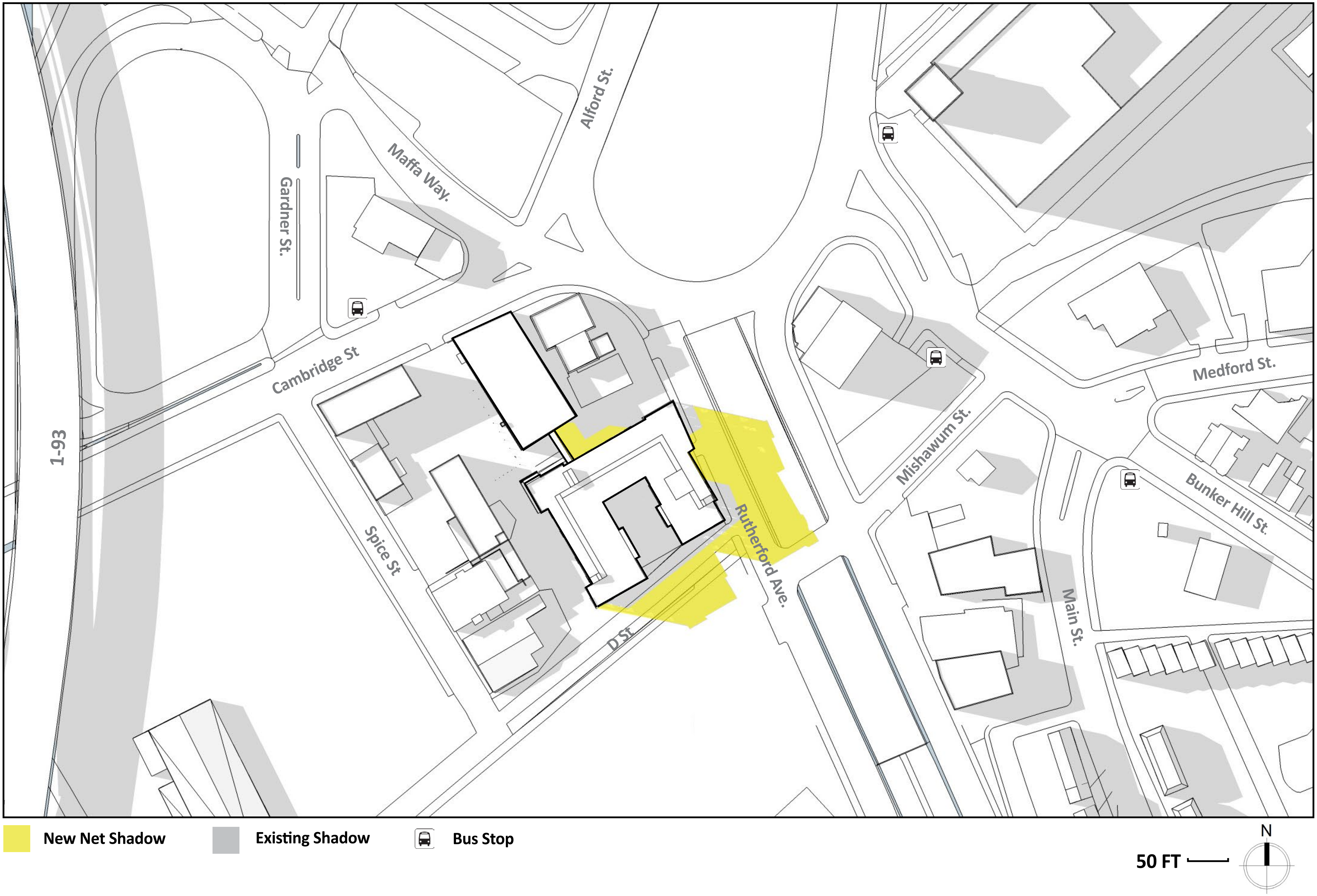


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-6

Sun Study: June 21 (Summer Solstice) 3:00 PM

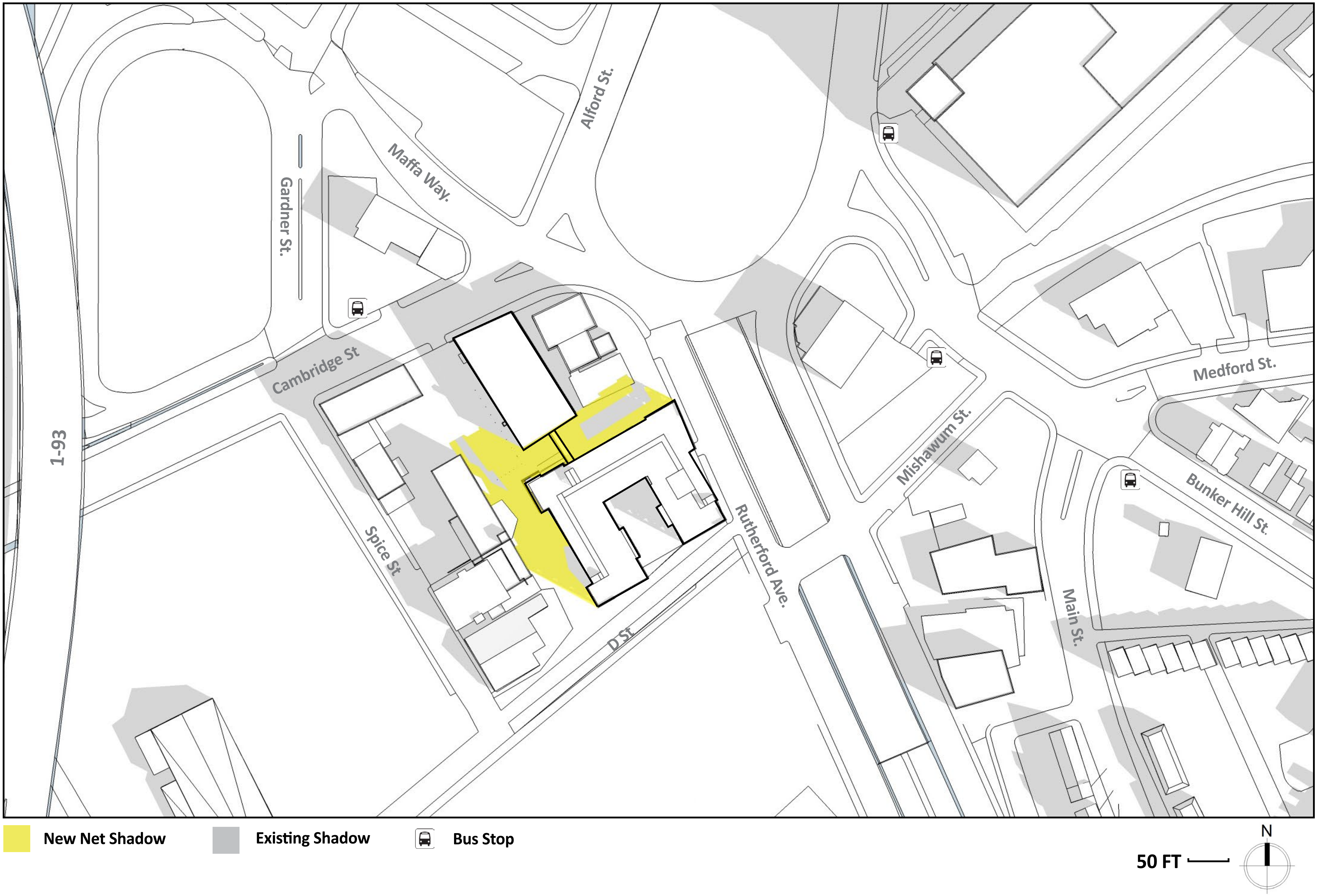


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-7

Sun Study: June 21 (Summer Solstice) 6:00 PM

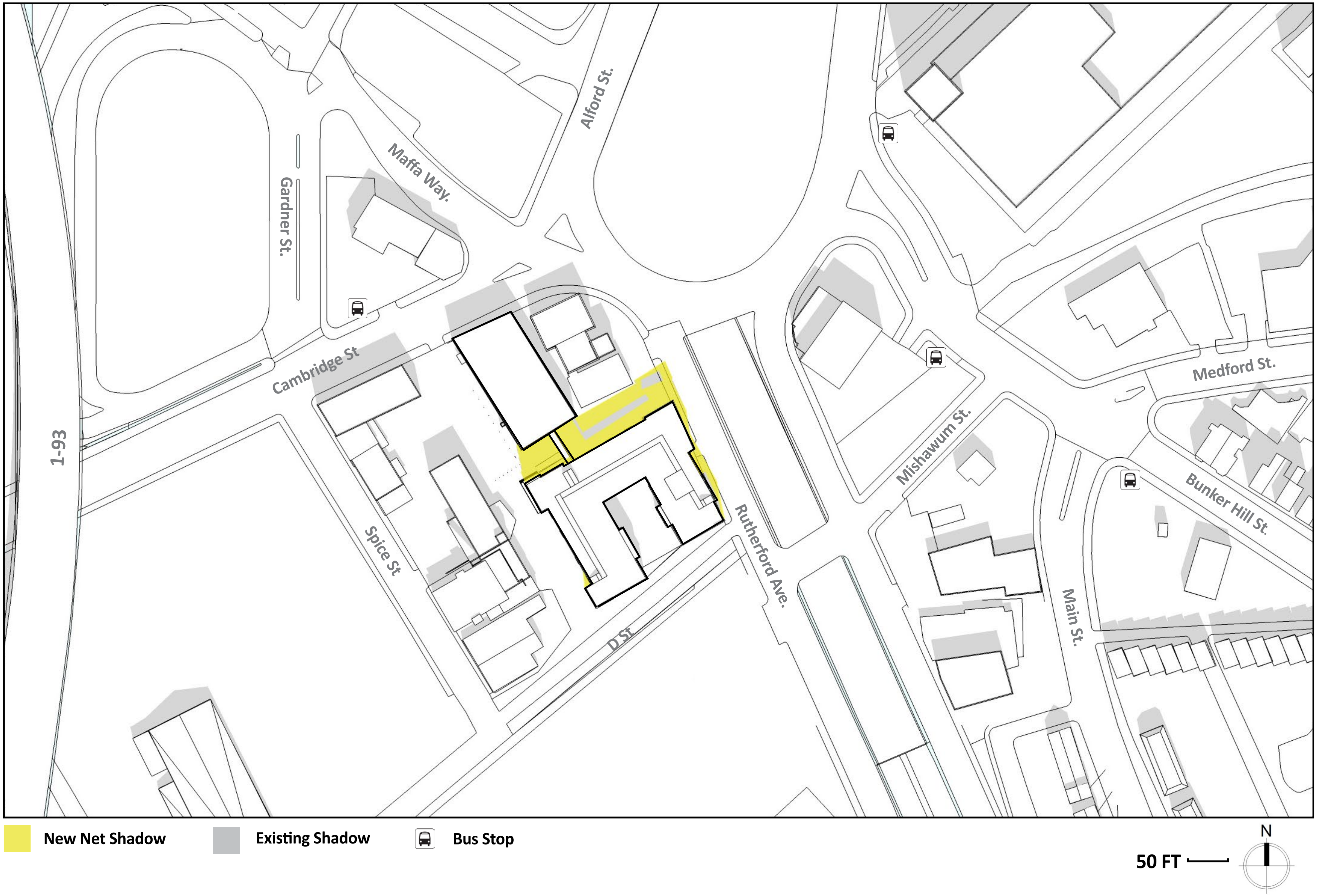


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-8

Sun Study: September 21 (Autumnal Equinox) 9:00 AM

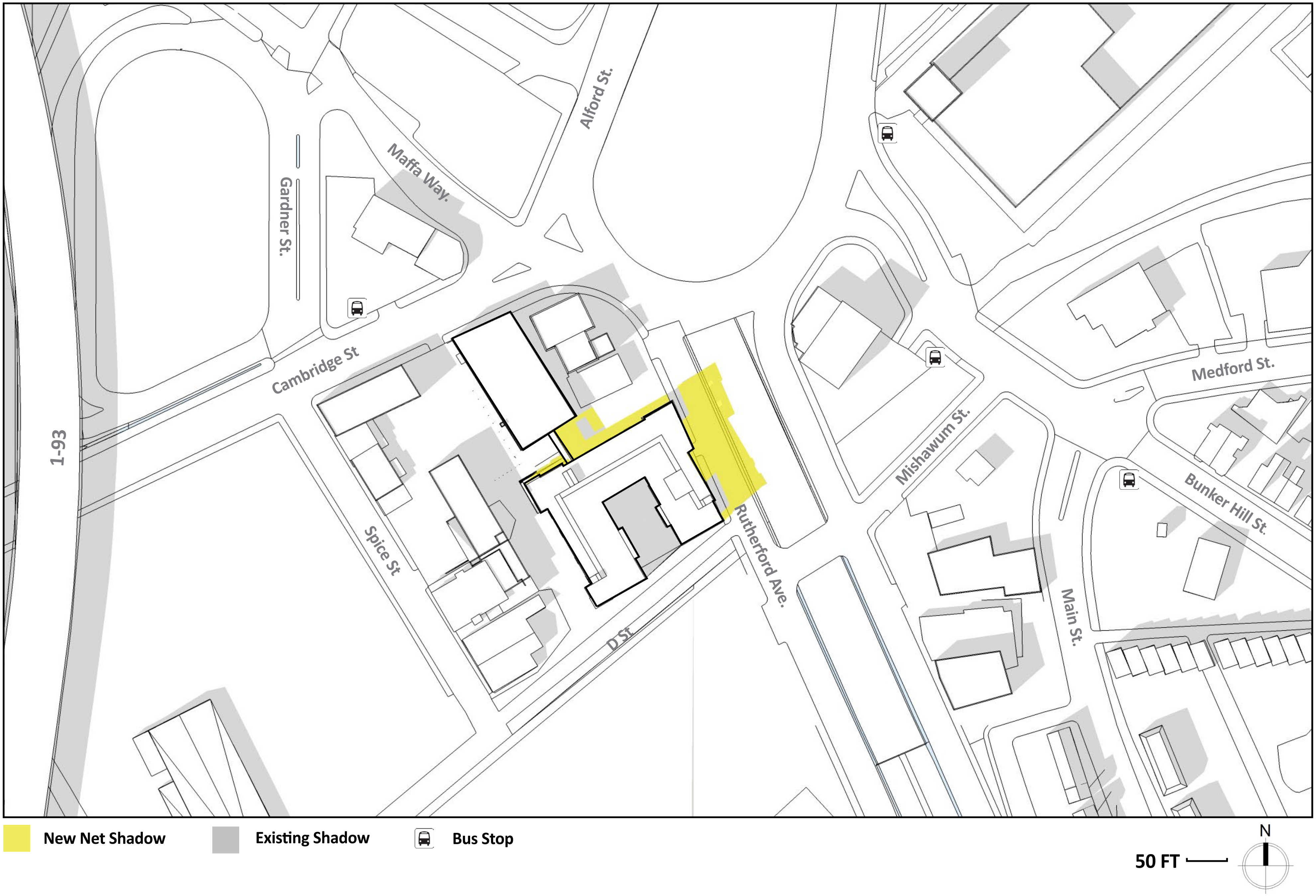


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-9

Sun Study: September 21 (Autumnal Equinox) 12:00 PM

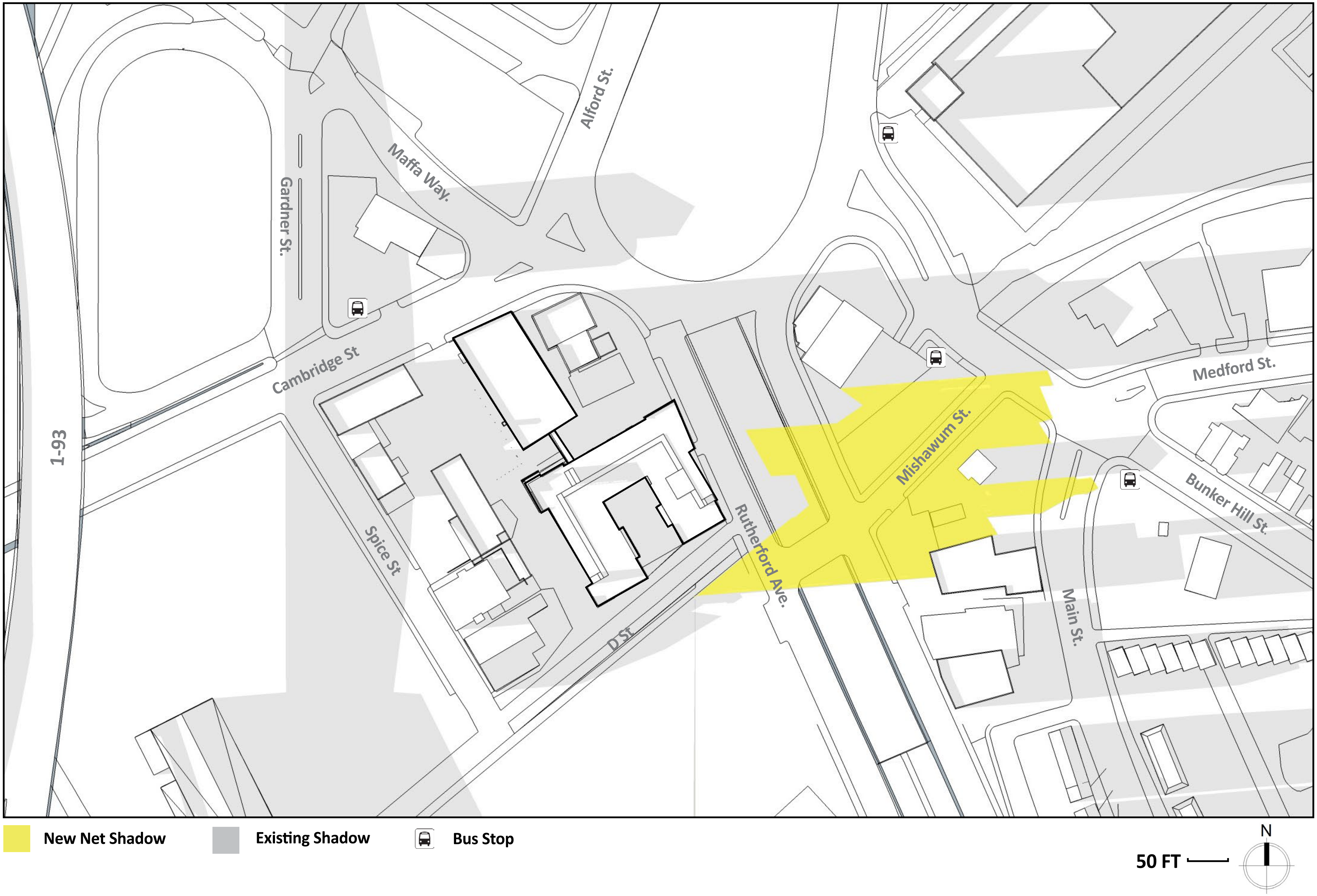


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-10

Sun Study: September 21 (Autumnal Equinox) 3:00 PM

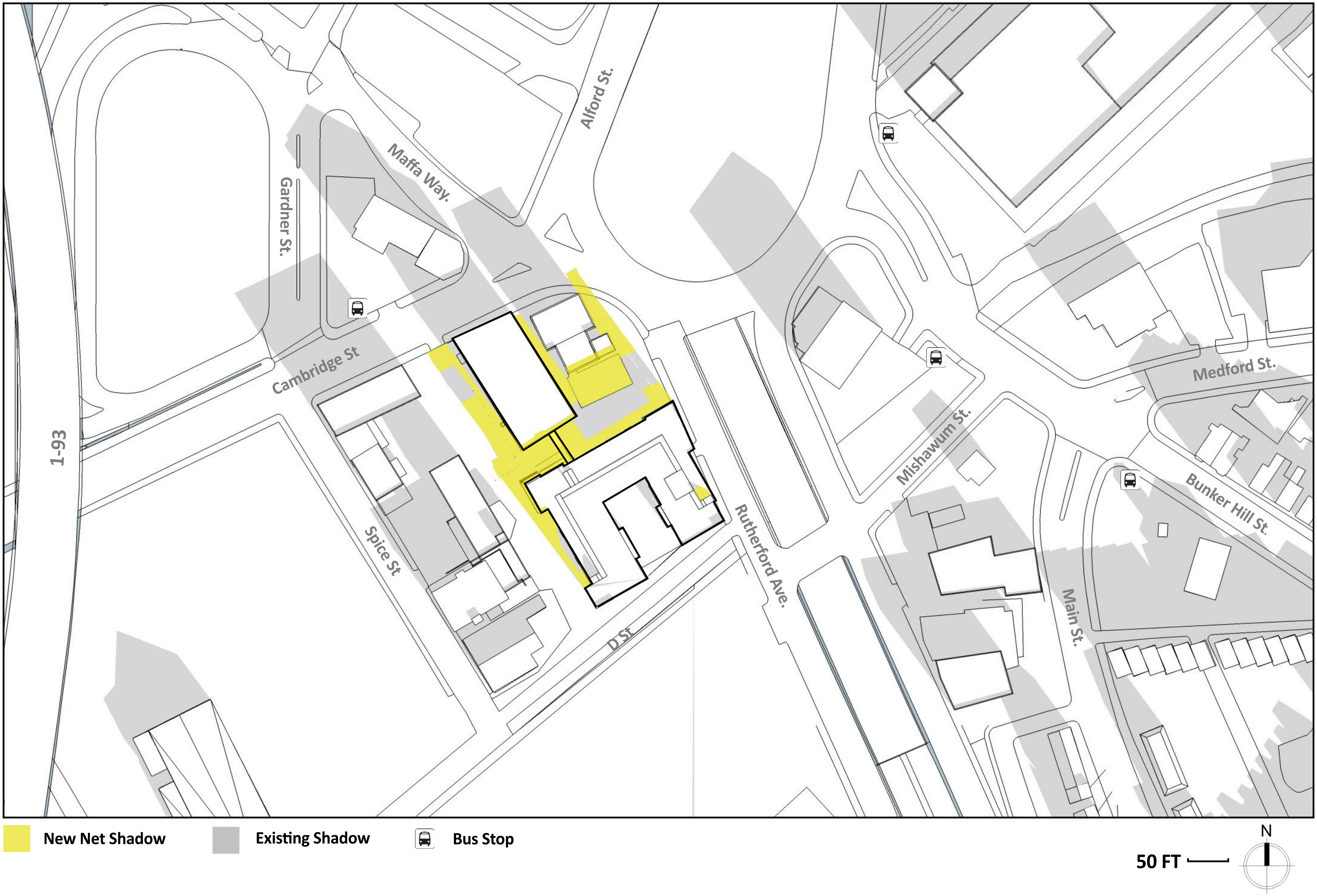


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-11

Sun Study: September 21 (Autumnal Equinox) 6:00 PM

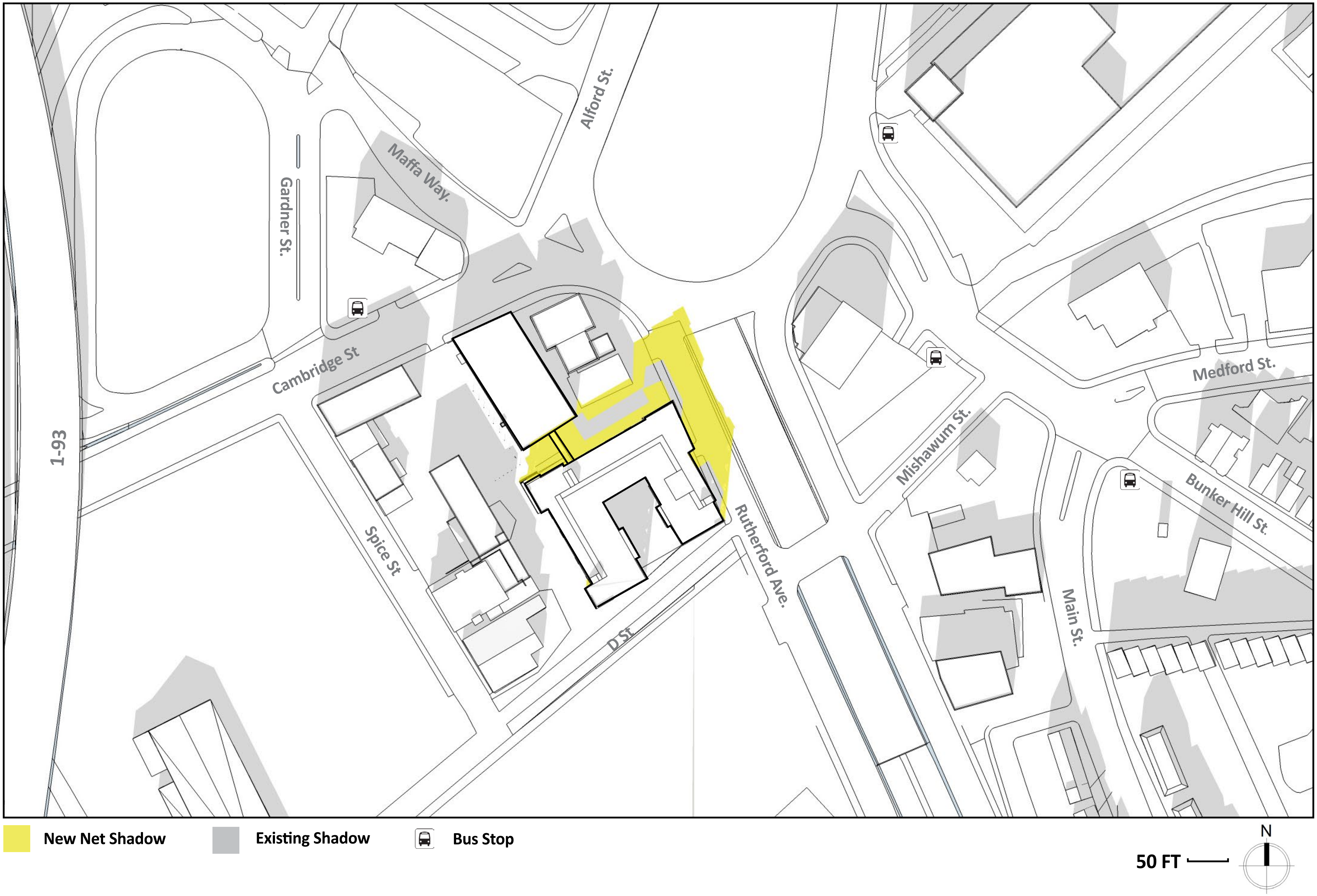


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-12

Sun Study: December 21 (Winter Solstice) 9:00 AM

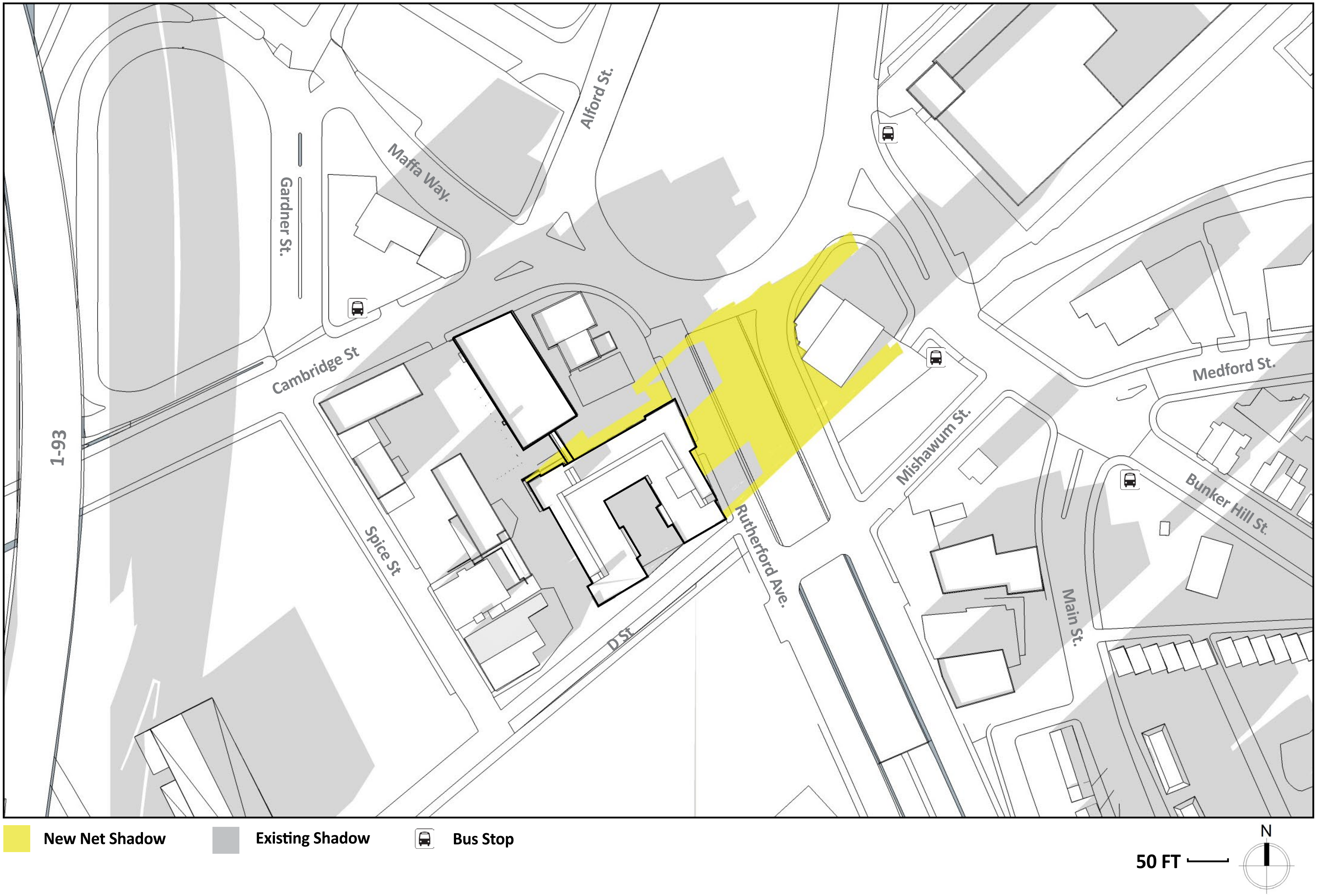


32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-13

Sun Study: December 21 (Winter Solstice) 12:00 PM



32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 3.2-14
Sun Study: December 21 (Winter Solstice) 3:00 PM

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. on the summer solstice, new shadow will be cast to the west and fall across the Project site and parcels immediately to the west and north of the site.

At 12:00 p.m., new shadow will be cast to the north and fall across a small portions of the Project site and a minor portion of the adjacent sidewalk along Rutherford Avenue.

At 3:00 p.m., new shadow will be cast to the northeast and fall across a small portion of the Project site and portions of Rutherford Avenue and its western sidewalk.

At 6:00 p.m., new shadow will be cast to the east across a portion of the Project site, D Street, Rutherford Avenue and a portion of Rutherford Avenue's western sidewalk.

No new shadow will be cast onto public open spaces or bus stops in the surrounding area during the summer solstice at the time periods studied.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. on the summer solstice, new shadow will be cast to the northwest and fall across the Project site and parcels immediately to the west and north of the site.

At 12:00 p.m., new shadow will be cast to the north and fall across the Project site, a portion of the parcel to the north of the site, and portions of Rutherford Avenue's western sidewalk.

At 3:00 p.m., new shadow will be cast to the northeast and fall across a portion of the Project site, Rutherford Avenue and portions of its western sidewalk.

At 6:00 p.m., new shadow will be cast to the east across Rutherford Avenue and its sidewalks, Mishawum Street and its sidewalks, as well as portions of Main Street and its sidewalks.

No new shadow will be cast onto public open spaces or bus stops in the surrounding area during the summer solstice at the time periods studied.

3.2.5 Winter Solstice (December 21)

At 9:00 a.m. on the summer solstice, new shadow will be cast to the northwest and fall across the Project site, the parcel immediately to the north of the site, and a minor portion of Cambridge Street and its southern sidewalk.

At 12:00 p.m., new shadow will be cast to the north and fall across the Project site, a portion of the parcel to the north of the site, and portions of Rutherford Avenue and its western sidewalk.

At 3:00 p.m., new shadow will be cast to the northeast and fall across a portion of the Project site, Rutherford Avenue and its sidewalks.

No new shadow will be cast onto public open spaces or bus stops in the surrounding area during the summer solstice at the time periods studied.

3.2.6 Conclusion

New shadow from the Project will generally be limited to the Project site, surrounding parcels to the north and west of the site, and Rutherford Avenue, with shadows extending further east during the later afternoon hours in September. No new shadow will be cast across public open spaces or bus stops in the surrounding area.

3.3 Daylight

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 daylight analysis for the Project considers the existing and proposed conditions, as well as typical daylight obstruction values of the surrounding area.

The building on the northern portion of the site will only be renovated, and therefore, daylight obstruction will not change. The southern portion of the site will include a new building that is taller than the existing building, and therefore daylight obstruction will increase; however, the daylight obstruction value will be similar to other urban areas in Boston.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. 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

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

viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

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

Three viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions. Since the building on the northern portion of the Project site will remain, the daylight obstruction value will not change from Cambridge Street. Four area context points were considered to provide a basis of comparison to existing build conditions in the surrounding area. It should be noted that large lots in the surrounding area are used for surface parking or are vacant, and therefore any new building will have a higher daylight obstruction value than much of the surrounding, underdeveloped 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 Rutherford Avenue looking west toward the Project site
- **Viewpoint 2**: View from D Street looking north toward the Project site
- **Viewpoint 3**: View from Cambridge Street looking south toward the Project site
- **Area Context Viewpoint AC1**: View from Rutherford Avenue looking at 500 Rutherford Avenue
- **Area Context Viewpoint AC2**: View from Rutherford Avenue looking at 547 Rutherford Avenue
- **Area Context Viewpoint AC3**: View from Cambridge Street looking at 40 Cambridge Street
- **Area Context Viewpoint AC4**: View from Cambridge Street looking at 2-20 Cambridge Street

3.3.3 Results

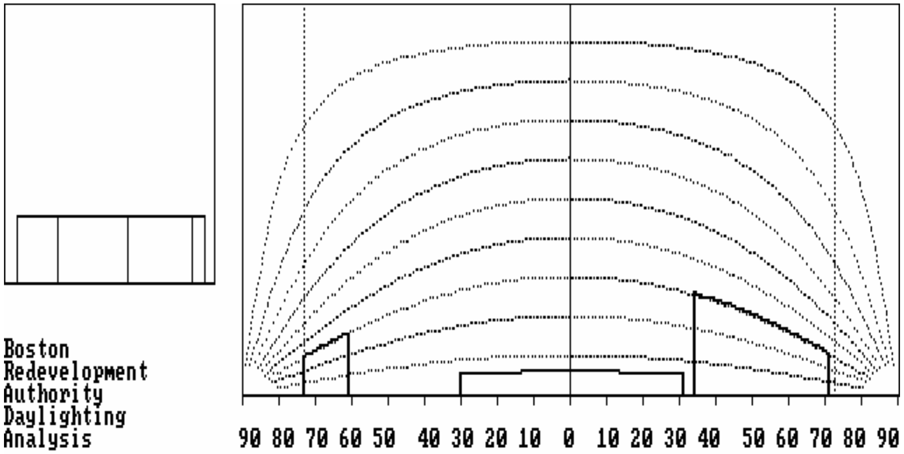
The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-4 illustrate the BRADA results for each analysis.

32 Cambridge Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

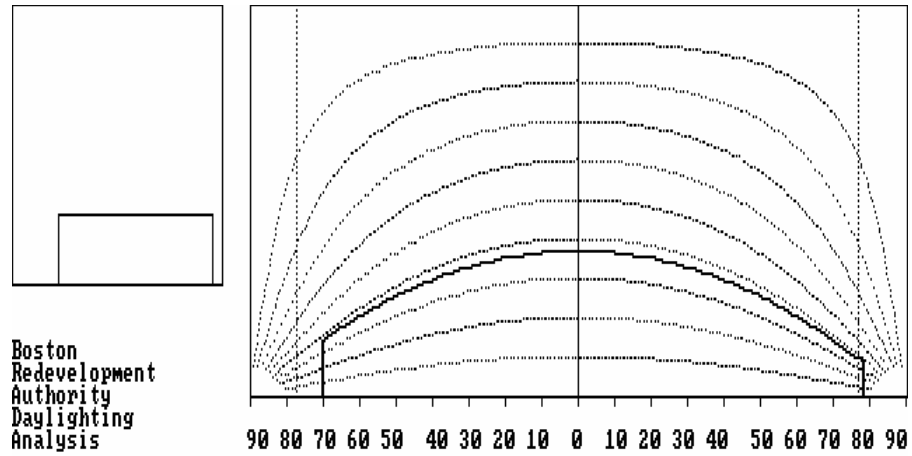
Figure 3.3-1

Viewpoint and Area Context Locations



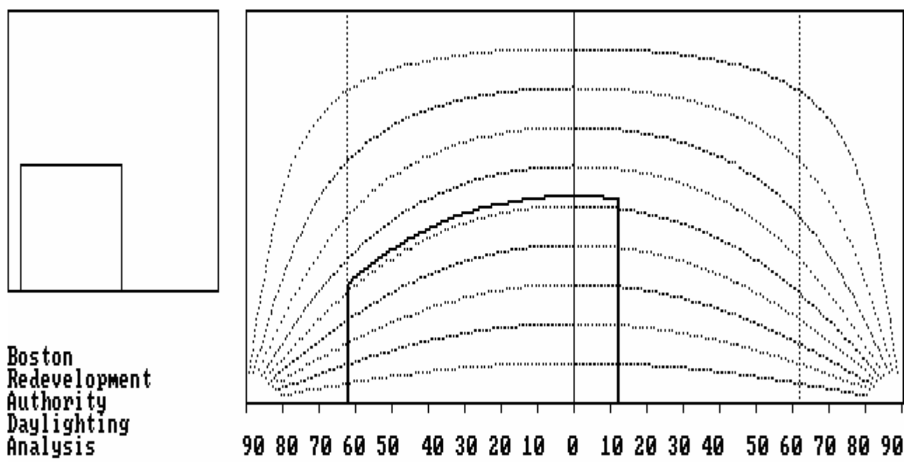
Obstruction of daylight by the building is 16.0 %

Viewpoint 1: View from Rutherford Avenue facing west toward the Project Site



Obstruction of daylight by the building is 35.7 %

Viewpoint 2: View from D Street Avenue facing north toward the Project Site

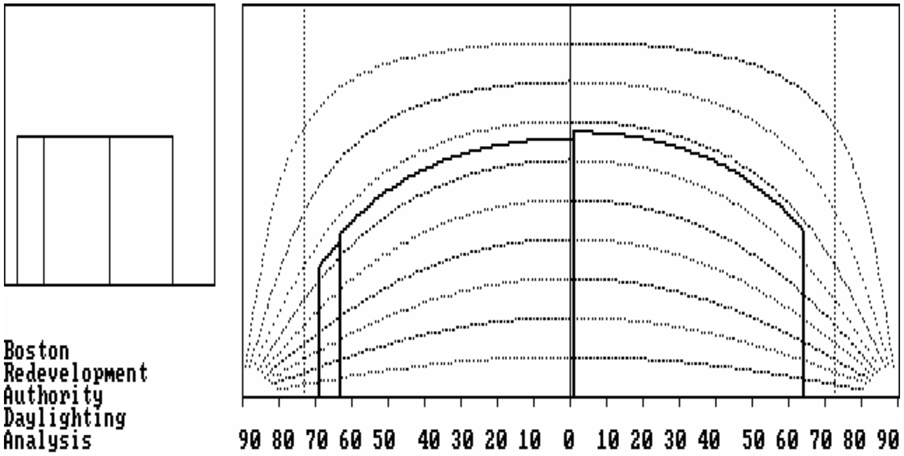


Obstruction of daylight by the building is 31.7 %

Viewpoint 3: View from Cambridge Street facing south toward the Project Site

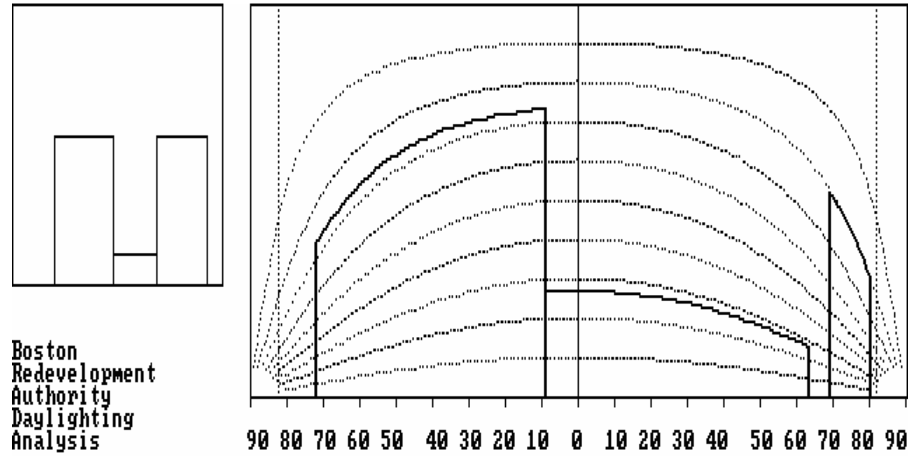
Figure 3.3-2

Daylight Analysis: Existing Conditions



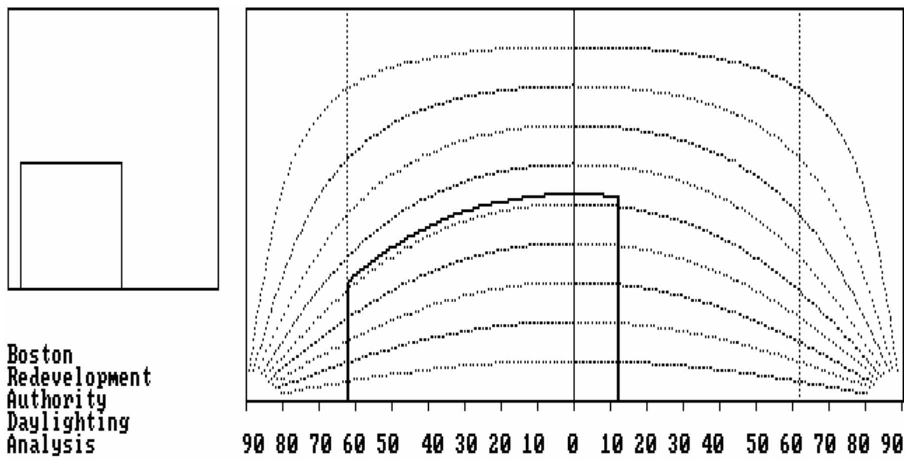
Obstruction of daylight by the building is 61.3 %

Viewpoint 1: View from Rutherford Avenue facing west toward the Project Site



Obstruction of daylight by the building is 40.7 %

Viewpoint 2: View from D Street Avenue facing north toward the Project Site

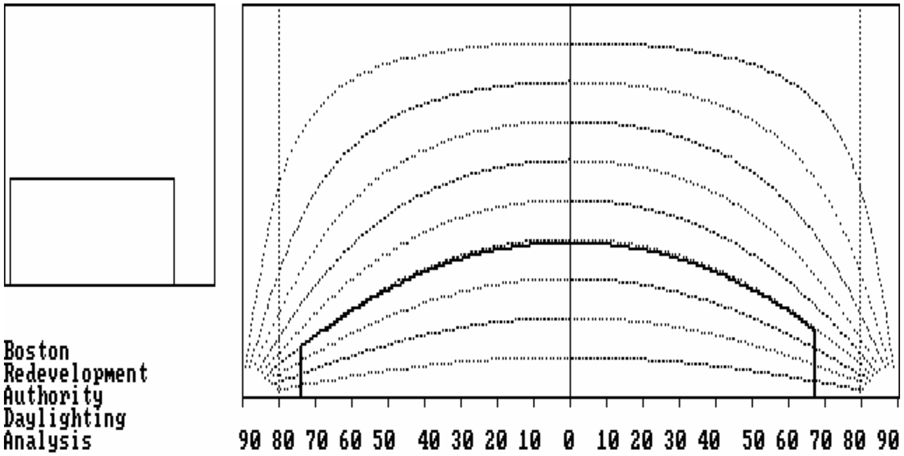


Obstruction of daylight by the building is 31.7 %

Viewpoint 3: View from Cambridge Street facing south toward the Project Site

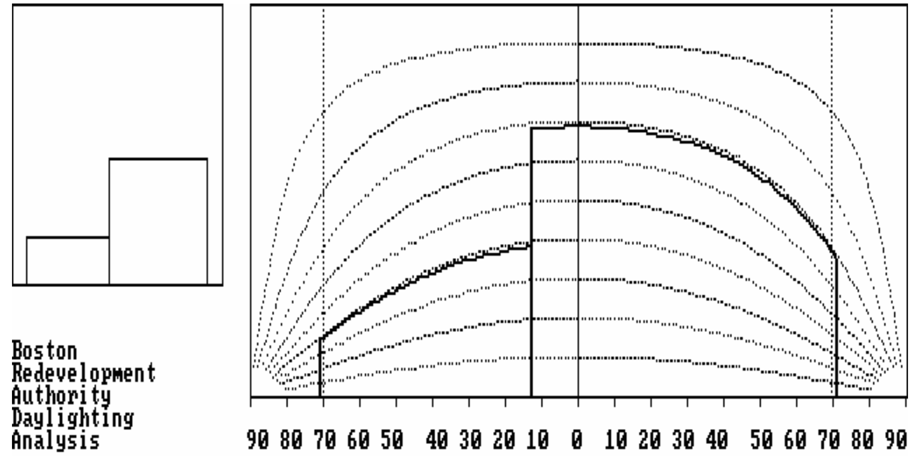
Figure 3.3-3

Daylight Analysis: Proposed Conditions



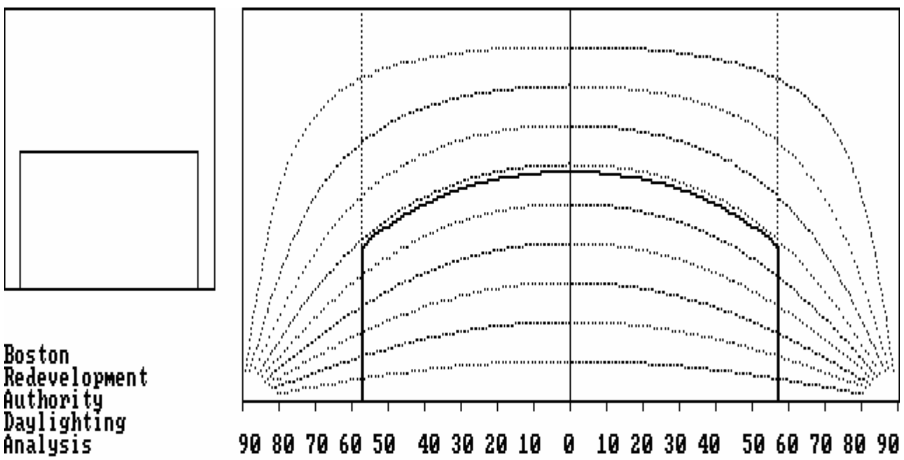
Obstruction of daylight by the building is 35.5 %

AC1: View from Rutherford Avenue looking at 500 Rutherford Avenue



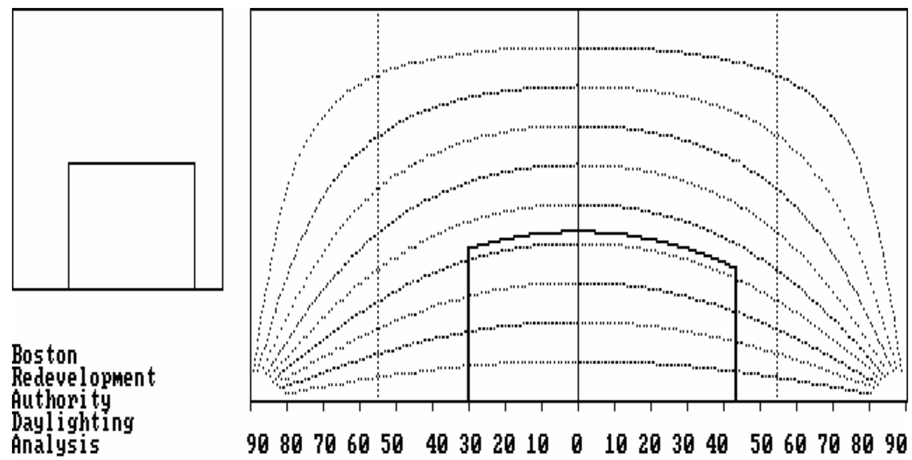
Obstruction of daylight by the building is 57.2 %

AC2: View from Rutherford Avenue looking at 547 Rutherford Avenue



Obstruction of daylight by the building is 58.3 %

AC3: View from Cambridge Street looking at 40 Cambridge Street



Obstruction of daylight by the building is 29.1 %

AC4: View from Cambridge Street looking at 2-20 Cambridge Street

Figure 3.3-4

Daylight Analysis: Area Context

Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from Rutherford Avenue facing west toward the Project site	16.0%	61.3%
Viewpoint 2	View from D Street facing north toward the Project site	35.7%	40.7%
Viewpoint 3	View from Cambridge Street facing south toward the Project site	31.7%	31.7%
Area Context Points			
AC1	View from Rutherford Avenue looking at 500 Rutherford Avenue	35.5%	
AC2	View from Rutherford Avenue looking at 547 Rutherford Avenue	57.2%	
AC3	View from Cambridge Street looking at 40 Cambridge Street	58.3%	
AC4	View from Cambridge Street looking at 2-20 Cambridge Street	29.1%	

Rutherford Avenue – Viewpoint 1

Rutherford Avenue runs along the eastern side of the Project site. Viewpoint 1 was taken from the center of Rutherford Avenue looking west toward the Project site. The site has an existing daylight obstruction of 16.0% due to large space on the east side of the site. The development of the Project will increase the daylight obstruction value to 61.3%. While this is an increase over existing conditions, the daylight obstruction value is similar to the Area Context viewpoints, and consistent with other urban areas in Boston.

D Street – Viewpoint 2

D Street runs along the south side of the Project site. Viewpoint 2 was taken from the center of D Street looking north toward the Project site. The existing site has a daylight obstruction value of 35.7%. The development of the Project will increase the daylight obstruction value to 40.7%. While this is an increase over existing conditions, the daylight obstruction value is consistent with the Area Context viewpoints.

Cambridge Street – Viewpoint 3

Cambridge Street runs along the north side of the Project site. Viewpoint 3 was taken from the center of Cambridge Street looking south toward the Project site. The existing site has a daylight obstruction value of 31.7%. Since the Project will only renovate the building on this side of the site, the daylight obstruction value will continue to be 31.7%.

Area Context Viewpoints

The Project site is located in Charlestown in an area with a mix of commercial, industrial, and residential properties, as well as significant areas used for surface parking. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the four Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 29.1% to 58.3%. Daylight obstruction values for the Project are similar to the Area Context values, and consistent with other urban areas in Boston.

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 the daylight obstruction values within the surrounding area and typical of other urban areas in Boston.

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

3.5.1 Introduction

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. Any new or replaced stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program (ERP).

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, Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for these 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.

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 are applied when comparing to the modeling results for a Project.

The NAAQS also reflect various durations of exposure. The 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.

The standards were developed by EPA to protect the human health against adverse health effects with a margin of safety.

Table 3.5-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-hour [7]	188	None
SO_2	Annual [1,8]	80	None
	24-hour [2,8]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	196	None
PM-10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM-2.5	Annual [4]	12	15
	24-hour [5]	35	Same
CO	8-hour [2]	10,000	Same
	1-hour [2]	40,000	Same
Ozone	8-hour [3]	147	Same
Pb	3-month [1]	1.5	Same

Notes:
[1] Not to be exceeded.
[2] Not to be exceeded more than once per year.
[3] Not to be exceeded more than an average of one day per year over three years.
[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from three successive years.
[5] Not to be exceeded based on the 98th percentile of data collection.
[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00.
[7] Not to be exceeded. Based on the three-year average of the 98th (NO_2) or 99th (SO_2) percentile of the daily maximum one-hour concentrations.
[8]The Annual and 24-hour SO_2 standards were revoked on June 2, 2010. However, these standards remain in effect until one year after an area is designated for the one-hour standard, unless currently in nonattainment.
Source: 40 CFR 50 and 310 CMR 6.00

3.5.1.2 Background Concentrations

MassDEP guidance directs project proponents to use the three most recent years of available background air quality monitoring data from within 10 km of a project site. Background concentrations were determined from the closest available monitoring stations to the proposed development from the most recent air quality monitor data reported by the MassDEP as available in its Annual Air Quality Reports for 2011 to 2013. The closest monitor is located at One City Square but only samples PM-10 and PM-2.5. The Harrison Avenue monitor samples for ozone and lead. The Kenmore Square monitor samples for the remaining criteria pollutants. All monitors are located in Boston, and consistent with MassDEP guidance, are within 10 km of the Project site.

The Clean Air Act allows for one exceedance per year of the CO and SO2 short-term NAAQS per year. The second highest concentration 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. The one-hour NO_2 standard is attained when the three-year average of the 98th percentile of the maximum daily one-hour concentrations do not exceed 188 $\mu g/m^3$.

A summary of the background air quality concentrations is presented in Table 3.5-2.

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

POLL	AVG TIME	Form	2011	2012	2013	Back-ground Conc. ($\mu g/m^3$)	Std ($\mu g/m^3$)	Location
SO_2 (1)(7)(8)	1-Hr	99^{th} %	50.6	34.6	31.4	50.6	196	Kenmore Sq., Boston
	3-Hr	H2H	64.5	36.2	41.9	64.5	1300	Kenmore Sq., Boston
	24-Hr	H2H	24.6	14.1	15.7	24.6	365	Kenmore Sq., Boston
	Ann.	H	6.2	4.9	2.6	6.2	80	Kenmore Sq., Boston
PM-10	24-Hr	H2H	34.0	37.0	40.0	40.0	150	One City Sq., Boston
	Ann.	H	15.9	16.8	18.0	18.0	50	One City Sq., Boston
PM-2.5	24-Hr (4)	98^{th} %	21.3	22.6	18.0	20.6	35	One City Sq., Boston
	Ann. (5)	H	8.6	8.8	7.8	8.4	12	One City Sq., Boston
NO_2 (3)	1-Hr (6)	98^{th} %	99.5	92.1	90.2	93.9	188	Kenmore Sq., Boston
	Ann.	H	38.3	35.9	33.4	38.3	100	Kenmore Sq., Boston

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

POLL	AVG TIME	Form	2011	2012	2013	Back-ground Conc. ($\mu g/m^3$)	Std ($\mu g/m^3$)	Location
CO [2]	1-Hr	H2H	1710.0	1482.0	1482.0	1710.0	40000	Kenmore Sq., Boston
	8-Hr	H2H	1368.0	1026.0	1026.0	1368.0	10000	Kenmore Sq., Boston
O_3	8-Hr [9]	H4H	117.8	153.1	115.8	128.904	147	Harrison Ave, Boston
Pb	3-Mo	H	0.017	0.014	0.007	0.017	0.15	Harrison Ave, Boston

From 2010-2013 MassDEP Annual Data Summaries

1 SO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 2.62 $\mu g/m^3$.

2 CO reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1140 $\mu g/m^3$.

3 NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 1.88 $\mu g/m^3$.

4 Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.

5 Background level for annual PM-2.5 is the average for three years.

6 Background level for one-hour NO_2 is the average of the 98th percentile of the daily maximum one-hour values a over three years.

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

8 The 2011 - 2013 SO_2 three-hour value is no longer reported by MassDEP. One-hour H2H used instead. 2013 24-hour value also no longer reported. Obtained from EPA AirData website.

9 Annual fourth-highest daily maximum eight-hour concentration, averaged over three years

Air quality is generally good in the area, with all of the ambient concentrations well below their respective NAAQS. For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.5 ppm (1,710 $\mu g/m^3$) for one-hour and 1.2 ppm (1,368 $\mu g/m^3$) for eight-hour CO.

3.5.2 Methodology

3.5.2.1 Microscale Analysis

The BRA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection (including garage entrances/exits) where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location. The microscale analysis involves modeling of 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 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in U.S. EPA's intersection modeling guidance.[2]

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 (2014) and future year (2019) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections.

Existing background values of CO at the nearest monitor location at Kenmore Square were obtained from MassDEP. CAL3QHC results were then added to background CO values of 1.5 ppm (one-hour) and 1.2 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).

The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[3]

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

Intersection Selection

One signalized intersection included in the traffic study meets the above conditions (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. Three intersections met the criteria for inclusion in the microscale analysis:

- Cambridge Street and the I-93 Northbound Ramp;
- Cambridge Street and Spice Street; and

[2] U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections; EPA-454/R-92-005, November 1992.
[3] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005.

- Cambridge Street, Alford Street, Maffa Way and Rutherford Avenue (Sullivan Square).

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2014 existing conditions, and the 2019 No Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

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 (2014) and build year (2019) are provided by MassDEP.

All link types for the modeled intersection were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (SYNCHRO) reports. A speed of 30 mph is used for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[4]

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 165 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 Figure 3.5-1 through Figure 3.5-3.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[5], 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 intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected.[6]

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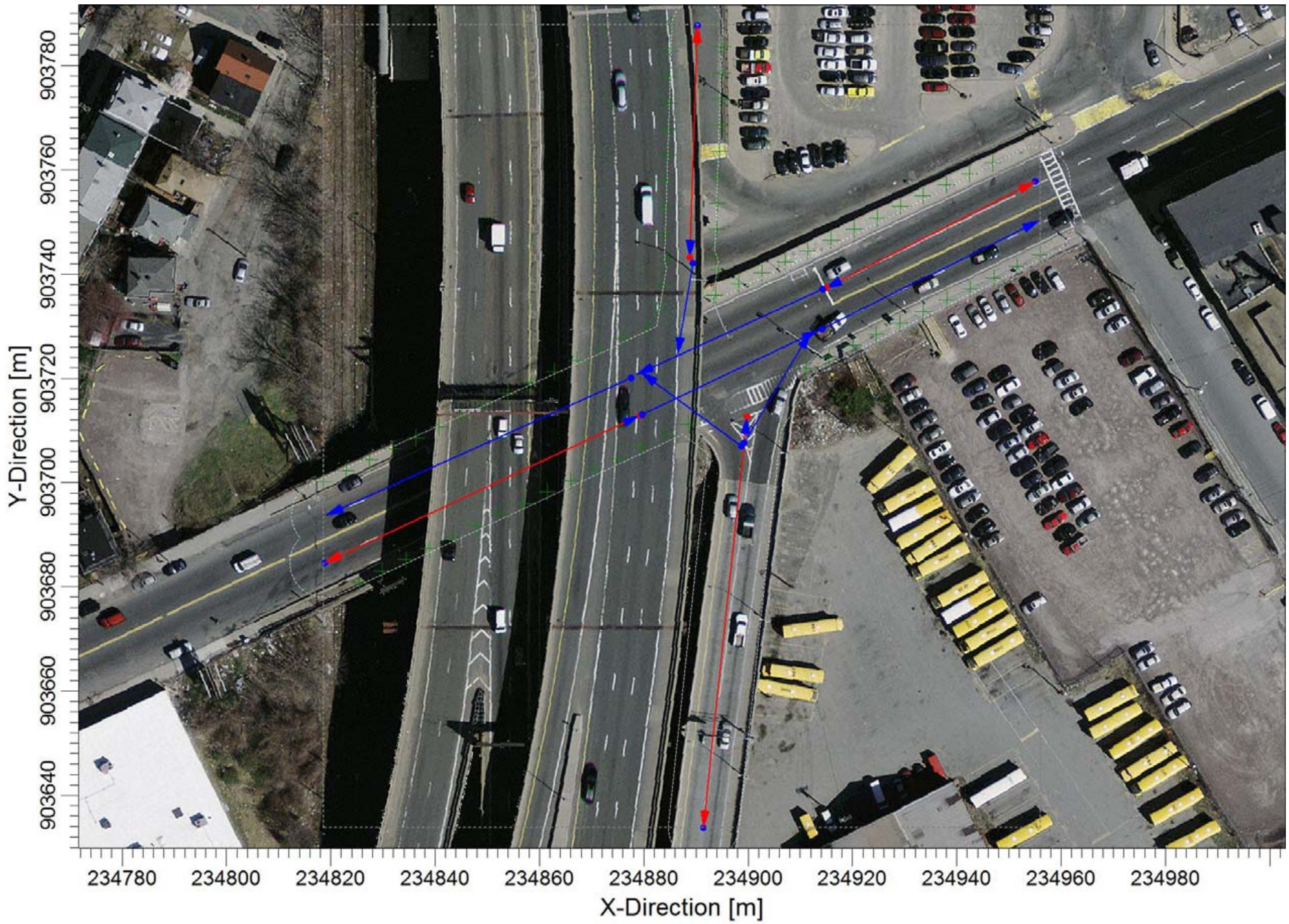
4 U.S. EPA, 2010. Using MOVES in Project-Level Carbon Monoxide Analyses. EPA-420-B-10-041.

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

6 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.



32 Cambridge Street **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 3.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Cambridge St & I-93 NB Ramp.

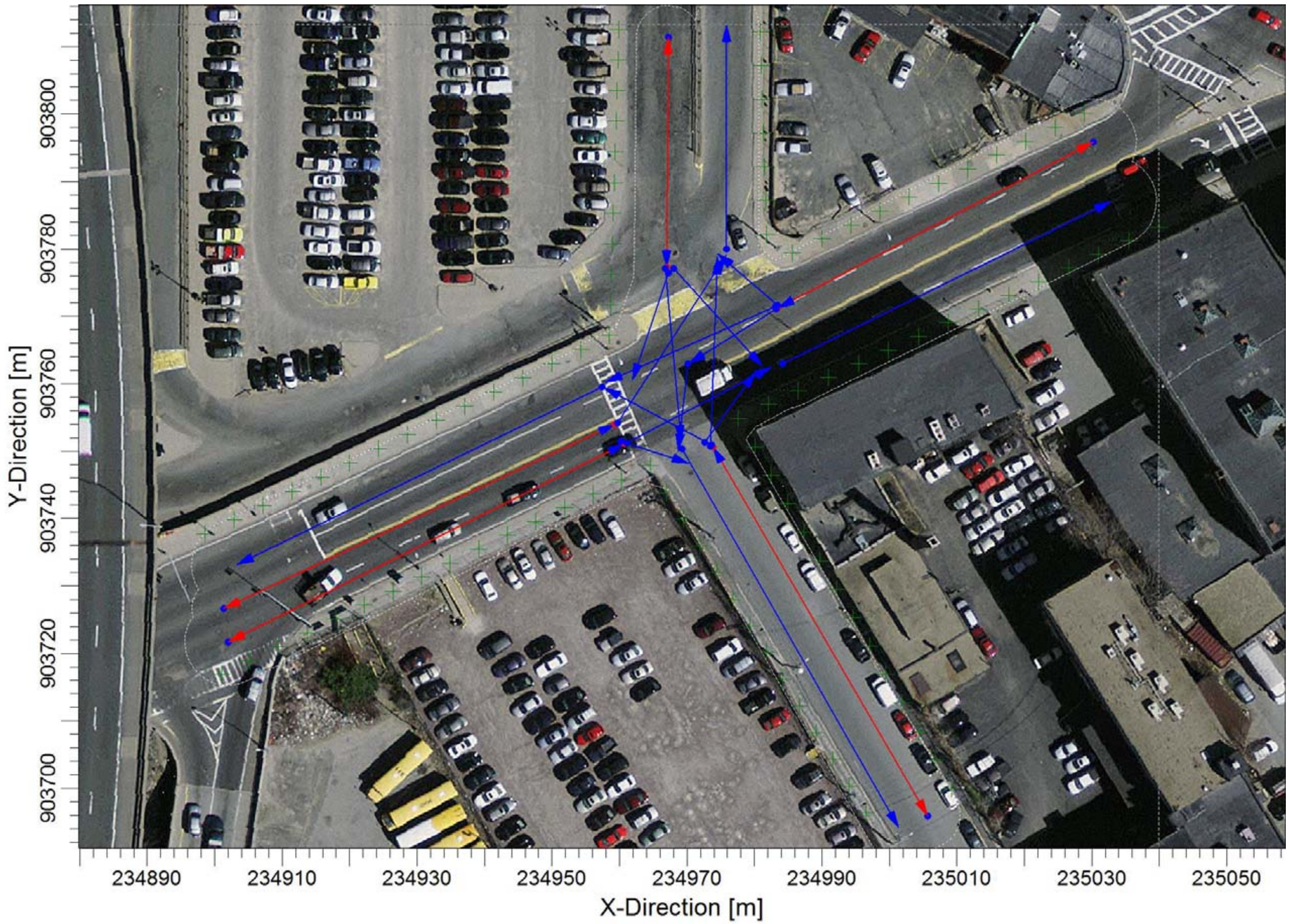


Figure 3.5-2

Link and Receptor Locations for CAL3QHC modeling of Intersection of Cambridge St & Spice St.

Figure 3.5-3

Link and Receptor Locations for CAL3QHC modeling of Intersection of Cambridge St., Alford St., Maffa Way & Rutherford Ave.

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.[7] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

3.5.3 Air Quality Results

3.5.3.1 Microscale Analysis

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 2014 and 2019 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[8]

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 intersections 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 (1.2 ppm) plus background (1.5 ppm) is 2.7 ppm for the 2014 Existing a.m. peak case at the intersection of Cambridge Street, Alford Street, Maffa Way and Rutherford Avenue (Sullivan Square). The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (2.3 ppm) plus background (1.2 ppm) is 3.5 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 Conclusions

3.5.4.1 Microscale Analysis

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.

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

8 Ibid.

3.5.4.2 Emergency Generators

Current design plans include an emergency generator to be installed on the building to be constructed. The unit will provide life safety and standby emergency power to the building. Typically, generators operate for approximately one hour each month for testing and general maintenance and as needed for emergency power. The units will be diesel-fired and located in a mechanical area on the roof of the building or in the basement. The generator will be designed such that its exhaust stack extends at least 10 feet above the individual building roof height above ground level.

Since the generator maximum rating capacity will be greater than the MassDEP's Environmental Results Program (ERP) limit of 37 kW, it will be subject to the ERP program. Per the ERP, the generator owner will limit operation of the generator to less than 300 hours per year and submit a certification form to MassDEP within 60 days of installation

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2014)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.4	1.5	1.9	35
	PM	0.5	1.5	2.0	35
Cambridge Street and Spice Street	AM	N/A	1.5	1.5	35
	PM	N/A	1.5	1.5	35
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	1.2	1.5	***2.7***	35
	PM	1.1	1.5	2.6	35
8-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.4	1.2	1.6	9
	PM	0.5	1.2	1.7	9
Cambridge Street and Spice Street	AM	N/A	1.2	1.2	9
	PM	N/A	1.2	1.2	9
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	1.1	1.2	***2.3***	9
	PM	1.0	1.2	***2.2***	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 2019)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.3	1.5	1.8	35
	PM	0.3	1.5	1.8	35
Cambridge Street and Spice Street	AM	0.2	1.5	1.7	35
	PM	0.3	1.5	1.8	35
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	0.7	1.5	2.2	35
	PM	0.6	1.5	2.1	35
8-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.3	1.2	1.5	9
	PM	0.3	1.2	1.5	9
Cambridge Street and Spice Street	AM	0.2	1.2	1.4	9
	PM	0.3	1.2	1.5	9
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	0.6	1.2	1.8	9
	PM	0.5	1.2	1.7	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 2019)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.3	1.5	1.8	35
	PM	0.3	1.5	1.8	35
Cambridge Street and Spice Street	AM	0.2	1.5	1.7	35
	PM	0.3	1.5	1.8	35
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	0.7	1.5	2.2	35
	PM	0.6	1.5	2.1	35
8-Hour					
Cambridge Street and I-93 Northbound Off-Ramp	AM	0.3	1.2	1.5	9
	PM	0.3	1.2	1.5	9
Cambridge Street and Spice Street	AM	0.2	1.2	1.4	9
	PM	0.3	1.2	1.5	9
Cambridge Street, Alford Street, Maffa Way, and Rutherford Ave.	AM	0.6	1.2	1.8	9
	PM	0.5	1.2	1.7	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 Chapter 7 for a discussion of stormwater impacts and water quality.

3.7 Flood Hazard Zones / Wetlands

The existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Project site indicates that it is located outside of a designated flood zone (FIRM, City of Boston, Map Number 25025C0014G, Effective Date September 25, 2009). However, a "preliminary" revised floodplain map for the site area was recently released by FEMA which shows the portions of the site are located within the 100-year flood zone and other portions within the 500-year flood zone (FIRM, Suffolk County, Massachusetts; Panel 0081J, Map Number 25025C0014J, Map Revised, Preliminary November 15, 2013). As discussed in Chapter 4, the design of the site and buildings will recognize and account for the site's location proximate to the Mystic River and within this preliminarily designated flood zone, as well as the potential impacts of sea level rise. The habitable areas, except for pedestrian access to the parking garage, will be located above the FEMA base flood elevation. All mechanical and electrical equipment will also be placed above the preliminary base flood elevation.

The site does not contain wetlands.

3.8 Geotechnical/Groundwater

3.8.1 Existing Site Conditions

The site is bordered to the north by Cambridge Street and the First Brazilian Baptist Church (24 Cambridge Street); to the south by D Street; to the east by the Rutherford Avenue; and to the west by the rear of several brick and wood frame buildings located along Spice Street. Based on a limited survey of well elevations, surface grades are estimated to generally range from El. 16 to 18 Boston City Base (BCB).

The northern half of the site is currently occupied by a three-story brick building (32 Cambridge Street) with a one level below grade basement. It is the Project team's understanding that the building is founded on shallow foundations. There is also an adjacent one-story brick building attached to the three-story portion that also has a basement level.

The southern half of the site is occupied by a one-story brick building (572 to 594 Rutherford Avenue) that has no below grade space. The existing building is believed to be supported on piers or short caissons. There is also an at-grade crawl space below the existing one story building.

Numerous utilities are anticipated to exist along and beneath the Rutherford Avenue and Cambridge Street sides of the site, which likely include lateral services entering onto the subject property for the existing buildings.

3.8.2 Subsurface Conditions

Site subsurface conditions consist of surficial fill underlain by marine deposits and glacial till, with bedrock at depth. The following subsurface conditions, listed below in order of increasing depth below ground surface, exist at the Project site:

Miscellaneous Fill - The composition of this stratum is varied, but typically consists of loose to medium dense sand and gravel intermixed with silt, wood, cinders, concrete, and other miscellaneous materials. The thickness of this stratum is expected to be about 5 to 9 feet at the site and is the result of prior development at the site.

Organic Deposits – Organic deposits consisting of soft to very soft fibrous peat to soft to stiff dark brown to black organic soil with varying amounts of sand was encountered below the fill over the majority of the site. The thickness of the organic deposits (where encountered) typically ranged from 3 to 6 feet.

Marine Deposits - The marine deposits typically consist of alternating and interbedded layers of medium dense to dense silty to clayey sand, to stiff to very stiff lean clay. The thickness of the marine deposits (where encountered) ranged from about 2 to 8 feet thick.

Glacial Till - The glacial till is an unsorted mixture of soil types, typically consisting of dense to very dense silty sand with varying amounts of gravel. The thickness of the glacial till is anticipated to be about 30 to 50 feet across the site.

Bedrock - The bedrock below the site is locally known as Cambridge Argillite. The bedrock is typically weathered at the top, and increasing in quality with depth. Bedrock is expected to exist at a depth of approximately 50 to 75 feet below ground surface.

Groundwater - Measurements obtained from observation wells installed at the site indicate shallow water perched on top of the organic soils at about 3 to 4 feet below ground surface (El. 13 to 14), and formation groundwater at depths of approximately 8 to 13 feet below the existing ground surface (approx. El. 4 to El. 7). Groundwater levels can fluctuate for a number of reasons, including precipitation, infiltration and exfiltration from utilities, and seasonal variation

3.8.3 Proposed Foundation Construction Methodology

It is anticipated that the spread footing foundations below the existing three-story building to remain (32 Cambridge Street) can be re-used. If the renovation of the existing building results in additional load column and wall loads, the existing foundation can be enlarged to accommodate the new loads.

For the new residential building, the fill and organic soils are not considered suitable for support of the anticipated building loads. It is anticipated that the new structure can be supported on conventional spread footing foundations following ground improvement techniques being undertaken to improve the fill and organic soils. The type of ground improvement considered feasible is Rammed Aggregate Piers (RAPs), which would effectively increase the strength/stiffness of the fill and organic soils. RAP-improved soil supports conventional shallow foundations.

Other technically feasible foundation alternatives include the use of Pressure Injected Footings (PIFs) or micropiles.

3.8.4 Potential Impacts During Excavation and Foundation Construction

Temporary support of excavation (SOE) will be needed to construct the new residential building as excavation depths of approximately 7 to 10 feet below existing grades are anticipated to construct new foundations and to make the excavation for the below grade parking level. SOE systems will likely consist of steel sheet piling or soldier pile and lagging. SOE systems will be designed to limit the movement of the wall to protect the adjacent roadway, underground utilities, and adjacent structures from damage during excavation activities.

Construction of the below grade will require only minor dewatering for a temporary, minor periods of time within the limits of the excavation, to facilitate excavation in the dry. Primarily, the dewatering will remove water draining from soils to be excavated, and from precipitation.

Engineering controls will be installed along the foundation walls to mitigate infiltration of moisture into the structure as well as maintain current groundwater levels.

The natural soils beneath the excavation have relatively low permeability, which will inhibit water seepage into the excavation, thereby avoiding groundwater drawdown outside the site.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

Haley & Aldrich, Inc. has been retained to provide consulting services associated with the assessment of site conditions as they relate to environmental regulatory compliance. Prior to excavation, subsurface explorations and testing will be completed to characterize site conditions relative to concentrations of contaminants in soil and groundwater. Based on the results of this testing, appropriate soil and groundwater management will be conducted during construction. As necessary, Haley & Aldrich will provide Licensed Site Professional (LSP) services.

3.9.2 Solid Waste and Recycling

3.9.2.1 Solid Waste

The Project will generate solid waste typical of residential and retail 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 150 tons of solid waste per year.

With the exception of household hazardous wastes typical of residential and retail/commercial developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials. Typical waste generated by the uses will be handled in compliance with all local, state and federal regulations.

All trash collection will occur on-site. The residential Trash and Recycling room will be located on each floor level, near the elevator. Building Management will remove the waste regularly throughout the week, relocating the waste to a dumpster in the service area of the site, to be removed by a contracted waste hauler.

3.9.2.2 Recycling During Operation

The Project will include a room for the gathering and storage of residents' recyclable materials on each floor. Building management will move the recyclables to the main trash room on the ground floor. Recycling and waste reduction will be encouraged for all residents.

3.9.2.3 Solid Waste Generation During Construction

Solid waste generated during construction will consist primarily of packaging and scrap materials (such as corrugated cardboard, glass, aluminum, scrap metal, and cable/wire) associated with new construction. Minimal waste is expected, since a large portion of the construction will be modular.

Construction waste material from demolition and new construction will be recycled when possible (see below). For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP's Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract.

3.9.2.4 Recycling During Construction

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The Project will target the use of regional materials with renewable characteristics and high recycled content. An evaluation of the potential for recycling will occur before the construction commences. Construction will be conducted so that some materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility. A comprehensive recycling program will be included in the final Construction Management Plan.

3.10 Noise

3.10.1 Introduction

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

This analysis, which is consistent with BRA requirements for noise studies, indicates that predicted noise levels from the Project with appropriate noise controls will comply with both state and local 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.[9] 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

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[9] *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.

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.

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

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

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

3.10.3 *Noise Regulations and Criteria*

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

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

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

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

3.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project, located within the Charlestown neighborhood of Boston. Existing noise sources in the vicinity of the Project site currently include: vehicular traffic along local roadways (including I-93 and Sullivan Square); MTBA buses; birds; some roadway construction; and the general City soundscape.

3.10.4.1 Noise Monitoring Methodology

Sound level measurements were made on Tuesday, March 31, 2015 during the daytime (11:00 a.m. to 1:00 p.m.) and on Thursday, April 2, 2015 during nighttime hours (12:00 a.m. to 2:00 a.m.). Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. All measurements were 20 minutes in duration.

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

3.10.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project area. Three noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 3.10-1 and described below.

- **Location ST-1** is located across from 32 Cambridge Street, representative of the closest residential receptor to the north of the Project.
- **Location ST-2** is located at the corner of Alford Street and Main Street representative of the closest educational and commercial receptors to the east of the Project.
- **Location ST-3** is located near 443 Bunker Hill Street near the intersection with Medford Street, representative of the closest residential receptors east of the Project.
- **Location ST-4** is located near 470 Charbonnier Street, representative of the closest residential and industrial receptors south and southeast of the Project.

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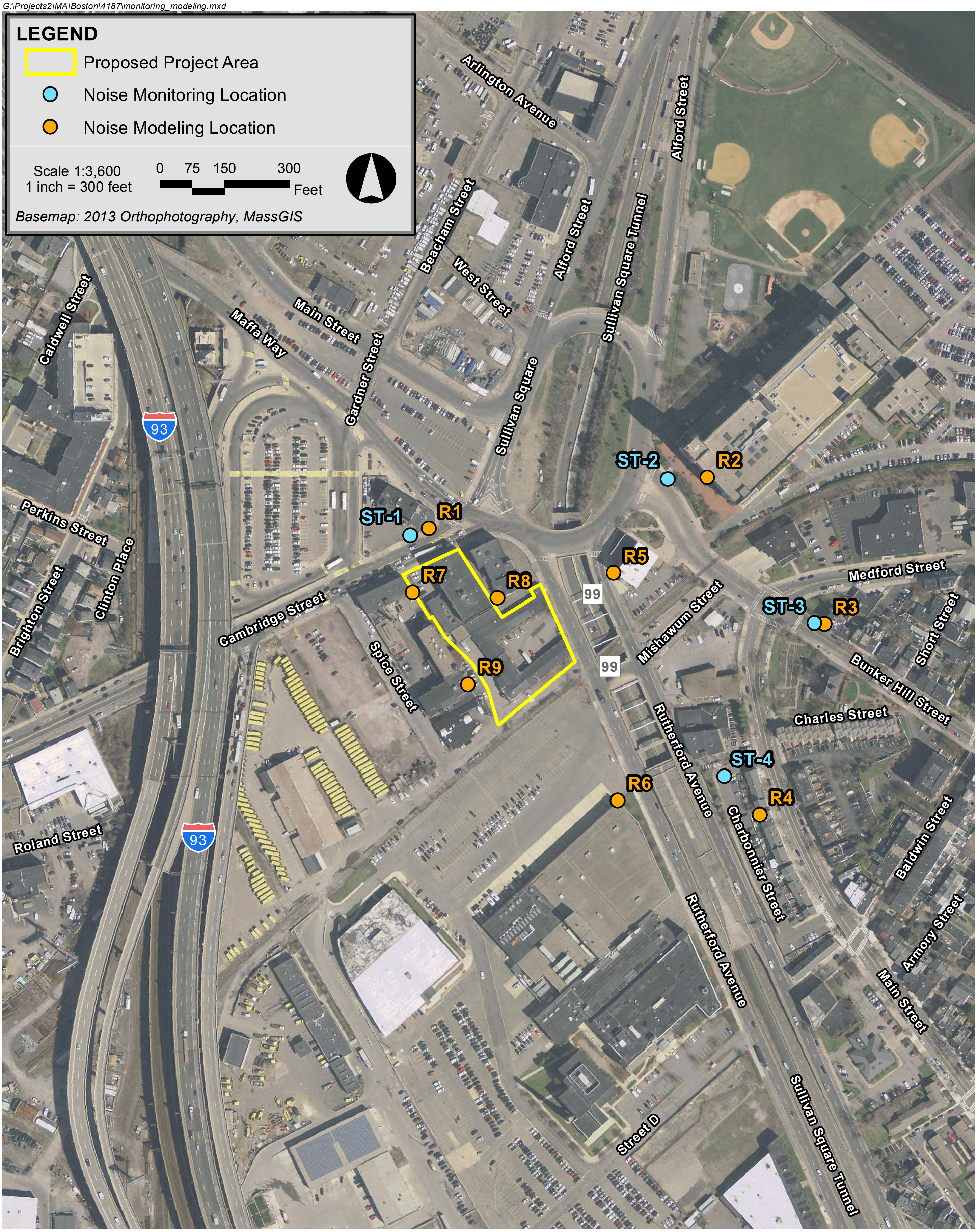

32 Cambridge Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.10-1

Noise Monitoring and Modeling Locations

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 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

3.10.4.4 Measured Background Noise Levels

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

- The daytime residual background (L_{90} dBA) measurements ranged from 59 to 67 dBA;
- The nighttime residual background (L_{90} dBA) measurements ranged from 48 to 57 dBA;
- The daytime equivalent level (L_{eq} dBA) measurements ranged from 63 to 74 dBA;
- The nighttime equivalent level (L_{eq} dBA) measurements ranged from 57 to 67 dBA;

3.10.5 Future Conditions

3.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project will consist of rooftop heating, ventilation, and air conditioning (HVAC) units, along with ground level electrical conditioning and emergency power equipment. These sources include inverter heat-pump systems, an electrical transformer, a transcloser, and one 100 kW emergency generator set.

Other secondary noise sources will either be enclosed 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.

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 hospital-grade exhaust silencer.

Table 3.10-2 Summary of Measured Background Noise Levels – March 31, 2015 (Daytime) & April 2, 2015 (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	11:15 AM	74	87	77	71	67	76	74	69	65	64	63	56	48	37
ST-2	Day	11:44 AM	72	88	75	68	66	71	72	68	64	62	62	55	46	37
ST-3	Day	12:07 PM	68	88	69	64	61	68	68	65	60	57	58	49	38	27
ST-4	Day	12:32 PM	63	78	64	62	59	67	66	60	56	55	56	48	35	22
ST-1	Night	12:07 AM	67	82	70	62	57	68	66	63	57	54	52	45	36	27
ST-2	Night	12:40 AM	62	79	64	59	55	65	63	60	54	51	50	44	35	27
ST-3	Night	1:04 AM	57	77	57	53	50	61	64	57	51	46	45	37	26	19
ST-4	Night	1:31 AM	59	73	63	56	48	61	59	53	47	44	44	36	22	19

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Tuesday, March 31, 2015	49 °F	25%	Mostly sunny	NE @ 2-10 mph
Nighttime	Thursday, April 02, 2015	30 °F	30%	Overcast	Calm

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3753
Microphone	Larson Davis	377B20	142956
Preamp	Larson Davis	PRM831	029564
Calibrator	Larson Davis	Cal200	7147

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

3.10.5.2 Noise Modeling Methodology

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

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

3.10.5.3 Noise Modeling Results

Nine modeling locations with a height of 1.5 meters above-grade were included in the analysis representing the nearest noise-sensitive residential, business, and industrial 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 20 to 33 dBA at nearby receptors (25 to 30 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 28 to 58 dBA at nearby receptors (32 to 51 at the closest residences).

Results of this evaluation demonstrate that sound levels from Project operation are anticipated to fully comply with the City of Boston nighttime broadband and octave-band noise limits described in Table 3.10-1, as shown in Table 3.10-6. Additionally, Project-only sound levels are predicted to remain well below the existing background sound levels in the area shown in Table 3.10-2, which already exceed many of the City of Boston limits

Table 3.10-3 Modeled Noise Sources

Noise Source	Quantity	Anticipated Location	Size/Capacity per Unit
HVAC Unit	182	'Building A' Roof (x54) 40' AGL, 'Building B' Roof (x128) 55' AGL	~20,000 BTU/hr
Transformer	1	Ground Level	1,500 kVA
Transcloser	1	Ground Level	5,000 A
Emergency Generator	1	Ground Level	100 ekW

Table 3.10-4 Modeled Sound Power Levels per Unit

Noise Source	Broadband	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
HVAC Unit[1]	65	60	63	64	64	63	61	57	53	47
Transformer[2]	62	59	65	67	62	62	56	51	46	39
Transcloser[3]	62	59	65	67	62	62	56	51	46	39
Emergency Generator – Mechanical[4]	99	110[6]	110	106	103	97	91	86	84	78
Emergency Generator – Exhaust[5]	132	110[6]	128	126	130	126	126	128	120	112

Notes:

1. Mitsubishi Electric Multi-Indoor Inverter Heat Pump (Model MXZ-2B20NA-1), or similar
2. Calculated sound levels based on 1.5 MVA rating
3. Assumed similar to transformer
4. CAT Model C9 200 ekW Diesel Generator Set, SA Canopy (Sound Attenuating Enclosure)
5. CAT Model C9 200 ekW Diesel Generator Set, Open Exhaust
6. 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	1000 Hz	2000 Hz	4000 Hz	8000 Hz
	dB	dB	dB	dB	dB	dB	dB	dB	dB
Emergency Generator Exhaust Silencert[1]	13[2]	26	45	51	47	35	31	32	33

1. Silex JDDS-6 Hospital Grade Silencer, or similar
2. No data available in 32 Hz band. Assumed equal to 63 Hz band.

without any contribution from the Project. At several modeling locations, mitigation designed to meet the City of Boston octave-band limits resulted in A-weighted broadband levels lower than the City of Boston A-weighted broadband limits. 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	30	31	32	31	31	29	25	18	11	0
R2	Educational[1]	Night	20	22	24	24	22	19	14	7	0	0
R3	Residential	Night	25	21	24	25	24	24	21	16	7	0
R4	Residential	Night	26	21	24	25	24	24	22	16	6	0
R5	Business	Night	26	28	29	29	27	24	20	14	6	0
R6	Industrial	Night	27	25	27	28	27	26	23	17	8	0
R7	Business	Night	33	32	34	35	34	32	28	22	15	2
R8	Business	Night	32	34	36	36	34	30	26	20	15	5
R9	Industrial	Night	32	32	35	36	33	31	26	20	14	5
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. 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	32	53	45	38	34	30	26	23	13	0
R2	Educational[1]	Day	28	53	45	37	32	24	18	17	3	0
R3	Residential	Day	50	62	57	52	52	45	42	44	31	4
R4	Residential	Day	51	66	61	56	54	47	43	45	33	9
R5	Business	Day	34	58	50	43	38	30	25	23	12	0
R6	Industrial	Day	57	70	65	60	58	51	49	52	41	24
R7	Business	Day	43	62	57	51	47	39	34	32	21	5
R8	Business	Day	34	53	44	38	36	31	27	25	17	6
R9	Industrial	Day	58	73	68	62	60	54	50	51	42	32
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. Compared 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 Zoning District Noise Standards. It should be noted that the existing ambient background levels at many locations immediately surrounding the Project 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

3.11.1 Introduction

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

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

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

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

3.11.2 Construction Methodology/Public Safety

Construction methodologies that ensure public safety 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. If required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. These measures will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work.

3.11.3 Construction Schedule

Construction of the Project is estimated to commence in December 2016 with completion in March 2018.

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

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 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 Mystic 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 186 construction jobs during the busiest construction period. 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 a jobs agreement 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 construction team 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. 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 Waste

Excavated soils will be re-used on the site as fill and backfill, to the extent feasible, to limit the quantity of materials that must be removed from or imported to the site. Over-size cobbles and boulders will be removed from the site and recycled.

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.

3.11.11 Protection of Utilities

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

3.12 Rodent Control

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

3.13 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE

4.1 Green Building

4.1.1 Introduction

As required by Article 37 of the Boston Zoning Code, the Project, at minimum, will be certifiable under the appropriate Leadership in Energy and Environmental Design (LEED) rating system. The Project will show compliance with Article 37 through the LEED for Homes rating system. The Project has a goal to reach the Gold level, as shown on the Checklist at the end of this section and described in the text below.

Major sustainable design elements of the Project include:

- Redevelopment of a currently underutilized site. The Project is in an urban area, close to regional and local public transportation. The new residential building will be located approximately 650 feet (walking distance) from public transportation at the MBTA's orange line at Sullivan Square. The station serves a number of bus lines, encouraging minimal vehicle use.

- The Project will embody urban principles encouraging public transportation use and pedestrian activity. The use of cars at this site is expected to be minimal in comparison to the public transportation and pedestrian trips. Other transportation related characteristics include:

  - Approximately only 0.65 parking spaces per housing unit.

  - Covered bicycle parking will be included for residents. Visitor bicycle parking will be adjacent to the building entrance.

  - The Proponent will provide two electric car charging stations (able to charge four vehicle) within the garage.

- Mechanical Systems:

  - No chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) will be used in cooling equipment.

  - The Project will seek to save energy across systems with energy efficient equipment and appropriate insulation.

  - High efficiency lighting with occupancy sensors will be incorporated where suitable.

- Residential Units:
  - Energy Star appliances, lighting and low-flow fixtures will be integrated into residential units.
  - Operable and high-quality insulated glass will allow residents to control air movement within the units.

4.1.2 LEED Credits

Innovation and Design Process (ID)

ID Prereq 1.1 Preliminary Rating: The LEED certification threshold set for this Project is Gold.

ID 1.2 Energy Expertise in HOMES: The design team will include expertise in energy for HOMES construction. Team includes:

- Architecture & Sustainable Design: ICON Architecture.
- Mechanical Engineer & Energy Modeler: Wozny Barbar & Associates
- Civil Engineer: Nitsch Engineering
- Landscape Architect: Richard Burke Associates

ID 1.3 Professional Credentialed with Respect to LEED for Homes: Several LEED for Homes Accredited Professionals are part of the Project team:

- ICON Architecture: Primary - Kendra Halliwell, AIA, LEED AP Homes.
- ICON Architecture: Secondary - Lillie Tang, AIA, LEED AP Homes.

ID 1.4 Design Charette: The design team is working together regularly as well as in focus meetings to discuss and integrate green strategies across the redevelopment.

ID 2.1 and 2.2 Prereq: Durability Planning and Durability Management: Durability strategies are currently in discussion and will be implemented during construction. The builder will have a quality Construction Management Plan (CMP) in place before construction begins. All applicable indoor moisture mitigation strategies will be incorporated into the design, and exterior products will be selected that meet or exceed the durability standards.

Location & Linkages (LL)

LL 2 Site Selection: The Project is proposed for a site that meets the requirements of this section. The site is not in a 100-year flood plain. The site is not a habitat for threatened or endangered species. The site is not within 100-feet of water, including wetlands. The land was not public parkland prior to acquisition. The soils are not prime, unique or of state significance.

LL 3.2 Infill: One hundred percent of the site perimeter immediately borders previously developed land.

LL 3.3 Previously Developed Lot: The redevelopment includes the demolition of an underutilized building and the construction of a new building, as well as the re-use of an existing building on the site.

LL 4.0 Infrastructure: The redevelopment is served by existing infrastructure from two main streets, Cambridge Street and Rutherford Avenue.

LL 5.3 Outstanding Community Resources / Transit: The site is within ½ mile of transit providing 125 rides per weekday — within 650 feet (walking distance) of the Sullivan Square Station, which offers rapid transit as well as bus lines.

LL 6 Access to Open Space: The site is an approximately 600-foot walk to the east to spacious Ryan Field.

Sustainable Sites (SS)

SS 1.1 Prereq 1: Erosion Controls: A Stormwater Pollution Prevention Plan (SWPPP) will be established to control stormwater runoff during construction. Erosion control measures in compliance with this prerequisite will be implemented and are outlined in the SWPPP, which will be approved by the DPW.

SS 1.2 Minimize Disturbed Area of Site: As the site was previously developed, a planting plan will be developed in accordance with section 2.2. The lot, which was previously covered in building and asphalt, has been designed with a large landscaped plaza and plantings around the new building perimeter.

SS 2.1 Prereq 2: No Invasive Plants: Based on the State of Massachusetts' accepted invasive plant species list as determined by the Massachusetts Invasive Plants Advisory Group (MIPAG), the Project will not include invasive plants.

SS 2.2 Basic Landscaping Design: The landscape is designed to only have a minimal area of drought tolerant turf which is being used in non-shaded locations. All sloped areas of the site will be covered with a mixture of non-turf groundcover, shrub and herbaceous plantings which will be adequately mulched to preserve soil moisture. Prior to placement of topsoil, the design will require that all subgrade areas be loosened to a minimum depth of six inches.

SS 2.4 Drought-Tolerant Plants: Approximately 70% of the plants being used on the Project will be drought-tolerant according to published drought-tolerant plant lists from the University of Massachusetts, University of New Hampshire, and the University of Vermont.

SS 4.2 Surface Water Management –Permanent Erosion Controls: The designer will utilize a variety of trees, shrubs, and groundcover at a rate sufficient to provide permanent erosion control on site.

SS 4.3 Surface Water Management: The Proponent intends to install permanent stormwater controls, consisting of an underground stormwater infiltration and detention chamber system, to manage runoff on-site.

SS 5 Pest Control Alternatives: The Project will strive to meet four of the non-toxic pest controls described in this section, including sealing external cracks, no wood-to-concrete contact, sealing joints, etc. with caulking and installing pest-proof screens and concrete foundation walls.

SS 6.3 Very High Density: The Project meets the requirement for Very High Density for HOMES. Projected density is approximately 171 units on approximately 1.6 acres, at a density of approximately 106 units per acre.

Water Efficiency (WE)

WE 2.1 High-Efficiency Irrigation System: A high efficiency irrigation system will be installed which will utilize a central shutoff valve, drip irrigation at all plant bed areas, and a sophisticated controller with solar, rain, and ice sensors.

WE 3.1 High-Efficiency Fixtures and Fittings: High-efficiency fixtures and fittings have been specified, including water closets with flow rates less than 1.30 gallons per flush.

WE 3.2 Very High-Efficiency Fixtures and Fittings: Very high-efficiency fixtures and fittings have been specified, including lavatory faucets with average flows less than 1.50 gallons per minute (gpm) and showers at less than or equal to 1.75 gpm.

Energy and Atmosphere (EA)

EA Prereq 1.1 Minimum Energy Performance: The Project will meet the performance requirements of Energy Star for Homes.

EA 1.2 Exceptional Energy Performance: The Project will exceed the performance of Energy Star for Homes. Anticipated HERS Index: 65.

EA 7.2 Pipe insulation: All domestic water piping shall have R-4 insulation. Construction documents will include direction to properly install insulation on required piping and piping elbows necessary to adequately insulate the 90-degree bend.

EA Prereq 8.1 Energy Star Lights: More than the minimum of four Energy Star Rated Fixtures will be included in high use areas.

EA 11.1 Appropriate HVAC Refrigerants: Non-HCFC refrigerants will be specified.

Materials and Resources (MR)

MR Prereq 1 Framing Order Waste Factor Limit: It is the intent of the Project to limit the overall estimated waste factor to 10% or less.

MR 1.5 Off-Site Fabrication: Modular construction, requiring off-site fabrication, will be utilized for the Project.

MR Prereq 2.1 FSC Certified Tropical Wood: It is the intent of the Project to install no tropical wood and to provide suppliers with a notice of preference for FSC products and to request the country of manufacture for each product.

MR 2.2 Environmentally Preferable Products: Use of environmentally preferred products which may include cementitious siding, recycled resilient flooring and cellulose building insulation will be specified. Use of low emission products including paints, adhesives and sealants will also be specified.

MR Prereq 3.1 Construction Waste Management Planning: The construction team shall institute a Construction Waste Management Plan, including investigation of local options for waste diversion and documentation of diversion rate for construction waste.

MR 3.2 Construction Waste Reduction: The construction team will divert 25% of the construction waste produced by the Project.

Indoor Environmental Quality (EQ)

IEQ Prereq 2 Basic Combustion Venting Measures: No fireplaces are planned for this development, and carbon monoxide detection will be installed.

IEQ 4.1 Prereq: Outdoor Air Ventilation: Continuous ventilation will be provided to each apartment.

IEQ 5.1 & 5.2 Basic Local Exhaust: All of the basic local exhaust requirements will be met. Apartment bathroom exhaust fans will be two speed fans (30 CFM continuous and 75 CFM boost). Apartment over the range exhaust hoods will be vented to the outdoors.

IEQ Prereq 6.1 Room-by-Room Load Calculations: Room-by-room design load calculations will be performed. All calculations will be based on the ASHRAE Fundamentals. All systems will be sized and installed per calculations.

IEQ Prereq 7.1 Good Filters: It is the intent of the Project to install air filters with a minimum efficiency rating equal to or greater than MERV 8.

IEQ 8.1 Indoor Contaminant Control During Construction: The team will seal all permanent ducts and vents to minimize contaminants during construction.

IEQ 8.2 Indoor Contaminant Control: Permanent walk-off mats will be installed at each common building entry.

IEQ 10 Garage Pollutant Protection: It is the intent of the Project to tightly seal shared surfaces between the open garage and conditioned spaces to minimize pollutants into the residential area. The garage will be open to meet ventilation requirements, and will not need mechanical exhaust fans.

Awareness & Education

AE Prereq 1.1 Basic Operations Training: Basic operations training will take place and will include provision of operations and training manuals to home occupants and a one-hour walkthrough of the home with the occupants.

AE 1.3 Public Awareness: The team will promote general public awareness about LEED for Homes by carrying out the following activities: Conduct an open house for the public lasting at least four hours, publish a website with at least two pages of detailed information, and display LEED for Homes signage on the exterior of the buildings.

AE 2 Education of Building Manager: The construction team will provide the building manager with an operations and training manual. The team will have the construction team provide a one-hour walkthrough for the building manager of the building prior to occupancy.

4.2 Solar Photovoltaic Feasibility

The Proponent has completed a preliminary feasibility analysis for incorporating solar photovoltaic (PV) into the Project. The preliminary analysis shows that a solar PV system on the roof has the potential to cover the common area electric loads. As the design progresses, the feasibility of solar PV and analysis of incentives will be studied further.

4.3 Climate Change Preparedness

4.3.1 Introduction

Climate change conditions considered by the Project team include sea level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts.

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

4.3.2 Extreme Heat Events

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

- Installing operable windows where possible;
- Planting shade trees around the site;
- Installing a high performance building envelope; and
- Specifying high reflective paving materials, high albedo roof tops and green roofs to minimize the heat island effect.

Energy modeling for the Project has not yet been completed; however, the Proponent will strive to reduce the Project's overall energy demand and greenhouse gas emissions that contribute to global warming. Due to the Project's proximity to the Sullivan Square Station, the Project proposes a parking ratio of approximately 0.65, lower than the City of Boston recommended maximum parking ratio of 0.75-1.25 spaces per residential unit in Charlestown at developments within a 10-minute walk of an MBTA station, and will

[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.

encourage alternative modes of transportation through the Project's TDM program, as described in Section 2.5. The Proponent is also studying the inclusion of solar photovoltaic, further reducing the Project's greenhouse gas emissions.

4.3.3 Sea Level Rise

According to the IPCC, if the sea level continues to rise at historic rates, the sea level in Massachusetts as a whole will rise by one foot by the year 2100. However, using a high emissions scenario of climate change, sea level rise could reach six feet by 2100. Adding this potential rise to the mean higher high water (MHHW) level, in 50 years the MHHW could be as high as 14.2 feet Boston City Base (BCB), assuming a sea level rise of approximately three feet.[2] The first floor elevation of the Project is approximately 20 feet BCB. Due to the site topography, the parking garage is proposed at an elevation of approximately 16 feet BCB, which continues to be above the potential future sea level.

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

4.3.4 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable. The Project will increase the pervious area on the site from the existing condition, creating infiltration ability on the site. The Project will also include a closed drainage system, if possible, that will strive to infiltrate one-inch of stormwater runoff from the impervious areas on-site into the ground to the greatest extent practicable. Additional measures include:

- Incorporating a green roof where practical, as the courtyard over the parking level;
- Locating critical mechanical and electrical equipment at the highest elevation possible to prevent exposure to flood waters; and

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

3 Ibid.

- Locating the backup generator above Base Flood Ellevation.

4.3.5 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials and a high efficiency irrigation system will be installed which will utilize a central shutoff valve, drip irrigation at all plant bed areas, and a sophisticated controller with solar, rain, and ice sensors. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

LEED for Homes Simplified Project Checklist

for Homes

Builder Name:	*Berkeley Investments*
Project Team Leader (if different):	*Kendra Halliwell, ICON Architecture*
Home Address (Street/City/State):	*32 Cambridge Street, Charlestown, Massachusetts*

Project Description:

Building type: *Multi-family* Project type: *Multi-family De*

\# of units: *119* Avg. Home Size Adjustment: *-7*

Adjusted Certification Thresholds

Certified: *38.0* Gold: *68.0*

Silver: *53.0* Platinum: *83.0*

Project Point Total

Prelim: *67 + 9 maybe pts* Final: *72*

Certification Level

Prelim: *Silver* Final: *Gold*

Final Credit Category Total Points

ID: *7* SS: *13* EA: *18* EQ: *7*

LL: *10* WE: *8* MR: *7* AE: *2*

date last updated : *4/10/2015*

last updated by : *K Halliwell*

				Max Points	Preliminary Y/Pts	Preliminary Maybe	Preliminary No	Final Y/Pts
Innovation and Design Process (ID)		(No Minimum Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Integrated Project Planning	1.1	Preliminary Rating		Prereq	Y			Y
	1.2	Integrated Project Team		1	1	0		1
	1.3	Professional Credentialed with Respect to LEED for Homes		1	1	0		1
	1.4	Design Charrette		1	1	0		1
	1.5	Building Orientation for Solar Design		1	0	0		0
2. Durability Management Process	2.1	Durability Planning		Prereq	Y			Y
	2.2	Durability Management		Prereq	Y			Y
	2.3	Third-Party Durability Management Verification		3	0	0		3
3.Innovative or Regional Design	3.1	Innovation #1		1	0	1		1
	3.2	Innovation #2		1	0	0		0
	3.3	Innovation #3		1	0	0		0
	3.4	Innovation #4		1	0	0		0
		Sub-Total for ID Category:		**11**	3	1		**7**
Location and Linkages (LL)		(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND	1	LEED for Neighborhood Development	**LL2-6**	10	0	0		0
2. Site Selection	2	Site Selection		2	2	0		2
3. Preferred Locations	3.1	Edge Development	**LL 3.2**	1	0	0		0
	3.2	Infill		2	2	0		2
	3.3	Previously Developed		1	1	0		1
4. Infrastructure	4	Existing Infrastructure		1	1	0		1
5. Community Resources/ Transit	5.1	Basic Community Resources / Transit	**LL 5.2, 5.3**	1	0	0		0
	5.2	Extensive Community Resources / Transit	**LL 5.3**	2	0	0		0
	5.3	Outstanding Community Resources / Transit		3	3	0		3
6. Access to Open Space	6	Access to Open Space		1	1	0		1
		Sub-Total for LL Category:		**10**	10	0		**10**
Sustainable Sites (SS)		(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship	1.1	Erosion Controls During Construction		Prereq	Y			Y
	1.2	Minimize Disturbed Area of Site		1	1	0		1
2. Landscaping	2.1	No Invasive Plants		Prereq	Y			Y
	2.2	Basic Landscape Design	**SS 2.5**	2	2	0		2
	2.3	Limit Conventional Turf	**SS 2.5**	3	0	0		0
	2.4	Drought Tolerant Plants	**SS 2.5**	2	0	1		1
	2.5	Reduce Overall Irrigation Demand by at Least 20%		6	0	4		0
3. Local Heat Island Effects	3	Reduce Local Heat Island Effects		1	0	0		0
4. Surface Water Management	4.1	Permeable Lot		4	0	0		0
	4.2	Permanent Erosion Controls		1	1	0		1
	4.3	Management of Run-off from Roof		2	2	0		2
5. Nontoxic Pest Control	5	Pest Control Alternatives		2	2	0		2
6. Compact Development	6.1	Moderate Density	**SS 6.2, 6.3**	2	0	0		0
	6.2	High Density	**SS 6.3**	3	0	0		0
	6.3	Very High Density		4	4	0		4
		Sub-Total for SS Category:		**22**	12	4		**13**

LEED for Homes Simplified Project Checklist (continued)

				Max Points	Project Points Preliminary			Final
Water Efficiency (WE)		(Minimum of 3 WE Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Water Reuse	1.1	Rainwater Harvesting System	**WE 1.3**	4	0	0		0
	1.2	Graywater Reuse System	**WE 1.3**	1	0	0		0
	1.3	Use of Municipal Recycled Water System		3	0	0		0
2. Irrigation System	2.1	High Efficiency Irrigation System	**WE 2.3**	3	3	0		3
	2.2	Third Party Inspection	**WE 2.3**	1	0	0		0
	2.3	Reduce Overall Irrigation Demand by at Least 45%		4	0	0		0
3. Indoor Water Use	3.1	High-Efficiency Fixtures and Fittings		3	1	0		1
	3.2	Very High Efficiency Fixtures and Fittings		6	4	0		4
		Sub-Total for WE Category:		**15**	8	0		8
Energy and Atmosphere (EA)		(Minimum of 0 EA Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance	1.1	Performance of ENERGY STAR for Homes		Prereq	Y			Y
	1.2	Exceptional Energy Performance		34	16	0		16
7. Water Heating	7.1	Efficient Hot Water Distribution		2	0	2		0
	7.2	Pipe Insulation		1	1	0		1
11. Residential Refrigerant Management	11.1	Refrigerant Charge Test		Prereq				
	11.2	Appropriate HVAC Refrigerants		1	1	0		1
		Sub-Total for EA Category:		**38**	18	2		18
Materials and Resources (MR)		(Minimum of 2 MR Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Material-Efficient Framing	1.1	Framing Order Waste Factor Limit		Prereq	Y			Y
	1.2	Detailed Framing Documents	**MR 1.5**	1	0	0		0
	1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	0	0		0
	1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
	1.5	Off-site Fabrication		4	4	0		4
2. Environmentally Preferable Products	2.1	FSC Certified Tropical Wood		Prereq	Y			Y
	2.2	Environmentally Preferable Products		8	2.5	0		2.5
3. Waste Management	3.1	Construction Waste Management Planning		Prereq	Y			Y
	3.2	Construction Waste Reduction		3	0.5	0		0.5
		Sub-Total for MR Category:		**16**	7	0		7
Indoor Environmental Quality (EQ)		(Minimum of 6 EQ Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. ENERGY STAR with IAP	1	ENERGY STAR with Indoor Air Package		13	0	0		0
2. Combustion Venting	2.1	Basic Combustion Venting Measures	**EQ 1**	Prereq	Y			Y
	2.2	Enhanced Combustion Venting Measures	**EQ 1**	2	2	0		2
3. Moisture Control	3	Moisture Load Control	**EQ 1**	1	0	0		0
4. Outdoor Air Ventilation	4.1	Basic Outdoor Air Ventilation	**EQ 1**	Prereq	Y			Y
	4.2	Enhanced Outdoor Air Ventilation		2	0	0		0
	4.3	Third-Party Performance Testing	**EQ 1**	1	0	0		0
5. Local Exhaust	5.1	Basic Local Exhaust	**EQ 1**	Prereq	Y			Y
	5.2	Enhanced Local Exhaust		1	1	0		1
	5.3	Third-Party Performance Testing		1	0	0		0
6. Distribution of Space Heating and Cooling	6.1	Room-by-Room Load Calculations	**EQ 1**	Prereq	Y			Y
	6.2	Return Air Flow / Room by Room Controls	**EQ 1**	1	0	0		0
	6.3	Third-Party Performance Test / Multiple Zones	**EQ 1**	2	0	0		0
7. Air Filtering	7.1	Good Filters	**EQ 1**	Prereq	Y			Y
	7.2	Better Filters	**EQ 7.3**	1	0	0		0
	7.3	Best Filters		2	0	0		0
8. Contaminant Control	8.1	Indoor Contaminant Control during Construction	**EQ 1**	1	1	1		1
	8.2	Indoor Contaminant Control		2	1	0		1
	8.3	Preoccupancy Flush	**EQ 1**	1	0	0		0
9. Radon Protection	9.1	Radon-Resistant Construction in High-Risk Areas	**EQ 1**	Prereq	N/A			N/A
	9.2	Radon-Resistant Construction in Moderate-Risk Areas	**EQ 1**	1	0	0		0
10. Garage Pollutant Protection	10.1	No HVAC in Garage	**EQ 1**	Prereq	Y			Y
	10.2	Minimize Pollutants from Garage	**EQ 1, 10.4**	2	2	0		2
	10.3	Exhaust Fan in Garage	**EQ 1, 10.4**	1	0	0		0
	10.4	Detached Garage or No Garage	**EQ 1**	3	0	0		0
		Sub-Total for EQ Category:		**21**	7	1		7
Awareness and Education (AE)		(Minimum of 0 AE Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the Homeowner or Tenant	1.1	Basic Operations Training		Prereq	Y			Y
	1.2	Enhanced Training		1	0	1		0
	1.3	Public Awareness		1	1	0		1
2. Education of Building Manager	2	Education of Building Manager		1	1	0		1
		Sub-Total for AE Category:		**3**	2	1		2

LEED for Homes Simplified Project Checklist

Addendum: Prescriptive Approach for Energy and Atmosphere (EA) Credits

Points cannot be earned in both the Prescriptive (below) and the Performance Approach (pg 2) of the EA section.

Energy and Atmosphere (EA)		(No Minimum Points Required)	OR	Max Points	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
2. Insulation	2.1	Basic Insulation		Prereq				
	2.2	Enhanced Insulation		2	0	0		0
3. Air Infiltration	3.1	Reduced Envelope Leakage		Prereq				
	3.2	Greatly Reduced Envelope Leakage		2	0	0		0
	3.3	Minimal Envelope Leakage	**EA 3.2**	3	0	0		0
4. Windows	4.1	Good Windows		Prereq				
	4.2	Enhanced Windows		2	0	0		0
	4.3	Exceptional Windows	**EA 4.2**	3	0	0		0
5. Heating and Cooling Distribution System	5.1	Reduced Distribution Losses		Prereq				
	5.2	Greatly Reduced Distribution Losses		2	0	0		0
	5.3	Minimal Distribution Losses	**EA 5.2**	3	0	0		0
6. Space Heating and Cooling Equipment	6.1	Good HVAC Design and Installation		Prereq				
	6.2	High-Efficiency HVAC		2	0	0		0
	6.3	Very High Efficiency HVAC	**EA 6.2**	4	0	0		0
7. Water Heating	7.1	Efficient Hot Water Distribution		2	0	0		0
	7.2	Pipe Insulation		1	0	0		0
	7.3	Efficient Domestic Hot Water Equipment		3	0	0		0
8. Lighting	8.1	ENERGY STAR Lights		Prereq				
	8.2	Improved Lighting		2	0	0		0
	8.3	Advanced Lighting Package	**EA 8.2**	3	0	0		0
9. Appliances	9.1	High-Efficiency Appliances		2	0	0		0
	9.2	Water-Efficient Clothes Washer		1	0	0		0
10. Renewable Energy	10	Renewable Energy Systen		10	0	0		0
11. Residential Refrigerant Management	11.1	Refrigerant Charge Test		Prereq				
	11.2	Appropriate HVAC Refrigerants		1	0	0		0
			Sub-Total for EA Category:	**38**	18	2		**18**

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

The Project will be one of the first building blocks of the long-planned transit-oriented mixed-use redevelopment of Sullivan Square. The site is immediately adjacent to Sullivan Square itself, with significant frontage on both Cambridge Street and Rutherford Avenue. It is directly across the street from the seven parcels—all but one vacant and publicly owned—that were the subjects of the BRA's December 2013 Sullivan Square Disposition Study (see Section 1.3), and the Project reflects the development guidelines that have been established for these parcels.

The approximately1.62-acre site includes a group of underutilized industrial buildings that are among the closest existing structures to the Orange Line's Sullivan Square Station. The Project represents an important first step in the transformation of the Square, looking to the future while acknowledging the past. The Project will consist of two components:

- The adaptive reuse of the three-story former Graphic Arts Finishers building at 32 Cambridge Street; and
- The development of a new, four-story residential structure designed with an industrial aesthetic that acknowledges the area's historic uses. It will replace several derelict warehouse structures to the rear of 32 Cambridge Street, in a courtyard configuration with a major frontage on Rutherford Avenue.

The two structures—old and new—will be linked with a glass connector element, linking all three stories of 32 Cambridge Street with the new structure, which will allow the two buildings to function as a single, integrated development with shared access and amenities. Together, the old and new structures will offer a range of unit types, from industrial style lofts to sleek contemporary studio, one-, two-, and three-bedroom units.

Adaptive Use

Consistent with the city's goal of mixed-use development with an activated public realm, the existing 32 Cambridge Street building is designed to include an approximately 2,500 sf retail or restaurant space, which could potentially include a bakery, coffee shop or small restaurant, at street level fronting Cambridge Street with access from the Project's entry court. This space will be well-suited for a bakery, café, or small-scale restaurant use. The remainder of this three-story building will include a mix of loft-style residential units. The one-story loading addition on the west side of this building will be demolished, but the existing chimney stack will be retained as a visual feature. The existing windows will be replaced with a historically appropriate, insulated aluminum window system, with a color matching that of the windows in the new building.

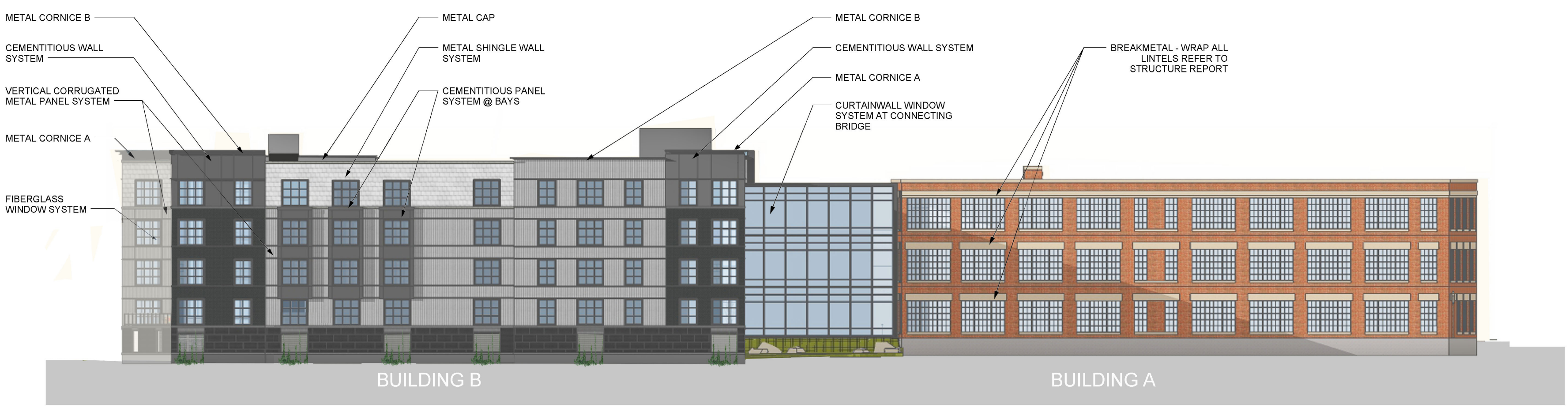
The basement of this building will provide storage space for the retail use, certain MEP/FP equipment, maintenance and management space, as well as resident amenities such as a personal storage locker area, a dog wash room, bicycle storage, and bicycle repair/lounge area.

Proposed Building Materials

As shown in Figures 5-1 to 5-3, within the structure's overall U-shaped form, the building is articulated and accommodates itself to the site through setbacks, with prominent corners highlighted as towers with a change in materials and steps in height. The predominant façade materials will be a combination of corrugated aluminum metal panels, upper-story shingle material with an inset cementitious panel system at the window bays and several corner towers.

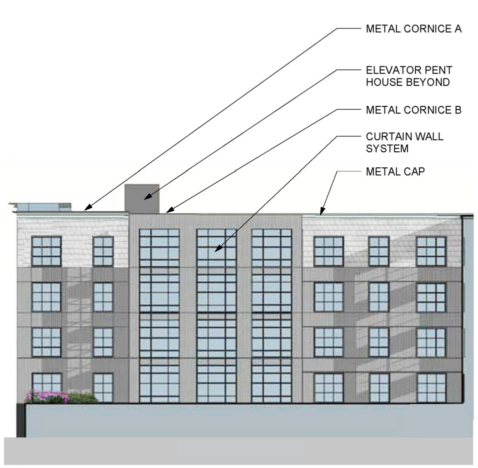
A change in materials is also used to articulate the massing horizontally into base, middle, and top. The at-grade open garage level, which is primarily exposed on the Rutherford Avenue and D Street sides, will be clad in large format masonry materials, with architectural metal grilles providing required natural ventilation. Plantings will intertwine up the metal grilles, providing screening of the vehicles and visual interest along the sidewalk edge. Glazed brick will extend up three floors at the prominent corner towers along Rutherford Avenue. The predominant material at the top floor will be metal shingles; this material will also be used to accentuate the corner tower above the Project's main residential entry, visible from Cambridge Street at the terminus of the pedestrian and vehicular entry court. The neutral but varied color palette of warm greys is intended to complement the warm red brick of 32 Cambridge Street.

2 SOUTHWEST ELEVATION
1" = 20'

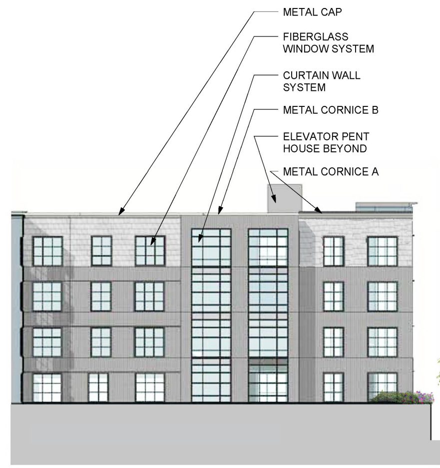


1 NORTHEAST ELEVATION (RUTHERFORD AVENUE)
1" = 20'

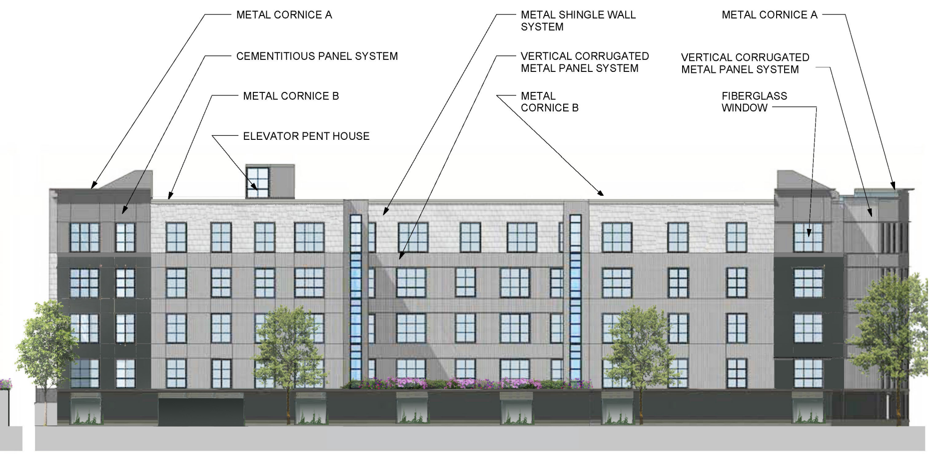
Figure 5-1
Building Elevations



6 NORTHEAST COURTYARD ELEVATION
1" = 20'

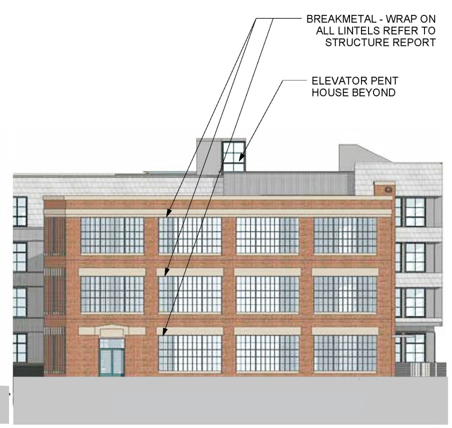


5 SOUTHWEST COURTYARD ELEVATION
1" = 20'

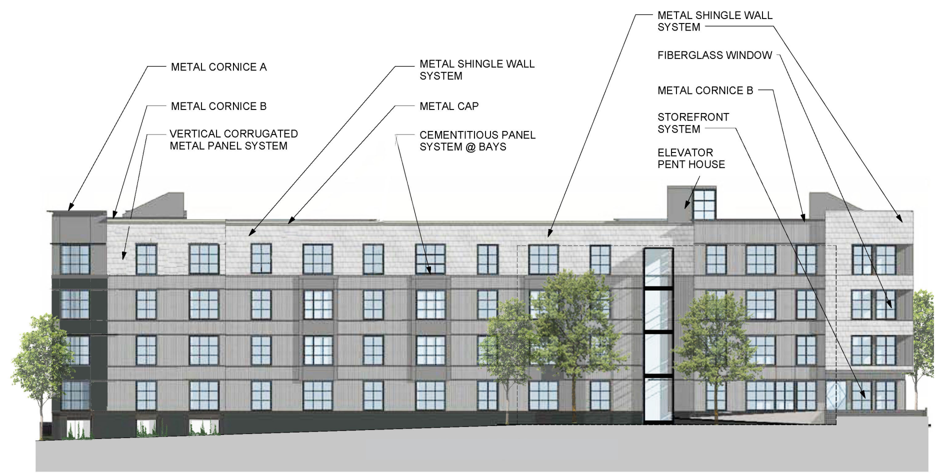


4 SOUTHEAST ELEVATION (D STREET)
1" = 20'

3 SOUTHWEST BLDG A ELEVATION
1" = 20'



2 NORTHWEST BLDG A ELEVATION
1" = 20'



1 NORTHWEST BLDG B ELEVATION
1" = 20'

Figure 5-2
Building Elevations

32 Cambridge Street Boston, MA

ICON ARCHITECTURE

Figure 5-3
Aerial View of Proposed

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and adjacent to the Project site and describes the potential effects of the Project on these resources. A review of the State and National Registers of Historic Places, Massachusetts Historical Commission (MHC) and Boston Landmarks Commission (BLC) survey files, as well as a field review of the areas in the vicinity of the Project, were undertaken to identify historic resources.

6.1 Project Site

The L-shaped Project site is bounded by Cambridge Street to the north, Rutherford Avenue to the east, D Street to the south, a former school to the northeast, and existing industrial buildings to the west. The site includes two industrial buildings: a three-story brick building on Cambridge Street that will be renovated, and a one-story warehouse building on Rutherford Avenue that will be demolished and replaced with a new structure.

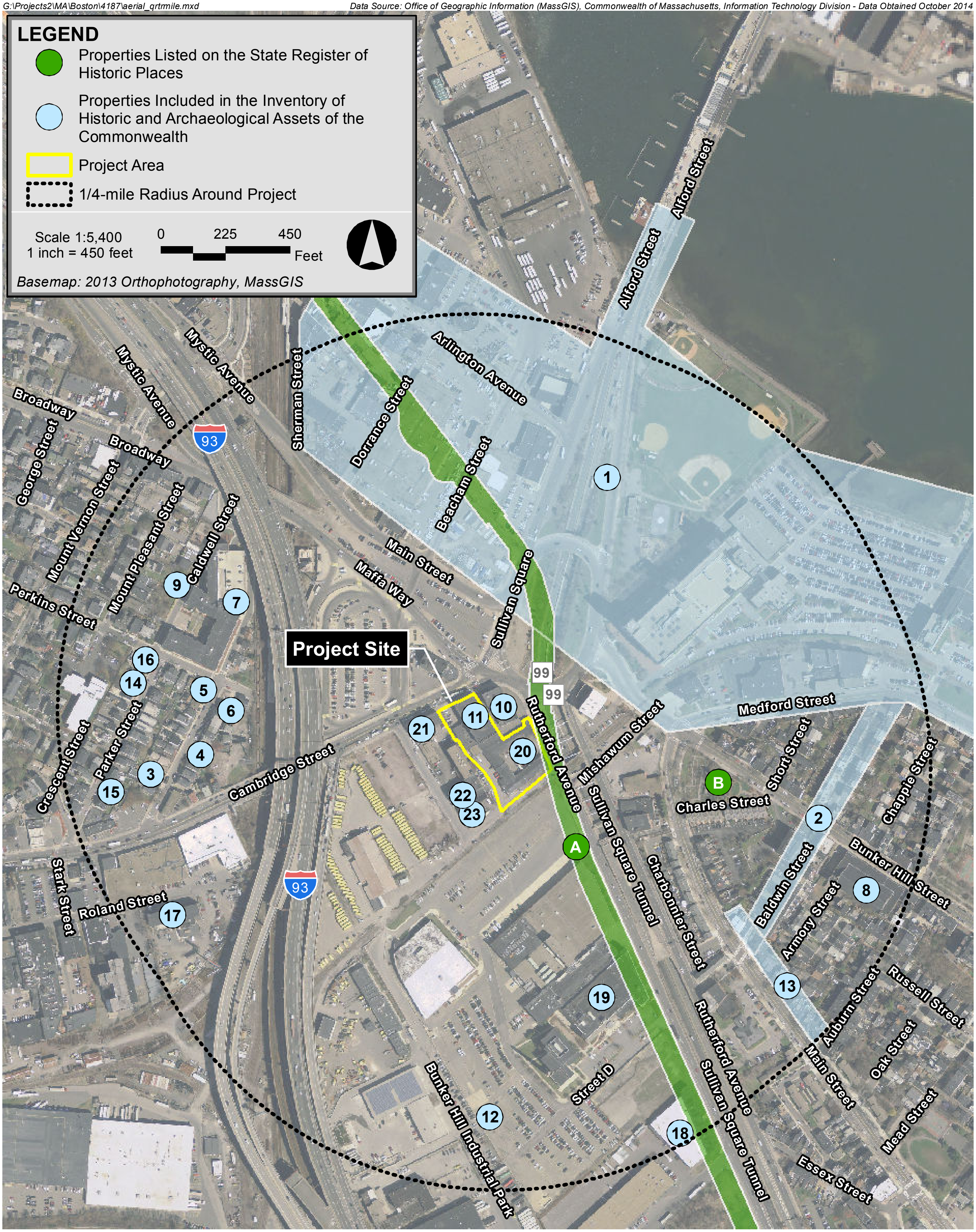
6.2 Historic Resources

Historic Resources within the Project Site

The Project site encompasses two buildings, the Graphic Arts Finishers Building (MHC BOS.12847) at 32 Cambridge Street and the former Henry Sawyers Printers building (MHC BOS.12856) at 572 Rutherford Avenue. Both buildings are included in the Inventory of Historic and Archaeological Assets of the Commonwealth and are located within the B&M Railroad area (MHC BOS.RL). The B&M Railroad area is a roughly L-shaped area comprising approximately 106 acres located at the northwest end of Charlestown. The 1997 survey undertaken for the BLC by The Public Archaeology Laboratory, Inc. (PAL) identified 15 industrial buildings and complexes within the area. The area as a whole was not recommended for listing as a potential historic district. Within the area, three separate industrial buildings were recommended for listing in the National Register Places (Crosby Steam Gage and Valve Company Factory, Puritan Brewery, H.P. Hood and Sons Milk Plant). The two buildings within the Project site at 32 Cambridge Street and 572 Rutherford Avenue were surveyed by PAL within the B&M Railroad area and were not recommended as meeting National Park Service (NPS) National Register eligibility criteria.

The property at 572 Rutherford Avenue is also located within the Middlesex Canal Historic District which is listed in the National and State Registers of Historic Places. A map prepared by the Middlesex Canal Commission identifies a small portion of the canal as having been located in the vicinity of the southeast corner of the Project site.

In addition to the resources within the Project site, there are several historic resources in the Project site's vicinity. The names and addresses of properties listed on the State Register of Historic Places and properties included in the Inventory within a quarter-mile radius of the Project are listed in Table 6-1. Figure 6-1 depicts the locations of these properties.



32 Cambridge Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources

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

No.	State National Register Listed Properties	Address
A	Middlesex Canal	
B	Boston Engine Company No. 42 (NR DOE)	442 Bunker Hill Street
Inventory of Historic and Archaeological Resources of the Commonwealth Properties		
1	Mystic River Industrial Area	
2	Baldwin Avenue Residences (52)	41-117 Baldwin Avenue
3	Israel R. Pruden Houses	4 and 6 Brighton Street
4	Gilbert Williams Houses	17 and 19 Brighton Street
5	Henry Bancroft House	28 Brighton Street
6	Frank Lamprey House	33 Brighton Street
7	Davidson Rubber Company - DEMOLISHED	50 Brighton Street
8	Charlestown Armory	380 Bunker Hill Street
9	Horatio Williams House	23 Caldwell Street
10	Benjamin Tweed Primary School	Cambridge Street
11	Graphic Arts Building	32 Cambridge Street
12	Boston and Maine Railroad Roundhouse - DEMOLISHED	D Street
13	Main Street Residences (11)	397-445 Main Street
14	Orr N. Towne House	3 Parker Street
15	Israel R. Pruden Double House	32 Parker Street
16	Edward A. Lawrence-Benjamin Parker House	71-71B Perkins Street
17	Crosby Steam Gage and Valve Company	24 Roland Street
18	Rosev Dairy	420-438 Rutherford Avenue
19	H.P. Hood & Sons Building and Power Station	500 Rutherford Avenue
20	Henry Sawyer Printers	572 Rutherford Avenue
21	Julian D'Este Brass Foundry	6 Spice Street/40 Cambridge Street
22	Henry E. Wright Company	24-26 Spice Street
23	Fraser and Malloy Associates	Spice Street

6.3 Impacts to Historic Resources

6.3.1 Urban Design

As described in Chapter 5, the Project will be one of the first building blocks of the long-planned transit-oriented mixed-use redevelopment of Sullivan Square. The proposed program and design reflect the development guidelines that have been established for the surrounding parcels subject to the BRA's Sullivan Square Disposition Study.

The Project will retain and adaptively reuse the three-story former Graphic Arts Finishers building at 32 Cambridge Street. In addition, a new four-story residential structure will be constructed to the rear of 32 Cambridge Street, designed with an industrial aesthetic that acknowledges the area's historic uses. It will replace the derelict one-story warehouse structure at 572 Rutherford Avenue. The existing and new structures will be linked with a glass connector element.

The new building is articulated and accommodates itself to the site through setbacks, with prominent corners highlighted as towers with a change in materials and steps in height. Materials include corrugated aluminum metal panels and upper-story shingles with an inset cementitious panel system at the window bays and corner towers. The neutral but varied color palette of warm greys is intended to complement the warm red brick of 32 Cambridge Street. The new building has been designed to be sensitive to its industrial setting, but also contemporary in its architectural character, creating a dynamic connection between the traditional and the new.

Given the limited historic resources in the area and the sensitive design of the new construction, the Project is not likely to have any adverse visual impacts on historic resources in the vicinity of the Project site.

6.3.2 Shadow Impacts

As described in Section 3.2, an analysis of existing and future shadow conditions was conducted. The shadow study included an analysis of impacts of the proposed Project on the area surrounding the Project site.

The shadow analysis examined existing and build condition shadow impacts for March 21, June 21, September 21, and December 21 at 9:00 a.m., 12:00 p.m. and 3:00 p.m., as well as 6:00 p.m. for June 21 and September 21. The results of the façade shadow studies are described in Section 3.2 and are depicted on Figures 3.2-1 through 3.2-14.

The results of the shadow study indicate that the Project will cause limited shadow impacts to the surrounding area. New shadow from the Project will generally be limited to the Project site, surrounding parcels to the north and west of the site, and Rutherford Avenue, with shadows extending further east during the later afternoon hours in September. There will be no adverse impacts from new shadow on significant historic resources.

6.4 Archaeological Resources

The Project site is located within a densely developed urban setting. It is not anticipated that the site contains significant archaeological resources. However, the southeast corner of the 572 Rutherford Avenue parcel contains a mapped portion of the Middlesex Canal, which is listed on the National and State Registers of Historic Places. This portion of the canal is "built over," meaning there are no exposed canal elements such as the canal prism, tow path, or earth berm. Because a mapped portion of the canal traverses the parcel, an archaeological assessment was undertaken by PAL. The goal of the assessment was to determine the potential for intact, buried canal elements within the area that overlaps the 572 Rutherford Avenue parcel.

PAL's review of geotechnical data and historic records concluded that nineteenth through early-twentieth century development of the Project parcel would have likely obscured any intact canal period fill deposits that may have been present. In addition, the 1950s construction of Rutherford Avenue underpass and road widenings would have obliterated all adjacent sections of the canal structure and associated soil strata in this area. PAL concluded that the built-over section of the mapped Middlesex Canal within and adjacent to the Project parcel has low sensitivity for significant archaeological deposits and no further archaeological investigations are recommended.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

7.1 Introduction

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

- Sewer
- Domestic water
- Fire protection
- Drainage
- Energy

The Project includes the redevelopment of a site containing two existing commercial buildings and associated parking lot area in the Charlestown neighborhood of Boston. The Project site is bounded by Cambridge Street to the north; Rutherford Avenue to the east; a Massport-owned, paved right-of-way sometimes known as "D Street" to the south; and abutting three-story buildings to the west.

7.2 Wastewater

7.2.1 Existing Sewer Infrastructure

Existing Boston Water and Sewer Commission (BWSC) and Massachusetts Water Resource Authority (MWRA) combined sewer and sanitary mains are located in Rutherford Avenue and/or Cambridge Street adjacent to the Project site.

Cambridge Street

There is a 24-inch x 30-inch BWSC combined sewer main and a 78-inch x 86-inch MWRA sanitary sewer main in Cambridge Street, both flowing easterly.

Rutherford Avenue

There is a 24-inch BWSC combined sewer which flows southerly and increases to a 30-inch BWSC combined sewer main in Rutherford Avenue. There is also a 29-inch x 30-inch MWRA sanitary sewer main, also called the Charlestown Branch Sewer, which flows northerly and increases to a 37-inch x 44-inch MWRA sanitary sewer main in Rutherford Avenue.

The 24-inch x 30-inch BWSC combined sewer main in Cambridge Street flows easterly to the 36-inch BWSC combined sewer main in Rutherford Avenue which flows easterly, with a 24-inch BWSC combined sewer main overflow in Rutherford Avenue which flows southerly. The 36-inch BWSC combined sewer main flows easterly and then northerly, and ultimately connects to the 78-inch x 86-inch MWRA sanitary sewer main known as the MWRA Cambridge Branch Sewer. The Cambridge Branch Sewer is conveyed to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. During times of high flow, the 24-inch x 30-inch BWSC combined sewer main overflows to the 24-inch BWSC combined sewer main in Rutherford Avenue. The 24-inch BWSC combined sewer main in Rutherford Avenue flows southerly and then increases to a 36-inch BWSC combined sewer main which ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal, and during times of high flow, overflows to the Mystic River.

The 78-inch x 86-inch MWRA sanitary sewer main in Cambridge Street flows easterly and connects to the 29-inch x 30-inch MWRA sewer main, and then connects to the 42-inch x 90-inch MWRA sewer main, also known as the MWRA Cambridge Branch Sewer, in Alford Street. The MWRA Cambridge Branch Sewer in Alford Street ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. The existing sewer system is illustrated in Figure 7-1.

7.2.2 Wastewater Generation

The Project's sewage generation rates were estimated using 310 CMR 15 and the proposed building program. 310 CMR 15.203 lists typical sewage generation values for the proposed building use, as shown in Table 7-1. Typical generation values are conservative values for estimating the sewage flows from new construction. 310 CMR 15.203 sewage generation values are used to evaluate new sewage flows or an increase in flows to existing connections. The existing site is comprised of two existing buildings with manufacturing and office space. Table 7-1 describes the increased sewage generation in gallons per day (gpd) due to the proposed Project.

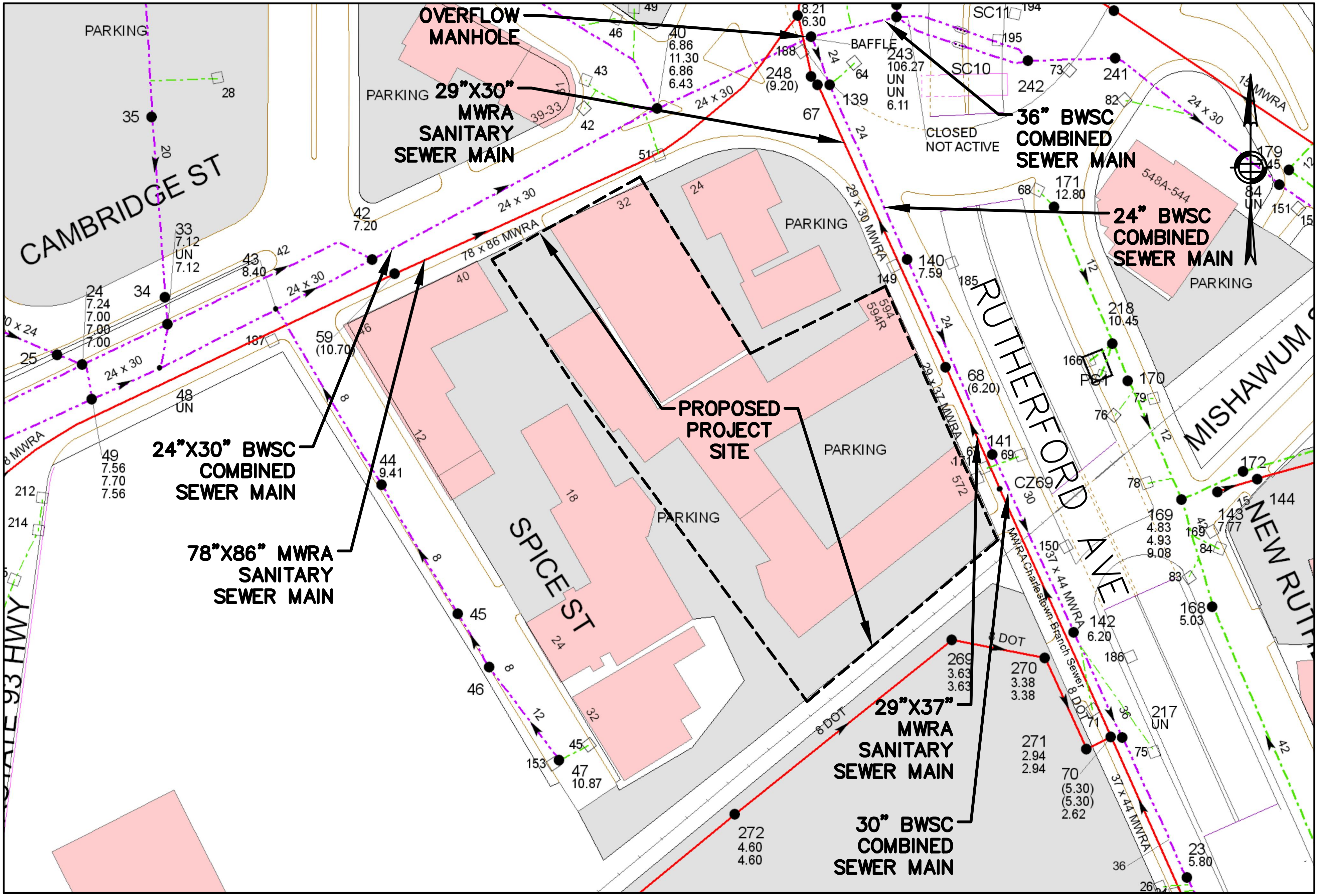
Table 7-1 Proposed Project Wastewater Generation

Proposed Conditions

Building	Size		310 CMR Value (gpd/unit)		Total Flow (gpd)
Residential	189	bedrooms	110	/bedroom	20,790
Commercial	2,490	s.f.	50	/1000 s.f.	125
		Total Proposed Sewer Flows (gpd):			20,915

Existing Conditions

Building	Size		310 CMR Value (gpd/unit)		Total Flow (gpd)
Manufacturing	68	employees	15	/employee	1,020
Office	5,000	s.f.	50	/1000 s.f.	250
		Approximate Existing Sewer Flows (gpd):			1,270
		Total Increase in Sewer Flows (gpd)			19,645



32 Cambridge Street   Boston, MA

SCALE: 1"=100'

Epsilon ASSOCIATES INC.

Figure 7-1

Existing Sewer System

7.2.3 Sewage Capacity and Impacts

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

Table 7-2 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Distance (feet)	Invert Elevation (up)	Invert Elevation (down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Cambridge Street								
43 to 42	83	8.40	7.20	1.4%	24 x 30	0.013	36.33	23.48
42 to 40	250	7.20	6.86	0.1%	24 x 30	0.013	11.14	7.20
40 to 86	132	6.43	6.30	0.1%	24 x 30	0.013	9.48	6.13
						Minimum Flow Analyzed:	9.48	5.66
Rutherford Avenue								
86 to 139	59	8.21	7.89	0.5%	24	0.013	16.66	10.77
139 to 140	149	7.89	7.59	0.2%	24	0.013	10.15	6.56
140 to 141	164	7.59	7.26	0.2%	24	0.013	10.15	6.56
						Minimum Flow Analyzed:	10.15	6.56

7.2.4 Proposed Conditions

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the existing sewer system. The Project is expected to generate approximately 20,915 gpd, or an increase in wastewater flows of approximately 19,645 gpd compared to the existing estimated average daily wastewater flows from the site. Approval for the increase in sanitary flow will come from BWSC.

The sewer services for the Project will connect to the existing BWSC combined sewer mains located in Cambridge Street and/or Rutherford Avenue.

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

7.2.5 Proposed Impacts

The Project's impact on the existing BWSC system in Cambridge Street, Rutherford Avenue, and potential building service connections to the sewer system were analyzed. The capacities of the existing sewer systems are presented in Table 7-2.

Table 7-2 indicates the hydraulic capacity of the existing 24-inch by 30-inch combined sewer main in Cambridge Street, and the 24-inch combined sewer main in Rutherford Avenue. The minimum hydraulic capacity is 5.66 million gallons per day (MGD) or 9.46 cubic feet per second (cfs) for the BWSC combined sewer system in Cambridge Street, and 6.56 MGD or 10.15 cfs for the BWSC combined sewer system in Rutherford Avenue. Based on an average increase in daily flow estimate for the Project of 19,645 gpd or 0.02 MGD; and with a safety factor of 10 (total estimate = .02 MGD x 10 = 0.2 MGD), no capacity problems are expected for the sewer mains in Cambridge Street and/or Rutherford Avenue.

7.3 Water Supply

7.3.1 Existing Water Infrastructure

Water for the Project site will be provided by the BWSC. There are five water systems within the City that provide service to portions of the City based on ground surface elevation. The five systems are Southern Low (commonly known as low service), Southern High (commonly known as high service), Southern Extra High, Northern Low, and Northern High. There are existing BWSC water mains in Cambridge Street and Rutherford Avenue.

There is a 12-inch BWSC Northern Low Main and a 30-inch BWSC Northern Low Main in Cambridge Street. There is also a 16-inch BWSC Northern Low Main in Rutherford Avenue. The existing water system is illustrated in Figure 7-2.

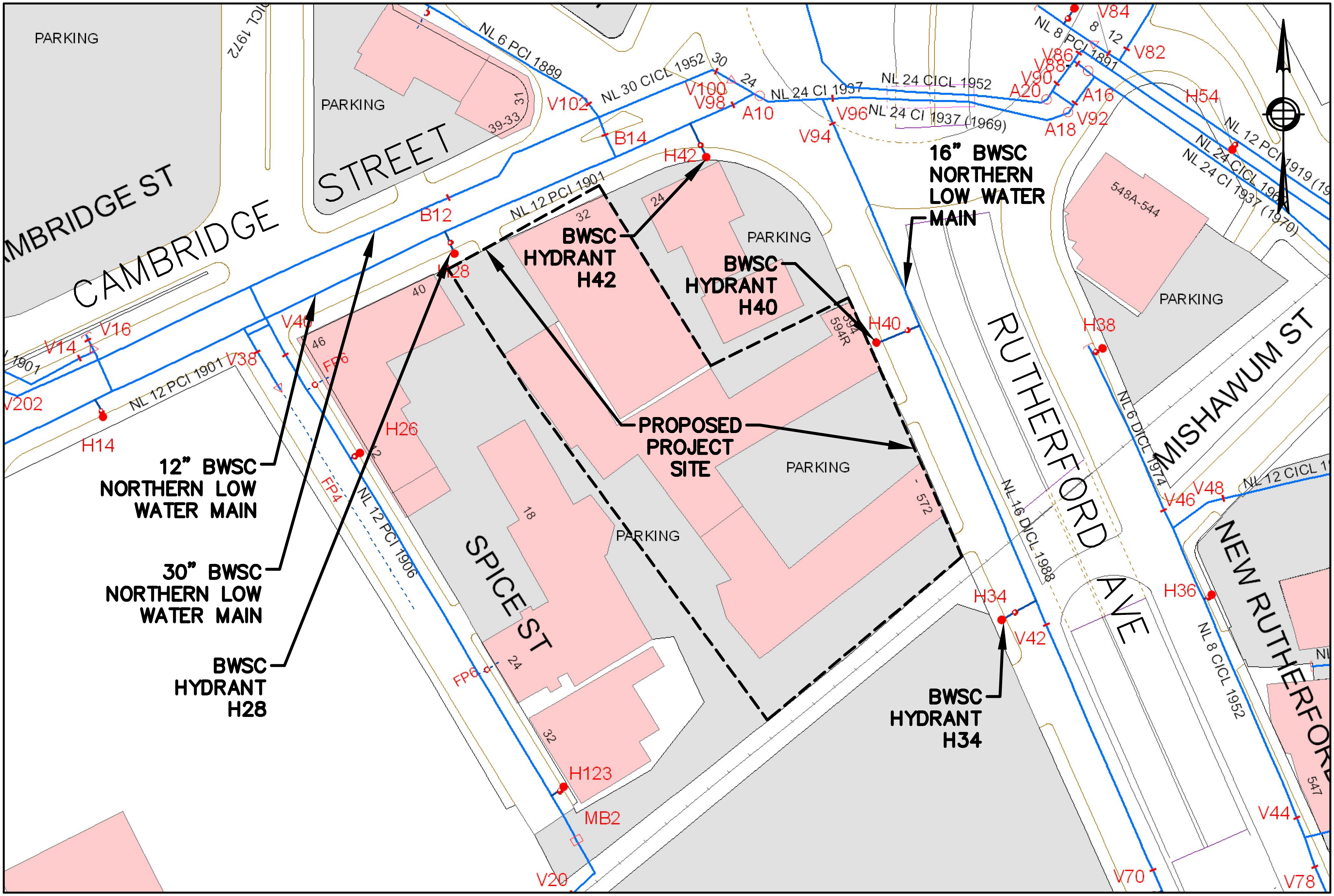
BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the site was requested by the Proponent. Hydrant flow data was not available for hydrants near the Project site. As the design progresses, the Proponent will request that hydrant flows be conducted by BWSC adjacent to the Project site.

7.3.2 Proposed Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation described in the previous section. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 310 CMR 15.203 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is 23,006 gpd, or an increase in 21,610 gpd compared to the existing condition. Water capacity problems are not anticipated within the BWSC system as a result of the Project.

7.3.3 Proposed Project

The domestic and fire protection water services for the Project will connect to the existing BWSC water mains in Cambridge Street and/or Rutherford Avenue. The proposed Project's impacts to the existing water system will be reviewed as part of the BWSC's Site Plan Review process.



32 Cambridge Street Boston, MA

Figure 7-2

Existing Water System

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

7.3.4 Water Supply Conservation and Mitigation Measures

Measures to reduce water consumption will be incorporated into the Project design, including water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand. In public areas, sensor operated faucets and toilets will be installed.

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

7.4 Stormwater

7.4.1 Existing Storm Drainage System

There are existing BWSC combined sewer mains in Cambridge Street and Rutherford Avenue, as previously described in Section 7.2.1. There are no dedicated storm drain mains adjacent to the Project site. The existing combined sewer mains in Cambridge Street and Rutherford Avenue flow to the MWRA Cambridge Branch Sewer and ultimately flow to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. The 24-inch BWSC combined sewer main flows southerly and ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal, and during times of high flow, overflows to the Mystic River. The existing BWSC combined sewer and storm drain system is illustrated in Figure 7-1.

On the Project site, existing stormwater is currently captured by existing closed drainage systems on-site and also sheet flows to the adjacent roadways. Stormwater in the roadways is captured by existing catch basins which flow to the existing BWSC combined sewer mains.

7.4.2 Proposed Project

The existing site is comprised of two existing buildings, paved parking areas, and compacted gravel areas, and is nearly 100 percent impervious. The Project will decrease the impervious area on site to approximately 92% compared to the existing condition. The Project will consist mainly of building roofs, associated paved parking, walkways, and landscaped areas. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable.

The Project will include a closed drainage system that will strive to infiltrate one-inch of stormwater runoff from the impervious areas on-site into the ground to the greatest extent practicable. Overflow connections to the BWSC mains will be provided for greater stormwater flows. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the Project site in the developed condition compared to the existing condition. The Project site is not located in the Groundwater Conservation Overlay District.

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

If it is determined that groundwater recharge is not feasible, the Proponent will treat the stormwater runoff to adequately capture TSS and phosphorus prior to discharging to the BWSC system.

7.4.3 Water Quality Impact

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

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

7.4.4 MassDEP Stormwater Management Policy Standards

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.5 Protection Proposed During Construction

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

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

7.6 Conservation of Resources

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

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENT AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designed to comply with the standards of the Americans with Disabilities Act. Appendix E includes the Accessibility Checklist as required by the City of Boston.

8.2 Massachusetts Environmental Policy Act (MEPA)

It is anticipated that the Project will receive the benefit of an access license or easement over the Massport-owned "D Street" right-of-way adjacent to the site. The Project may therefore be subject to the limited jurisdiction of the Office of the Massachusetts Executive Office of Energy and Environmental Affairs under the Massachusetts Environmental Policy Act (MEPA) with respect to the Massport access agreement. However, the only MEPA threshold the Project is expected to exceed is the demolition of the building at 572 Rutherford Avenue, a structure listed in the Inventory of Historic and Archaeological Assets of the Commonwealth. The Proponent expects to enter into a Memorandum of Agreement with the Massachusetts Historical Commission stipulating the measures that will be taken to avoid, minimize and/or mitigate any adverse effects on historic properties; therefore MEPA review will not be required per 301 CMR 11.03(10)(b).

8.3 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 review process.

8.4 Boston Landmarks Commission (Article 85)

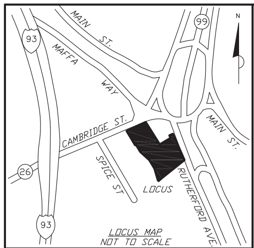
The proposed demolition of the 572 Rutherford Avenue building will be subject to review by the BLC under Article 85 of the Boston Zoning Code. An Article 85 Application for the building will be submitted to the BLC.

8.5 Massachusetts Historical Commission

The MHC has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places. An MHC PNF will be filed to initiate the State Register Review process. The Proponent anticipates entering into a Memorandum of Agreement with MHC concerning the demolition of the 572 Rutherford Avenue building on the Project site.

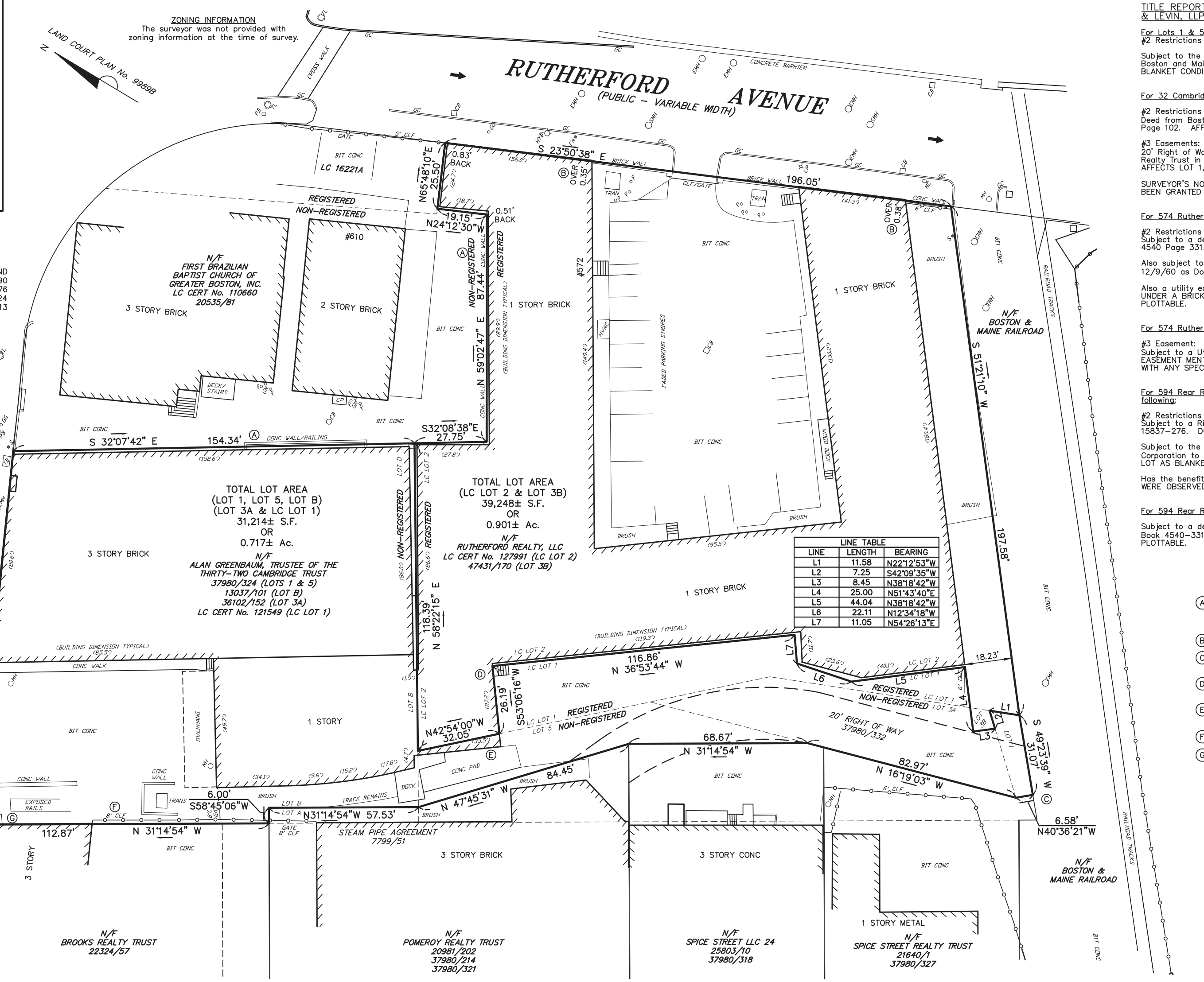
Appendix A

Site Survey



REFERENCES
SUFFOLK COUNTY REGISTRY OF DEEDS
LAND COURT PLAN No. 9989B
" " " " 16221A
PLAN RECORDED IN DEED BOOK 35078 PAGE END
" " " " " 33837 " 190
" " " " " 15837 " 276
" " " " " 7527 " 24
" " " " " 6121 " 613
1950 STATE HIGHWAY LAYOUT No. 3689

ZONING INFORMATION
The surveyor was not provided with zoning information at the time of survey.



LINE TABLE

LINE	LENGTH	BEARING
L1	11.58	N22°12'53"W
L2	7.25	S42°09'35"W
L3	8.45	N38°18'42"W
L4	25.00	N51°43'40"E
L5	44.04	N38°18'42"W
L6	22.11	N12°34'18"W
L7	11.05	N54°26'13"E

TITLE REPORT AS PREPARED BY JUSTIN TIERNEY AS SUPPLIED BY GONZALEZ & LEVIN, LLP

For Lots 1 & 5 as shown on plan recorded in Book 35078 Page End discloses the following:
#2 Restrictions and Conditions:

Subject to the reservations, conditions, covenants and agreements as set forth by the Boston and Maine Corp. in Deed Book 33837 Page 190. AFFECTS LOT 1 AND 5 AS BLANKET CONDITIONS AND IS NOT PLOTTABLE.

For 32 Cambridge Street, Charlestown MA (23,535 sq ft) discloses the following:

#2 Restrictions and Conditions:
Deed from Boston and Maine Railroad to Wright-Zeigler Co. dated 12/13/24 in Book 4639 Page 102. AFFECTS LOT LOT AS BLANKET CONDITIONS AND IS NOT PLOTTABLE.

#3 Easements:
20' Right of Way Agreement between the Thirty Two Cambridge Trust and the Pomerory Realty Trust in Book 37980 Page 332 as shown on Plan in Book 35078 Page end. AFFECTS LOT 1, LOT 3A AND LOT 5

SURVEYOR'S NOTE: LOT A AS SHOWN ON PLAN RECORDED IN BOOK 35078 PAGE END HAS BEEN GRANTED TO POMEROY REALTY TRUST BY DEED BOOK 37980 PAGE 214.

For 574 Rutherford Ave, Charlestown (Lot 2 on Plan 9989-B) discloses the following:

#2 Restrictions and Conditions:
Subject to a deed from the Boston and Main Corp to Harry W. Barrett et als, trs. In Book 4540 Page 331. AFFECTS LOT AS BLANKET CONDITIONS AND IS NOT PLOTTABLE.

Also subject to a deed from Walther C. Bettilyon Co. to Atlantic Excelsior Co., Inc. dated 12/9/60 as Doc # 246641 (DOCUMENT NOT SUPPLIED)

Also a utility easement dated 7/1/83 as Doc # 374084. EASEMENT MENTIONS A LOCATION UNDER A BRICK WALL BUT IS NOT SHOWN OR DESCRIBED WITH ANY SPECIFICITY, NOT PLOTTABLE.

For 574 Rutherford Ave, Charlestown (Lot 3B on Plan 7527-24) discloses the following:

#3 Easement:
Subject to a Utility Easement to Boston Edison Co. dated 7/1/83 in Book 10547 Page 274. EASEMENT MENTIONS A LOCATION UNDER A BRICK WALL BUT IS NOT SHOWN OR DESCRIBED WITH ANY SPECIFICITY, NOT PLOTTABLE.

For 594 Rear Rutherford Ave., Charlestown (Lot 3A on Plan 7527 Page 24) discloses the following:

#2 Restrictions or Conditions:
Subject to a Right of Way Agreement from James N. Kidder in Book 15837-275 see plan 15837-276. DOES NOT AFFECT LOCUS.

Subject to the Restrictions, Covenants, and Agreements in a Deed from Boston and Maine Corporation to Charlestown Properties, Inc. in Book 6181-613 dated 10/20/45. AFFECTS LOT AS BLANKET CONDITIONS AND IS NOT PLOTTABLE.

Has the benefit of a Steam Pipe Agreement in Book 7799 Page 51. NO STEAM PIPES WERE OBSERVED IN THE VICINITY OF THE REAR YARD OF 18 SPICE STREET.

For 594 Rear Rutherford Ave., Charlestown (Lot 1 on Plan 9989B) discloses the following:

Subject to a deed from Boston and Maine Corp to Harry W. Barrett et als, trustees, in Book 4540-331 dated 12/29/23. AFFECTS LOT AS BLANKET CONDITIONS AND IS NOT PLOTTABLE.

LIST OF SIGNIFICANT OBSERVATIONS

(A) CONCRETE WALL WITH RAILING ENCROACHES ONTO LAND NOW OR FORMERLY OF FIRST BRAZILIAN BAPTIST CHURCH OF GREATER BOSTON, INC. BY UP TO 1.7'.

(B) BUILDING ENCROACHES ONTO RUTHERFORD AVENUE BY UP TO 0.38'.

(C) ACCESS IS GAINED FROM LAND NOW OR FORMERLY OF THE RAILROAD.

(D) STAIRS ATTACHED TO RUTHERFORD REALTY LLC BUILDING EXIST ON LAND NOW OR FORMERLY OF THIRTY-TWO CAMBRIDGE TRUST.

(E) BUILDING OF RUTHERFORD REALTY LLC EXISTS ON LAND NOW OR FORMERLY OF THIRTY-TWO CAMBRIDGE TRUST.

(F) FENCE ENCROACHES ONTO LOCUS BY UP TO 1.6'.

(G) BUILDING ENCROACHES ONTO LOCUS BY UP TO 0.3'.

FLOOD NOTE

By graphic plotting only, this property is located in Flood Zone X (unshaded), areas determined to be outside the 0.2% chance of annual flood, as shown on the Flood Insurance Rate Map, Suffolk County, Massachusetts, Panel 77 of 151, Map Number 25025C0014G, Effective Date: September 25, 2009. No Field Surveying was performed to determine this zone and an elevation certificate may be needed to verify this determination or apply for a variance from the Federal Emergency Management Agency.

DIG SAFE

UNDERGROUND UTILITIES WERE NOT INVESTIGATED AS PART OF THIS WORK EFFORT. BEFORE DESIGN AND CONSTRUCTION CALL "DIG SAFE" 1-888-344-7233. SOME DATA IS CONFLICTING AND CAN ONLY BE VERIFIED BY EXCAVATION.

LEGEND

BIT CONC	BITUMINOUS CONCRETE
CB	CATCHBASIN
CP	CONCRETE PAD
CLF	CHAIN LINK FENCE
DMH	DRAIN MANHOLE
EMH	ELECTRIC MANHOLE
GC	GRANITE CURB
GM	GAS METER
GV	GATE VALVE
HYD	HYDRANT
LP	LIGHT POLE
MC	METAL COVER
MH	MANHOLE
P	POST
SMH	SEWER MANHOLE
TL	TRAFFIC LIGHT
TMH	TELEPHONE MANHOLE
TRAN	TRANSFORMER

NOTES:
1) NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, CONSTRUCTION OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
2) NO APPARENT CHANGES IN STREET RIGHT OF WAY LINES, EITHER COMPLETED OR PROPOSED WERE OBSERVED.
3) NO OBSERVABLE EVIDENCE OF SITE USE AS A SOLID WASTE DUMP, SUMP, OR SANITARY LANDFILL.
4) NO OBSERVABLE EVIDENCE OF SITE USE AS A CEMETERY OR BURIAL GROUND.
5) DIRECT ACCESS TO THE PROPERTY IS OBTAINED FROM CAMBRIDGE STREET AND RUTHERFORD AVENUE, BOTH PUBLIC WAYS.

SURVEYOR'S CERTIFICATION

To: THIRTY-TWO CAMBRIDGE TRUST AND RUTHERFORD REALTY, LLC

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), 8, 9, 10, 11(a), 13, 14, 16, 17, 18 and 21 of Table A thereof. The field work was completed on November 20, 2012.

PROGRESS

Michael A. Pustizzi, PLS #46505 ________ Date

#32 CAMBRIDGE STREET
#572-#594 RUTHERFORD AVENUE

ALTA/ACSM LAND TITLE SURVEY
IN
CHARLESTOWN DISTRICT
BOSTON, MA
(SUFFOLK COUNTY)

SCALE: 1"= 20' DATE: NOVEMBER 20, 2012

0 20 40 60 80 ft

PLS
Precision Land Surveying, Inc.
32 Turnpike Road
Southborough, Massachusetts 01772
TELE NO.: (508) 460-1789 FAX NO.:(508) 970-0096

4100TI1.DWG

Appendix B

Transportation

Available Upon Request

Appendix C

Air Quality

AIR QUALITY APPENDIX

Introduction

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

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2014 and 2019 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2014	2019
Free Flow	30 mph	3.486	2.069
Right Turns	10 mph	5.894	3.243
Left Turns	15 mph	5.010	2.867
Queues	Idle	17.030	8.355

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.

32 Cambridge St. - Charlestown, MA
Background Concentrations

Background Concentrations										
POLLUTANT	AVERAGING TIME	Form	2011	2012	2013	Units	ppm to μg/m³ Conversion Factor	Background Concentration (μg/m³)	Standard (μg/m³)	Location
SO_2 (1)(7)(8)	1-Hr	99th %	19.3	13.2	12	ppb	2.62	50.6	196	Kenmore Sq., Boston
	3-Hr	H2H	24.6	13.8	16	ppb	2.62	64.5	1300	Kenmore Sq., Boston
	24-Hr	H2H	9.4	5.4	6	ppb	2.62	24.6	365	Kenmore Sq., Boston
	Ann.	H	2.36	1.87	1	ppb	2.62	6.2	80	Kenmore Sq., Boston
PM-10	24-Hr	H2H	34	37	40	μg/m³	1	40.0	150	One City Sq., Boston
	Ann.	H	15.9	16.8	18	μg/m³	1	18.0	50	One City Sq., Boston
PM-2.5	24-Hr (4)	98th %	21.3	22.6	18	μg/m³	1	20.6	35	One City Sq., Boston
	Ann. (5)	H	8.63	8.76	7.8	μg/m³	1	8.4	12	One City Sq., Boston
NO_2 (3)	1-Hr (6)	98th %	52.9	49	48	ppb	1.88	93.9	188	Kenmore Sq., Boston
	Ann.	H	20.36	19.1	17.78	ppb	1.88	38.3	100	Kenmore Sq., Boston
CO (2)	1-Hr	H2H	1.5	1.3	1.3	ppm	1140	1710.0	40000	Kenmore Sq., Boston
	8-Hr	H2H	1.2	0.9	0.9	ppm	1140	1368.0	10000	Kenmore Sq., Boston
O_3	8-Hr (9)	H4H	0.060	0.078	0.059	ppm	1963	128.904	147	Harrison Ave, Boston
Pb	3-Mo	H	0.017	0.014	0.007	μg/m³	1	0.017	0.15	Harrison Ave, Boston

From 2010-2013 MassDEP Annual Data Summaries

[1] SO_2 reported in ppb. Converted to μg/m³ using factor of 1 ppb = 2.62 μg/m³.

[2] CO reported in ppm or ppb. Converted to μg/m³ using factor of 1 ppm = 1140 μg/m³.

[3] NO_2 reported in ppb. Converted to μg/m³ using factor of 1 ppb = 1.88 μg/m³.

[4] Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.

[5] Background level for annual PM-2.5 is the average for three years.

[6] Background level for 1-hour NO2 is the average of the 98th percentile of the daily maximum 1-hour values a over three years.

[7] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

[8] The 2011 - 2013 SO_2 3-hr value is no longer reported by MassDEP. 1-hr H2H used instead. 2013 24-hr value also no longer reported. Obtained from EPA AirData website.

[9] Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years

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

Appendix D

Climate Change Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

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

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

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

Climate Change Analysis and Information Sources:

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

Checklist

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

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

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

A.1 - Project Information

Project Name:	32 Cambridge Street
Project Address Primary:	32 Cambridge Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Jen Rosenberg, Construction Manager/Development PM, Berkeley Investments Inc., jrosenberg@berkinv.com, 617-439-0088

A.2 - Team Description

Owner / Developer:	Berkeley Investments, Inc.
Architect:	ICON Architecture
Engineer (building systems):	Wozny/Barbar & Associates, Inc
Sustainability / LEED:	ICON Architecture
Permitting:	Epsilon Associates, Inc.
Construction Management:	Tocci Building Companies
Climate Change Expert:	Epsilon Associates, Inc.

A.3 - Project Permitting and Phase

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

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

A.4 - Building Classification and Description

List the principal Building Uses:	Residential, Retail
List the First Floor Uses:	*Retail, Residential Lobby*

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

☑ Wood Frame	☑ Masonry	☑ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*70,462 SF*	Building Area:	*140,500 SF*
Building Height:	*59 Ft.*	Number of Stories:	*5 Flrs.*
First Floor Elevation (reference Boston City Base):	*20.23 ft/26.58 ft Elev.*	Are there below grade spaces/levels, if yes how many:	*1*

A.5 - Green Building

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

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

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

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

A.6 - Building Energy-

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

Electric:	*500 (kW)*	Heating:	*2.1 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*(kWh/SF)*	Cooling:	*250 (Tons/hr)*

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

Electric:	*80 (kW)*	Heating:	*0.5 (MMBtu/hr)*
		Cooling:	*20 (Tons/hr)*

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

Electrical Generation:	*100 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

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

B.1 - Analysis

What is the full expected life of the project?

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

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

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

What time span of future Climate Conditions was considered?

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

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

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

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

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

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

30-90 Days	*0.2 Events / yr.*

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

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

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

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

B.2 - Mitigation Strategies

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

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

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 = 38*	Walls / Curtain Wall Assembly:	*R = 20*
Foundation:	*R = N/A*	Basement / Slab:	*R = 10 (where applicable)*
Windows:	*R = / U =0.30*	Doors:	*R = / U =TBD*

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: Solar PV feasibility to cover the common area load is being studied.

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

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

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

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

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

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

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

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

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

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

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

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

C - Sea-Level Rise and Storms

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

C.1 - Location Description and Classification:

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

	Yes / No

Describe site conditions?

Site Elevation – Low/High Points:	*16.08 to 20.23 Boston City Base Elev.(Ft.)*
Building Proximity to Water:	*1,300 Ft.*

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

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

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

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

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

	~5 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:	*N/A Boston City Base Elev.(Ft.)*	First Floor Elevation:	*20 ft Boston City Base Elev.)*

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:	The parking garage will be able to be inundated in a flood event.		

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

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

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

*Yes / **No***

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

Yes */ No*	If yes, to what height above 100 Year Floodplain:	*8 ft Boston City Base Elev.*

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 E

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/

Project Information

Project Name:	32 Cambridge Street
Project Address Primary:	32 Cambridge Street
Project Address Additional:	32 Cambridge & 572 Rutherford Avenue, Charlestown, MA
Project Contact (name / Title / Company / email / phone):	Jen Rosenberg, Construction Manager/Development PM, Berkeley Investments Inc., jrosenberg@berkinv.com, 617-439-0088

Team Description

Owner / Developer:	Berkeley Investments, Inc.
Architect:	ICON Architecture Inc.
Engineer (building systems):	Wozny/Barbar and Associates
Sustainability / LEED:	ICON Architecture Inc.
Permitting:	Epsilon Associates, Inc.
Construction Management:	Tocci Construction Companies

Project Permitting and Phase

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

PNF / Expanded		

Building Classification and Description

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

Residential – One to Three Unit	Residential - Multi-unit, Four +	Retail	Education
	171 total residential apartments	+/- 2,000 SF	

First Floor Uses (List)	*Retail & Residential*

What is the Construction Type – select most appropriate type?

Wood Frame –	Masonry	Steel Frame	Concrete
New Construction: Concrete parking level with 4 levels of Modular wood frame above	Existing Building: Three floors of heavy timber and steel with masonry exterior		

Describe the building?

The redevelopment consists of the adaptive reuse of the three-story former Graphic Arts Finishers building at 32 Cambridge Street with ground floor retail fronting Cambridge Street; and development of a new, four-story residential structure over grade level parking.

The two structures – old and new – will be linked with a glass connector element, connecting all three stories of the existing building with the new structure, which will allow the two buildings to function as a single, integrated development with shared access and amenities. Together, the old and new structures will offer a range of residential unit types.

Site Area:	*70,462 SF*	Building Area:	*140,620 SF*
Building Height:	*54'-6" Above average grade*	Number of Stories:	*3 - 5Flrs (including parking)*

First Floor Elevation:	*Existing Building: BCB: 20.23';* *New Building: BCB 26.58'*	Are there below grade spaces:	*Yes: Existing Building Basement*

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.	**The Project site is located in Sullivan Square in the Charlestown neighborhood. The immediate surroundings include surface parking lots and low density commercial, industrial and residential uses. The site is located within a diverse neighborhood offering a mix of many different housing typologies and many business types. Numerous transportation options exist within a quarter mile radius of the site. Noteworthy landmarks include the Sullivan Square MBTA Station and the Schrafft's Building.**
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	**Sullivan Square Orange Line MBTA Transit Station is within a quarter mile radius. Bus routes 86, 89/93, 90, 91, 92, 93, 96, 104, 105 and CT2 all make stops within a quarter mile from the Project site.**
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	**Bunker Hill Community College, Charlestown Community Center, First Brazilian Baptist Church of Greater Boston, Bright Horizons Daycare, Prospect Hill Academy Charter School, East Somerville Community School, General Warren Apartments, Teamsters Mental Health, Mass General: Charlestown HealthCare, Springfield College School of Human Services, Computer Systems Institute**
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	**No. Surrounding Facilities include Charlestown Working Theater, Ryan Playground, Charlestown Branch – Boston Public Library, Bunker Hill College Library, Somerville Public Library East Branch**

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?	**The development is adjacent to public sidewalks, but there are no sidewalks or ramps existing on the site.**
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	**The existing vehicular curb cut into the site from Cambridge Street is to remain.**
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.	**Some of the public sidewalks are existing-to-remain and have not been verified as being compliant. ADA Compliant sidewalks and ramps will be provided in the redevelopment.**
Is the development site within a historic district? If yes, please identify.	**Charlestown B&M Railroad Industrial Area**

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	No, the surrounding sidewalk areas do not have bio-swales, street trees, bike/bus lanes, intelligent signals, street furniture, zoned sidewalk materials, etc.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Both Cambridge Street and Rutherford Avenue fit the description of the Industrial Street Type. Rutherford Avenue is slated for upgrades including a center median.

What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	The public sidewalk on Cambridge Street is 11'- 6" wide. The public sidewalk on Rutherford Avenue is 10 feet wide.
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?	The sidewalks outside the property are concrete. Within the property boundaries, the pedestrian surfaces will be ADA Compliant.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	Not Applicable.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	Not Applicable.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	Not Applicable.

Proposed Accessible Parking:

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

What is the total number of parking spaces provided at the development site parking lot or garage?	Up to 114 total parking spaces provided on site, with up to 98 parking spaces in the garage and 16 parking spaces in the entry court.
What is the total number of accessible spaces provided at the development site?	Of the up to 98 parking spaces in the garage, four (4) are accessible. Of the 16 Parking spaces in the entry court, two (2) parking spaces are 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?	No on-street parking spaces are proposed.
Where is accessible visitor parking located?	Accessible visitor parking will be located in the entry court.
Has a drop-off area been identified? If yes, will it be accessible?	The landscape design includes a vehicle turnaround near the main entry of the building.
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.	Please refer to Figure 1-10 of the PNF for Pedestrian and Vehicular Access.

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.	Please refer to Figure 1-8 of the PNF for Pedestrian and Vehicular Access.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Primary Retail entrance (off courtyard) Flush access Primary Residential entrance (off courtyard) Access via ramp/ stairs to main lobby Access to Garden Courtyard: Flush access. Main elevator serves all residential floors; Secondary Elevator serves Basement for Retail, Bike, Tenant Storage
Are the accessible entrance and the standard entrance integrated?	Yes.
If no above, what is the reason?	Not Applicable.
Will there be a roof deck or outdoor	Please refer to Figure 1-10 of the PNF for Pedestrian and Vehicular Access.

courtyard space? If yes, include diagram of the accessible route.	
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	Not yet. Currently the redevelopment project is in the schematic phase of design.

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?	171 total residential apartments are proposed in the connected buildings; Building A is adaptive re-use, Building B is proposed new construction.
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	All apartments in both buildings are proposed as rental units. 23 affordable, 148 market rate
How many accessible units are being proposed?	The total number of fully barrier-free apartments will be 5% of the total unit count, or nine apartments. These barrier-free, Group 2 units will be equitably dispersed across the building and will match the proposed unit mix for the entire redevelopment. The design includes 1 three-bedroom apartment, 1 two-bedroom apartment, and Building A is an existing building and is not required to have Group 1 (adaptable) units, nor is it required to meet FHA. In Building B, the remaining units that are not Group 2 will meet Group 1 adaptable requirements. In addition, Building B will provide four hearing impaired units and will meet FHA requirements.
Please provide plan and diagram of the accessible units.	Please refer to the figure at the end of this appendix for unit types and location throughout the building.
How many accessible units will also be affordable? If none, please describe reason.	2 affordable units are anticipated to be accessible units

Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	No. Standard units in Building B (new construction) will meet all ADA requirements, including adaptability within each unit for a building with an elevator. Building A will have slightly smaller bathrooms, as well as slightly smaller apartments. All common spaces in the entire redevelopment will be fully accessible to all residents and visitors.
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	No
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	

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

Barrier Free Group 2 Unit

Barrier Free Unit Count				
Studio	1BR	2BR	3BR	Totals
2	5	1	1	9