Expanded Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

Residences at Morrissey Boulevard

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

Submitted by:
Morrissey Holdings LLC
100 Franklin Street, Suite 200
Boston, MA 02110

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

In Association with:
ICON Architecture
Dalton & Finegold, LLP
Vanasse Hangen Brustlin, Inc.
Polaris Consultants, LLC
Goldman Environmental Consultants
Copley Wolf Design Group
Wharf Partners
Geotechnical Partnership, Inc.

November 16, 2012

Epsilon
ASSOCIATES INC.

Expanded Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

Residences at Morrissey Boulevard

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

Submitted by:
Morrissey Holdings LLC
100 Franklin Street, Suite 200
Boston, MA 02110

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

In Association with:
ICON Architecture
Dalton & Finegold, LLP
Vanasse Hangen Brustlin, Inc.
Polaris Consultants, LLC
Goldman Environmental Consultants
Copley Wolf Design Group
Wharf Partners
Geotechnical Partnership, Inc.

November 16, 2012

Epsilon ASSOCIATES INC.

Table of Contents

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

List of Appendices

List of Figures

List of Figures (Continued)

List of Tables

List of Tables (Continued)

Section 1.0

Introduction/Project Description

1.0 INTRODUCTION / PROJECT DESCRIPTION

1.1 Introduction

Morrissey Holdings LLC (Proponent), proposes to develop an approximately 102,380 square-foot (2.35 acre) parcel of vacant land located at 25 William T. Morrissey Boulevard (Project Site) in the Dorchester neighborhood of Boston. The Project Site is located within the boundaries of the recently completed Columbia Point Master Plan (Master Plan). The Proponent was an active participant in the Master Plan's public planning process and the Project has been designed to be consistent with many of its key recommendations.

The Proponent proposes to construct two new buildings consisting of approximately 278 residential rental units, with approximately 143 accessory parking spaces for residents, and usable open space (Project). The apartments will include studios, and one-, two-, and three-bedroom units. The Project is designed to be a transit-oriented development (TOD) as it directly abuts the Massachusetts Bay Transportation Authority's (MBTA) Red Line and Commuter Rail at JFK/UMass Station.

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

1.2 Project Identification

Project Address/Location:	25 William T. Morrissey Boulevard
Developer:	Morrissey Holdings LLC c/o Synergy Investment LLC 100 Franklin Street Boston, MA 02110 (617) 204-9506 David Greaney John Barszewski
Architects:	ICON Architects, Inc. 38 Chauncy Street Boston, MA 02111 (617) 451-3333 Nancy Ludwig Kendra Halliwell Dom Maiellaro

Legal Counsel:	Dalton & Finegold, LLP 34 Essex Street Andover, MA 01810 (978) 269-6404 Jared Eigerman
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Laura Rome Tyler Norod
Transportation and Parking Consultants:	Vanasse Hangen Brustlin, Inc. 99 High Street, 10th Floor Boston, MA 02110 (617) 728-7777 David Black Selma Mandzo-Preldzic
Civil Engineer:	Polaris Consultants, LLC. 1495 Hancock Street, Suite 206 Quincy, MA 02169 (617) 689-1010 Craig Horsfall
Environmental Consultant:	Goldman Environmental Consultants 60 Brooks Drive Braintree, MA 02184 (781) 356-9140 Parrish C. Smolcha
Landscape Architect:	Copley Wolf Design Group 160 Boylston Street, 3rd Floor Boston, MA 02116 (617) 654-9000 Lynn Wolff

Community Relations Consultant	Wharf Partners 66 Long Wharf, 5th Floor Boston, MA 02110 (617) 523-0298 Christine McMahon
Geotechnical Consultant:	Geotechnical Partnership, Inc. 350 Massachusetts Avenue, #149 Arlington, MA 02474 (781) 646-6982 Lisa R. Casselli

1.3 Project Description

1.3.1 Project Site

The Project Site is an approximately 2.35-acre (102,380 square-foot) parcel of land located at 25 William T. Morrissey Boulevard (Morrissey Boulevard) in the Dorchester neighborhood of Boston (see Figures 1.3-1 and 1.3-2). At present, approximately half of the Site is used as surplus accessory parking for the adjacent *Shaw's* supermarket, which abuts the Site immediately to the south. The Proponent is the fee owner of both the Project Site and of the adjacent *Shaw's* supermarket site. The Project Site has approximately 318 feet of frontage along the Morrissey Boulevard Access Road (Access Road) bordering Morrissey Boulevard to the east, and is also bounded by the MBTA's JFK/UMass Station to the north. The elevated Interstate 93 (I-93) and at-grade MBTA rail lines run along the Site's western boundary.

1.3.2 Development Program

The two, proposed five-story buildings will have a total gross floor area (GFA) of approximately 220,000 square feet. The West Building will house 104 apartments, with 33 enclosed parking spaces at grade and another 30 parking spaces on a mezzanine level behind the building. The East Building will house 174 apartments, with enclosed parking for 80 cars located a half level below grade. In total, the Project will include approximately 278 residential units and 143 parking spaces.

The buildings will include a mix of studios, and one-, two-, and three-bedroom units. Along the East Building's edge facing the Access Road, 12 ground-level units will be lofted and will offer individual unit entrances onto the sidewalk thereby improving the local pedestrian environment. Active amenity spaces will enliven the ground floor adjacent to the main lobby, and will spill out into the courtyard.

G:\Projects2\MA\Boston\3431\aerial.mxd

Residences at Morrissey Boulevard Boston, MA

Epsilon ASSOCIATES INC.

Figure 1.3-1
Aerial Locus Map

G:\Projects2\MA\Boston\3431\usgs.mxd

Residences at Morrissey Boulevard Boston, MA

Epsilon ASSOCIATES INC.

Figure 1.3-2
USGS Locus Map

The East Building's central lobby will mark the prominent northern corner at the Access Road and the MBTA station helping to create an active edge along both the MBTA's property and the Access Road. The lobby space will house management offices, leasing offices, and the majority of resident amenity spaces. Amenity spaces are planned to include a fitness room and a club room for residents use. A wall element will curve through the building lobby, visually connecting the East Building across the landscaped courtyard to the West Building.

Table 1-1 Program

Project Element	Approximate Dimension
Gross Floor Area[1]	220,000 square feet
Residential	278 units
Building Height[2]	70 feet
Parking	143 spaces

[1] Under the Boston Zoning Code, residential garage space located at or below grade is not included in calculating floor area ratio.

[2] Based on the Boston Zoning Code.

1.3.2.1 Parking

Given its location proximate to the MBTA Red and Commuter Lines and nearby bus routes, the Project has been designed as a transit-oriented development. The Project includes approximately 143 parking spaces or a parking ratio of approximately 0.51 spaces per unit. The Boston Transportation Department's (BTD's) maximum parking ratio guidelines for residential use in Dorchester is 0.75-1.25 spaces per unit. The Proponent will work with *Zipcar* to explore the feasibility of including access to *Zipcar* and explore the feasibility of providing an on-site electric vehicle charging station.

1.3.2.2 Columbia Point Master Plan

The Project has been designed to be consistent with the Columbia Point Master Plan. The Project Site is located within the area studied by the Columbia Point Master Plan Task Force from 2007 to 2011. An affiliate of the Proponent was an active participant in this public process, which resulted in the completion of the Master Plan adopted by the BRA Board on June 16, 2011.

Under the Master Plan, the site, in conjunction with adjacent parcels, was identified for potential redevelopment with several mixed-use, high-rise buildings. (Master Plan, p. 38.) The Proponent investigated developing a project of this scale and type, and determined that it was not feasible for a variety of reasons including a lack of strong community consensus around high-rise development at the Project Site and of financial viability for such a project in the near future. The current proposal is based upon input received from the Dorchester community, the equity and debt markets, and designers and planners at the BRA.

Although the Project is proposed at a lower height than the Master Plan envisioned for this particulate site, it still features transit-oriented, multi-family residential use, as contemplated for the Master Plan area. With the goal of making Columbia Point an 18-hour-a-day neighborhood, approximately three-quarters of the land uses proposed under the Master Plan are residential. (Id., pp. xii and 20.)

A portion of the Site is located within a Greenbelt Protection Overlay District, and so the Project is subject to review by the Boston Parks Commission. This is expected to help the Massachusetts Department of Conservation and Recreation (DCR) realize its vision for Morrissey Boulevard under DCR's historic parkways program, including new paths that can accommodate pedestrians, bicycles and other non-automobile modes of travel. (Id., pp. xiii, 21, 24-25, and 77.)

The Project will also further an important objective of the Master Plan by incorporating sustainable building and land development practices. (Id., pp. xvi and 87-89.) For example, the Project will feature constrained accessory parking, at an approximate ratio of 0.51 per dwelling unit. (Id., pp. 66 and 99.) This is appropriate with the MBTA Station next door.

Finally, the Project would not preclude later redevelopment of air rights above the adjacent MBTA station on one side of the Project Site or of the *Shaw's* supermarket site on the other, including high-rise buildings. Most importantly, as envisioned under the Master Plan, the Project includes a new, north-south way open to public travel, referred to in both the Master Plan and this PNF as "Main Street", which is parallel to Morrissey Boulevard, and, eventually, could continue Old Colony Avenue from the north. (Id., pp. 23 and 29.) Over the decades that the Master Plan comes to fruition, this new way could serve as the "spine" along the entire westerly block face of Morrissey Boulevard.

The Project is an important first step toward realizing the Master Plan's vision of, as Mayor Thomas M. Menino has written, transforming an automobile-oriented neighborhood into a transit-oriented community. "Over time, a mix of land uses—homes, offices, shops, restaurants, and hotels—will come to line ample, tree-lined streets, inviting people to live, work, and shop in close proximity." The Project begins that transformation.

1.4 Public Benefits

The Project provides numerous public benefits to the Dorchester neighborhood and the City of Boston overall, including the following:

- **Urban Design:** Consistent with the recommendations of the Master Plan, the Project is designed to support a more pedestrian-friendly environment establishing a high quality of design for the development of a continuous streetwall along Morrissey Boulevard. The design will include the addition of approximately 40 new trees for the City of Boston and its residents.

- **Neighborhood Creation:** Consistent with the recommendations of the Master Plan, the Project will enliven the neighborhood through the creation of approximately 278 new residences, directly accessible from the MBTA's JFK/UMass station.

- **Affordable Housing:** The Project will meet its requirements for affordable housing on site, in accordance with the Mayor's Executive Order Regarding Inclusionary Housing, dated February 29, 2000, as amended, by including approximately 36 affordable dwelling units.

- **Public Access:** Consistent with the recommendations of the Master Plan, the Project includes the construction of a new private way open to public travel, running parallel to Morrissey Boulevard and potentially improving access to the MBTA's JFK/UMass station.

- **Sustainability:** In compliance with Article 37 of the Boston Zoning Code, the Project will feature a number of "green building" characteristics that will help to preserve the natural environment. These may include electric vehicle charging stations, a shared car program, and bicycle racks for the use of residents and visitors.

- **Increased Property Taxes:** The Project is expected to generate approximately $650,000 in additional annual property taxes for the City of Boston.

- **Construction Jobs:** The Project is expected to create approximately 180 construction-related employment opportunities, including the promotion of local employment through good-faith efforts to hire Boston residents.

- **Permanent Jobs:** The Project creates the potential for approximately four permanent employment opportunities, managing the Project Site.

1.5 Public Review

As part of its planning efforts, the Proponent has consulted and will continue to consult with officials from state and city agencies, including DCR, the BRA, the Boston Parks Department, and BTD, as well as elected officials and members of the public, to discuss the Project. The Proponent is committed to developing an effective dialogue with the community concerning the Project. The formal community outreach begins with the filing of this Project Notification Form, and the Proponent looks forward to a productive public review.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Project Team is unaware of any legal judgments adverse to the Project.

1.6.2 History of Tax Arrears on Property

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

1.6.3 Site Control / Public Easements

The Proponent owns a fee interest the Project site, which comprises the currently vacant lot at 25 Morrissey Boulevard, as well as a very small portion of the adjacent lot at 35-55 Morrissey Boulevard, which is currently improved with a *Shaw's* supermarket. The Project involves the Proponent's adjusting the existing lot line between these two lots it owns in order to create a single lot coterminous with the Site. The Proponent acquired fee title to the Project site by two quitclaim deeds: one for 25 Morrissey Boulevard, dated October 1, 2012, and recorded at the Registry on October 1, 2012, in Book 643, Page 77 (Land Court Certificate No. 129477); and the other for 35-55 Morrissey Boulevard, dated August 10, 2012, and recorded at the Suffolk County Registry of Deeds (Registry) on October 1, 2012, in Book 643, Page 78 (Land Court Certificate No. 129478). The Proponent is unaware of any public easements that burden the Site.

1.7 Regulatory Controls and Permits

1.7.1 State Review

1.7.1.1 Department of Conservation and Recreation

The Access Road which abuts the easterly lot line of the Project site, is under the jurisdiction of DCR. The Project entails relocating an existing curb cut on the Access Road southward, closer to the *Shaw's* supermarket. No DCR parkway or other DCR property may be dug up or physically modified, nor opening made therein, for any purpose without a construction and access permit. (302 CMR 11.06(1)(a).) Accordingly the Proponent will apply to DCR for the necessary permit.

1.7.1.2 Massachusetts Historical Commission

The Massachusetts Historical Commission (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. As just noted, the Project requires a DCR construction and access permit and therefore is subject to MHC review in compliance with Chapter 9 of the Massachusetts General Law (MGL), Sections 27-27c, as amended by Chapter 254 of the Acts of 1988. MHC's review of the Project under the State Register Review process will be initiated through the filing of an MHC Project Notification Form.

1.7.1.3 Inapplicability of MEPA

The Project is not subject to review under the Massachusetts Environmental Policy Act (MEPA), which is codified at Sections 62 through 62I of MGL Chapter 30, and implemented under the "MEPA Regulations" at Section 11 of Chapter 301 of the Code of Massachusetts Regulations (CMR). MEPA and the MEPA Regulations apply to: (i) projects undertaken by a state agency; (ii) those aspects of a project that are within the subject matter of any required state permit; (iii) projects involving state financial assistance; and (iv) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR 11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations. (301 CMR 11.03.) While the Project requires state action, at least in the form of a construction and access permit from DCR, none of the review thresholds will be exceeded by the Project.

1.7.2 City Review

Because the Project includes the construction of at least one building having a gross floor area of more than 50,000 square feet, it is subject to Large Project Review under Section 80B of the Boston Zoning Code. This Project Notification Form is being prepared to initiate that review, and the Proponent expects that it will facilitate a comprehensive public process.

1.7.3 Anticipated Permits, Reviews and Approvals

Table 1-2 below presents a list of state and local agencies from which permits or other actions are expected to be required:

Table 1-2 Required Permits, Reviews, and Approvals

Agency	Permit, Review or Approval
State Agencies	
Department of Conservation and Recreation	♦ Construction and Access Permit
Department of Environmental Protection – Division of Water Pollution Control	♦ Construction Dewatering Permit
Department of Environmental Protection	♦ Notification prior to construction
City Agencies	
Boston Board of Appeal	♦ Conditional use permits for multi-family residential use, to allow one dwelling to be located behind another on the same lot, and for development within a Greenbelt Protection Overlay District. ♦ Variances for maximum floor area ratio and maximum building height

Table 1-2 Required Permits, Reviews, and Approvals (Continued)

Agency	Permit, Review or Approval
City Agencies	
Boston Civic Design Commission	♦ Schematic Design Review
Boston Committee on Licenses/Public Safety Commission	♦ Flammable Storage License (parking garages)
Boston Fire Department	♦ Approval of Fire Safety Equipment
Boston Inspectional Services Department	♦ Building Permits
Boston Parks and Recreation Commission	♦ Review of Greenbelt Protection Overlay District application ♦ Approval of construction within 100 feet of a park or parkway
Boston Redevelopment Authority	♦ Article 80 Large Project Review ♦ Cooperation Agreement ♦ Boston Residents Construction Employment Plan ♦ Affordable Housing Agreement and Restriction
Boston Transportation Department	♦ Transportation Access Plan Agreement ♦ Construction Management Plan
Boston Water and Sewer Commission	♦ Water and Sewer Connection Permits ♦ General Service Application ♦ Site Plan Review

1.8 Zoning Compliance

1.8.1 Zoning Districts

Based on Zoning Map 5A/5B (Dorchester Neighborhood District) appended to the Boston Zoning Code, the Site is located within the Morrissey Boulevard Community Commercial (CC) Subdistrict of the Dorchester Neighborhood District (Article 65[1]). The Access Road, which abuts the Project Site is a "Greenbelt Roadway," and so at least a portion of the Project Site is located within a Greenbelt Protection Overlay District, in which development is subject to Article 29.

[1] All references in this Subsection 1.8 to "Articles" and "Sections" refer to the Boston Zoning Code, unless indicated otherwise.

1.8.2 Use Regulations

The applicable land use controls appear in Table B of Article 65, which regulates Business Subdistricts within the Dorchester Neighborhood District. (Section 65-15.) The Project will result in two residential buildings of at least four dwelling units each, which constitutes multi-family dwelling use. (Section 2A-1.) Such use is conditional at all stories in the Morrissey Boulevard CC Subdistrict. (Article 65, Table B.) Accordingly, the Project requires a conditional use permit for such use. The proposed accessory parking use is permitted by right at the Project site. (Id.)

1.8.3 Bulk and Dimensional Requirements

The applicable dimensional requirements appear in Table D of Article 65. (Section 65-16.):

1.8.3.1 Floor Area Ratio

The maximum floor area ratio (FAR) for projects within the Morrissey Boulevard CC Subdistrict is 2.0. (Article 65, Table D.) Based the Project's approximately 220,000 square feet of GFA, and the lot size of approximately 102,380 square feet, the Project will result in an FAR of approximately 2.1, more than the maximum allowed, and so a variance from the Boston Board of Appeal is required.

1.8.3.2 Building Height

The maximum building height within the Morrissey Boulevard CC Subdistrict is 45 feet. Each of the two new buildings would have a building height of approximately 70 feet, which is above the 45-foot maximum, and so a variance from the Boston Board of Appeal is required for building height.

1.8.3.3 Lot Size, Width and Frontage

There is no minimum lot size, width or frontage in the Morrissey Boulevard CC Subdistrict. (Article 65, Table B.)

1.8.3.4 Minimum Usable Open Space

The minimum usable open space for the Morrissey Boulevard CC Subdistrict is 50 square feet per dwelling unit. (Article 65, Table B.) The Project will include approximately 34,420 square feet of usable open space, which is approximately 124 square feet of usable open space per dwelling unit, far more than the Zoning Code requires.

1.8.3.5 Yards

If on one lot there are two or more buildings, then the yard requirements of Article 65 shall apply at each actual lot line and not as if each building were on a separate lot. (Section 65-42(14).) There is no minimum front yard in the Morrissey Boulevard CC Subdistrict, nor is

there a minimum side yard in the Morrissey Boulevard CC Subdistrict except in the case of a lot with a side lot line abutting a residential subdistrict, which shall have side yards as if it were in such abutting district. (Article 65, Table B.) The Project Site does not have a side lot line abutting a residential subdistrict.

The minimum rear yard in the Morrissey Boulevard CC Subdistrict is twenty feet (20′). (Article 65, Table B.) However, the required rear yard for the Project may be as shallow as fifteen feet (15′) in depth because the rear wall of the West Building is not parallel to the rear lot line, and the rear lot line is not also a street line. (Section 65-42(9).) The Project will include a rear yard that is approximately twenty feet (20′) in depth, which is more than the fifteen-foot (15′) minimum.

1.8.4 Off-Street Parking and Loading Requirements

For any Proposed Project in the Dorchester Neighborhood District that is subject to, or has elected to comply with, Large Project Review, required off-street parking spaces and off-street loading facilities shall be determined through such review in accordance with the provisions of Article 80. (Section 65-41.) As noted above, the Project is subject to Large Project Review, which will include review of the approximately 143 on-site accessory parking spaces proposed as part of the Project.

1.8.5 Two Dwellings on Single Lot

Under the Project, the West Building will be constructed behind the East Building on the same lot. Each building is a "Dwelling" under the meaning of the Zoning Code. (See Section 2A-1.) Normally at the Project Site, a Dwelling is not permitted to be built to the rear of another Dwelling on the same lot. (Section 65-42(13).) However, the Board of Appeal may grant a conditional use permit to allow this condition upon finding that open space for all occupants, and light and air for all rooms designed for human occupancy, will not be less than would be provided if the requirement were met. Accordingly, the Project involves seeking such a conditional use permit from the Board of Appeal.

1.8.6 Inapplicability of Linkage Requirements

The BRA's Development Impact Project (DIP) exactions (linkage) program requires the payment of development exactions, or equivalent in-kind contributions, for the creation of affordable housing and job training programs. (Zoning Code § 80B-7(1).) The Project will not trigger the DIP exactions requirements of Section 80B-7 because it will not result in any new Development Impact Uses as defined in Section 80B-7.2(c) of the Zoning Code.

1.8.7 Boston Civic Design Commission

The Boston Civic Design Commission (BCDC) must review any project exceeding 100,000 square feet of gross floor area or any project determined by BCDC to be of "special urban design significance." (Section 28-5.) As noted above, the Project would have a gross floor area of approximately 220,000 square feet, and so requires schematic design review by BCDC.

1.8.8 Greenbelt Protection Overlay District

The Project is subject to Article 29 of the Boston Zoning Code because, as noted above, a portion of the Project Site is located within a Greenbelt Protection Overlay District, and the Project entails seeking a building permit for exterior construction of two structures constituting a unified development capable of depiction on a single site plan, where one or more of the buildings will have a total GFA in excess of five thousand (5,000) square feet. (Section 29-4.) Therefore, the Project requires the requisite conditional use permit from the Board of Appeal. Pursuant to Section 29-5(1), the Proponent will submit to the BRA evidence of having submitted its plans to the Boston Parks and Recreation Commission at least sixty (60) days prior to the meeting held by the BRA on the Proponent's request for a conditional use permit or a report by the Parks and Recreation Commission indicating whether it recommends project approval, denial, or modification.

1.9 Boston Parks and Recreation Commission

Independently of the Boston Zoning Code, approval of the Parks and Recreation Commission is required prior to erecting or altering any building or structure within 100 feet of a "park or parkway" within the City of Boston. (City of Boston Ord. 7-4.11.) Although Morrissey Boulevard is under the jurisdiction of DCR and not the Parks and Recreation Commission, the Proponent plans to obtain such approval.

1.10 Schedule

It is anticipated that construction will commence in the first quarter of 2013. Once begun, construction is expected to last approximately 18 months and finish in the third quarter of 2014.

Section 2.0

Transportation

2.0 TRANSPORTATION

2.1 Introduction

This chapter presents an evaluation and summary of potential transportation impacts of the proposed Project to the existing transportation network serving the site. The analysis examines existing traffic, access, parking, transit, pedestrian and bicycle conditions, and what changes are expected as a result of the Project.

The transportation analysis considers existing conditions and in the future, with and without the Project. The following three scenarios are evaluated:

- Existing (2012) conditions
- Future (2017) No-Build conditions (without the Project)
- Future (2017) Build conditions (with the Project)

The transportation analysis has been performed in accordance with standard Boston Transportation Department (BTD) methodologies, and is consistent with the assumptions established for the transportation analysis supporting the Boston Redevelopment Authority's Columbia Point Master Plan. In particular, the projection of Project trips, the application of local travel characteristics and the distribution and assignment of Project trips are based on the Master Plan assumptions for this particular location.

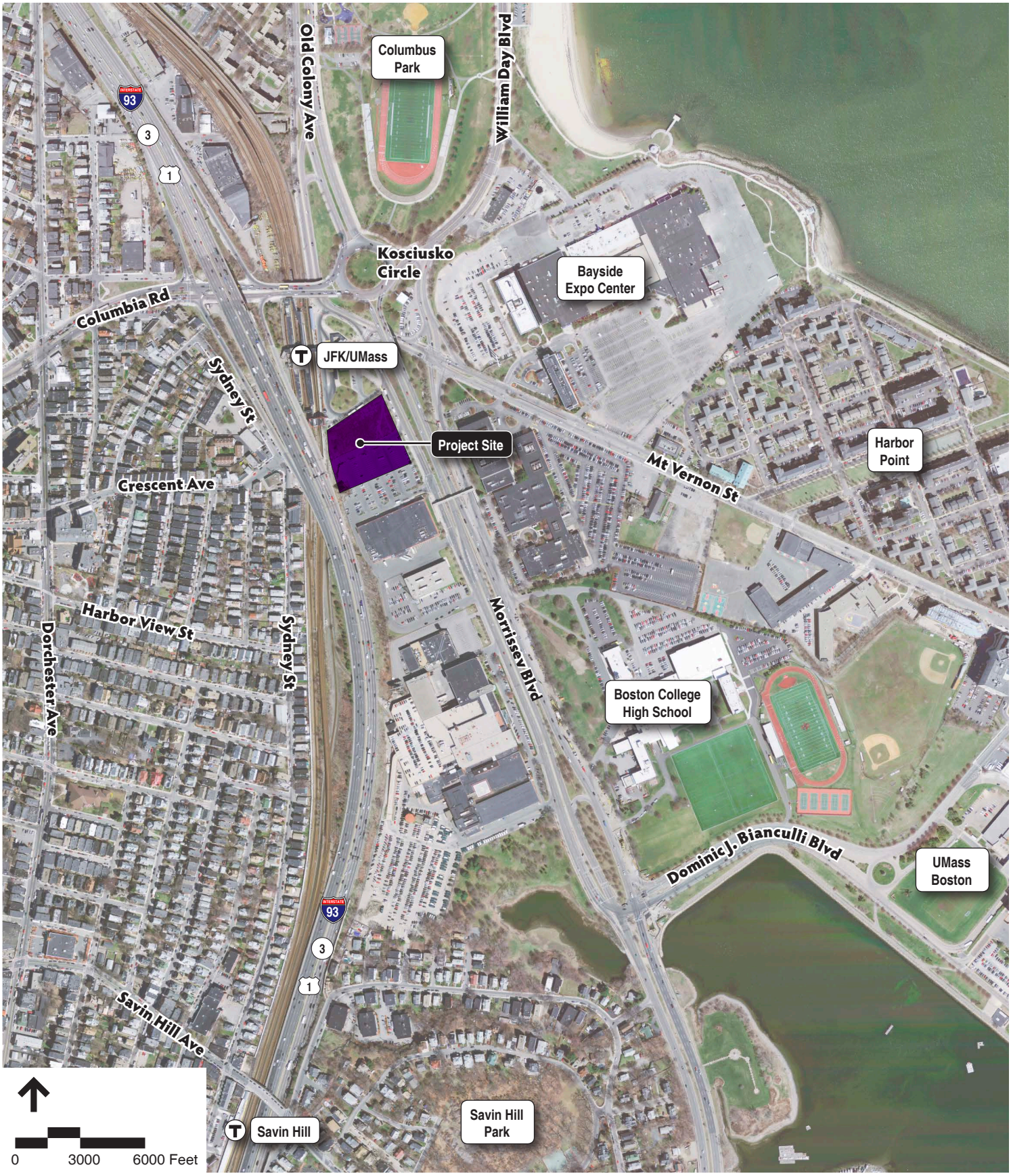
Synchro 6 software was used to facilitate the evaluation of traffic operations based on Highway Capacity Manual (HCM) methodologies.

2.1.1 Project Overview

The location of the Project Site in relation to the local and regional roadway network is presented in Figure 2-1. Existing and proposed site plans are presented in Figures 2-2 and 2.3, respectively. The Project is described in full in Sections 1.0 and 4.0.

The Project comprises construction of two residential buildings to provide a total of 278 rental dwelling units, supported by a total of 143 parking spaces and 278 bicycle parking spaces. The East Building will provide 80 parking spaces in a below-grade garage that is accessed via a curb cut on the newly constructed "Main Street." The West Building will include 63 parking spaces on two levels that are accessed via two curb cuts on newly constructed "New Street."

The Project program is summarized in Table 2-1.



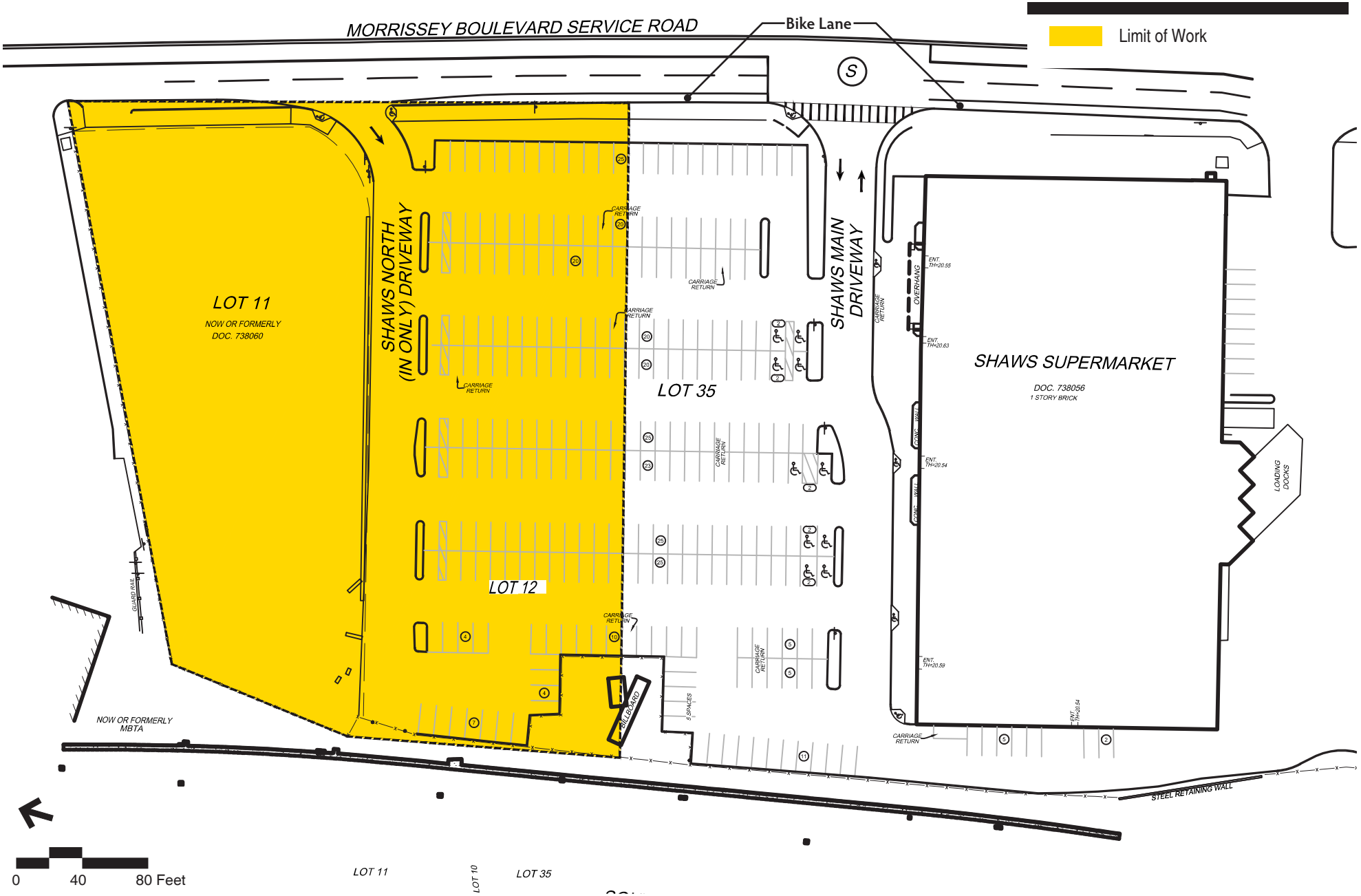
Source: MA USGS 2008 15 cm Aerial Imagery

Residences at Morrissey Boulevard - Boston, MA

VHB Vanasse Hangen Brustlin, Inc.

Figure 2-1

Site Location Map

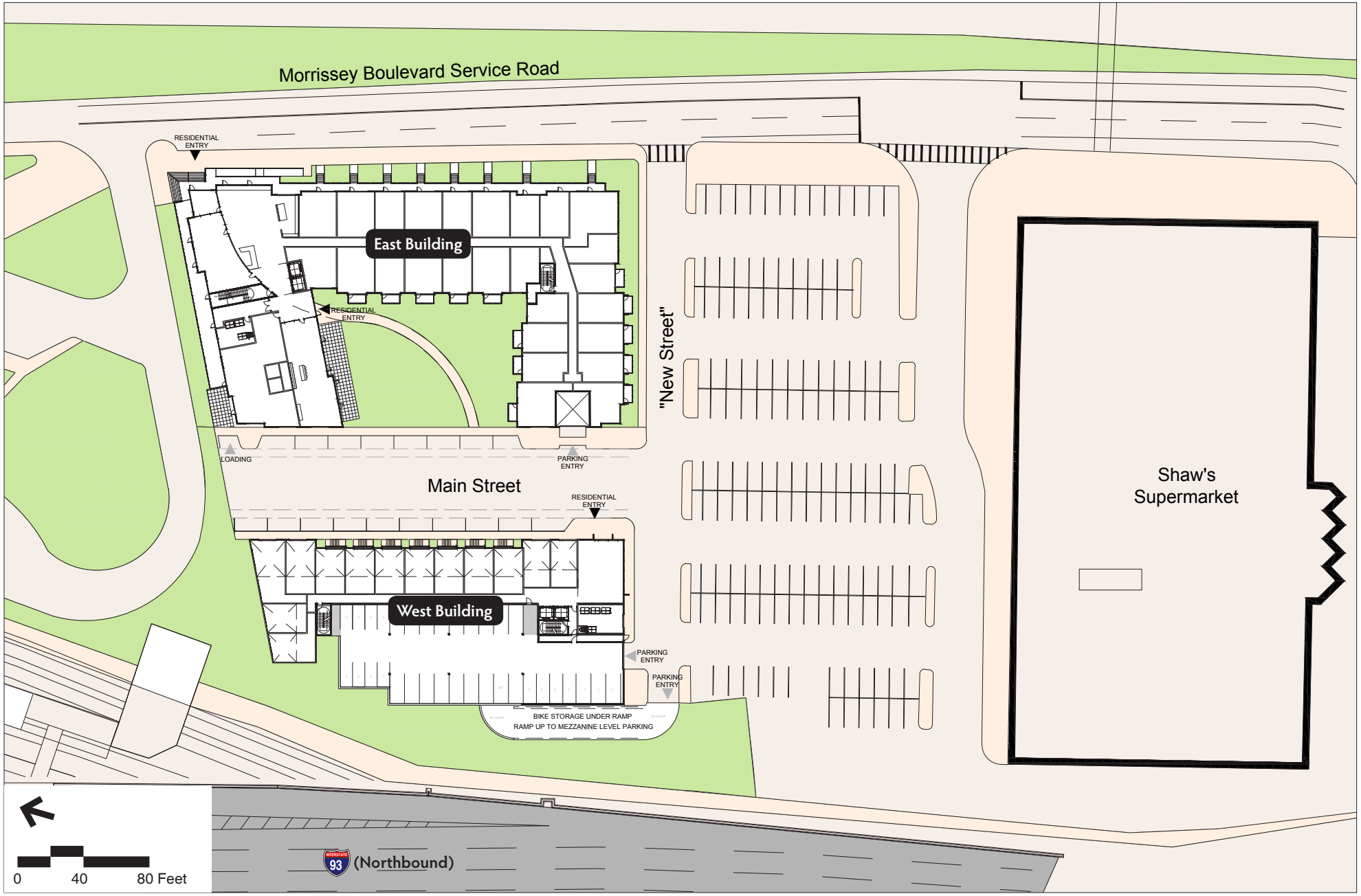


Residences at Morrissey Boulevard - Boston, MA

Vanasse Hangen Brustlin, Inc.

Figure 2-2

Existing Site Plan



Residences at Morrissey Boulevard - Boston, MA

VHB *Vanasse Hangen Brustlin, Inc.*

Figure 2-3

Proposed Site Plan

Table 2-1 Proposed Building Program

Building	Use	No. Units	Parking Spaces
East Building	Residential	174	80
West Building	Residential	104	63
	Total:	**278**	**143**

Vehicular access will be provided by "New Street" via a driveway connection on the Access Road along the Project Site's eastern boundary.

The Project Site is well-located with regard to both the local and regional roadway networks, with Interstate (I-93) access ramps located in reasonable proximity to the Project Site itself. The Project will provide pedestrian connections to the existing pedestrian network supporting the Site, and the site plan also anticipates a future connection via "Main Street," as envisioned in the Master Plan, to the Massachusetts Bay Transportation Authority's (MBTA's) adjacent JFK/UMass station.

2.1.2 Summary of Findings

The transportation analysis concludes that the proposed Project is consistent with the transportation goals of the Columbia Point Master Plan, and that it will have no adverse impacts to the transportation system supporting the Project Site. This is in part due to the transit-oriented characteristics of the Project, being located adjacent to JFK/UMass station and abutting *Shaw's* supermarket. It also reflects that the residential density and floor area ratio (FAR) of the Project is significantly less than was anticipated under the Master Plan.

2.2 Existing Transportation Conditions

This section discusses the existing transportation conditions in the vicinity of the Project Site, including roadway geometry, site access, traffic controls and operations, traffic, pedestrian and bicycle volumes, transit availability, parking and loading.

2.2.1 Roadway Network

As shown in Figures 2-1 and 2-2, the Project Site is bounded by the Access Road to the east, the UMass/JFK MBTA Station to the north, a *Shaw's* Supermarket to the south and MBTA train tracks to the west.

The Project Site comprises an un-used lot on its northern boundary and a portion of the existing *Shaw's* Supermarket parking lot, which will be merged and reconfigured as part of the Project. Currently, the existing *Shaw's* parking lot is accessed from the Access Road via a right-turn entry driveway at its northern end and by a signalized all-movements driveway at its southern end.

The Access Road is a two-way road providing a connection to Morrissey Boulevard in the south and Mt. Vernon Street/Old Colony Road in the north. The Access Road extends as a two-way road to the curb cut for the *Shaw's* service area on the south side of the supermarket building. Beyond that point, the Access Road continues as a one-way southbound frontage roadway before connecting to Morrissey Boulevard itself at Dominic Bianculli Boulevard (the UMass Boston campus driveway) to the south. Farther to the south, Morrissey Boulevard has various connections to and from I-93 (Southeast Expressway) at Freeport Street and beyond.

To the north, the Access Road provides access to the JFK/UMass MBTA station busway, and connects with the signalized intersection of Mt. Vernon Street and Old Colony Avenue. In turn, these roadways connect with William Day Boulevard and Columbia Road where there are on- and off-ramps to the Southeast Expressway.

2.2.2 Project Site Driveways

Observations in the field indicate that, while there is significant congestion on Morrissey Boulevard, at Kosciuszko Circle and on Columbia Road during commuting periods, the Access Road operates comfortably within its capacity, and there is very limited queuing or delay at the various site driveways along its length.

On-street parking is not permitted along the Access Road, and sidewalks are provided along the western side of the Access Road only, reflecting the fact that the east side of the Access Road is fronted by retaining walls for the Morrissey Boulevard mainline ramp to and from Kosciuszko Circle.

A description of Intersection geometry and physical characteristics of the Project Site driveways follows, and traffic operations and level of service (LOS) analysis are presented later in this chapter.

Shaw's North Driveway at the Access Road

The intersection of the *Shaw's* north driveway and the Access Road is a three leg unsignalized intersection located at the northeast corner of the existing *Shaw's* parking lot. The Access Road accommodates two lanes of traffic in the southbound and one lane of traffic in the northbound directions. *Shaw's* north driveway is a right-in only movement from the Access Road southbound. Accessible ramps are provided at the curb cut, but no crosswalk is striped.

Shaw's Main Driveway at Morrissey Boulevard Access Road

The intersection of *Shaw's* main driveway and the Access Road is a T-intersection that operates under a three-phase traffic signal control, including an exclusive pedestrian phase. The Access Road accommodates one northbound travel lane, and two southbound travel lanes. There is also a nominal southbound bike lane comprising a striped shoulder with "Bike Only" pavement markings.

The *Shaw's* main driveway approach consists of one general-purpose lane on the approach to the Access Road, and there is a stripped crosswalk with accessible ramps. Ramps to a pedestrian overpass for the entire Morrissey Boulevard corridor are located just south of the driveway.

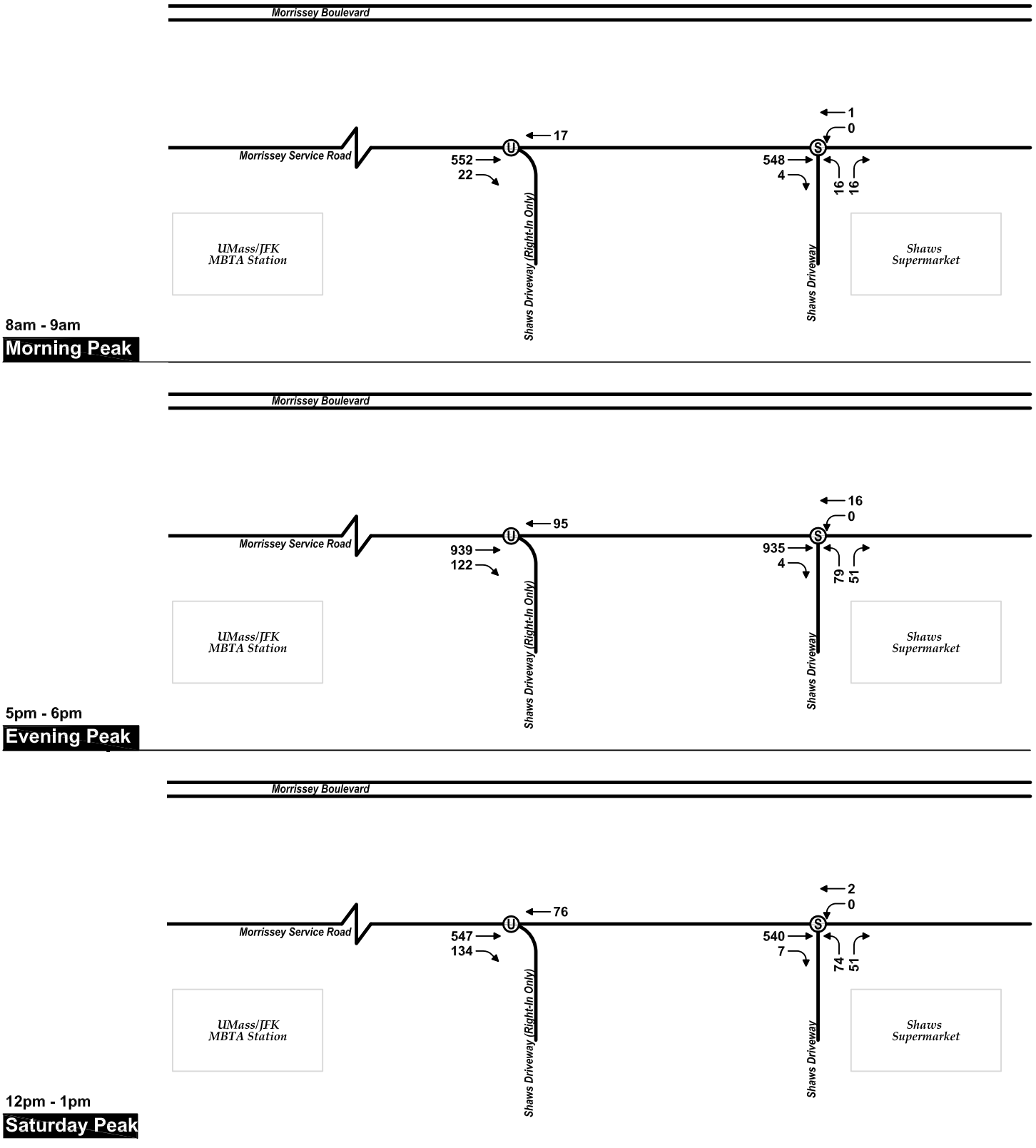
2.2.3 Traffic Volumes

Although the Project is residential, both weekday and Saturday traffic data were collected to facilitate analysis of the Saturday peak retail (*Shaw's* Supermarket) activity as well as the weekday commuter peaks. Manual Turning Movement Counts (TMCs) were conducted on Tuesday October 16, 2012, from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, and on Saturday October 20, 2012, from 11:00 AM to 1:00 PM. In addition, an Automatic Traffic Recorder (ATR) was placed on the *Shaw's* North Driveway for a full-week count, commencing October 14, 2012, which yielded peak hour turning movements into the Project Site.

A 48-hour ATR count was also performed at the Project Site frontage on the Access Road. These data confirm the relatively low volumes observed in the field, with total daily traffic volumes of approximately 8,740, 9,350 and 5,375 on Thursday, Friday and Saturday, respectively. Weekday morning peak hour volumes on the Access Road are approximately 610 and 1,090 in the morning and evening peak hours, respectively. As expected, the southbound direction is dominant, with only 7 to 12 percent of the peak-hour traffic being northbound.

The intersection turning movement counts were used to establish 2012 Existing Condition traffic networks for the weekday morning, weekday evening and Saturday midday peak hours. The overall morning peak hour was determined to occur between 8:00 AM to 9:00 AM, and the evening peak hour was determined to occur between 5:00 PM to 6:00 PM. The Saturday midday peak hour occurred from 12:00 PM to 1:00 PM.

Existing Condition weekday-morning, weekday-evening and Saturday-midday peak hour traffic volumes are shown in Figure 2-4. Detailed TMC and ATR data are provided in the Transportation Appendix.



Residences at Morrissey Boulevard - Boston, MA

VHB Vanasse Hangen Brustlin, Inc.

Figure 2-4

2012 Existing Condition, Peak Hour Traffic Volumes
Morning, Evening and Saturday

2.2.4 Pedestrian Accommodations

The Project site is located within a short walk of the UMass/JFK MBTA Station, and pedestrian access is currently provided by the sidewalk on the west side of the Access Road. In addition, a pedestrian bridge is located just south of the Project Site, providing a west-east link across Morrissey Boulevard to Boston College High School, the University of Massachusetts-Boston (UMass Boston), the Bayside Expo Center and the Harbor Point neighborhood.

Pedestrians were counted as part of the traffic count program, and the morning, evening and Saturday peak hour pedestrian volumes are presented in Figure 2-5.

2.2.5 Bicycle Facilities

Bicycle racks provide bicycle parking in various locations near the Project Site. These include bicycle racks at the JFK/UMass Station as well as bike racks in front of the *Shaw's* Supermarket. Observations of bicycle racks near the JFK/UMass train station show that they are heavily used. In addition a *Hubway* bike station is located at the JFK/UMass station, providing 15 bicycles,

Bicycles were counted as part of the traffic count program, and the morning, evening and Saturday peak hour bicycle volumes are presented Figure 2-6.

In the vicinity of the Project Site cyclists must generally share travel lanes with vehicular traffic, although as previously noted, a nominal southbound bike lane comprising a striped shoulder with "Bike Only" pavement markings is provided along part of the eastern site frontage.

2.2.6 Public Transportation

The Project Site benefits from its highly transit-oriented location adjacent to the JFK/UMass MBTA station. Transit services available at this location include subway, commuter rail, bus and shuttle service as summarized in Table 2-2 and presented in Figure 2-7.

Table 2-2 Study Area Public Transit Service

Transit Line/Route	Destination	Rush-Hour Frequency (minutes)
Red Line	Ashmont	8-9 minutes
Red Line	Alewife	8-9 minutes
Red Line	Braintree	8-9 minutes
Commuter Rail	Kingston/Plymouth and Middleborough/Lakeville	10-40 minutes*

Table 2-2 Study Area Public Transit Service (Continued)

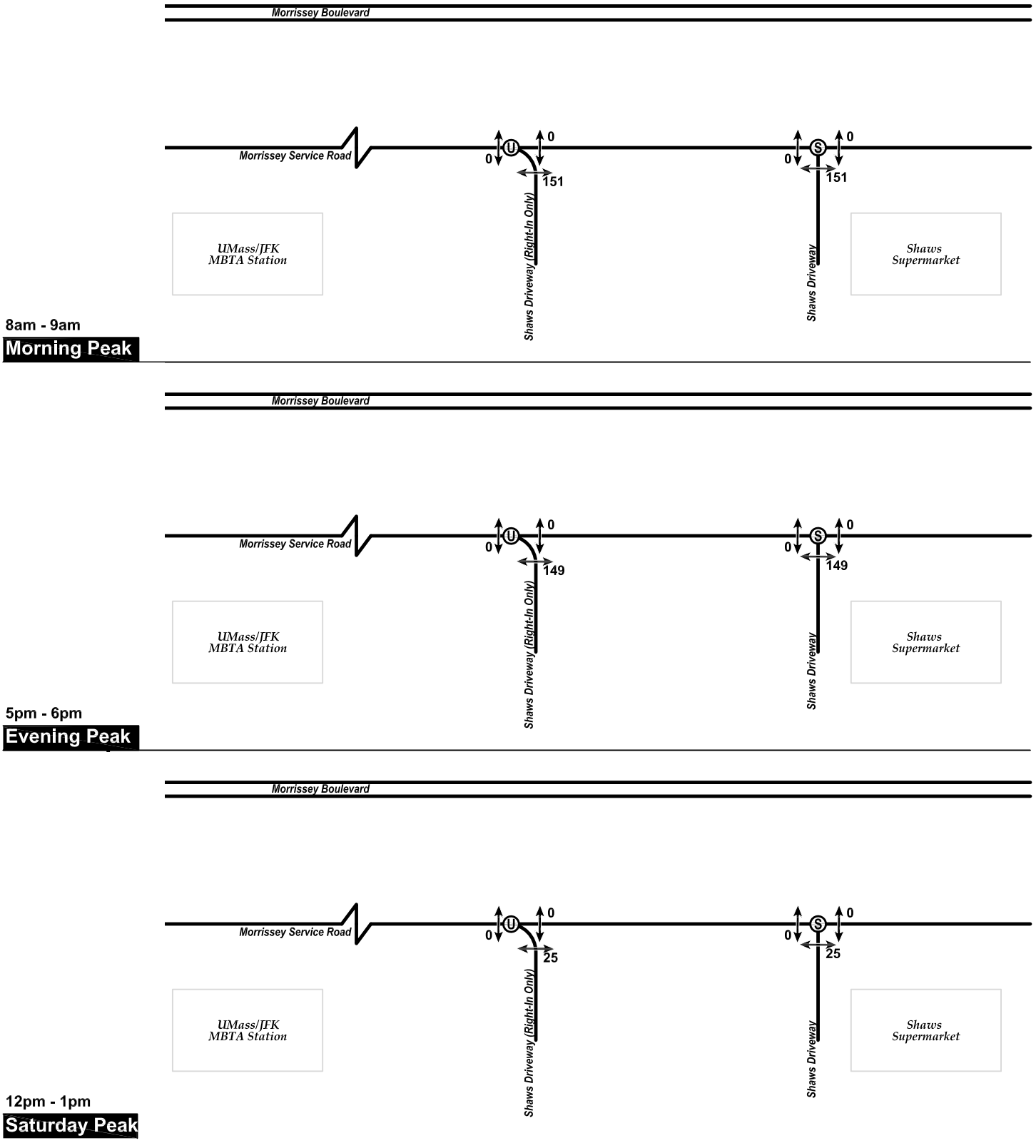
Transit Line/Route	Destination	Rush-Hour Frequency (minutes)
Commuter Rail	Greenbush Line	2 trains in the AM & PM (6:30AM, 7:28AM, 4:08PM and 5:26PM)
Bus #5	City Point – McCormack Housing (via Andrew Station)	60 minutes
Bus #8	Harbor Point/ UMass – Kenmore Station (via BU Medical center and Dudley Station)	13-14 minutes
Bus #16	Forest Hills Station - Andrew Station or UMass (via Columbia Road)	15-18 minutes
Bus #41	Centre Street & Elliot Street – JFK/UMass Station (via Dudley Station, Center Street & Jackson Station)	20-22 minutes
JFK/UMass Shuttle 1	JFK/UMass Station – UMass	5-7 minutes
JFK/UMass Shuttle 2	JFK/UMass Station – UMass & JFK Library	20 minutes

Source: Massachusetts Bay Transportation Authority, blue book 2010 and
UMass Boston Public Transportation Website
*depending on line and direction

2.2.6.1 MBTA Rapid Transit Services

The Red Line provides service from 5:05 AM to 1:05 AM on Weekdays, running every 8-9 minutes during the peak hour. The closest stop to the Project Site is at the UMass/JFK Station abutting the Project Site to the north, accessed from the Access Road.

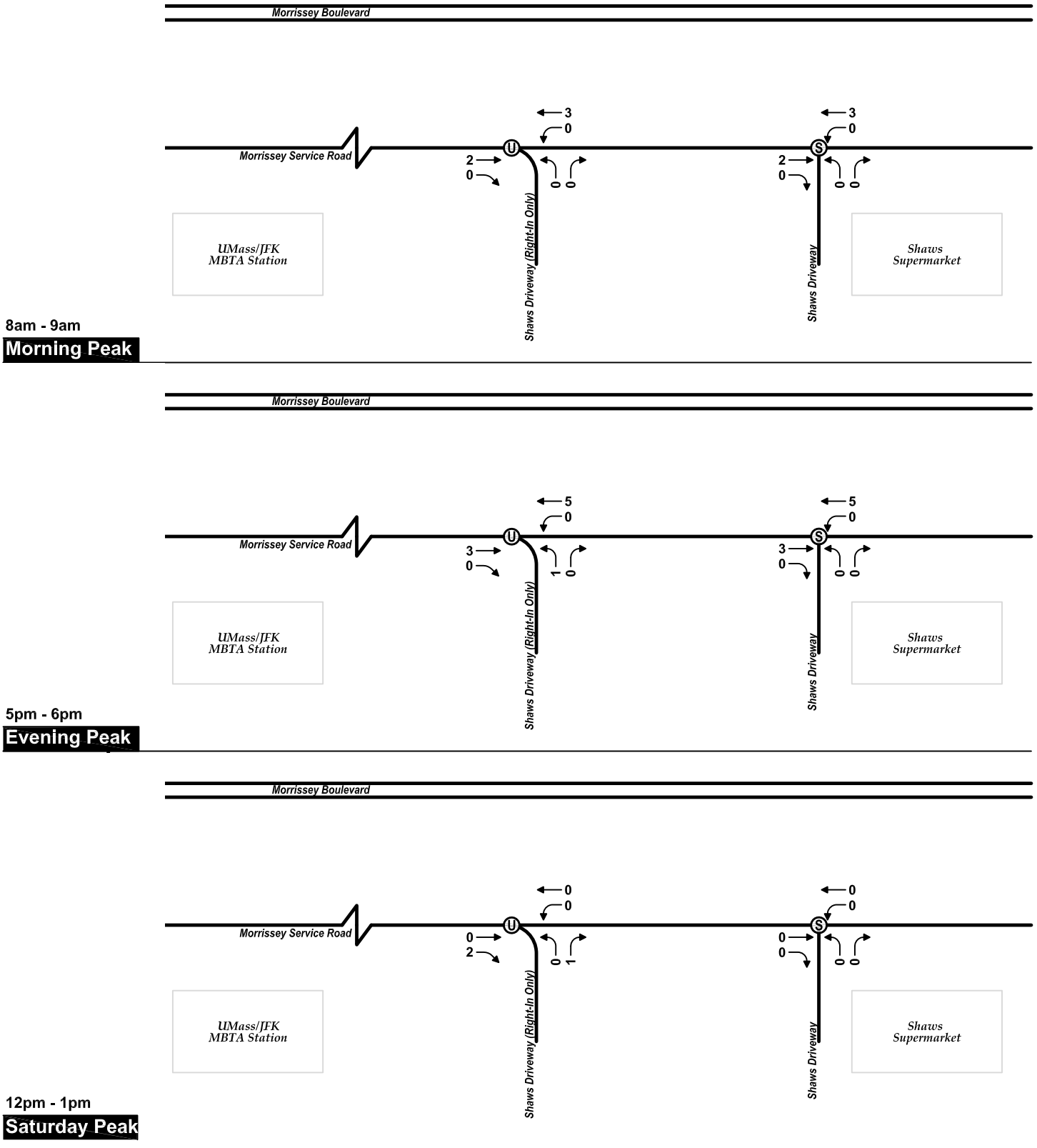
There is Red Line service between both Ashmont and Braintree stations to the south and, through downtown Boston, to Alewife in Cambridge to the northwest. To the north, the Red Line provides strong transit connections to rail and bus services at South Station, the Orange Line at Downtown Crossing, and the Green Line at Park Street.



Residences at Morrissey Boulevard - Boston, MA

Figure 2-5

2012 Existing Condition, Peak Hour Pedestrian Volumes
Morning, Evening and Saturday



Residences at Morrissey Boulevard - Boston, MA

Vanasse Hangen Brustlin, Inc.

Figure 2-6

2012 Existing Condition, Peak Hour Bicycle Volumes
Morning, Evening and Saturday

Source: MBTA.com

Residences at Morrissey Boulevard - Boston, MA

2.2.6.2 Commuter Rail Services

Commuter Rail service between South Station and the Middleborough/Lakeville, Kingston/Plymouth and Greenbush Lines stop at the station.

Middleborough/Lakeville and Kingston/Plymouth Lines, also referred to as the Old Colony Lines, run from 5.20 AM to 11.36 PM and the Greenbush line runs from 5.40 AM to 10.57 PM, however not all trains stop at JFK/UMass station.

2.2.6.3 MBTA Bus Services

While the rapid transit lines are radial, circumferential bus service is provided to Forest Hills, Jackson Square, Monument, Ruggles, Kenmore Square, and City Point by MBTA bus routes #5, 8, 16, and 41.

Bus Route #5 – provides service from City Point to McCormack Housing, via Andrew Station, running every 60 minutes during the peak hour. The closest stop to the Project Site is at the JFK/UMass Busway.

Bus Route #8 – provides service from Harbor Point/ UMass to Kenmore Station, via Boston University Medical Center and Dudley Station, running every 13 to 14 minutes during the peak hour. The closest stop to the Project Site is at the JFK/UMass Busway.

Bus Route #16 – provides service from Forest Hills Station to Andrew Station or UMass, via Columbia Road, running every 15 to 18 minutes during the peak hour. The closest stop to the Project Site is at the JFK/UMass Busway.

Bus Route #41 – provides service from Centre Street & Elliot Street to JFK/UMass Station, via Dudley Station, Center Street & Jackson Station, running every 20 to 22 minutes during the peak hour. The closest stop to the Project Site is at the JFK/UMass Busway.

2.2.6.4 UMass/JFK Shuttle Service

UMass Boston operates two shuttle bus routes to and from the JFK/UMass Station.

Route 1 – runs non-stop from JFK/UMass Station to the UMass Campus Center, on weekdays only, from 6:40 AM to 9:30 PM every 5-7 minutes, and from 9:30 PM to 10:30 PM every 10-12 minutes.

Route 2 - buses stop at the UMass Campus Center, the Massachusetts Archives, the JFK Library, Clark Athletic Center Circle and the University's Early Learning Center, seven days a week from 8:00 AM to 5:45 PM every 20 minutes.

2.2.7 Parking

Existing curb regulations in the vicinity of the Project Site prohibit on-street parking on the Morrissey Boulevard Access Road, and on Old Colony Road/Mt. Vernon Street. Off-street parking is provided at the *Shaw's* Supermarket, with approximately 254 spaces. Observations indicate that the parking lot is substantially under-utilized, even during peak retail hours, with peak occupancy occurring on a Sunday when the parking lot is approximately 50-percent full. The parking is primarily utilized by supermarket shoppers as well as liquor store shoppers, although field observations indicate that a limited number of spaces are used by transit riders, who park in spaces closes to the train station and walk to the train. The MBTA does not provide parking at the JFK/UMass station.

2.3 Future Traffic Projections

This section describes the development of traffic projections over a five-year time horizon (2017), including the projected demand associated with the Project. These projections yield 2017 No-Build and 2017 Build Condition traffic volumes for evaluation of morning, evening and Saturday peak hour traffic operations, as presented in Section 2.4.

2.3.1 2017 No-Build Condition

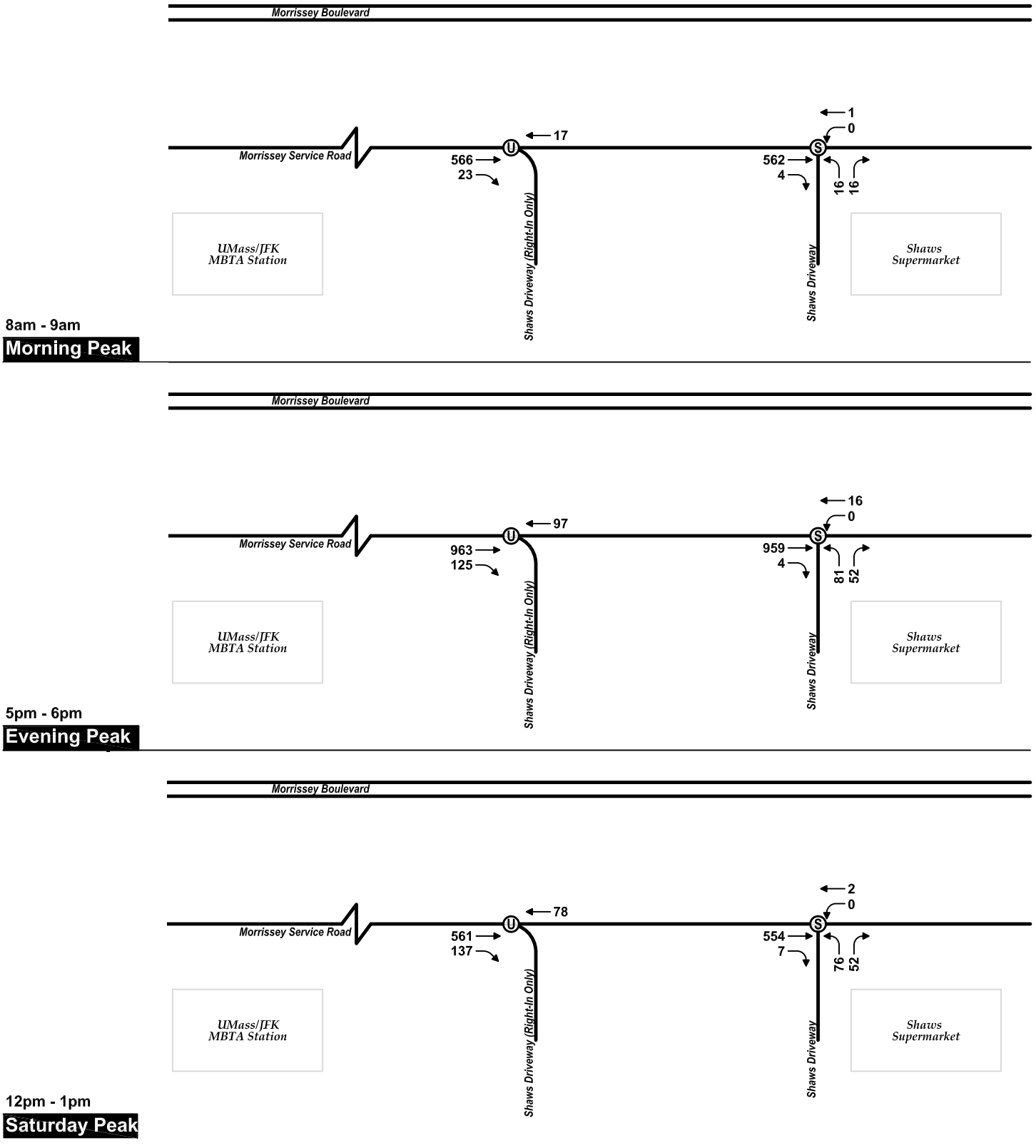
The 2017 No-Build Condition evaluates future transportation conditions in the Study Area without the Project. In accordance with BTD guidelines, this future analysis year represents a five-year planning horizon. Under the 2017 No-Build Condition, increases in traffic activity are projected due to regional traffic growth and any specific approved projects in the area.

Although the Access Road is not expected to experience significant background growth in the immediate future due to its function as a frontage roadway, a background growth rate of 0.5-percent per year was applied to also adequately reflect additional traffic from other approved projects in the area. This growth rate is slightly higher than the 0.25-percent per year assumed in the Columbia Point Master Plan, and therefore likely reflects a conservative analysis.

Figure 2-8 presents the 2017 No-Build Condition traffic volume networks for the Weekday Morning, Weekday Evening and Saturday Midday peak hours.

2.3.2 2017 Build Condition

The 2017 Build Condition traffic projections comprise the previously described No-Build projections with the addition of projected traffic volumes for the Project, reflecting any changes in access and circulation associated with the Project.



Residences at Morrissey Boulevard - Boston, MA

VHB Vanasse Hangen Brustlin, Inc.

Figure 2-8

2017 No-Build Condition, Peak Hour Traffic Volumes
Morning, Evening and Saturday

2.3.2.1 Project Trip Generation

The Residences at Morrissey Boulevard Project is a two-building development providing 278 residential units. The Institute of Transportation Engineers (ITE) trip rates for Land Use Code (LUC) 220 Apartment are used as a basis for project trip generation.

ITE vehicle trip generation rates are based on trip rates derived from surveys of similar land uses in generally auto-oriented, suburban locations. Since the Project is located in a mixed-use, transit-accessible area, the number of person trips is a more accurate representation of expected activity associated with the proposed Project. Accordingly, standard average vehicle occupancies (AVO) of 1.2 persons per vehicle were applied to the ITE trip rates to derive person trips. The projected person trips for the Project are presented in Table 2-3.

Table 2-3 Project Person Trip Generation Summary

	ITE Trips	AVO	Person Trips
Weekday Daily			
IN	924	1.2	1,109
OUT	924	1.2	1,109
Total:	1,849		2,218
Morning Peak Hour			
IN	28	1,2	34
OUT	113	1,2	136
Total:	141		170
Evening Peak Hour			
IN	112	1.2	134
OUT	60	1.2	72
Total:	172		206
Saturday Midday Peak Hour			
IN	72	1.2	87
OUT	72	1.2	87
Total:	144		174

SSource: Institute of Transportation Engineers Trip Generation 8th Edition

To reflect the mixed-use urban environment with pedestrian facilities and access to transit service, mode share and vehicle occupancy characteristics developed for this specific location in the Columbia Point Master Plan were applied. The mode splits for the Project are summarized in Table 2-4.

Table 2-4 Project Mode Split

Mode	%
Automobile	43%
Transit	53%
Walk/Bike/Other	4%
Total:	100%

Source: Columbia Point Master Plan, June 2011

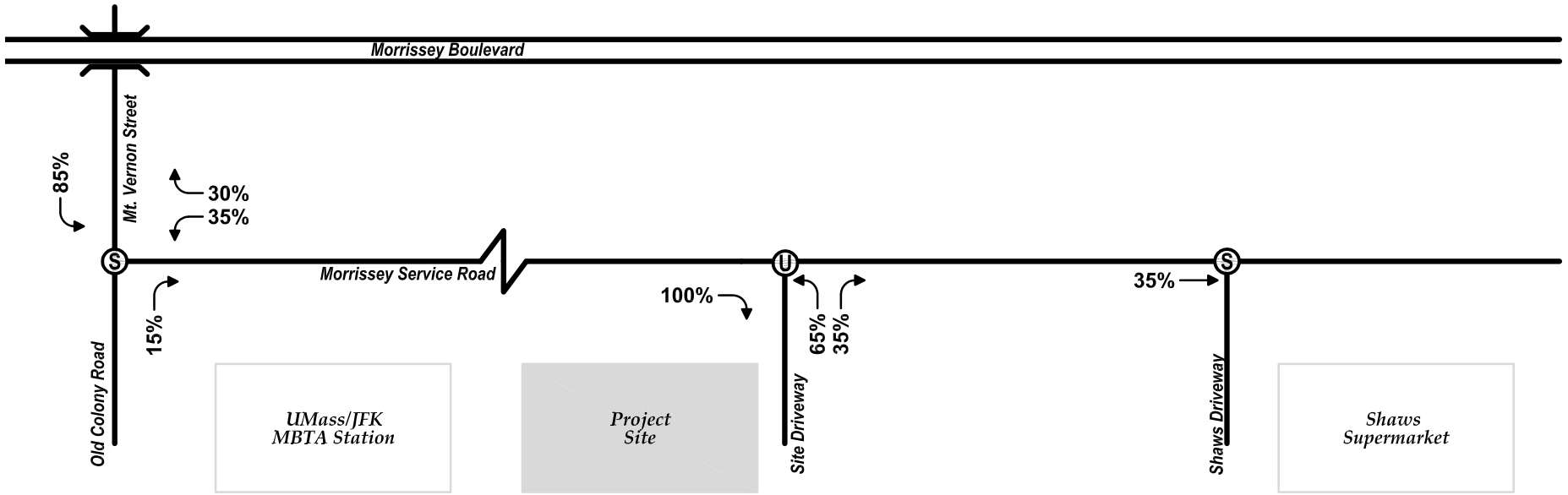
The final projected vehicle, transit, pedestrian and bicycle trips are presented in Table 2-5.

Table 2-5 Project Person Trip Generation Summary

	Transit	Walk/ Bike/ Other	AVO	Vehicle Trips
Weekday Daily				
IN	588	44	1.2	442
OUT	588	44	1.2	442
Total:	1,176	88		884
Morning Peak Hour				
IN	18	1	1.2	14
OUT	72	5	1.2	54
Total:	90	6		68
Evening Peak Hour				
IN	71	5	1.2	54
OUT	38	3	1.2	29
Total:	110	8		83
Saturday Midday Peak Hour				
IN	46	3	1.2	35
OUT	46	3	1.2	35
Total:	92	6		70

2.3.2.2 Project Vehicle Trip Distribution and Assignment

The vehicle trip distribution for residential trips is based on the Columbia Point Master Plan distribution for the Project's specific location. The distribution and assignment of Project vehicle trips to the roadway network is presented in Figure 2-9, and the Project-generated vehicle turning movements for the morning, evening and Saturday peak hours are presented in Figure 2-10.

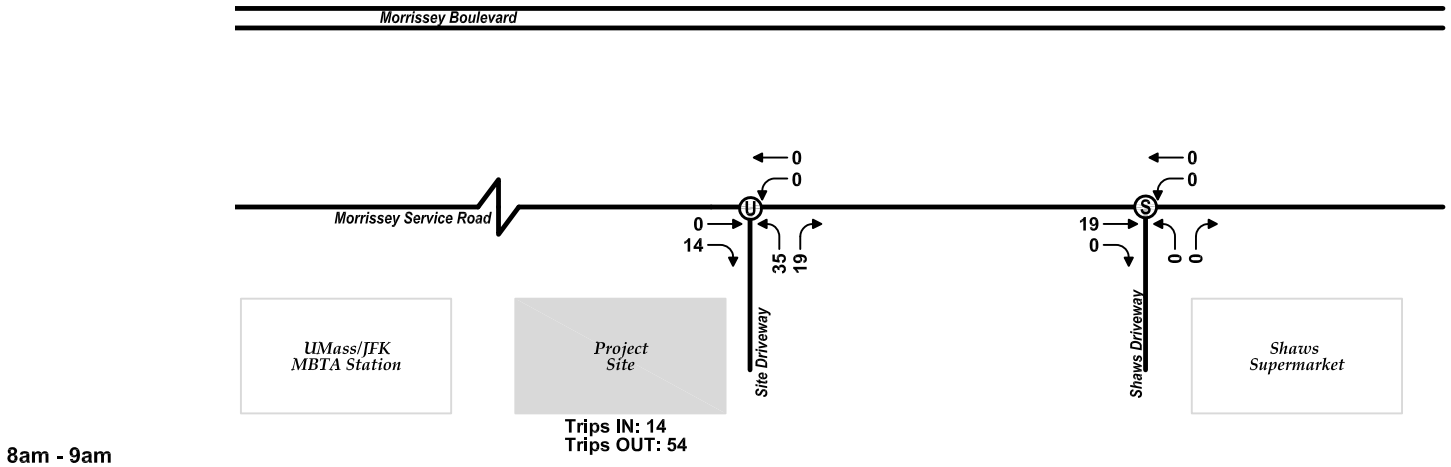


Residences at Morrissey Boulevard - Boston, MA

Vanasse Hangen Brustlin, Inc.

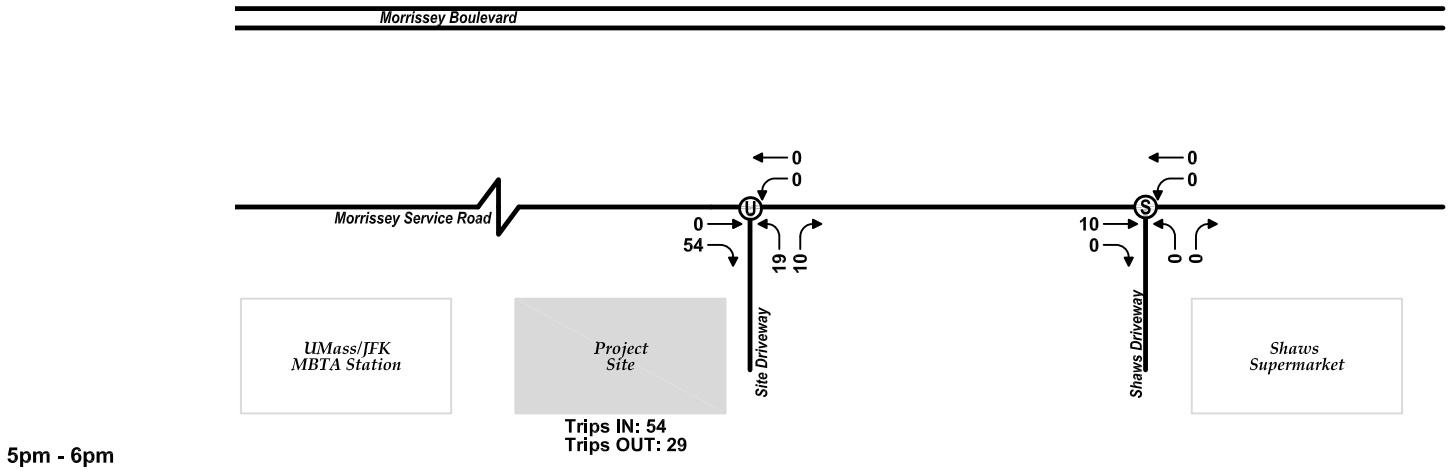
Figure 2-9

Trip Distribution



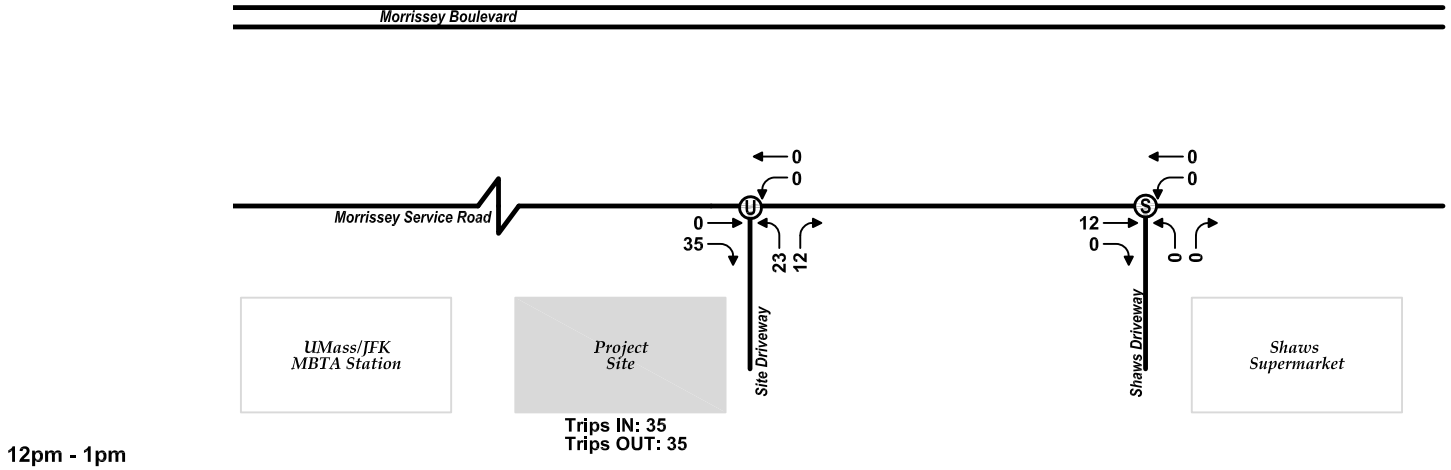
8am - 9am

Morning Peak



5pm - 6pm

Evening Peak



12pm - 1pm

Saturday Peak

Residences at Morrissey Boulevard - Boston, MA

VHB Vanasse Hangen Brustlin, Inc.

Figure 2-10

Peak Hour Project Generated Trips
Morning, Evening and Saturday

As shown, the Project is expected to generate approximately 70 vehicle trips during the morning and Saturday peak hours, and just over 80 vehicle trips during the evening peak hour. The peak hour vehicle trip generation is equivalent to approximately 1 to 1.4 trips per minute.

2.3.2.3 2017 Build Peak Hour Traffic Volumes

Figure 2-11 presents the 2017 Build Condition morning, evening and Saturday peak hour traffic volume networks.

2.4 Traffic Operations Analysis

Consistent with BTD's guidelines, Synchro 6 software was used to model level of service operations at study intersections. LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection.

LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS D is generally considered to be acceptable in urban areas. LOS E indicates vehicles endure significant delay while LOS F suggests unacceptable delay for the average vehicle. LOS thresholds differ for signalized and un-signalized intersections.

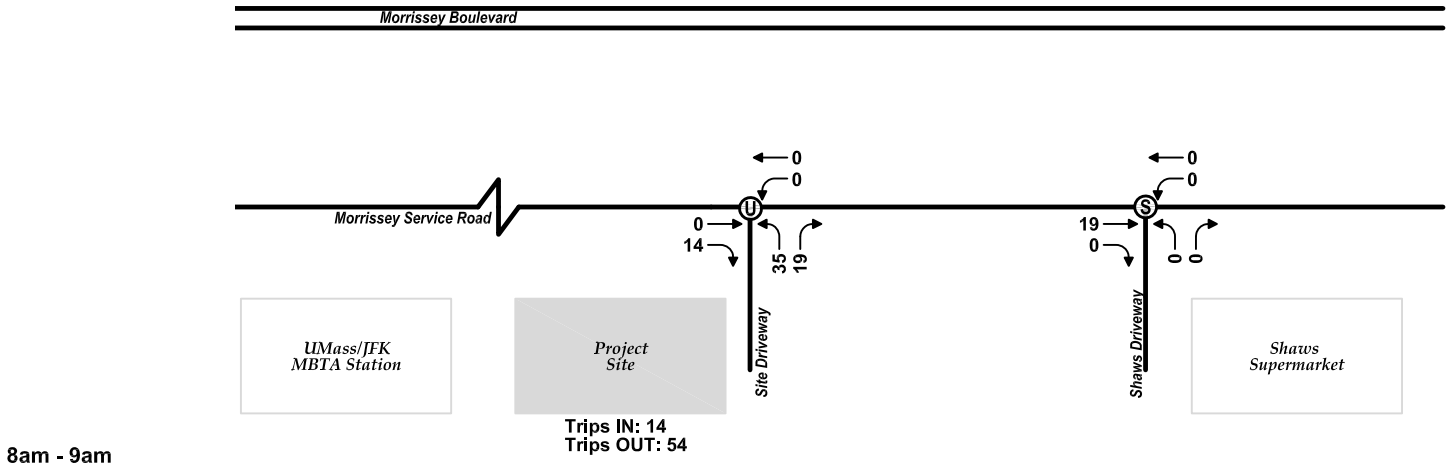
Table 2-6 presents the level of service delay threshold criteria as defined in the 2000 Highway Capacity Manual.

Table 2-6 Intersection Capacity Criteria

Level of Service	Average Delay (in seconds)	
	Signalized Intersection[1]	Un-Signalized Intersection[2]
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

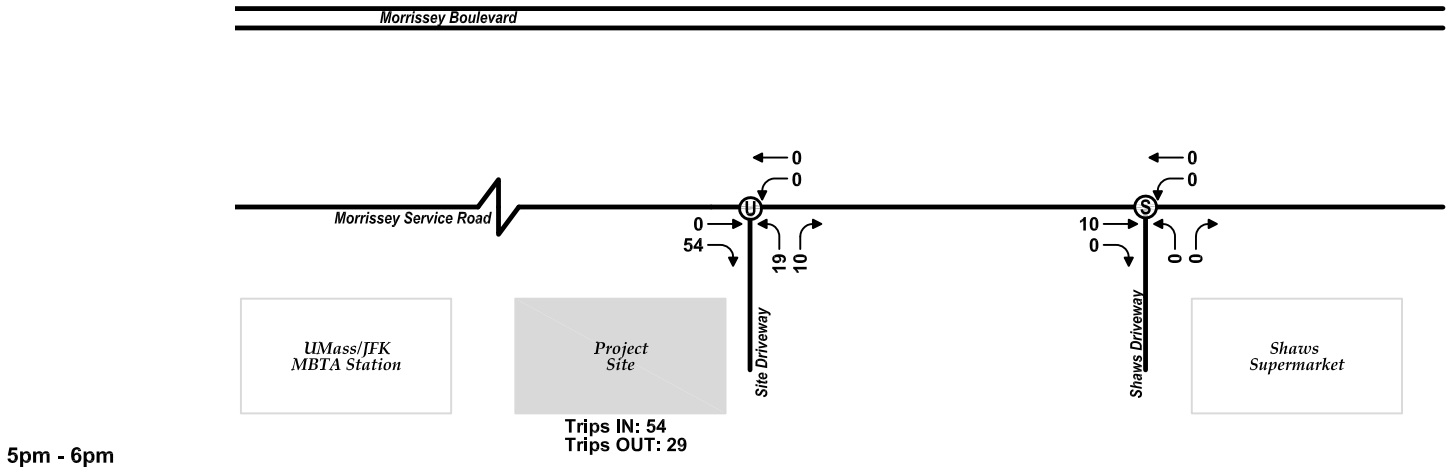
Source: Highway Capacity Manual, HCM2000, Transportation Research Board, Washington D.C. (2000).
[1]. Average delay for all vehicles entering the intersection.
[2]. Average delay for vehicles in the critical movement.

The LOS results for the 2012 Existing, 2017 No-Build and 2017 Build conditions are presented in Tables 2-7, 2-8 and 2-9, respectively. Detailed Synchro 6 work sheets are included in the Transportation Appendix.



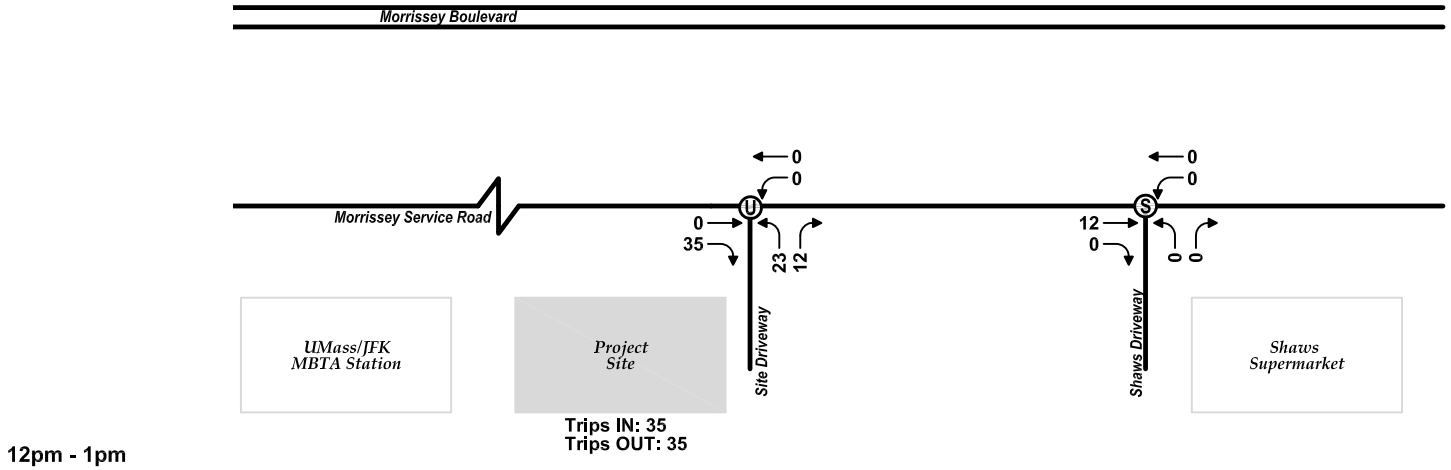
8am - 9am

Morning Peak



5pm - 6pm

Evening Peak



12pm - 1pm

Saturday Peak

Residences at Morrissey Boulevard - Boston, MA

VHB Vanasse Hangen Brustlin, Inc.

Figure 2-11

2017 Build Condition, Peak Hour Traffic Volumes
Morning, Evening and Saturday

Table 2-7 Weekday Morning Peak Hour Intersection Level of Service Summary

Approach	2012 Existing v/c[1]	2012 Existing Delay[2]	2012 Existing LOS[3]	2017 No-Build v/c	2017 No-Build Delay	2017 No-Build LOS	2017 Build v/c	2017 Build Delay	2017 Build LOS
Signalized: *Shaw's* Driveway / Access Rd									
Eastbound	0.37	57.2	E	0.37	57.2	E	0.28	56.9	E
Northbound	0.00	4.0	A	0.0	4.0	A	0.0	3.8	A
Southbound	0.28	5.2	A	0.28	5.3	A	0.29	5.2	A
Overall	**0.28**	**9.2**	**A**	**0.29**	**9.2**	**A**	**0.29**	**7.8**	**A**
Unsignalized: *Shaw's* Driveway (In Only) / Access Rd									
Northbound	0.01	0.0	A	0.01	0.0	A	-	-	-
Southbound	0.24	0.0	A	0.24	0.0	A	-	-	-
Unignalized: North Project Site Driveway / Access Rd									
Eastbound	-	-	-	-	-	-	0.15	13.9	B
Westbound	-	-	-	-	-	-	0.0	0.0	A
Northbound	-	-	-	-	-	-	0.24	0.0	A
Southbound	-	-	-	-	-	-	0.14	0.0	A

[1]. Volume-to-capacity ratio reported for critical movement.
[2]. Average delay to all vehicles entering intersection, expressed in seconds per vehicle.
[3]. Level of Service.

Table 2-8 Weekday Evening Peak Hour Intersection Level of Service Summary

Approach	2012 Existing Condition v/c[1]	2012 Existing Condition Delay[2]	2012 Existing Condition LOS[3]	2017 No-Build Condition v/c	2017 No-Build Condition Delay	2017 No-Build Condition LOS	2017 Build Condition v/c	2017 Build Condition Delay	2017 Build Condition LOS
Signalized: *Shaw's* Driveway / Access Rd									
Eastbound	0.81	79.2	E	0.82	79.3	E	0.68	66.4	E
Northbound	0.02	6.0	A	0.02	6.1	A	0.02	5.1	A
Southbound	0.45	9.2	A	0.46	9.5	A	0.46	8.1	A
Overall	**0.50**	**18.2**	**B**	**0.51**	**18.4**	**B**	**0.48**	**13.1**	**B**
Unsignalized: *Shaw's* Driveway (In Only) / Access Rd									
Northbound	0.06	0.0	A	0.06	0.0	A	-	-	-
Southbound	0.40	0.0	A	0.41	0.0	A	-	-	-
Unignalized: North Project Site Driveway / Access Rd									
Eastbound	-	-	-	-	-	-	0.36	30.1	D
Westbound	-	-	-	-	-	-	0.0	0.0	A
Northbound	-	-	-	-	-	-	0.41	0.0	A
Southbound	-	-	-	-	-	-	0.32	0.0	A

[1]. Volume-to-capacity ratio reported for critical movement.
[2]. Average delay to all vehicles entering intersection, expressed in seconds per vehicle.
[3]. Level of Service.

Table 2-9 Saturday Midday Peak Hour Intersection Level of Service Summary

Approach	2012 Existing Condition			2017 No-Build Condition			2017 Build Condition		
	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS	v/c	Delay	LOS
Signalized: *Shaw's* Driveway / Access Rd									
Eastbound	0.76	73.3	E	0.77	74.3	E	0.65	65.2	E
Northbound	0.0	5.6	A	0.0	5.7	A	0.0	4.8	A
Southbound									
Overall	**0.32**	0.25	7.0	A	0.26	7.2	A	0.27	6.1
Unsignalized: *Shaw's* Driveway (In Only) / Access Rd									
Northbound	0.05	0.0	A	0.05	0.0	A	-	-	-
Southbound	0.23	0.0	A	0.24	0.0	A	-	-	-
Unignalized: North Project Site Driveway / Access Rd									
Eastbound	-	-	-	-	-	-	0.20	15.6	C
Westbound	-	-	-	-	-	-	0.00	0.0	A
Northbound	-	-	-	-	-	-	0.02	0.0	A
Southbound	-	-	-	-	-	-	0.24	0.0	A

[1]. Volume-to-capacity ratio reported for critical movement.
[2]. Average delay to all vehicles entering intersection, expressed in seconds per vehicle.
[3]. Level of Service.

As shown in Tables 2-7, 2-8 and 2-9, under 2012 Existing Conditions, both site driveways operate at LOS A during the morning peak hour and LOS B or better during the evening and Saturday peak hours.

Under the 2017 No-Build Conditions, the driveway operations are expected to remain at LOS A during the morning peak hour and LOS B during the evening peak hours, but drop to LOS C during the Saturday peak hour.

Under the 2017 Build Conditions, the driveway operations remain at similar levels of service as No-Build Conditions. The new (north) site driveway is expected to operate at LOS B or better during the morning peak hour, LOS D or better during the evening peak hour and LOS C of better during Saturday midday peak hour.

In summary, the Project Site driveway intersections on the Access Road operate at satisfactory levels of service, and are projected to continue to operate satisfactorily under No-Build and Build conditions. Therefore, there would be no significant impact associated with the Project. Indeed, it is worth noting that, under the Build condition, with the introduction of all turning movements at the Project driveway, some retail traffic is expected to shift to that driveway, resulting in an improvement in operations at the existing signalized *Shaw's* driveway.

2.5 Project Site Access, Circulation and Parking

The proposed site plan presented previously in Figure 2-3 shows the overall layout of the Project Site, including the introduction of all vehicle turning movements at the relocated north curb cut on the Access Road, and the reduction in size of the *Shaw's* Supermarket parking lot as defined by the alignment of "New Street." Approximately 175 parking spaces will be retained in the *Shaw's* parking lot, which will be adequate to accommodate the retail demand.

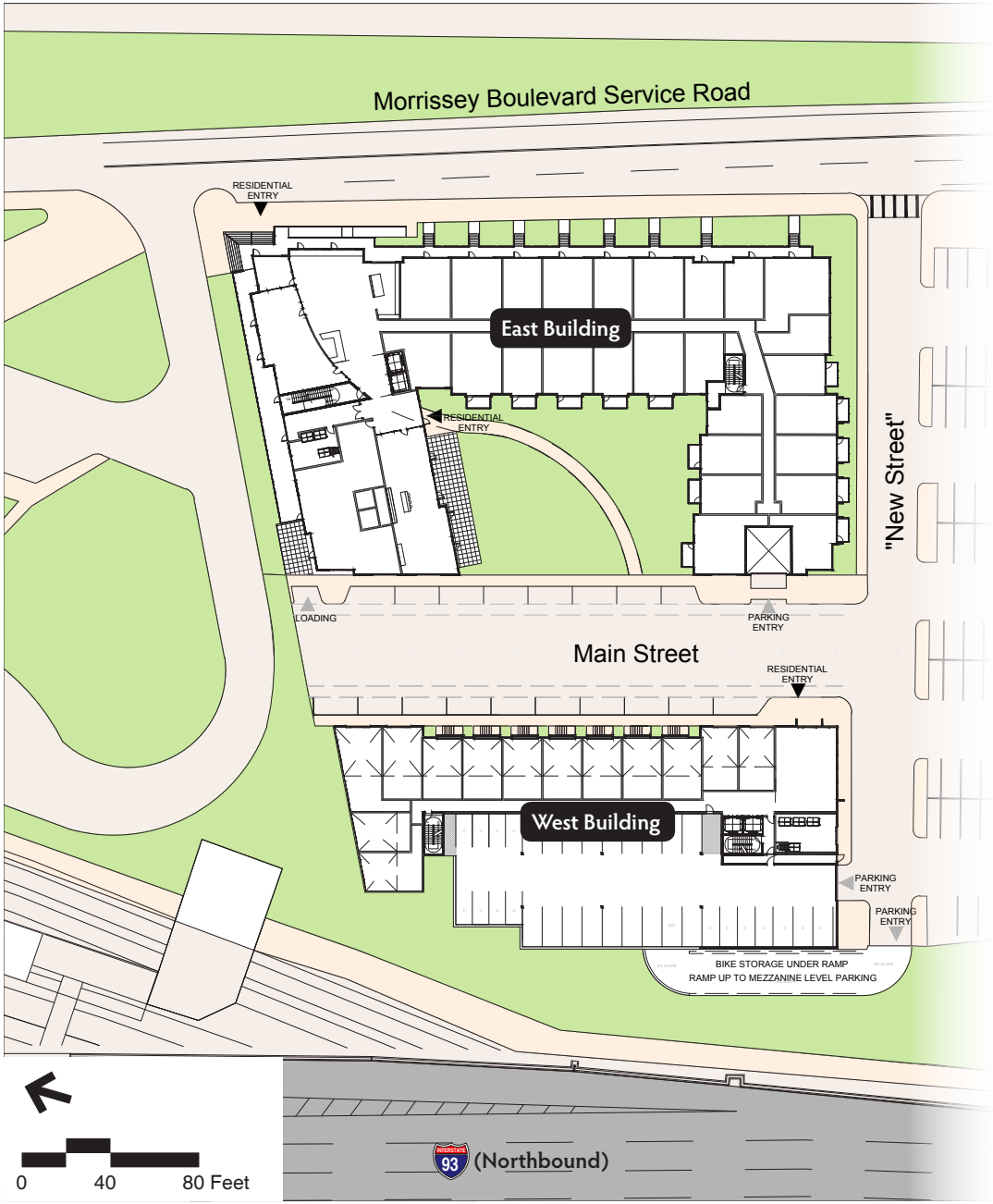
Project Site circulation and parking for the Project are presented in Figure 2-12. Access to 80 parking spaces under the East Building will be provided by a ramp from "Main Street", while access to 63 parking spaces within the West Building will be provided from "New Street" by an entrance to 33 ground-level spaces and a separate ramp to 31 mezzanine level spaces.

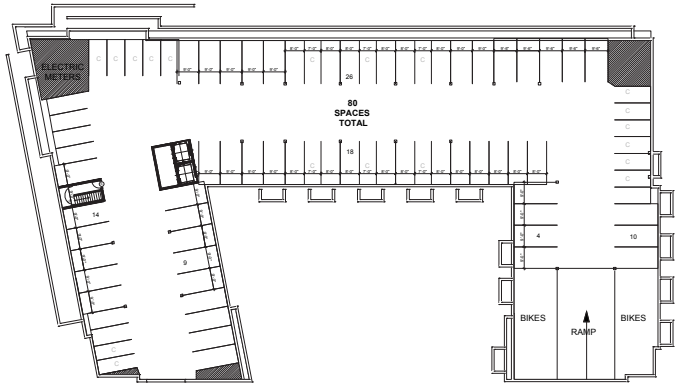
2.5.1 Parking Supply

The total parking supply of 143 spaces supporting 278 residential units, to be used exclusively by residents and visitors of the Project, represents a ratio of 0.51 spaces per unit. The Project is expected to attract residents who rely substantially on transit and non-auto travel modes. Accordingly, the ratio is commensurate with the excellent transit access enjoyed by the site, and will be supported by a Transportation Demand Management (TDM) plan, as described in Section 2.6 below. Reliance on travel by car is also reduced by the presence of a grocery store directly abutting the Project Site.

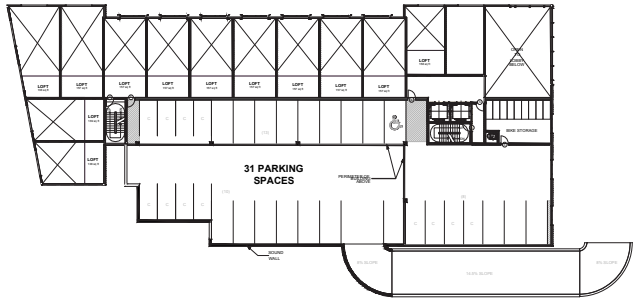
As noted above, the parking supply for the *Shaw's* Supermarket and ancillary Liquor Store will be reduced from approximately 254 spaces to 175 spaces as a result of the Project. Based on the ATR counts performed at the existing driveways over the course of a full week in early November 2012, the maximum accumulation of parked cars is estimated to be approximately 138 cars on a Saturday. Parking demand on weekdays is lower, but other "busy" days include Thursday at approximately 125 cars with and 121 cars on a Sunday. Therefore, the reduced supply of 175 parking spaces will be more than adequate to satisfy existing demand, and allows a buffer for any potential growth in retail activity.

A total of 278 bicycle parking spaces, equivalent to 1 space per unit, will be accommodated in locations in both garages, accessed directly from inside the buildings. Short term uncovered bicycle parking will be provided in the vicinity of the entrance lobbies for both building. Bicycling will also be supported by the nearby Hubway station at JFK/UMass station.





East Building Parking Level



West Building Parking Level

Residences at Morrissey Boulevard - Boston, MA

Figure 2-12

Site Circulation and Parking

2.5.2 Pedestrian Access

As shown in Figure 2-12, pedestrian access for the Project Site is currently oriented to and from the Access Road, with the entrance lobby for the East Building located at the north-east corner of the site, closest to the JFK/UMass MBTA station. The lobby for the West Building is located at the corner of "Main Street" and "New Street," with a sidewalk connection to the Access Road. In addition, a more direct pedestrian route to the West building lobby is provided through the East Building lobby and a pathway in the interior courtyard oriented towards the West Building lobby.

2.5.3 Loading and Servicing

Loading and servicing needs for the Project are relatively limited due to its residential nature. An average of 12 delivery/service vehicles per day is projected for the Project, including mail delivery, regular trash collection, etc. The majority of service vehicles are expected to comprise vans and smaller vehicles that typically service on-street. Special arrangements will be made to accommodate moving trucks and occasional large trucks on "Main Street."

Trash and recycling rooms are accommodated inside each building, accessed via "Main Street" and "New Street" for the East and West Buildings. The East Building will have a loading dock for trucks to back up to.

2.5.4 Future Roadway Circulation

The Columbia Point Master Plan calls for coordinated site planning in the area so that ultimately a new roadway will be provided parallel to Morrissey Boulevard through future development of all the sites on the west side of Morrissey Boulevard. The roadway intended to provide a spine road for development traffic associated with these sites, connecting from a reconfigured redevelopment of the JFK/UMass station to the north and a new east-west connection with Morrissey Boulevard to the south.

The Project builds the first section of this new roadway by providing "Main Street," running north-south between the two residential buildings, with a cross-section that includes a travel lane, a bike lane and parallel parking in each direction. When the MBTA station site is redeveloped, it is expected that "Main Street" can then connect through the MBTA site to Old Colony Avenue. In turn, this will create a much more direct pedestrian link to the JFK/UMass station, benefiting not only the Project and the MBTA station, but also future development to the south.

In addition, the future roadway network with the extended "Main Street" will provide increased flexibility for vehicular access, further distributing traffic in all directions and eliminating the Access Road's function as simply a frontage road.

2.6 Transportation Demand Management Actions

The Proponent is committed to reinforcing the transit-oriented nature of the Project through other transportation demand management strategies, including the following:

1. Providing orientation packages for new residents containing information on transit routes and schedules and non-auto modes such as Hubway;

2. Posting transit information in building lobbies or common areas;

3. Proving secure bicycle parking at a ratio of 1 space per unit, and short term visitor bicycle parking close to building lobbies;

4. Exploring the feasibility of accommodating car-sharing spaces on site with a car-sharing operator (such as Zipcar);

5. Designating a Transportation Coordinator within the management company to coordinate the transportation needs of all residents, manage loading and servicing activities, and act as the point of contact with the Boston Transportation Department and others, as necessary; and

6. Joining a Transportation Management Association (TMA) as and when one is established in the area.

As required as part of Large Project Review under Article 80 of the Boston Zoning Code, the Proponent will prepare and submit a Transportation Access Plan Agreement (TAPA) for execution by the Proponent and BTD. In addition, a Construction Management Plan (CMP) will be prepared for review by BTD and other City of Boston agencies. Elements of the CMP are described in Chapter 3.0.

Section 3.0

Environmental Component

3.0 ENVIRONMENTAL COMPONENT

3.1 Wind

The Proponent retained Rowan Williams Davies & Irwin Inc. (RWDI) to study the potential wind conditions around the Site. RWDI are expert wind consultants with extensive experience working on a variety of projects throughout Boston. A copy of RWDI's report is included as an appendix to this PNF.

Based on RWDI's extensive experience providing wind tunnel analysis for Boston projects, an analysis of the local wind data, and the limited bulk of the Project, RWDI's report finds that wind conditions on and around the Project Site will be similar to those that currently exist, and that they are considered suitable for the intended use for most of the pedestrian areas. The report also finds that higher winds than those desired for passive activities such as sitting are expected at the proposed East Building, at its northeast entrance and the roof-top deck. As the design process progresses, possible mitigation efforts to improve wind conditions at the northeast corner will be reviewed, including planting coniferous trees along the sidewalks, installing wind screens, using sliding doors, and increasing the depth of the entrance's canopy. Windy conditions at the roof-top deck may be mitigated by tall parapets or structural or vegetated screens.

3.2 Shadow

3.2.1 Introduction and Methodology

A shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 AM, 12:00 PM, and 3:00 PM) during the summer solstice (June 21), autumnal equinox (September 21), vernal equinox (March 21), and the winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 PM time period during the summer solstice and autumnal equinox.

The shadow analysis presents the existing shadow and new shadow that would be created by the Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and MBTA bus stops and stations adjacent to and in the vicinity of the Project Site. Shadows have been determined using the applicable altitude and azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-4 at the end of this section.

As the Project Site is currently vacant, new shadow will be cast onto the surrounding area, in particular the adjacent streets and sidewalks.

3.2.2 Vernal Equinox (March 21)

At 9:00 AM, during the vernal equinox, new shadow from the Project will be cast to the northwest. New shadow will be cast across the portions of the adjacent JFK/UMass MBTA station, the surrounding sidewalks, and a portion of the proposed "Main Street" in between the East and West Buildings.

At 12:00 PM, new shadow is cast to the north. New shadow will be limited to the Project Site and a small portion of the MBTA station.

At 3:00 PM, new shadow will be cast to the northeast across the Access Road, the proposed "Main Street" and their sidewalks.

3.2.3 Summer Solstice (June 21)

At 9:00 AM, during the summer solstice, new shadow will be cast to the northwest. A sliver of new shadow will be cast onto a portion of the MBTA station. Additional new shadow will fall on the proposed "Main Street" and its sidewalks as well as onto the abutting MBTA train tracks to the west.

At 12:00 PM, minimal new shadow will be cast to the north primarily within the Project Site.

At 3:00 PM, new shadow will be cast to the east across the Access Road, the proposed "Main Street" and portions of their sidewalks.

At 6:00 PM, new shadow will be cast to the southeast. New shadow will be cast across Morrissey Boulevard, its sidewalks, and onto the adjacent property's front lawn. New shadow will also be cast onto the existing Shaw's parking lot to the south of the Project Site.

3.2.4 Autumnal Equinox (September 21)

At 9:00 AM, during the autumnal equinox, new shadow will be cast to the north. New shadow will be cast onto a small portion of the MBTA station, and onto the proposed "Main Street and its sidewalks.

At 12:00 PM, new shadow will be cast to the north. New shadow will be limited to a small portion of the Project Site and abutting MBTA station. New shadows will also be cast onto the sidewalks of the Access Road and proposed "Main Street."

At 3:00 PM, new shadow is cast to the east. New shadow will be cast across both the Access Road and the proposed "Main Street" including sidewalks on both sides of the street.

At 6:00 PM, new shadow is cast to the east but will be hidden amongst existing shadows form the surrounding structures.

3.2.5 Winter Solstice (December 21)

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

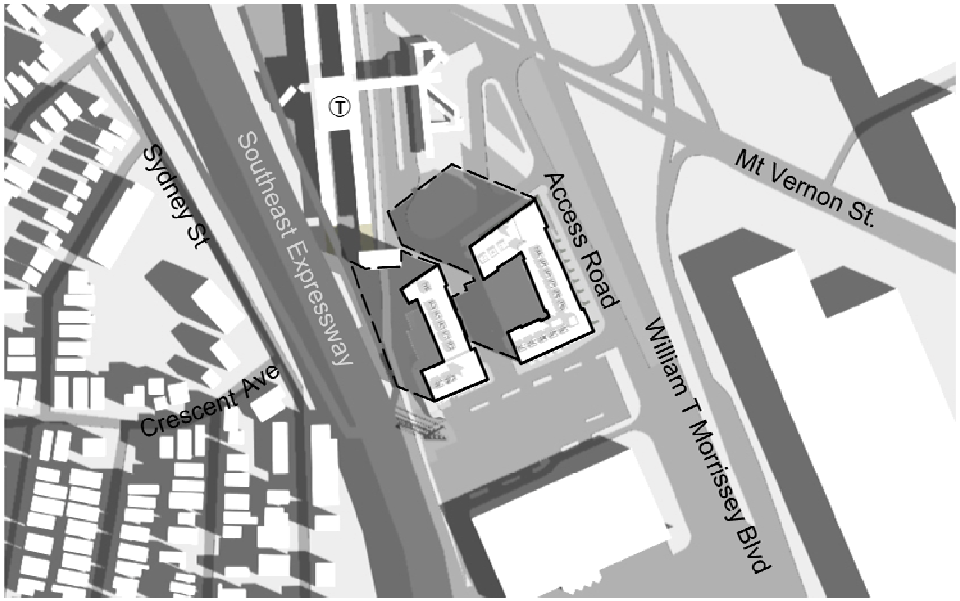
At 9:00 AM, during the winter solstice, new shadow is cast to the northwest. New shadow will be cast onto areas already covered in existing shadow from the surrounding structures. A small portion of the MBTA station may experience some new shadow from the Project.

At 12:00 PM, new shadow will be cast to the north. New shadow will be cast across the MBTA' s property as well as small portions of the Access Road, the proposed "Main Street" and their sidewalks.

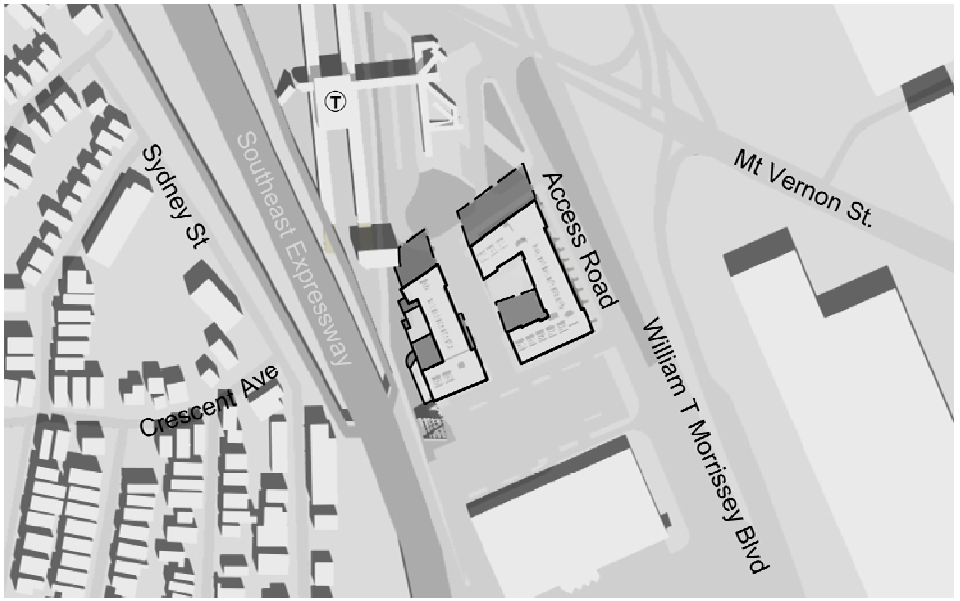
At 3:00 PM, new shadow will be cast to the northeast. New shadow will be cast across the proposed "Main Street", the Access Road, Morrissey Boulevard, and their sidewalks. A portion of the MBTA station will likely experience new shadows as well.

3.2.6 Conclusions

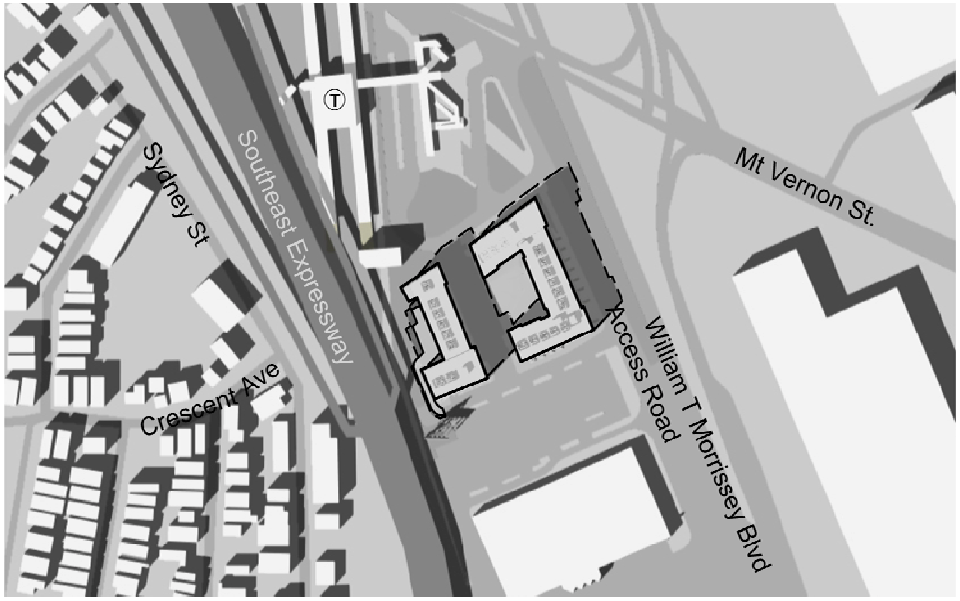
The Project site is currently vacant, and therefore the new buildings proposed under the Project will necessarily create some new shadow in the surrounding area. New shadow is generally cast onto the surrounding streets and sidewalks. Because of the Project's relatively low height and bulk, relatively minimal new shadow impacts for an urban site are expected.



9.00 a.m.



12.00 p.m.



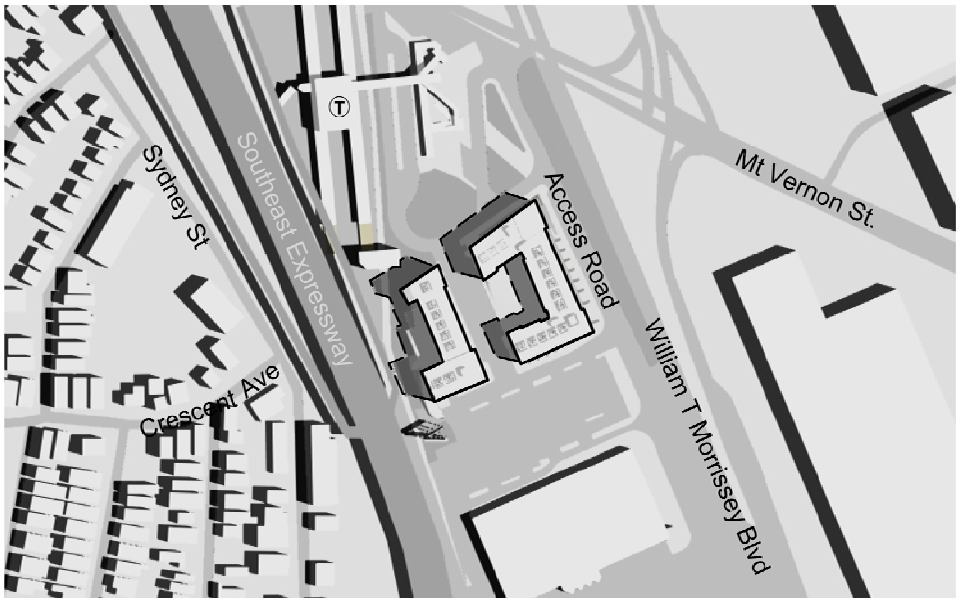
3.00 p.m.

Residences at Morrissey Boulevard Boston, MA

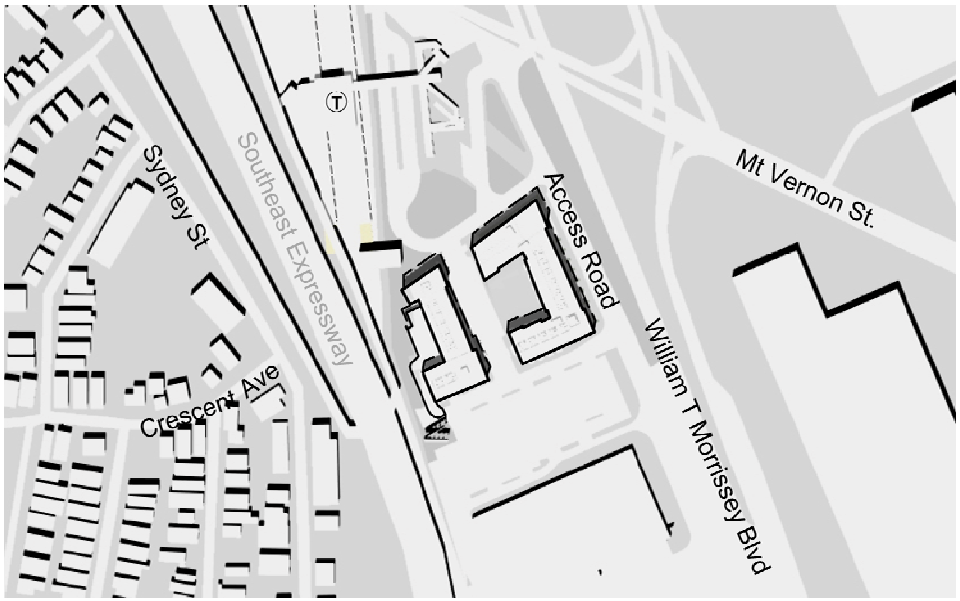
N

Figure 3.2-1

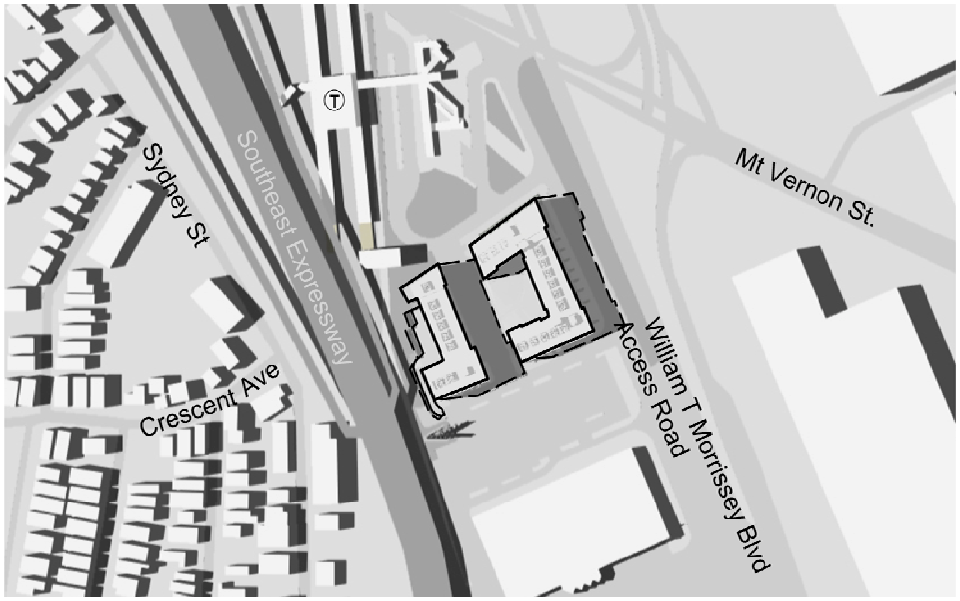
Shadow Analysis (March 21st)



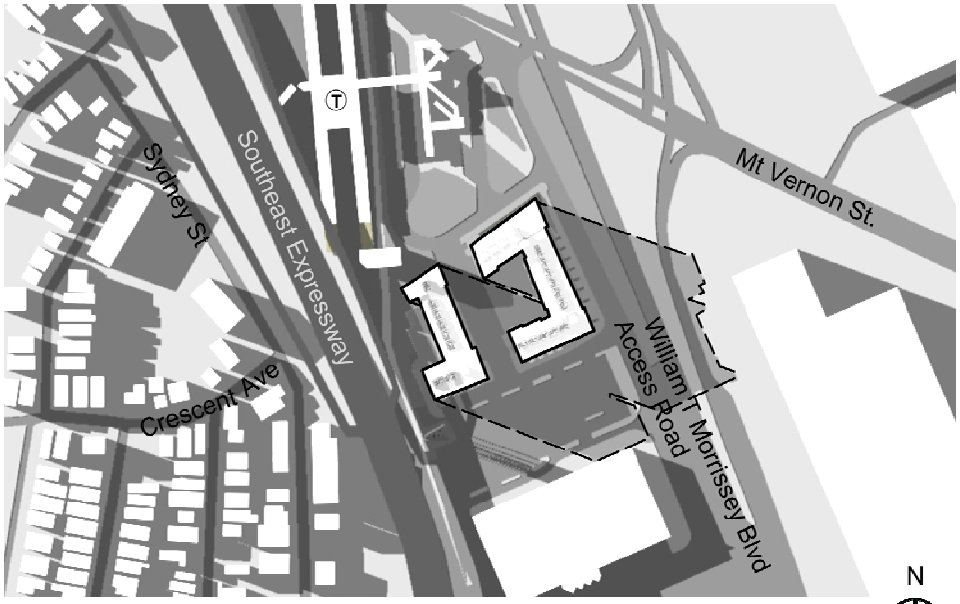
9.00 a.m.



12.00 p.m.



3.00 p.m.

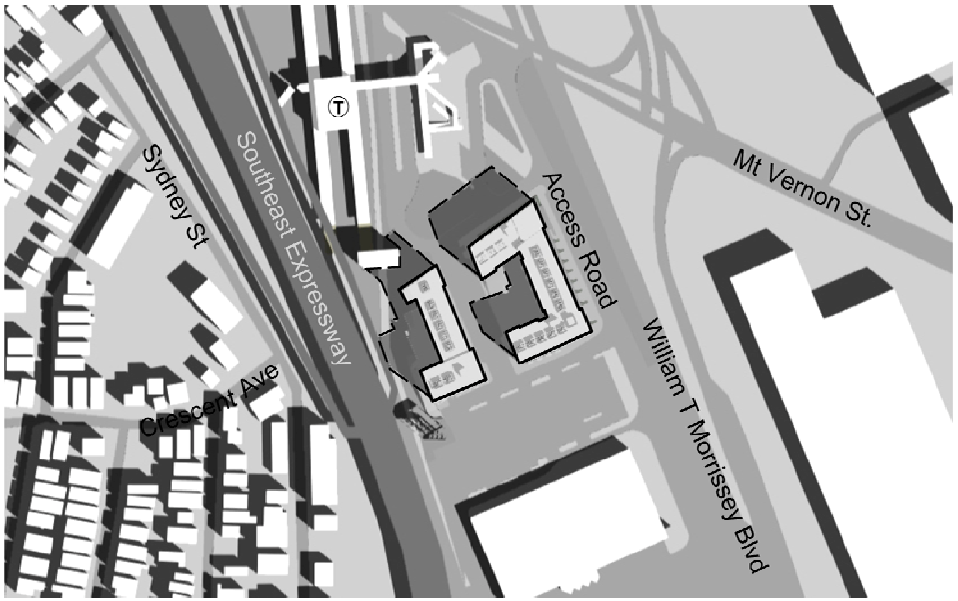


6.00 p.m.

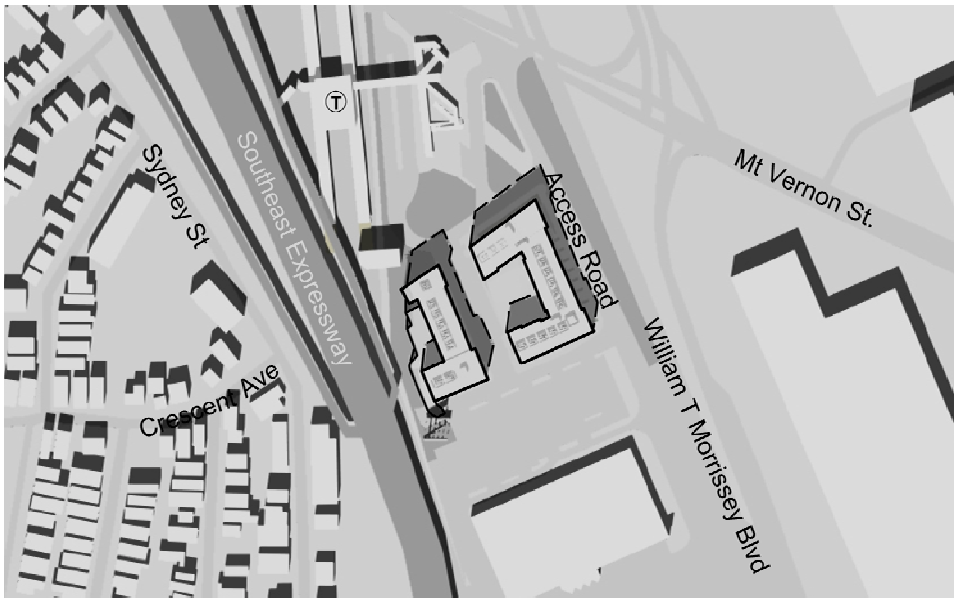
Residences at Morrissey Boulevard Boston, MA

Figure 3.2-2

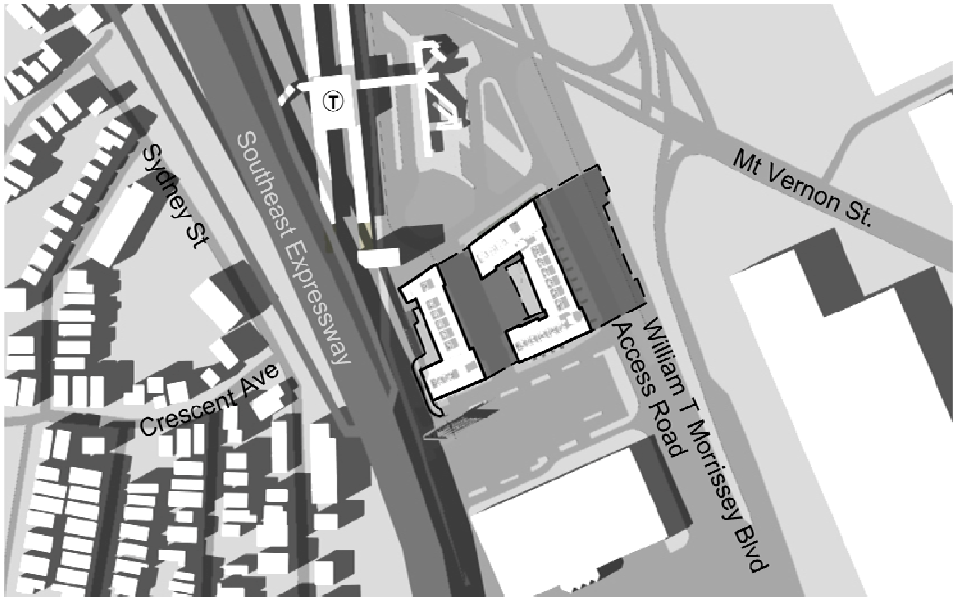
Shadow Analysis (June 21st)



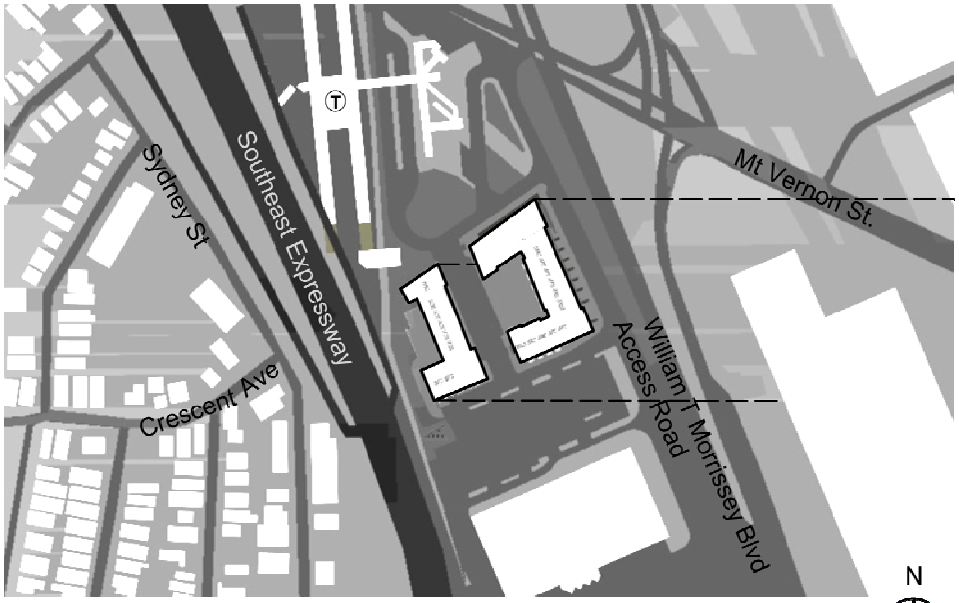
9.00 a.m.



12.00 p.m.



3.00 p.m.



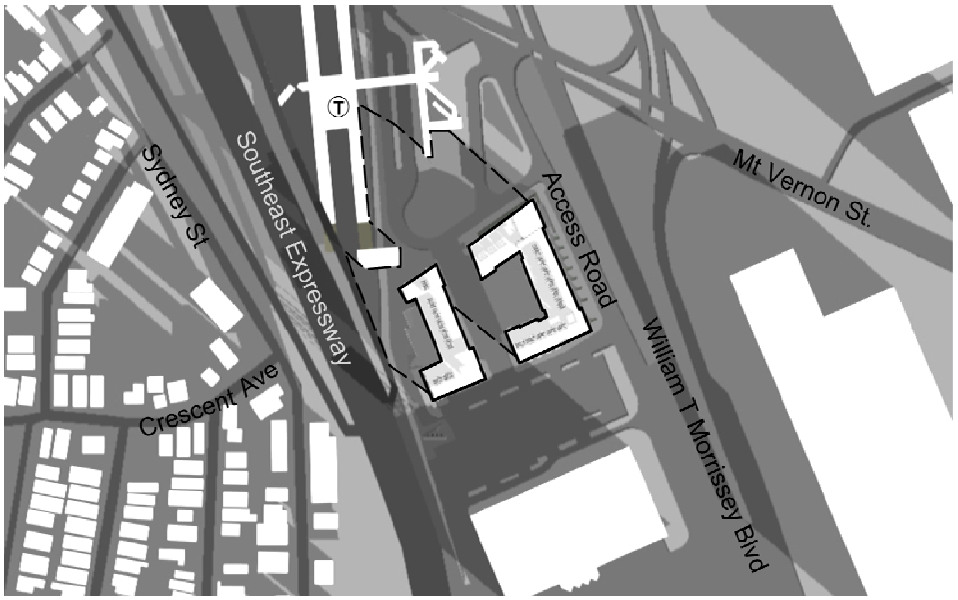
6.00 p.m.

Residences at Morrissey Boulevard Boston, MA

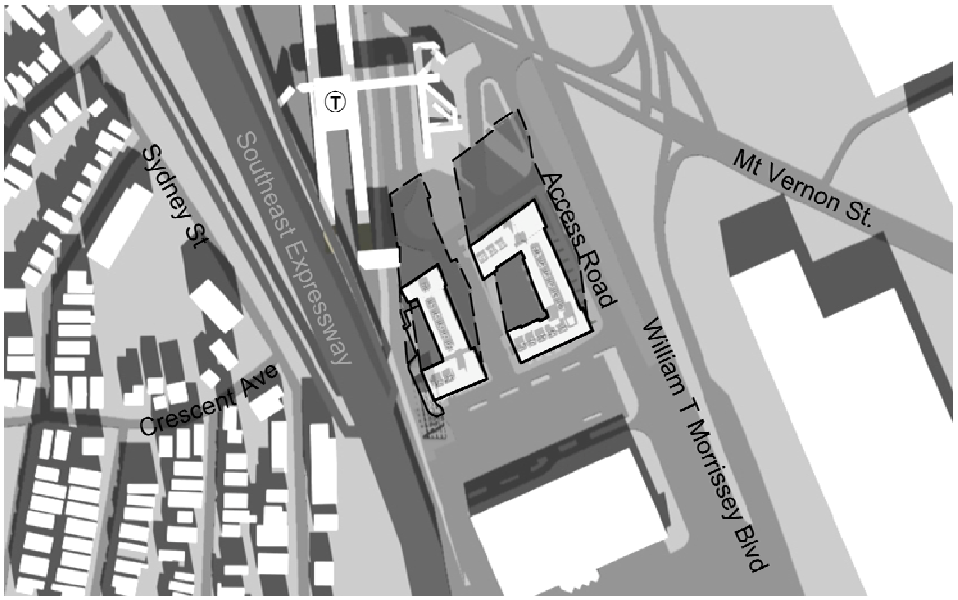
ICON

Figure 3.2-3

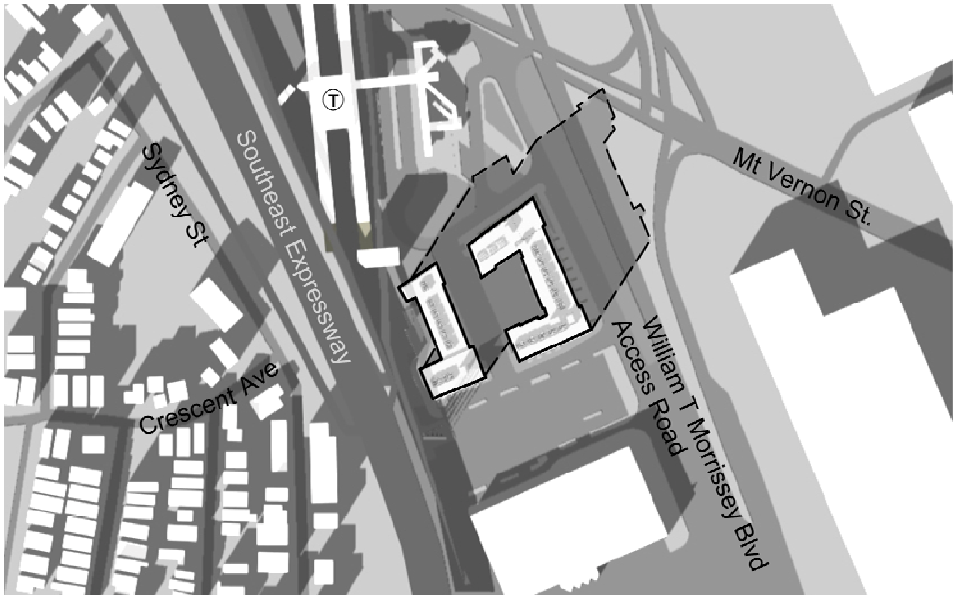
Shadow Analysis (September 21st)



9.00 a.m.



12.00 p.m.



3.00 p.m.

N

Residences at Morrissey Boulevard Boston, MA

ICON

Figure 3.2-4

Shadow Analysis (December 21st)

3.3 Daylight

3.3.1 Introduction

The purpose of a 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 its immediate vicinity. A daylight analysis for the Project considers the existing and proposed conditions on the Project Site and daylight obstruction values of the surrounding area.

Because the Project Site is currently a vacant lot, the proposed Project will necessarily increase daylight obstruction; however, the resulting conditions will be typical of a more an urban public realm, and daylight obstruction will not be significant given the large amount of open space, the spaces between existing buildings and the existing relatively wide streets surrounding the Project Site.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program.[1] The BRADA program measures the percentage of sky that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

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

The analysis compares three conditions: Existing Conditions; Proposed Conditions; and the context of the area. A single viewpoint along the Access Road and two along the proposed "Main Street" were chosen to evaluate daylight obstruction for the proposed and existing conditions. Four area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoints and area context viewpoints were taken in the following locations and are shown on Figure 3.3-1.

- **Viewpoint 1** – View from the Access Road facing west toward the Project Site.

[1] This method was developed by Harvey Bryan and Susan Stuebing, and the computer program was developed by Ronald Fergle of the Massachusetts Institute of Technology, located in Cambridge, MA, during September of 1984.

- **Viewpoint 2** – View from the proposed "Main Street" facing west toward the West Building on the Project Site.

- **Viewpoint 3** – View from the proposed "Main Street" facing east toward the East Building on the Project Site.

- **Area Context Viewpoint AC1** – View from Morrissey Boulevard facing east toward the *Sovereign Bank* Building.

- **Area Context Viewpoint AC2** – View from Morrissey Boulevard facing west toward the *Shaw's* supermarket building.

- **Area Context Viewpoint AC3** – View from Morrissey Boulevard facing west toward *the Boston Globe* Building.

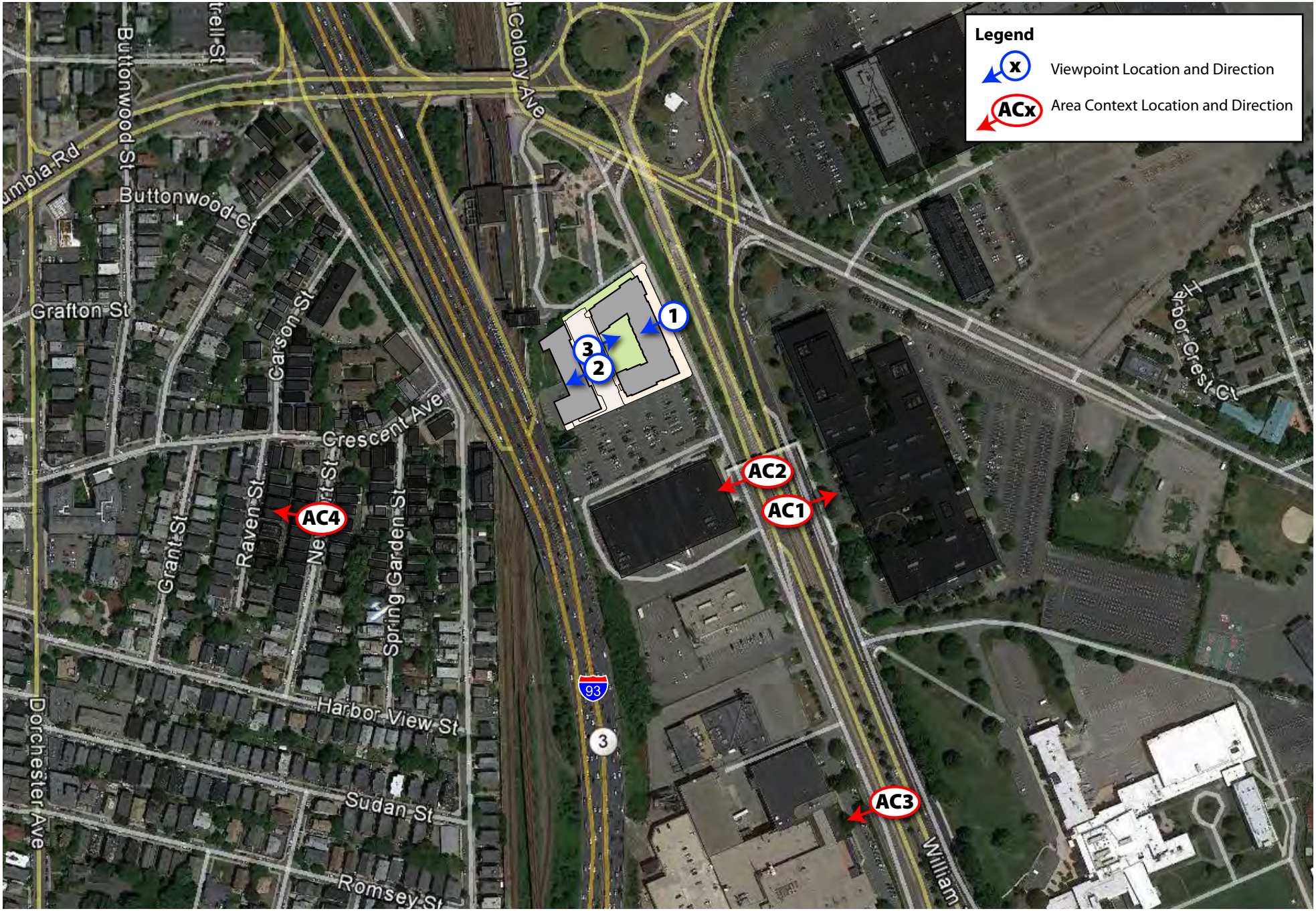
- **Area Context Viewpoint AC4** – View from Newport Street facing west toward a three-story building typical of the surrounding residential neighborhood.

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figure 3.3-2 through Figure 3.3-3 illustrates the BRADA results for each analysis.

Table 3.3-1 Daylight Obstruction Values

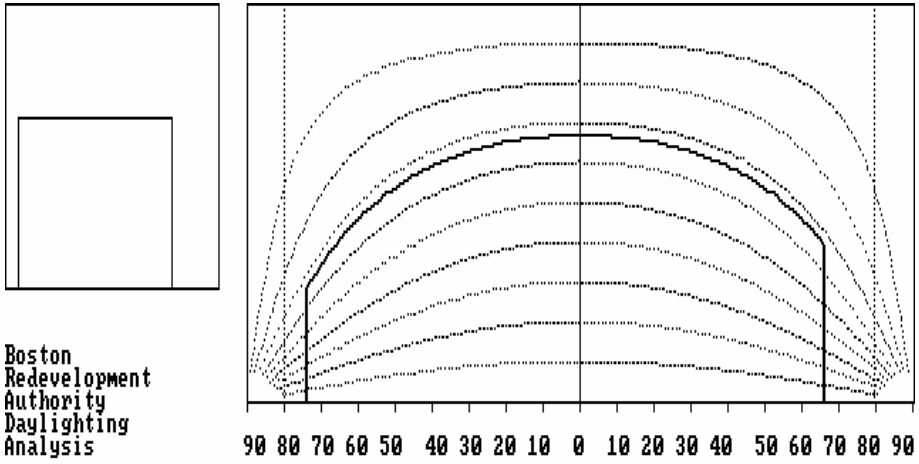
Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	The Access Road looking west toward the Project Site	0%	59.7%
Viewpoint 2	The proposed "Main Street" looking west toward the West Building	0%	51.5%
Viewpoint 3	The proposed "Main Street" looking east toward the East Building	0%	37.4%
Area Context Points			
AC1	View from Morrissey Boulevard facing east toward the *Sovereign Bank* building	11.1%	N/A
AC2	View from Morrissey Boulevard facing west toward the *Shaw's* supermarket building	17.7%	N/A
AC3	View from Morrissey Boulevard facing west toward *the Boston Globe* building	16.1%	N/A
AC4	View from Newport Street facing west toward a three-story building typical of the surrounding residential neighborhood	66.4%	N/A



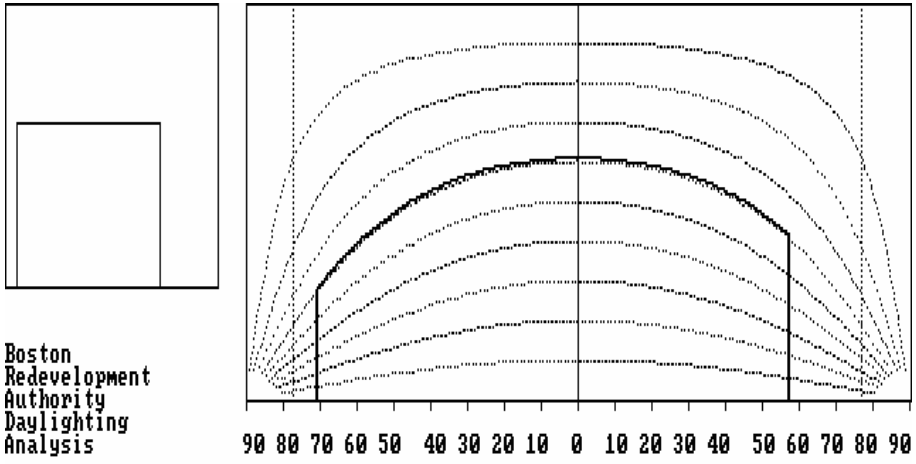
Residences at Morrissey Boulevard Boston, MA

Figure 3.3-1

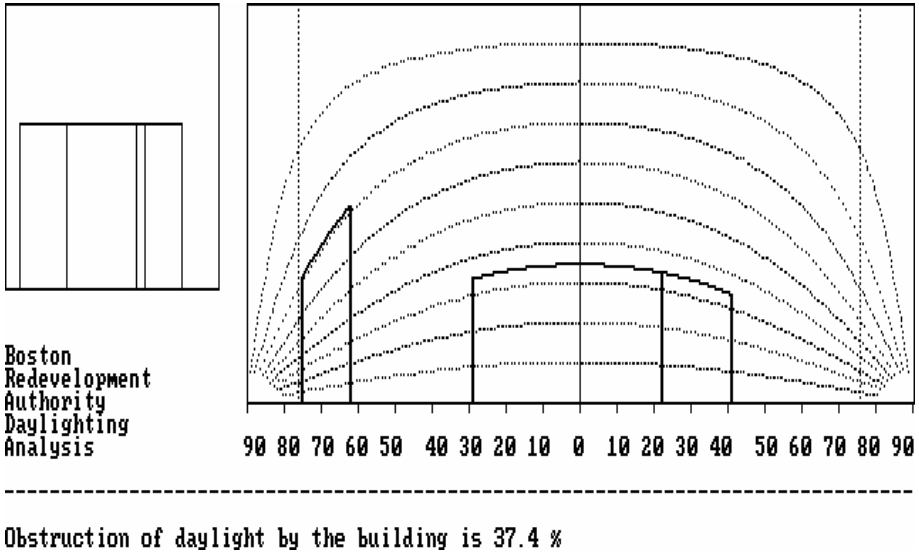
Viewpoint and Area Context Locations



Viewpoint 1: Project from the Access Road



Viewpoint 2: West Building from the proposed “Main Street”



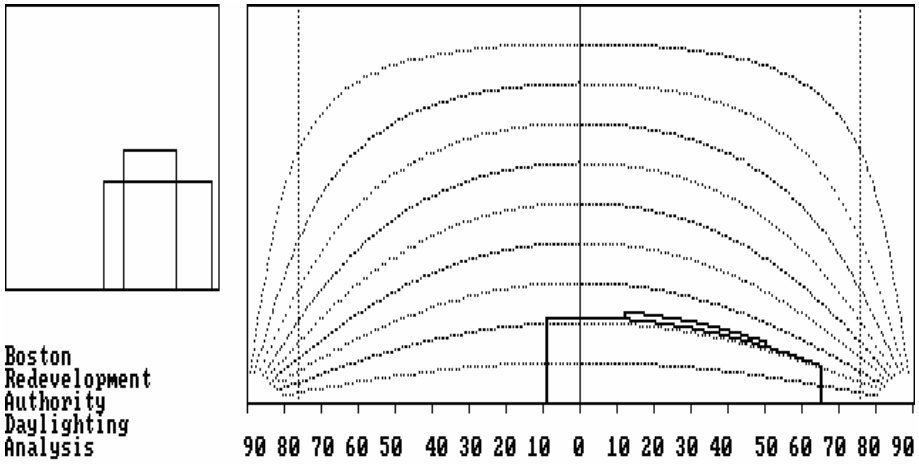
Viewpoint 3: East Building from the proposed “Main Street”

Residences at Morrissey Boulevard Boston, MA

Epsilon Associates Inc.

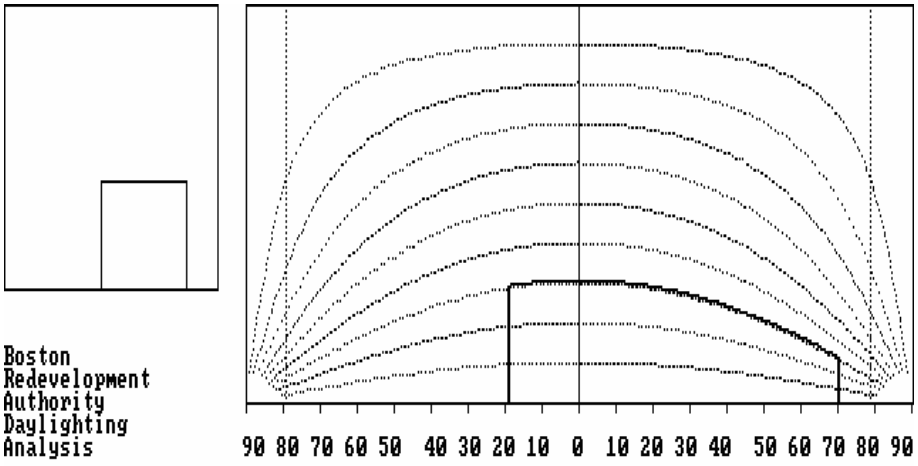
Figure 3.3-2

Daylight Analysis – Proposed Condition Results



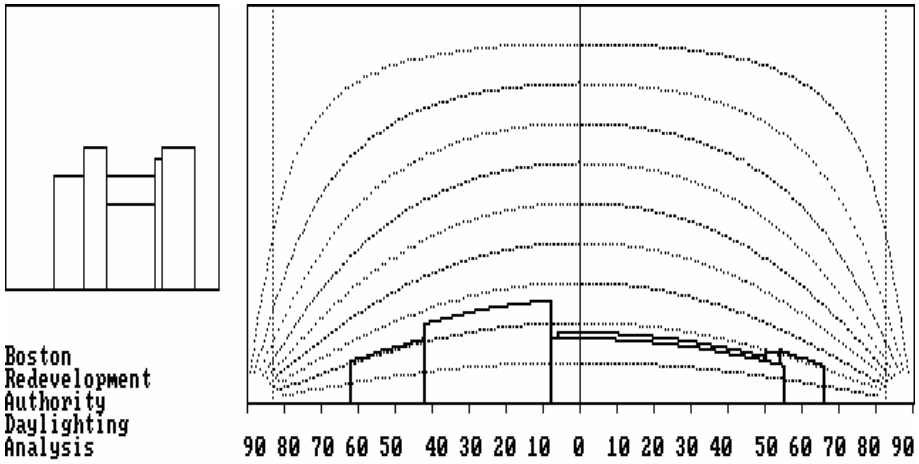
Obstruction of daylight by the building is 11.1 %

Area Context Viewpoint 1



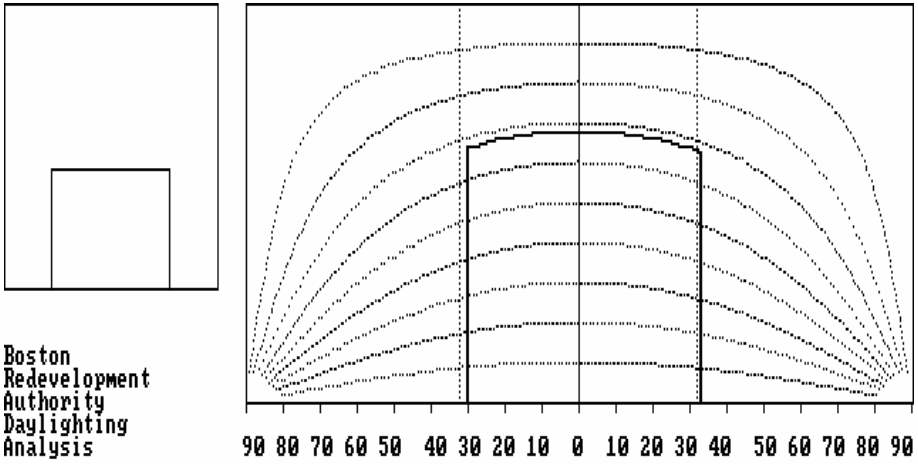
Obstruction of daylight by the building is 17.7 %

Area Context Viewpoint 2



Obstruction of daylight by the building is 16.1 %

Area Context Viewpoint 3



Obstruction of daylight by the building is 66.4 %

Area Context Viewpoint 4

The Access Road – Viewpoint 1

The Access Road borders the Project Site to the east. Viewpoint 1 was taken from the center of the Access Road, looking directly west at the Project Site. The Project Site is currently a vacant lot and, therefore, has an existing daylight obstruction value of zero percent. The development of the Project will increase daylight obstruction values to 59.7 percent from this perspective. Despite the increase in daylight obstruction this percentage is still modest for an urban location and is less than that of the typical residential neighborhoods as described in AC4 below.

Proposed "Main Street" – Viewpoint 2

Viewpoint 2 was taken from the center of the proposed "Main Street," looking directly west toward the proposed West Building. From this perspective, the development of the Project will increase daylight obstruction values to 51.5 percent. While this is an increase over existing conditions, the daylight obstruction value in the Project vicinity is minimized by spaces between buildings and large setbacks, limiting the impact of the proposed building on the sky dome in the surrounding area.

Proposed "Main Street" – Viewpoint 3

Viewpoint 3 was taken from the center of the proposed "Main Street," looking directly east toward the proposed East Building. From this perspective, the Project will increase daylight obstruction values to 37.4 percent.

Area Context Views

The area around the Project Site is primarily characterized by residential, transportation infrastructure, and commercial uses. The buildings in the vicinity have a mix of heights, ranging between three-story residential buildings, suburban-style retail, and commercial office buildings with surface parking. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for four Area Context Points described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 11.1 percent on Morrissey Boulevard (AC1) to 66.4 percent on Newport Street (AC4). The area context views that result in lower daylight obstruction values than the Project are in large part due to the significant width of Morrissey Boulevard and the more suburban style setbacks and surface parking of the existing buildings.

3.3.4 Conclusions

The Project's daylight impacts are modest in comparison to typical urban areas and are in line with the type of urban design recommended by the Columbia Point Master Plan. The setbacks and surface parking areas found in the surrounding properties are the direct result of type of designs that the recent Master Plan seeks to replace as the neighborhood transforms. The Project's urban design will help the community achieve the goals of the Master Plan by creating a more walkable and vibrant urban context.

3.4 Solar Glare

Non-reflective materials will be included in the design of the East and West Buildings to avoid adverse impacts from spot glare. Due to the mid-rise height of the buildings and their orientation, solar glare impacts are not anticipated.

3.5 Air Quality

3.5.1 Introduction

An air quality analysis is used to determine the potential impact of pollutant emissions from combustion and mobile source emissions generated by the Project. A mesoscale analysis is often performed to determine whether and to what extent a project will increase the amount of ozone precursors in the area, as well as to determine if a project is consistent with the Massachusetts State Implementation Plan (SIP). A microscale analysis is typically performed to evaluate the potential air quality impacts of carbon monoxide (CO) due to traffic flow around the project area. In addition, for stationary sources (i.e. combustion source stacks, and garage vents), United States Environmental Protection Agency (EPA) approved air dispersion models are often used to estimate project-generated ambient concentrations of nitrogen oxides (NOx), particulate matter (PM-10 and PM-2.5), and sulfur dioxide (SO2), in addition to CO.

3.5.2 Mesoscale Analysis

A mesoscale analysis predicts the change in the regional ozone precursor emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) due to the Project. The BRA requires a mesoscale analysis when a project will generate more than 10,000 vehicle trips per day. The analysis compares the future build condition to the no-build condition and, if emissions are greater for the build condition, evaluates reasonable and feasible mitigation measures. Methods and parameters for the mesoscale analysis follow those approved by the MassDEP. Because the proposed Project does not generate more than 10,000 trips per day, a mesoscale analysis is not required.

3.5.3 Microscale Analysis

A microscale analysis is sometimes required to analyze the effect on air quality of the increase in traffic generated by a project. The analysis examines anticipated local effects of the potential increase in traffic on ambient air quality near specific intersections. This "microscale" analysis is required for projects in which:

1) project traffic would impact intersections or roadway links currently operating at LOS of D, E, or F or would cause LOS to decline to D, E, or F;
2) project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or,

3) the project will generate 3,000 or more new average daily trips on roadways providing access to a single location.

The microscale analysis involves modeling of CO emissions from vehicles idling at and traveling through both signaled and unsignalized 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 traffic analysis performed by VHB and presented in Chapter 2 indicates that the Project will not trigger any of the three conditions noted above. Therefore, a microscale analysis is not required for the Project.

3.5.4 Stationary Source Analysis

Stationary sources expected to be included in the Project include boilers for heating and hot water, and emergency generators for power generation. This equipment may be subject to additional air quality permitting requirements as regulated in 310 CMR 7.00.

It is expected that the majority of stationary sources (boilers, emergency engines, etc) associated with this Project would be subject to the Massachusetts Environmental Protection (MassDEP) Environmental Results Program (ERP). Thus, any air quality impacts would be mitigated by this program and air impact analyses would be done at the time of permitting. Therefore, no formal air quality analysis of stationary source emissions was performed for this document.

3.5.4.1 Heating Equipment

All heating and hot water boilers are expected to be either within or well below the requirements of ERP, since individual estimated heat inputs would be within or below the 10 to 40 mmBtu/hour ERP range. Boilers within this range would be required to meet applicable emissions limits and register in MassDEP's ERP program. The program includes notification requirements to provide MassDEP with boiler specifications, fuel usage, and related information. Any boilers below the ERP limit of 10 mmBtu/hour would not be required to register in MassDEP's ERP program. Boilers larger than 40 mmBtu/hour would be subject to the requirements of MassDEP's Major or Non-Major Comprehensive Plan Approval process for preconstruction permits of fuel combusting sources.

3.5.4.2 Emergency Generators

Depending on the final uses of the Project, there will likely be a need for emergency power units that would provide life safety and standby emergency power to the building. These units are typically diesel-fired and located in a mechanical area on the roof or in the basement of a building. The generators must be designed such that exhaust stacks extend at least 10 feet above the individual building roof height above ground level.

Typically, generators will operate for approximately one hour each month for testing and general maintenance. The ERP regulation applies to new emergency generators greater than 37 kW. The regulation is similar to the boiler ERP in that new engines are subject to emission standards, recordkeeping, certification, and compliance with the MassDEP noise policy. If the generator engine maximum rating capacity is greater than the ERP limit of 37 kW, it will be subject to the ERP program. Under the ERP, the generator owner will limit operation of the generator to less than 300 hours per year and submit a certification form to MassDEP within 60 days of installation.

3.5.5 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the federal government to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide, sulfur dioxide, particulate matter (PM) (PM10 and PM-2.5), carbon monoxide, 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.

The NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, including the health of the sensitive populations such as asthmatics, children and elderly. The secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as decreased visibility and damage to animals, crops, vegetation and buildings. The more stringent of the primary or secondary standards are applied when comparing to the modeling results for a particular 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 for 3-hr and 24-hr SO_2 and 1-hr and 8-hr CO. The more recently promulgated short-term standards use a statistical form of the standard as described below. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a Fine Particulate (PM-2.5) NAAQS, effective December 2006, with an annual standard of 15 microgams per cubic meter ($\mu g/m^3$) and the 24-hour standard of 35 $\mu g/m^3$.

A one-hour NO_2 standard was promulgated on January 22, 2010, to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly NO_2 NAAQS was published in the Federal

Register on February 9, 2010, and became effective on April 12, 2010. The form of this standard is the three-year average of the 98th percentile of the daily maximum one-hour concentrations.

Similarly, a one-hour SO_2 standard was promulgated on June 2, 2010, to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly SO_2 NAAQS was published in the Federal Register on June 22, 2010, and became effective on August 23, 2010. The form of this standard is the three-year average of the 99th percentile of the daily maximum one-hour concentrations. The annual and 24-hour SO_2 standards were revoked in the same 2010 rule. However these standards remain in effect until one year after an area is designated for the 2010 standard. It is likely to take a few years for the area designations to be determined by EPA.

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]	80	None
	24-hour [2]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	195	None
PM10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM2.5	Annual [4]	15	Same
	24-hour [5]	35	Same
CO	8-hour [2]	10,000 (9 ppm)	Same
	1-hour [2]	40,000 (35 ppm)	Same
Ozone	8-hour [3]	235	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 (NO2) or 99th (SO2) percentile of the daily maximum 1-hour concentrations.
Source: 40 CFR 50 and 310 CMR 6.00

3.5.6 Ambient Background Concentrations

The MassDEP Air Assessment Branch collects representative samples of ambient air for a number of pollutants at monitoring stations located throughout the Commonwealth. All samples are collected in a scientifically sound manner in order to properly characterize the air quality in the state and to assess the exposure of its citizens to airborne pollutants. To estimate ambient pollutant levels representative of the Project area, the most recent air-quality monitor data reported by the MassDEP in their Annual Air Quality Reports, was obtained for 2009 to 2011. MassDEP guidance specifies the use of the latest three years of available monitoring data from within 10 km of the Project Site.

The closest monitor is located at Harrison Avenue in Boston, approximately 1.75 miles to the west-northwest of the Project Site. A summary of the background air-quality concentrations are presented in Table 3.5-2.

Ambient air quality observed concentrations are currently in compliance with applicable NAAQS. The air-quality impacts from the proposed Project are expected to be minimal, thereby not affecting the overall ambient air-quality of the area.

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

Pollutant	Averaging Time	2009	2010	2011	Background Concentration ($\mu g/m^3$)	NAAQS	Location
SO_2 [4]	1 HOUR	86.5	63.7	94.1	94.1	195	HAR
	3 HOUR	73.4	N/A	N/A	73.4	365	HAR
	24 HOUR	34.1	23.1	33.8	34.1	1,300	HAR
	ANNUAL	5.8	4.2	3.3	5.8	80	HAR
PM-10	24 HOUR	47	50	42	50	150	HAR
	ANNUAL	16.0	14.1	14.8	16.0	50	HAR
PM-2.5	24 HOUR [1]	21.3	22.5	20.9	21.6	35	HAR
	ANNUAL [2]	8.70	8.25	8.48	8.48	15	HAR
NO_2	1 HOUR [3]	109.0	116.6	139.1	139.1	188	HAR
	ANNUAL	33.8	32.1	34.8	34.8	100	HAR
CO	1 HOUR	2964	3306	2816	3306	40,000	HAR
	8 HOUR	1710	2394	2166	2394	10,000	HAR

From 2009-2011 MassDEP Annual Data Summaries

HAR = Harrison Ave., Boston

[1] Average of the 98th percentile 24-hour values.

[2] Average of the annual values.

[3] Maximum annual one-hour concentrations (EPA "first tier" method).

[4] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
The 3-hour value is not reported in the 2010 or 2011 Annual Data Summaries

3.6 Flood Hazard Zones/Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates the FEMA Flood Zone Designations for the Project site (City of Boston, Community Panel Number 25025C0083G). The map for the Project Site shows the Project is located outside of designated flood zones. The Project Site does not contain wetlands.

3.7 Geotechnical/Groundwater

Geotechnical Partnership, Inc. completed background data review, subsurface explorations (structural test borings), field soil testing, and groundwater monitoring well installation for the Project Site. A summary of the findings is provided in this section.

3.7.1 Site Conditions

The Project Site has gently rolling topography with the southern portion being a paved parking lot and the northern portion being abandoned pavement and weeds. The existing ground surface slopes downward from the south to northwest from approximately Elevation +15.9 feet to 13.7 feet.

Fifteen borings were drilled at the Project Site to characterize the soil conditions. The generalized subsurface profile is provided below.

- **Man-placed Fill**: The fill is made up of plastic and non-plastic silt with little to no sand or gravel, and granular fill with sand and silt, and little to no gravel. Certain individual borings also included construction debris. The thickness of the fill was approximately five to ten feet in thickness.

- **Organic Deposits/Peat**: The organic deposits/peat layer was approximately two to six-feet thick and included fibrous peat, amorphous peat and organic silt.

- **Glacial Fluvial Deposits**: The glacial fluvial deposit was not found with every boring, but consists predominantly of silty sand to sandy silt. This layer is approximately one to five-feet thick where found on the Project Site.

- **Marine Sediment**: Marine sediment includes silty clay that softens with depth. The thickness of this layer is more than 29 feet.

- **Glacial Till**: Glacial till was not encountered on site. However, previous area borings encountered glacial till below the marine sediment layer.

- **Bedrock**: Depth to bedrock has been collected for area borings and is estimate to be located at a depth of 81 feet near the southwest corner of the Project Site to 134 feet or more north of the Project Site. Bedrock is expected to be predominantly Argillite.

3.7.2 Groundwater Levels

Two groundwater monitoring wells were installed at the Project Site. Groundwater during the dry months was found at a depth of approximately seven feet. Groundwater was not observed within the test pits at the time of excavation. It is anticipated that future groundwater levels across the Project Site may vary from those reported herein due to factors such as normal seasonal changes, periods of heavy precipitation, and alterations of existing drainage patterns.

3.7.3 Foundation Construction

Four foundation systems are being reviewed for the proposed East and West Buildings:

- Conventional shallow foundations with lowest level grade slabs following bulk excavation and replacement of existing fill and organic soils with engineered fill;
- Conventional shallow foundations with lowest level grade slabs following execution of ground improvement (aggregate piers);
- Driven piles (timber piles) with lowest level structural slabs; and
- Drilled caissons with lowest level structural slabs.

As the design of the Project progresses, these foundation systems will be studied further to determine which are best-suited for the Project.

3.8 Solid and Hazardous Waste

3.8.1 Hazardous Waste

Goldman Environmental Consultants conducted an evaluation of the Project Site to evaluate environmental conditions associated with the Site's history, existing observable conditions, current uses, and current and former uses of adjoining properties.

As determined by Goldman Environmental Consultants, the Project Site was formerly a marshy wetland bordering Savin Hill Cove, which was an area of extensive filling for urban expansion in the late 1890's to the early 1900's. Based on historical records and observations from numerous field investigations, the fill material used in this area consisted of coal, slag, wood ash, cinders, building debris, creosote coated timbers, urban trash (e.g., bottles, plates, shoes, rubber) and other fill materials. A detailed history of the Project Site is provided below.

The Project Site was operated as a Gulf Oil station from approximately 1956 to 1969. Historical photographs (1951) indicate that prior to operation of the service station, the area was utilized for parking associated with a bus terminal located north of the Project Site. A historic photograph from 1969 shows the service station surrounded by a large parking area

encompassing the Project Site and areas to the south. From 1969 to 1979, the Project Site was used for surface parking. In 1979, the lots containing the service station were sold and a total of six underground storage tanks (USTs) were apparently removed between 1979 and 1981. An additional 1,000-gallon heating oil UST was installed at the time of the UST removals to store heating oil for consumptive use. The remainder of the Project Site was leased to various entities for vehicle storage and parking purposes between 1979 and 1985.

In 1987, The Eighty Trust purchased the Project Site. Between 1985 and 1989, 25 Morrissey Boulevard was leased to the Three Brothers Garage, which operated an automobile impound yard and scrap yard at the Project Site. Between 1989 and January 1990, the on-site structure was demolished and debris associated with the impound yard and scrap yard (drums of hydraulic oil, batteries, paints and solvents) were removed from the Site by Franklin Environmental under the oversight of MassDEP. The 1,000-gallon heating oil UST installed in the early 1980's was also removed during this period. The majority of the Project Site has remained vacant since 1989; however, the southern portion of the Project Site is used as a parking lot for the *Shaw's* supermarket located at 35-45 Morrissey Boulevard.

The Project Site is a state-listed hazardous waste site, assigned Release Tracking Number 3-4210, that achieved regulatory closure in May 2007 via a Class A-3 Response Action Outcome (RAO) Statement, which includes an Activity and Use Limitation (AUL) that was applied to the entire site. Details of the AUL are discussed below.

Investigation of soil and groundwater conditions at the Project Site, documented in a *Phase II Comprehensive Site Assessment*, prepared by Environmental Compliance Services, Inc. (ECS), dated May 2007, and submitted to the MassDEP, indicates elevated concentrations of oil and/or hazardous materials (OHM) related to petroleum (i.e., fuel oil, waste oil and gasoline) and polycyclic aromatic hydrocarbons (PAHs), and metals. In general, the levels of OHM detected in groundwater are relatively minor. Most of the PAHs and metals detected in soil are common constituents of coal, coal ash, and/or wood ash; however, several PAHs and metals were detected in soil at concentrations that exceed MassDEP's generic background concentrations for urban soil containing coal and coal ash.

In general, environmental conditions at the Project Site are typical of urban properties, which commonly have coal and coal ash mixed in with other urban fill materials and are characterized by elevated levels of PAHs and metals. Historic use of the Project Site as a scrap yard, gasoline station and for auto repair likely contributed to elevated levels of petroleum hydrocarbons and metals.

As documented in the Class A-3 *Response Action Outcome Statement*, prepared by ECS, dated May 2007, and submitted to MassDEP, the AUL permits use or development of the Project Site for multi-family residential use, manufacturing, industrial and commercial uses, parking areas, children's daycare, public park, and other passive recreational uses, and landscaping and routine maintenance of landscaped areas, subject to certain relevant

obligations. The AUL does not permit use or development of the Project Site for single-family residential use, gardening, or other agricultural uses which utilize the soils for the cultivation of edible plants, and excavation and off-site relocation of soils from the Project Site unless a Licensed Site Professional (LSP) renders an opinion which states that such excavation and relocation is consistent with maintaining a condition of no significant risk.

Off-site disposal of soils from the Project Site that may be required will be performed in accordance with MassDEP policies and the AUL, which will be outlined in a site-specific Soil Management Plan prepared for the Project and incorporated into the construction contract documents. The excavation of petroleum-contaminated soils for off-site recycling, treatment or disposal would likely be considered a remedial action by MassDEP. Pursuant to 310 CMR 40.1067(4)(b), remedial actions being conducted after a Class A-3 RAO is submitted may be conducted as a Release Abatement Measure (RAM) as long as the RAM is conducted in accordance with the 310 CMR 40.0440, including 310 CMR 40.0442, which limits the scope of the RAM. Remedial actions conducted in accordance with 310 CMR 40.1067(4)(b) will require the preparation of a RAM Plan, RAM Status Reports and Remedial Monitoring Reports (as needed) and a RAM Completion Report. Because the RAM is not being conducted to change the acceptable activities and uses resulting in the Class A-3 RAO, no modified RAO Statement will have to be submitted upon completion of the RAM.

3.8.2 Operational Solid and Hazardous Waste Generation

The Project is expected to generate solid waste typical of other residential projects. Solid waste generated by the Project will be approximately 246 tons per year, based on the residential space proposed at a generation rate of four pounds per bedroom per day and amenity space proposed at a generation rate of 5.5 tons per 1,000 square feet per year.

Table 3.8-1 Solid Waste Generation

Use	Program	Generation Rate	Solid Waste (tons per year)
Residential	317 bedrooms	4 lbs/bedroom/day	210
Amenity Space	6,500 SF	5.5 tons/ 1,000 sf/year	36
Total Solid Waste Generation			**246**

Solid waste typical of residential projects includes wastepaper, cardboard, glass, bottles, and food waste. A portion of the waste will be recycled as described below. The remainder of the waste will be compacted and removed by a waste hauler contracted by

building management. With the exception of "household hazardous wastes" typical of residential uses (for example, cleaning fluids and paint), the Project is not expected to generate hazardous waste.

All trash collection will occur at the Project Site. A trash room for the residential space is located on the ground floor adjacent to the loading dock. Each floor of the buildings will have access to a trash chute that leads to the dumpsters in the trash room.

3.8.2.1 Recycling During Operation

The proposed Project will include space for the collection and storage of residents' recyclable materials on each floor of the buildings, adjacent to the trash chute. Building management will move the recyclables to the main trash room. Recycling and waste reduction will be encouraged for all residents.

3.8.2.2 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.

Construction waste material from demolition and new construction will be recycled when feasible. 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.

3.8.2.3 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 materials that may be recycled are segregated from materials that are not recyclable to facilitate disposal at an approved solid waste facility. A comprehensive recycling program will be included in the final Construction Management Plan, which is also described below.

3.9 Noise

3.9.1 Introduction

This section describes a noise analysis conducted for the Project and an estimate of future sound levels when the Project is in operation. The scope of the analysis is consistent with BRA requirements for noise studies.

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

3.9.2 Noise Terminology

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

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

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

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

Because the sounds in our environment vary with time, they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment A-weighted sound-level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value of 0 to 100 percent. For example:

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

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

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

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

L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.,* the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is also A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by occasional loud, intrusive noises.

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

3.9.3 Noise Regulations and Criteria

The primary set of regulations relating to the potential increase in noise levels is the City Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Results of the baseline ambient noise-level survey and the modeled noise levels were compared to the City Noise Standards. Separate regulations within the

City Noise Standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the proposed buildings, as completed, and was considered in this noise study. Table 3.9-1 includes the City Noise Standards.

Additionally, MassDEP regulates community noise by its Noise Policy (DAQC policy 90-001). The MassDEP Noise Policy limits source sound levels to a 10-dBA increase in the ambient measured noise level (L_{90}) at the Project property line and at the nearest residences. The policy further prohibits pure tone conditions—when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by three decibels or more.

Table 3.9-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

Octave Band Center Frequency (Hz)	Residential Zoning District		Residential-Industrial Zoning District		Business Zoning District	Industrial Zoning District
	Daytime (dB)	All Other Times (dB)	Daytime (dB)	All Other Times (dB)	Anytime (dB)	Anytime (dB)
32	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
A-Weighted (dBA)	**60**	**50**	**65**	**55**	**65**	**70**

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

3.9.4 Existing Conditions

3.9.4.1 Baseline Noise Environment

An ambient noise-level survey was conducted to characterize the "baseline" acoustical environment in the vicinity of the Project Site. Existing noise sources consisted of: vehicular traffic (including trucks) on the local roadways including I-93 and Morrissey Boulevard; trains pulling into and out of JFK/UMass MBTA station; pedestrian foot traffic; mechanical equipment located on the surrounding buildings; light leaf rustle; airplane flyovers; birds chirping; and lawn maintenance activities.

3.9.4.2 Noise Measurement Locations

The selection of the sound-monitoring locations was based upon a review of the existing land uses in the area around the Project Site. Four noise-monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. The measurement locations are depicted on Figure 3.9-1 and are described below.

- ST-1 was located in front of #13 Spring Garden Street, representing the nearest residential neighborhood west of the Project. Daytime noise sources at this location included traffic on Interstate 93, Morrissey Boulevard, and Dorchester Avenue, trains pulling in and out of JFK/UMass station, and light leaf rustle. At night, traffic on Interstate 93 and trains at JFK/UMass station dominated the soundscape.

- ST-2 was located in the middle of the *Shaw's* parking lot at the southern property line of the Project. Ambient daytime noise consisted of traffic from I-93 and Morrissey Boulevard, rolling shopping carts, seagulls, airplane flyovers, and trains at JFK/UMass MBTA station. Nighttime levels were dominated by steady traffic noise on I-93 and occasional train noise.

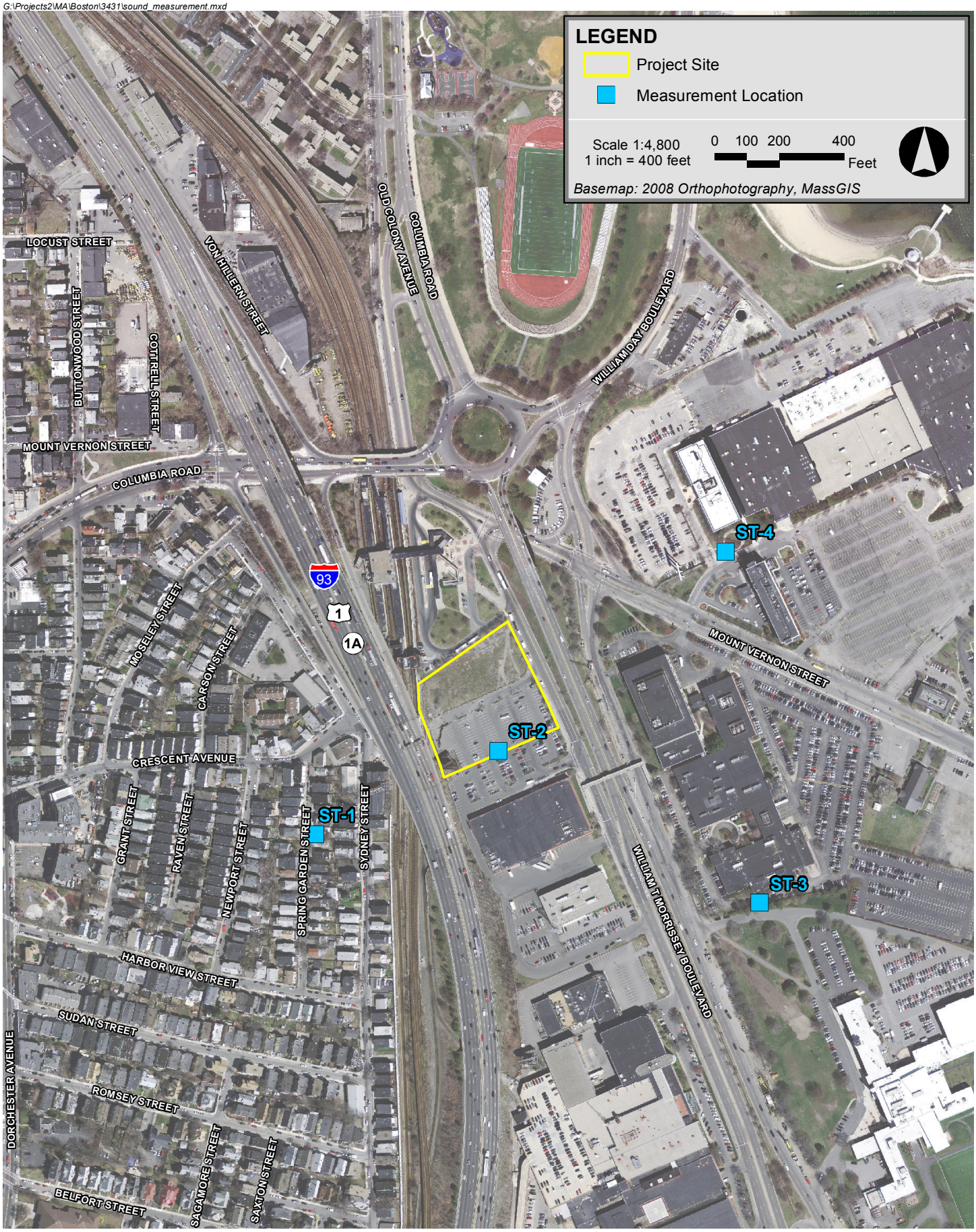
- ST-3 was located along the northern entrance of Boston College High School. Ambient noise sources during the daytime included traffic from Morrissey Boulevard and I-93, birds chirping, leaf rustle, and aircraft flyovers. No nighttime measurements were made at this location due to the school's daytime-only use.

- Location 4 was located between the *Double Tree* Hotel and the Executive Conference Center on Mount Vernon Street. Daytime ambient levels were dominated by nearby lawn-maintenance activities involving industrial leaf-blowers. Nighttime noise levels included traffic along Mount Vernon Street and I-93, HVAC noise from the hotel rooftop, and buzzing from nearby streetlamps.

3.9.4.3 Noise Measurement Methodology

Sound level measurements were for 20 minutes per location during daytime (11:30 AM to 2:00 PM) and nighttime hours (12:00 AM to 2:00 AM) on November 5 and 6, 2012.

Because noise impacts from the Project on the community would be greatest when existing noise levels are lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions.



Residences at Morrissey Boulevard Boston, MA

Epsilon Associates Inc.

Figure 3.9-1

Sound Level Measurement Locations

3.9.4.4 Measurement Equipment

A Larson Davis Model 831 sound level meter was used to collect ambient sound pressure-level data. This instrumentation meets the "Type 1 - Precision" requirements set forth in American National Standards Institute (ANSI) S1.4 for acoustical measuring devices. The microphone was tripod-mounted at a height of 1.5 meters above ground and statistical descriptors (L_{eq}, L_{90}, etc.) were calculated for each 20-minute sampling period. Octave band levels for this study correspond to the same data set processed for the broadband levels. The measurement equipment was calibrated in the field before and after the surveys with an acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984.

The sound levels were measured at publicly-accessible locations under low wind conditions and when roadway surfaces were dry. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity measurements were made using a General Tools digital psychrometer. Unofficial observations about meteorology, including wind speed, temperature, and humidity, as well as land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project Site.

3.9.4.5 Baseline Ambient Noise Levels

The existing ambient noise environment varied depending on location. Baseline noise monitoring results are presented in Table 3.9-2, and summarized below:

- The daytime residual background (L_{90} dBA) measurements ranged from 50 to 62 dBA;
- The nighttime residual background (L_{90} dBA) measurements ranged from 46 to 54 dBA;
- The daytime equivalent level (L_{eq} dBA) measurements ranged from 54 to 67 dBA;
- The nighttime equivalent level (L_{eq} dBA) measurements ranged from 50 to 60 dBA.

A "pure tone" according to the MassDEP definition was present both during the day and at night at 63 Hz at Location ST-4.

Table 3.9-2 Baseline Ambient Noise Measurements – Morrissey Blvd, Boston, MA

Receptor I.D	Start Time	L_{10}	L_{50}	L_{90}	L_{eq}	L_{max}	L_{90} Sound Level (dB) per Octave Band Center Frequency (Hz)								
		(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	31.5	63	125	250	500	1000	2000	4000	8000
ST-1 Day	11:45 am	56	53	50	54	73	57	57	50	46	46	47	40	27	19
ST-2 Day	12:21 pm	69	64	62	67	82	70	68	63	57	58	59	52	39	25
ST-3 Day	12:50 pm	62	58	54	59	71	60	60	56	51	48	50	43	34	26
ST-4 Day	1:20 pm	68	63	60	65	77	64	**75**	62	57	54	55	49	43	30
ST-1 Night	12:06 am	53	49	46	50	65	50	49	45	42	41	43	36	23	18
ST-2 Night	12:38 am	61	58	54	60	74	61	60	56	51	49	51	44	27	18
ST-3 Night*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ST-4 Night	1:04 am	54	52	51	54	70	56	**61**	54	50	47	46	38	35	26

Notes:

* No nighttime measurements were made at this location due to the school's daytime only use.

1. Daytime weather: Temperature = 49°F, RH = 29%, skies partly sunny, winds light and variable <2 mph.
   Nighttime weather – Temperature = 34°F, RH = 40%, clear skies, winds light and variable <2 mph.
2. Road surfaces were dry during all periods.
3. All sampling periods were 20 minutes in duration.
4. Daytime measurements were collected on November 5, 2012.
   Nighttime measurements were collected on November 6, 2012.
5. Highlighted values represent ambient "pure tones" as defined by MassDEP, without contribution from the project, likely caused by HVAC noise and leaf-blowing activities.

3.9.5 Overview of Potential Project Noise Sources

The Project will consist of a two residential buildings, the East Building and the West Building. The primary sources of continuous sound exterior to the Project will consist of ventilation, cooling, and emergency power noise sources. The majority of the noise sources will be rooftop in nature with exception of several exhaust fans related to the parking garage ventilation.

3.9.5.1 East Building

The major sources of sound exterior to the proposed East Building will be two 25 to 30-ton condenser units, 180 individual 30-30 air conditioning units, seven (7) 3,000 cubic-feet-per-minute (CFM) garage exhaust fans, and one 150 kW standby generator.

The proposed rooftop condenser units for the East Building are AAON RN 25 to 30-ton units. One will be located on the roof of the north tier (69′ AGL) and the second will be located on the southern tier (63′ AGL). Sound associated from this source can be broken into two categories, condenser fans and cabinet sound levels. All 180 Carrier 24ABC6 air-conditioning units will be located on the roof of the East Building. Thirty-six (36) will be located on the northern tier (69′ AGL) while 144 will be located on the southern tier (63′ AGL). The Greenheck BCF-208-20 garage exhaust fans will exhaust out of the northern, eastern, and southern facades of the building at a height of 2′ AGL. Two (2) exhausts will be located on the northern façade, three (3) on the eastern façade and two (2) on the southern façade. The 150 kW Caterpillar standby generator will be located on the roof of the southern tier (63′ AGL). The exhaust stack for the generator will extend above the roof by 10 feet. A tabular summary of the modeled mechanical equipment proposed for the East Building is presented below in Table. 3.9-3-a. Manufacturer specifications indicating the sound power for each of piece of equipment except for the emergency generator was provided by the Proponent and is presented in Table 3.9-3-b. The sound power of the mechanical and exhaust components of the emergency generator were calculated using the sound-pressure levels provided at a reference distance for a comparable unit. These values are presented in Table 3.9-3-b.

The Project includes various noise-control measures which are necessary to achieve compliance with the applicable noise regulations. Noise mitigation will be applied to the rooftop condenser units to reduce the sound from the condenser fans and the cabinet. The emergency generator will be controlled using an exhaust silencer and an acoustical enclosure. To further limit impacts from the generators, the required periodic routine testing of the generators will be during daytime hours when background sound levels are highest. A summary of the noise mitigation proposed for the East Building is presented below in Table 3.9-3-c.

Table 3.9-3-a Modeled Noise Sources – East Building

Noise Source	Quantity	Location	Size/Capacity
Condenser Unit	2	Roof at 63′ / 69′ AGL	25 – 30 Ton
Air Conditioning Unit	180	Roof at 63′ / 69′ AGL	30 - 30
Garage Exhaust Fan	7	Façade – North, East, & South – 2′ AGL	3,000 CFM per unit
Generator	1	Roof – 63′ AGL	150 kW

Table 3.9-3-b Modeled Sound Power Levels per Noise Source – East Building

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Condenser Unit – RN 25-30 Ton – Condenser Fans	93	101[2]	101	96	92	91	86	83	80	79
Condenser Unit – RN 25-30 Ton – Cabinet	97	94[2]	94	92	95	95	91	89	88	85
Air Conditioning Unit – Carrier 24ABC6	74	94[3]	81[3]	71	72	71	70	66	63	60
Garage Exhaust Fan – Greenheck BCF-208-20	77	81[2]	81	81	78	70	70	70	68	66
150 kW Generator[1]	116	114[2]	114	107	114	109	113	109	104	98

Notes:
Sound power levels do not include mitigation.
1. Sound levels for 250 kW Caterpillar standby diesel generator set.
2. Sound level assumed to be equal to dB level in 63 Hz band.
3. Sound level assumed to be equal to dBA level in 125 Hz band.

Table 3.9-3-c Attenuation Values Applied to Mitigate Each Noise Source – East Building

Noise Source	Form of Mitigation	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Condenser Unit – RN 25-30 Ton – Condenser Fans	Quieter Fan	0	0	1	2	3	3	3	3	2
Condenser Unit – RN 25-30 Ton – Cabinet	Better Enclosure	1	2	3	5	10	10	10	10	5
150 kW Generator[1]	Enclosure and Silencer	4	7	13	25	25	25	25	25	13

3.9.5.2 West Building

The major sources of sound exterior to the proposed West Building will be one 25 to 30-ton condenser unit, 106 individual 30-30 air conditioning units, and one 150 kW standby generator.

The proposed condenser unit for the West Building is an AAON RN 25 to 30-ton unit which will be located on the roof (68′ AGL). Sound associated from this source can be broken into two categories, condenser fans and cabinet sound levels. All 106 Carrier 24ABC6 air conditioning units will be located on the roof (68′ AGL) of the West Building. The 150 kW Caterpillar standby generator will be located on the roof of the building (68′ AGL). The exhaust stack for the generator will extend above the roof by 10 feet. A tabular summary of the modeled mechanical equipment proposed for the West Building is presented below in Table. 3.9-4-a. Manufacturer specifications indicating the sound power for each of piece of equipment except for the emergency generator was provided by the Proponent and is presented in Table 3.9-4-b. The sound power of the mechanical and exhaust components of the emergency generator were calculated using the sound-pressure levels provided at a reference distance for a comparable unit. These values are presented in Table 3.9-4-b.

The Project includes various noise-control measures which are necessary to achieve compliance with the applicable noise regulations. Noise mitigation will be applied to the rooftop condenser unit to reduce the sound from the condenser fans and the cabinet. The emergency generator will be controlled using an exhaust silencer and an acoustical enclosure. To further limit impacts from the generators, the required periodic routine testing of the generators will be during daytime hours when background sound levels are highest. A summary of the noise mitigation proposed for the West Building is presented below in Table 3.9-4-c.

Table 3.9-4-a Modeled Noise Sources – West Building

Noise Source	Quantity	Location	Size/Capacity
Condenser Unit	1	Roof at 68′ AGL	25 – 30 Ton
Air Conditioning Unit	106	Roof at 68′ AGL	30 - 30
Generator	1	Roof – 68′ AGL	150 kW

Table 3.9-4-b Modeled Sound Power Levels per Noise Source – West Building

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Condenser Unit – RN 25-30 Ton – Condenser Fans	93	101[2]	101	96	92	91	86	83	80	79
Condenser Unit – RN 25-30 Ton – Cabinet	97	94[2]	94	92	95	95	91	89	88	85
Air Conditioning Unit – Carrier 24ABC6	74	94[3]	81[3]	71	72	71	70	66	63	60
150 kW Generator[1]	116	114[2]	114	107	114	109	113	109	104	98

Notes:
Sound power levels do not include mitigation.
1. Sound levels for 250 kW Caterpillar standby diesel generator set.
2. Sound level assumed to be equal to dB level in 63 Hz band.
3. Sound level assumed to be equal to dBA level in 125 Hz band.

Table 3.9-4-c Attenuation Values Applied to Mitigate Each Noise Source – West Building

Noise Source	Form of Mitigation	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Condenser Unit – RN 25-30 Ton – Condenser Fans	Quieter Fan	0	0	1	2	3	3	3	3	2
Condenser Unit – RN 25-30 Ton – Cabinet	Better Enclosure	1	2	3	5	10	10	10	10	5
150 kW Generator[1]	Enclosure and Silencer	4	7	13	25	25	25	25	25	13

3.9.6 Modeling Methodology

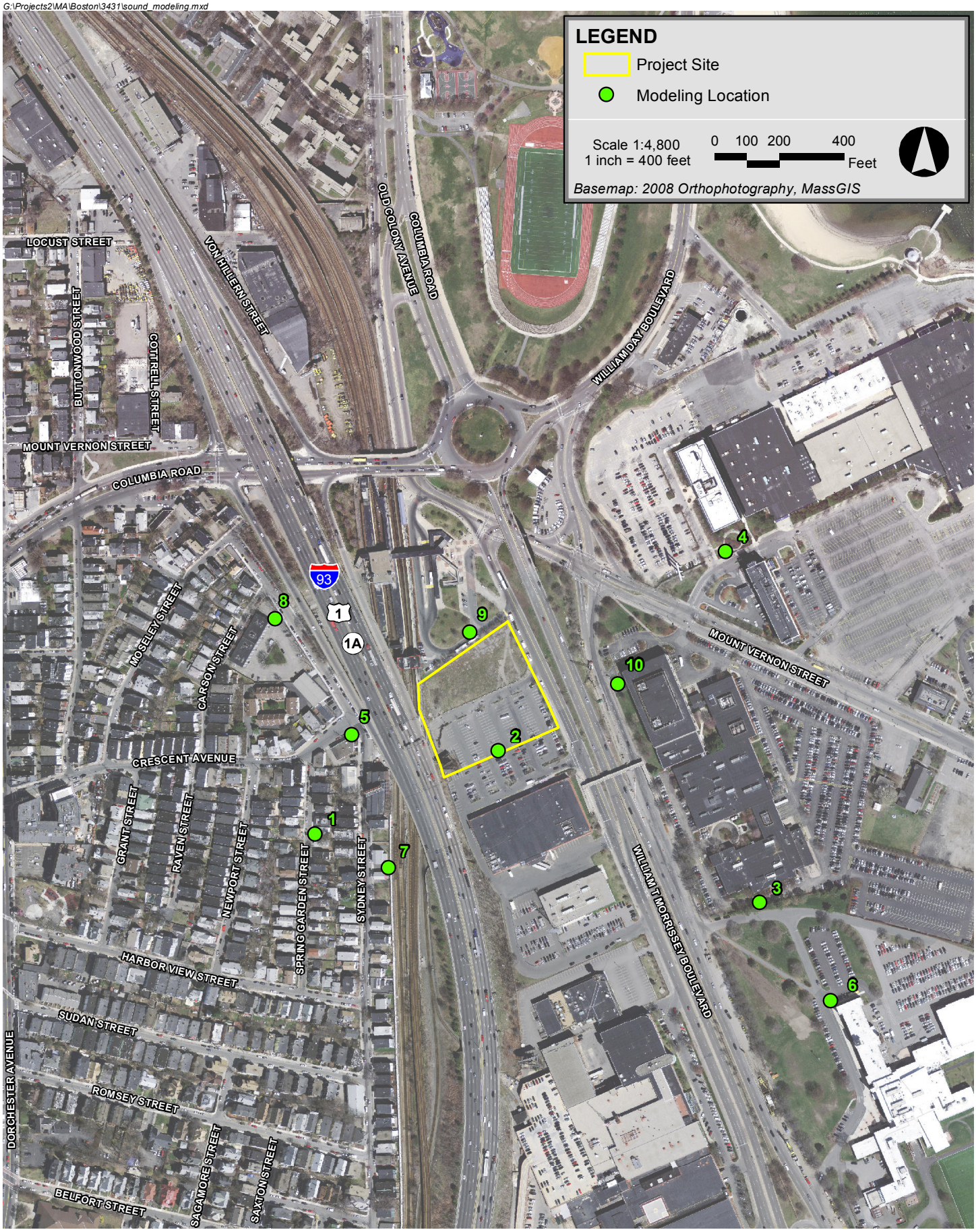
The noise impacts associated with the Project were predicted at the nearest receptors using the Cadna/A noise calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors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

3.9.6.1 Future Sound Levels – Nighttime

The analysis of sound levels at night considered all of the mechanical equipment without the emergency generators running, to simulate typical nighttime operating conditions at nearby receptors. Ten (10) modeling locations were included in the analysis. Location IDs 1 through 4 correspond to the sound level measurement locations. The remaining locations consist of nearby residential, business and institutional locations. These locations are depicted in Figure 3.9-2. The predicted exterior Project-Only sound levels are expected to range from 26 to 49 dBA at nearby receptors. The range at residential/institutional modeling locations is 26 to 42 dBA. Predicted sound levels from Project-related equipment are within the most stringent broadband and octave band nighttime limits under the City Noise Standards at closest residential receptors and also meet the business and industrial limits. This evaluation is presented in Table 3.9-5-a. In addition, the predicted future total sound levels (Project + Background) are below the MassDEP criteria of 10dBA over the quietest nighttime sound levels (the L_{90} level) at sensitive receptors with nighttime use. This evaluation is presented in Table 3.9-5-b. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions as defined by the MassDEP when combined with existing middle of the night background sound levels at these locations as shown in Table 3.9-5-c.

Table 3.9-5-a Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
1	Residential	30	52	38	32	27	27	26	21	12	0
3	Institutional	26	53	42	33	29	24	17	10	-1	0
5	Residential	40	62	51	43	40	37	34	29	24	10
6	Institutional	38	57	48	41	39	36	32	26	14	0
7	Residential	40	61	51	44	42	38	35	30	23	8
8	Residential	42	61	51	44	42	40	37	33	25	6
2	Business	44	68	57	49	46	41	38	35	31	25
4	Business	41	60	50	43	41	39	35	31	22	2
9	Business	48	67	56	52	49	43	42	41	38	35
10	Business	49	63	59	53	51	47	43	39	34	27
City of Boston Limits	Residential	50	68	67	61	52	46	40	33	28	26
	Business	65	79	78	73	68	62	56	51	47	44
	Industrial	70	83	82	77	73	67	61	57	53	50



Residences at Morrissey Boulevard Boston, MA

Epsilon Associates Inc.

Figure 3.9-2

Sound Level Modeling Locations

Table 3.9-5-b Comparison of Future Predicted Nighttime Sound Levels with Existing Background – MassDEP Policy

Modeling Location ID	Zoning / Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Nighttime (dBA)	Future L_{90} – Nighttime Total (dBA)[1]	Increase (dBA)[1]
1	Residential	30	46	46	0
5	Residential	40	46[2]	47	1
7	Residential	40	46[2]	47	1
8	Residential	42	46[2]	47	2
4	Business[3]	41	51	51	0

Notes:
1. Calculation performed using existing and project sound levels rounded to one decimal place.
2. Ambient sound level assumed to be comparable to Location 1.
3. Current use is a hotel.

Table 3.9-5-c MassDEP "Pure-Tone" Evaluation of Future Predicted Nighttime Sound Levels

Modeling Location ID	Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
1	Residential	54	49	45	42	41	43	36	23	18
5	Residential	62	53	47	44	43	44	37	26	19
7	Residential	61	53	47	45	43	44	37	26	19
8	Residential	61	53	47	45	43	44	38	27	19
4	Business[3]	61	61	55	50	48	46	39	35	26

Notes:
1. Calculation performed using existing and project sound levels rounded to one decimal place.

3.9.6.2 Future Sound Levels – Daytime

The emergency generators will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of the electrical grid; therefore, a second analysis combined the mechanical equipment and the emergency generators, to reflect worse-case conditions during brief, routine, daytime testing of the generators when ambient levels are higher. The sound levels were calculated at the same receptors as in the nighttime analysis. The sound levels were evaluated against daytime limits and daytime ambient sound levels were incorporated where applicable.

The predicted exterior Project-Only daytime sound levels are expected to range from 28 to 51 dBA at nearby receptors. The range at residential/institutional modeling locations is 28 to 45 dBA. Predicted sound levels from Project-related equipment are within the daytime broadband and octave band limits under the City Noise Standards at each of the modeling locations. This evaluation is presented in Table 3.9-6-a. In addition, the predicted future total sound levels (Project + background) are below the MassDEP criteria of 10dBA over the quietest nighttime sound levels (the L_{90} level). This evaluation is presented in Table 3.9-6-b. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions as defined by the MassDEP when combined with existing middle of the day background sound levels. The predicted total sound levels per octave band are shown in Table 3.9-6-c.

Table 3.9-6-a Comparison of Future Predicted Project-Only Daytime Sound Levels to City Noise Standards

Modeling Location ID	Land Use	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
			31.5[1]	63	125	250	500	1k	2k	4k	8k
1	Residential	30	53	42	33	28	27	26	22	12	0
3	Institutional	28	55	47	35	30	24	19	12	0	0
5	Residential	45	65	59	48	43	40	40	36	29	24
6	Institutional	39	58	52	42	39	36	34	28	15	0
7	Residential	43	63	57	46	43	39	38	33	25	12
8	Residential	44	62	56	46	43	40	40	35	26	10
2	Business	48	70	63	52	48	43	43	40	34	32
4	Business	42	61	54	45	42	39	37	33	23	5
9	Business	49	67	56	52	49	43	42	41	38	35
10	Business	51	67	64	55	51	48	46	42	36	31
City of Boston Limits	Residential	60	76	75	69	62	56	50	45	40	38
	Business	65	79	78	73	68	62	56	51	47	44
	Industrial	70	83	82	77	73	67	61	57	53	50

Table 3.9-6-b Comparison of Future Predicted Daytime Sound Levels with Existing Background – MassDEP Policy

Modeling Location ID	Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Nighttime (dBA)	Future L_{90} – Nighttime Total (dBA)[1]	Increase (dBA)[1]
1	Residential	30	50	50	0
3	Institutional	28	54	54	0
5	Residential	45	50[2]	51	1
6	Institutional	39	54[3]	54	0
7	Residential	43	50[2]	51	1
8	Residential	44	50[2]	51	1
2	Business	48	62	63	0
4	Business	42	51	51	1
9	Business	49	62[4]	63	0
10	Business	51	54[3]	56	2

Notes:
1. Calculation performed using existing and project sound levels rounded to one decimal place.
2. Ambient sound level assumed to be comparable to Location 1.
3. Ambient sound level assumed to be comparable to Location 3.
4. Ambient sound level assumed to be comparable to Location 2.

Table 3.9-6-c MassDEP "Pure-Tone" Evaluation of Future Predicted Daytime Sound Levels

Modeling Location ID	Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
1	Residential	58	57	50	46	46	47	40	27	19
3	Institutional	61	60	56	51	48	50	43	34	26
5	Residential	65	61	52	48	47	48	42	31	25
6	Institutional	62	61	56	52	49	50	43	34	26
7	Residential	64	60	51	48	47	48	41	29	20
8	Residential	63	59	51	48	47	48	41	29	20
2	Business	73	69	63	58	58	59	53	40	33
4	Business	62	62	55	50	48	47	39	35	26
9	Business	72	68	63	58	58	59	53	42	35
10	Business	67	66	59	54	51	52	46	38	32

Notes:
1. Calculation performed using existing and project sound levels rounded to one decimal place.

3.9.7 Mitigation of Ambient Noise on the Project

Elements will be incorporated into the design of the West Building to mitigate the impact of ambient noise on those residential units located adjacent to the JFK/UMass MBTA station and the elevated I-93. Potential noise-mitigating elements include the following:

- Minimizing the number of residential units in proximity to the western edge of the Project Site.
- Installing triple-glazed windows or storm windows.
- Using parking levels to act as a buffer between the residential use and the sound sources.
- Installing sound-barrier walls adjacent to the parking levels.

3.9.8 Conclusion

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

Predicted mechanical equipment noise levels from the Project at each receptor location, taking into account attenuation due to distance, structures, and noise control measures, will be equal to or below the broadband requirements of City Noise Standards based on zoning and land-use maps available through the BRA, and will comply with all MassDEP A-weighted noise limits. When the aforementioned mitigation efforts are included, the predicted sound levels from Project-related equipment are expected to remain below 50 dBA, within the most stringent nighttime residential zoning limits for the City of Boston at the nearest residential receptors. The results in Section 3.9 indicate that the Project can operate without significant impact on the existing acoustical environment and will result in a noise experience similar to that of a typical urban setting.

At this time, the mechanical equipment and noise controls are conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave band limits of the City Noise Standards, as well as the MassDEP Noise Policy. Additional mitigation may include the selection of quieter units, acoustical louvers, screening walls, mufflers, or equipment enclosures, as needed.

3.10 Construction

3.10.1 Introduction

A Construction Management Plan, in compliance with the City's Construction Management Program, will be submitted to the Boston Transportation Department 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 planning with the City and neighborhood will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed. The Proponent intends to follow the guidelines of the City of Boston and of MassDEP, which direct the evaluation and mitigation of construction impacts.

3.10.2 Construction Methodology/Public Safety

Construction methodologies that ensure public safety and protect nearby residents will be employed. Techniques such as barricades, walkways 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.

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

All of these measures will be incorporated into the CMP that will be submitted to BTD for approval prior to the commencement of construction work.

3.10.3 Construction Schedule

It is anticipated that construction will commence at the end of the first quarter of 2013. Once begun, construction is expected to last approximately 18 months.

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

3.10.4 Construction Staging/Access

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

3.10.5 Construction Mitigation

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

A CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community. The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets. "Don't Dump - Drains to Charles River" plaques will be installed at storm drains that are replaced or installed as part of the Project.

3.10.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 180 full-time equivalent (FTE) construction jobs will be created over the length of construction. The Proponent will enter into a Boston Residents Construction Employment Program agreement with the BRA, thereby committing to make reasonable, good-faith efforts to have at least 50% of the total employee work hours for Boston residents, at least 25% of total employee work hours for minorities and at least 10% of the total employee work hours for women.

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

3.10.7 Construction Truck Routes and Deliveries

Truck traffic will vary throughout the construction period, depending on the activity. The construction team will manage deliveries to the Project 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 Project 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 posted at the loading, delivery, pick-up and drop-off areas.

3.10.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during excavation and the early phases of construction. Plans for controlling fugitive dust during excavation and construction include mechanical street sweeping, wetting portions of the Project Site during periods of high wind, and removal of debris in covered trucks. The construction contract documents will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to Article 80 of the Boston Zoning Code. 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 Project Site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

3.10.9 Construction Noise

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

Mitigation measures are expected to include:

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

3.10.10 Construction Vibration

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

3.10.11 Construction Waste

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. For those materials that cannot feasibly 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 documents. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

3.10.12 Protection of Utilities

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

3.10.13 Rodent Control

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

3.10.14 Wildlife Habitat

The Project site is in an established urban neighborhood. According to the 2008 Natural Heritage online MassGIS data layer, prepared by the Massachusetts Natural Heritage and Endangered Species Program, there are no Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife on the Project Site.

3.11 Sustainable Design

The Proponent is committed to developing a building that is sustainably designed, energy efficient, environmentally conscious and healthy for the residents. As required under Article 37 of the Boston Zoning Code, projects that are subject to Large Project Review under Section 80B will be certifiable under the US Green Building Council's Leadership in Energy and Environmental Design (LEED) system. The LEED-H (MID-RISE) checklist is included in as an appendix to this PNF.

As recognized throughout the LEED checklist, the Project offers various sustainable design elements as part of its development, including:

Transportation

The Project is an urban infill development that directly abuts excellent public transportation options with access the MBTA's Commuter Rail, Red Line, and several bus lines. As a transit-oriented development the Project will encourage minimal personal automobile use amongst residents and the design of the buildings will begin the process of improving the pedestrian environment from its current automobile orientation. The Project will supply ample bicycle parking for residents and visitors. A *Hubway* Bike Stand is located adjacent to the primary building entrance on MBTA-owned land, further supporting resident's access to alternative modes of transportation. For those trips that do necessitate a car, the development team has begun discussions with *Zipcar* to potentially include shared-car facilities within the building, thus limiting the need for personal automobiles for the Project's residents.

Mechanical Systems

The Proponent will consider ways to improve the sustainability of the Project in regard to its mechanical systems. These efforts will likely include not using chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) in the building's cooling equipment, saving energy across systems with energy-efficient equipment and appropriate insulation, as well as offering high-efficiency lighting with occupancy sensors where practicable.

Residential Units

The Proponent will offer ENERGY STAR appliances and lighting, and low-flow fixtures as part of the residential units. The design will also incorporate operable and high-quality insulated glass allowing residents to control air movement within each unit.

The following narrative provides a description of the LEED credits that the Proponent is considering as part of the Project.

INNOVATION AND DESIGN PROCESS (ID)

3 points expected

ID Prerequisite 1.1 Preliminary Rating

The target LEED certification threshold set for the Project is Silver.

ID Prerequisite 1.2 Energy Expertise in MID-RISE

The design team will include expertise in energy for Mid-Rise construction.

ID Credit 1.3 Professional Credentialed with Respect to LEED for Homes

A LEED Accredited Professional will be part of the project team (1 point [pt])

ID Credit 1.4 Design Charrette

A design charrette will be held with the design and development teams to review LEED goals and responsibilities (1 pt).

ID Credit 1.6 Trades Training for MID-RISE

The design team will discuss with the construction team trades training for mid-rise construction. (1 pt).

ID Prerequisites 2.1 and 2.2 Durability Planning and Durability Management

Durability strategies will be developed, recorded in the checklist and implemented. The construction consultant shall have a quality management process in place.

ID Credit 2.3 Third-Party Durability Management Verification

The Proponent will explore the possibility of third party durability management verification (3 pts).

LOCATION & LINKAGES (LL)

7 points expected

LL 2 Credit Site Selection

The Project is proposed for a site that meets the requirements of this section. The Project Site is not in a 100-year flood plain. The Project Site is not a habitat for threatened or endangered species. The Project 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 (2 pts).

LL Credit 3.2 Infill

One-hundred percent of the Project Site perimeter immediately borders previously developed land (2 pts).

LL Credit 4 Existing Infrastructure

Existing water service and sewer lines immediately surround the Site (1 pt).

LL Credit 5.1 Basic Community Resources for MID-RISE

The Project Site is within ¼ mile of four basic community services: A supermarket, a convenience store, a school and an office building (1 pt).

LL Credit 6 Access to Open Space

The Project Site is located within ½ mile of Columbus Park, which is a large park in excess of ¾ acre (1 pt).

SUSTAINABLE SITES (SS)

13 points expected

SS Prerequisite 1 Site Stewardship

Erosion control measures in compliance with this prerequisite will be implemented.

SS Credit 1.2. Minimize Disturbed Area of Site for MID-RISE

The Project will achieve a density greater than 40 units per acre (1 pt.).

SS Credit 2.2 Basic Landscaping Design

The Project will strive to use drought-tolerant turf located away from densely shaded areas, on less than 25% slope, with compacted construction soil at six inches in depth (1pt).

SS Credit 2.3 Limit Conventional Turf for MID-RISE

The Proponent will strive to limit the percentage of designed landscape that is turf to no more than 40% of the total soft-scape (1 pt).

SS Credit 3.2 Reduce Roof Heat Island Effects for MID-RISE

It is anticipated that 100% of the roofing will be comprised of high albedo materials (1 pt).

SS Credit 5 Pest Control Alternatives

The Project will strive to meet four of the non-toxic pest controls described in this section, including maintaining exterior wood 12" above soil (1/2 pt each, maximum 2 pts).

SS Credit 6.3 Very High Density for MID-RISE

The Project meets the requirement for Very High Density for Mid-Rise. Projected density is 118 units per acre (4 pts).

SS Credit 7.1 Public Transit

The Project is adjacent to an MBTA Red Line and commuter rail station and is also a stop on several MBTA bus lines. These transit services provide more than 60 rides per weekday (2 pts).

SS Credit 7.2 Bicycle Storage

The Project will provide approximately 278 bicycle storage spaces which will be in excess of 15% of the building occupants (317 bedrooms). The Proponent will provide one bike parking space for each residential unit, as required by the Bicycle Parking Guidelines-Boston Transportation Department (1 pt).

SS Credit 7.3 Parking Capacity / Low Emitting and Fuel-Efficient Vehicles

Parking density has been sized not to exceed the minimum zoning requirements of 0.5 per unit (1 pt).

WATER EFFICIENCY (WE)

4 points expected

WE Credit 1 Water Reuse for MID-RISE

The Project will investigate rainwater, graywater and recycled water systems for viability (1 pt).

WE Credit 2.1 High-Efficiency Irrigation System for MID-RISE

The Proponent will work to create a high efficiency irrigation system for the proposed landscaping (2 pts).

or

WE Credit 2.2 Reduce Overall Irrigation Demand by at Least 45% for MID-RISE

The Proponent will study the opportunity of reducing overall irrigation demand by at least 45% for mid-rise (maximum 2 pts, as specified in Table 12).

WE Credit 3.1 High-Efficiency Fixtures and Fittings

It is the intent of the Project to install high-efficiency fixtures and fittings including lavatory faucets with average flows less than or equal to 2.00 gpm, showers with flows less than or equal to 2.00 gpm per stall, and water closets with flow rates less than or equal to 1.30 gpf (1 pt each, maximum 3 pts).

WE Credit 3.3 Water Efficient Appliances for MIDRISE

The Project will include water-efficient clothes washers and ENERGY STAR labeled dishwashers that use 6.0 or less gallons per cycle (1 pt).

ENERGY AND ATMOSPHERE (EA)

2 points expected

EA Prerequisite 1.1 Minimum Energy Performance for MID-RISE

The Project's intent is to minimize energy performance for Mid-Rise per the requirements of this section.

EA Prerequisite 1.2 Testing and Verification for MID-RISE

The Proponent will verify implementation of testing and verification of for Mid-Rise.

EA Credit 1.3 Optimize Energy Performance

The Project will strive to optimize energy performance for mid-rise construction and realize energy cost savings compared with ASHRAE 90.1 2007 (5 pts).

EA Credit 7.1 Efficient Hot Water Distribution

The Proponent will strive to design and implement an Efficient Hot Water Distribution System (2 pts).

EA Credit 11.1 Appropriate HVAC Refrigerants

It is the intent of the Project to use non-HCFC refrigerants (1 pt).

MATERIALS AND RESOURCES (MR)

9.5 points expected

MR Prerequisite 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 Credit 1.2 Detailed Framing Documents

Detailed framing documents will be created for use on the job site (1 pt).

MR Credit 1.3: Detailed Cut List and Lumber Order

The construction team will create a detailed cut list and lumber order (1 pt).

MR Credit 1.5: Off-Site Fabrication

It is anticipated that panelized construction, requiring off-site fabrication will be utilized for the Project (4 pts).

MR Prerequisite 2.1: FSC Certified Tropical Wood

It is the intent of this Project to install no tropical wood, to install FSC certified wood products and to provide suppliers with a notice of preference for FSC products and to request the country of manufacture for each product.

MR Credit 2.2: Environmentally Preferable Products

Use of environmentally preferred products including cementitious siding, bamboo flooring and cellulose building insulation are a priority. Use of Low emission products including paints, adhesives and sealants are also a priority (2.5 to 3.5 pts).

MR Prerequisite 3.1Construction Waste Management Planning

The construction consultant shall institute a Construction Waste Management Plan, including investigation of local options for waste diversion and documentation of diversion rate for construction waste.

MR Credit 3.2 Construction Waste Reduction

The construction consultant shall strive to reduce construction waste to a level below the industry norm (3 pts).

INDOOR ENVIRONMENTAL QUALITY (EQ)

7.5 points expected

IEQ Prerequisite 2

The Proponent will implement Basic Combustion Venting Measures for Mid-Rise Construction.

IEQ Credit 4.3 Third-Party Performance Testing for MID-RISE

The Proponent will explore the possibility of third-party performance testing for the flow rate of ventilation to each unit (1 pt).

IEQ Prerequisite 5.1 Basic Local Exhaust

It is the intent of the Project to meet all the requirements for Basic Local Exhaust.

IEQ Credit 5.2 Enhanced Local Exhaust

It is the intent of the Project to achieve enhanced local exhaust through the installation of a continuously operating exhaust fan at each bathroom (1 pt).

IEQ Credit 5.3 Third Party Performance Testing

The Proponent will explore third-party performance testing of each exhaust air flow rate (1 pt).

IEQ Prerequisite 6.1 Room-by-Room Load Calculations

Room by room design load calculations will be performed. System will be installed per calculations.

IEQ Credit 6.2 Return Air Flow

Ducted HVAC systems are anticipated. It is the intent of the Project to install return air openings of 1 square inch per CFM of supply (1 pt).

IEQ Credit 6.3 Third Party Performance Test

The Proponent will explore third-party performance testing of supply air flow rate in each room (2 pts).

IEQ Prerequisite 7.1 Good Filters

It is the intent of the Project to install air filters with a minimum efficiency rating of equal or greater than MERV 8.

IEQ Credit 8.1 Indoor Contaminant Control During Construction

The Proponent will seal all permanent ducts and vents to minimize contaminants during construction (1 pt).

IEQ Credit 8.3 Preoccupancy Flush

The Proponent will explore the possibility of conducting a pre-occupancy flush when all phases of construction are completed, prior to occupancy (1 pt).

IEQ Prerequisite 9.1 Radon-Resistant Construction in High-Risk Areas

The Project will be constructed with radon-resistant construction techniques. Suffolk County is a low-risk zone.

IEQ Credit 10.2 Minimize Pollutants from Garage for MID-RISE

It is the intent of the Project to tightly seal shared surfaces between garage and conditioned spaces to minimize pollutants into the mid-rise (2 pts).

IEQ Credit 11.1 Environmental Tobacco Smoke Reduction for MID-RISE

It is the intent of the Project to prohibit smoking in common areas, exterior areas on the property that are within 25′ from entries, air intakes and windows and to communicate these prohibitions through lease agreements, CC&Rs and signage (0.5 pts).

AWARENESS & EDUCATION

1 points expected

AE Prerequisite 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 Credit 1.2 Enhanced Training

The Proponent will provide two hours of training for occupants in addition to the training provided in AE Prerequisite 1.1 (1 pt).

AE Credit 1.3 Public Awareness

The Proponent will explore possible means to 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 (1 pt).

AE Credit 2 Education of Building Manager

The Proponent will explore the possibility of providing the building manager with an operations and training manual. The team may have the construction team provide a one hour walkthrough for the building manager of the building prior to occupancy (1 pt).

3.12 Historic Resources

This section discusses the historic resources in the Project vicinity and the anticipated impacts to them.

3.12.1 Historic Resources in the Vicinity of the Project

The Project Site is an approximately 2.35-acre vacant parcel of land, most recently utilized partially for surface parking. The site is bounded by the JFK MBTA Station to the north, Morrissey Boulevard to the east, the Shaw's Supermarket and surface parking to the south, and the elevated Southeast Expressway (I-93) and MBTA rail lines to the west.

The Project site is in the vicinity of three historic resources – the Old Harbor Reservation Parkways to the north, the JFK MBTA Station to the northwest, and the Crescent Avenue neighborhood to the west. The historic resources are depicted on Figure 3.12-1.

The *Old Harbor Reservation Parkways* encompass more than three miles of parkways along and near the shores of the westernmost section of Dorchester Bay between South Boston and Dorchester. The parkway district, encompassing Kosciuszko (Columbia) Circle, William Day Boulevard, Columbia Road, and Old Colony Avenue, is listed on the National Register of Historic Places. The district is located to the north of the Project site, physically and visually separated by the elevated portion of Morrissey Boulevard where it rises to cross over Mount Vernon Street to meet Kosciuszko (Columbia) Circle and the Columbia Road overpass where it crosses over the MBTA right-of-way.

The *JFK (Columbia) MBTA Station*, located to the northwest of the Project site, was inventoried by the MBTA in their Historic Property Survey (1984) and is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (BOS.6349). The MBTA survey notes that the station, constructed in 1927, is historically significant for its association with the opening of the rapid transit line to Fields Corner. However, the original station, head house, and platforms have all been replaced by later renovations and the station does not retain architectural integrity.

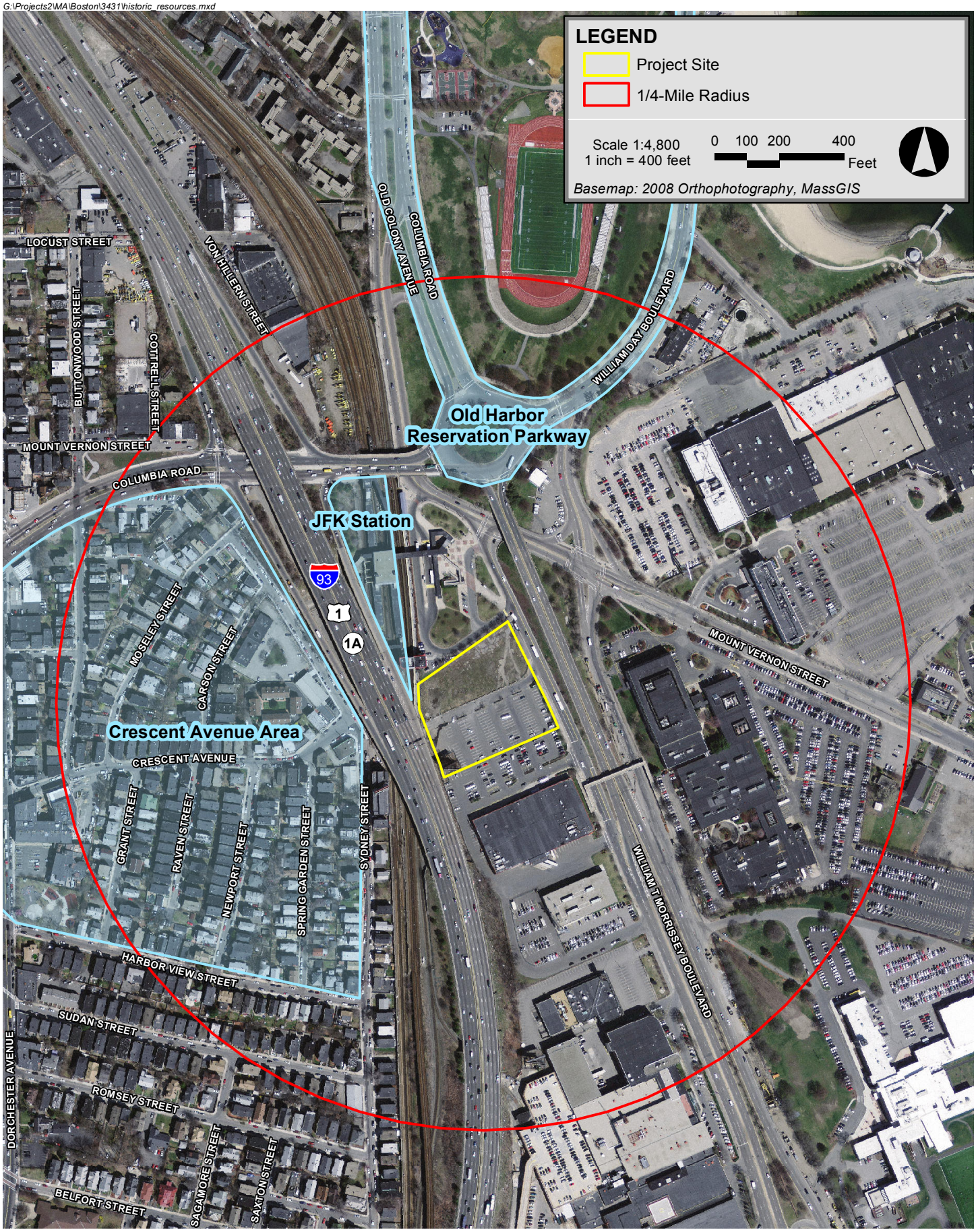
The *Crescent Avenue* neighborhood, roughly bounded by Columbia Road to the north, Sydney Street to the east, Harbor View Street to the south, and Dorchester Street to the west is a dense neighborhood with a concentration of modest Italianate and Mansard single-family and triple decker residences. The area is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (BOS.CZ). While the neighborhood is in close proximity to the Project site, they are physically and visually separated by the elevated Southeast Expressway, which rises approximately 40 feet above grade.

3.12.2 Archaeological Resources

There are no known archaeological resources listed in the State and National Registers of Historic Places or included in the Inventory of Historic and Archaeological Assets of the Commonwealth within the Project site. The Project site consists of a previously developed urban site; therefore, it is unlikely that the proposed Project will affect previously unidentified archaeological resources.

3.12.3 Impacts to Historic Resources

The Project proposes new construction consisting of two buildings with heights of approximately 70 feet within the Project site. Given the modern development in the vicinity of the Project area, including the elevated Southeast Expressway to the west and elevated Morrissey Boulevard and Columbia Road overpass to the north and west, the new construction will not have any visual impacts on historic resources.



Residences at Morrissey Boulevard Boston, MA

Epsilon Associates Inc.

Figure 3.12-1
Historic Resources

Section 4.0

Urban Design

4.0 URBAN DESIGN

4.1 Introduction

The Residences at Morrissey Boulevard will create a vital new community directly adjacent to the JFK/UMass MBTA Red Line and commuter rail station in Dorchester. The vibrant development will provide an excellent opportunity for urban transit-oriented living. Ideally sited between a grocery store and the transit station, residents are likely to make use of public transportation rather than relying on personal automobile use. A mix of unit sizes and styles, ranging from traditional flat apartments to multi-level lofts, will appeal to a range of residents.

The Project Site is bounded by I-93, the MBTA station, a broad access road to Morrissey Boulevard, and the parking lot of a *Shaw's* supermarket. Two new buildings will frame a new "Main Street" running north-south down the center of the site, as envisioned in the Columbia Point Master Plan. The development program will consist of 278 residential apartments, ground-level resident amenity space, and partially-underground parking with a total of 143 parking spaces. The residential units will be a mix of studios, one-, two-, and three-bedroom units. Residents will have access to open space in the form of a landscaped urban courtyard accessible by the proposed "Main Street."

4.2 Columbia Point Master Plan

The Proponent developed the Project's design while paying close attention to the Columbia Point Master Plan, completed in 2011. As recommended in the plan, the Proponent has strategically integrated into the Project elements of open space, connectivity, views, block & street pattern, and pedestrian and bike access, as well as transit access.

Central to the design is the proposed internal "Main Street." This new road will be the first step in establishing the north-south link that will break up the superblock located between I-93 and the Access Road, creating a more pedestrian-friendly urban grid. Pending future discussions with the MBTA, potential vehicular and pedestrian connections to the MBTA station have been designed at the northern edge of the Project Site, as a continuation of Main Street.

The Proponent is committed to achieving the Columbia Point Master Plan's goal of creating a more pedestrian friendly environment. Accordingly, the ground level is designed to be active and vibrant. Wherever possible, stoops and patios have been incorporated to provide variation along the sidewalk. Consistent with pedestrian treatments in other successful urban communities, street furniture, trees, lighting and sidewalk patterning have been added to enhance the quality of the pedestrian experience for both the Project's residents and the surrounding community.

4.3 Vehicular Access

The primary automobile entrance to the Project Site will be via a new street, passing through the reconfigured supermarket parking lot, and serving to link the Access Road to the proposed "Main Street" and to parking for the West Building. Parking for the East Building will be located in a half-level below-grade garage, accessed via a ramp off of the proposed "Main Street" along the building's southern edge. A dual-use loading dock will be located near the northwest corner of the East building, allowing move in/out or a place to stretch in the sun outside the Fitness Room when the dock is not in use.

The West Building parking levels will be accessed via the new street, facing the supermarket. Two access points on the south façade of the West Building will allow vehicles to enter the grade-level parking or the mezzanine level parking. Located nearest I-93 and the MBTA's Red Line Commuter Rail lines and MBTA train lines, the parking decks will act as a buffer between the Project and the tracks and highway. This parking will be open for ventilation, with sound-absorptive and visual screening with architectural fencing and plantings. Move Residents moving in/ or out will occur at the use the grade-level parking deck.

4.4 Architectural Character

The East and West Buildings are both designed at a height of approximately 70 feet. The greatest building heights will be achieved at the edges nearest the MBTA Station and the *Shaw's* supermarket, making these edges as the prime corners of the site. The architectural elements of the buildings will be linked with less tall "bars," with rhythmic stoops and bays between, establishing an interesting and varied streetscape.

The East Building is C-shaped, with a landscaped courtyard as the central open space for the entire Project Site. The West Building will frame the western side of "Main Street." The residential units in this building will be buffered by parking levels and held away from I-93 and MBTA rail lines located directly to the west of the Project Site.

Building rooflines will vary, from built-up trellis elements at site corners to low profile patterning. Mechanical equipment will be screened from view on the roof, and will be located away from parapet walls. The corner above the main lobby of the East Building will be available to the residents as a roof-top deck.

The forms of the two new buildings will step up toward the MBTA station. The northern and southern wings will reach up to 70 feet and will contain residential units with high ceilings, double-height windows and French balconies.

Contemporary materials and vertical forms have been added to break up the mass and length of the facades. Tall expressions of high ceilings and lofts will create interest and variety, and raised patios or stoops will be located where possible around the building

perimeter. Along the Access Road, a plinth with stoops will provide barrier-free access to first floor units. The dual-purpose deck outside the Fitness Room may also be used for loading on move in/out days.

The north and south wings of the East Building will be wrapped in a zinc-clad shingle system, and the connecting bar will be dressed in metal panels. The West Building will be masonry with punched openings and projecting bays of metal panel. Proposed aluminum window systems will incorporate canopies, sunshades and French balcony screens.

Architectural details will activate the facades at the corners and building entrances, including balconies with woven metal railings. Entry canopies will be incorporated at most ground level private entrances and decks, and cornice elements will mark the prime corners of the buildings. The main entrances have been oriented to highlight the building corners particularly acknowledging both Morrissey Boulevard and the abutting MBTA JFK Station

Sheltered from the bustle of traffic, the courtyard garden will be serene and peaceful. Pockets of seating and small gathering areas accommodate small group gatherings. Large glass doors will allow people to spill out of the club rooms onto the patio. Lining the side streets, private residential decks and stoops will enliven the street level. Street trees and low plantings will soften the ground plane and provide shelter to pedestrians.

North view towards JFK MBTA station

Looking south towards the supermarket

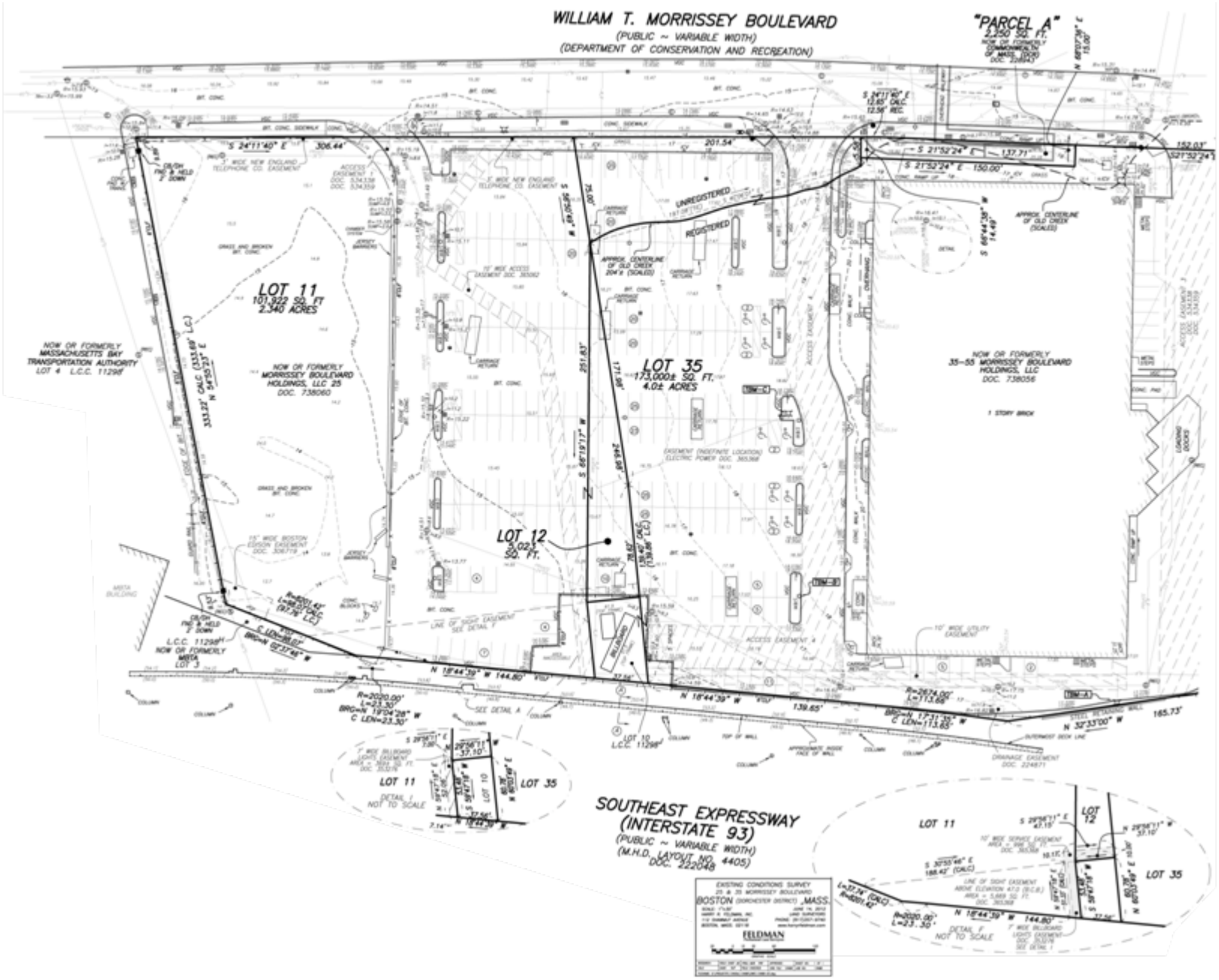
Looking north on I-93

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-1

Site & Neighborhood Context

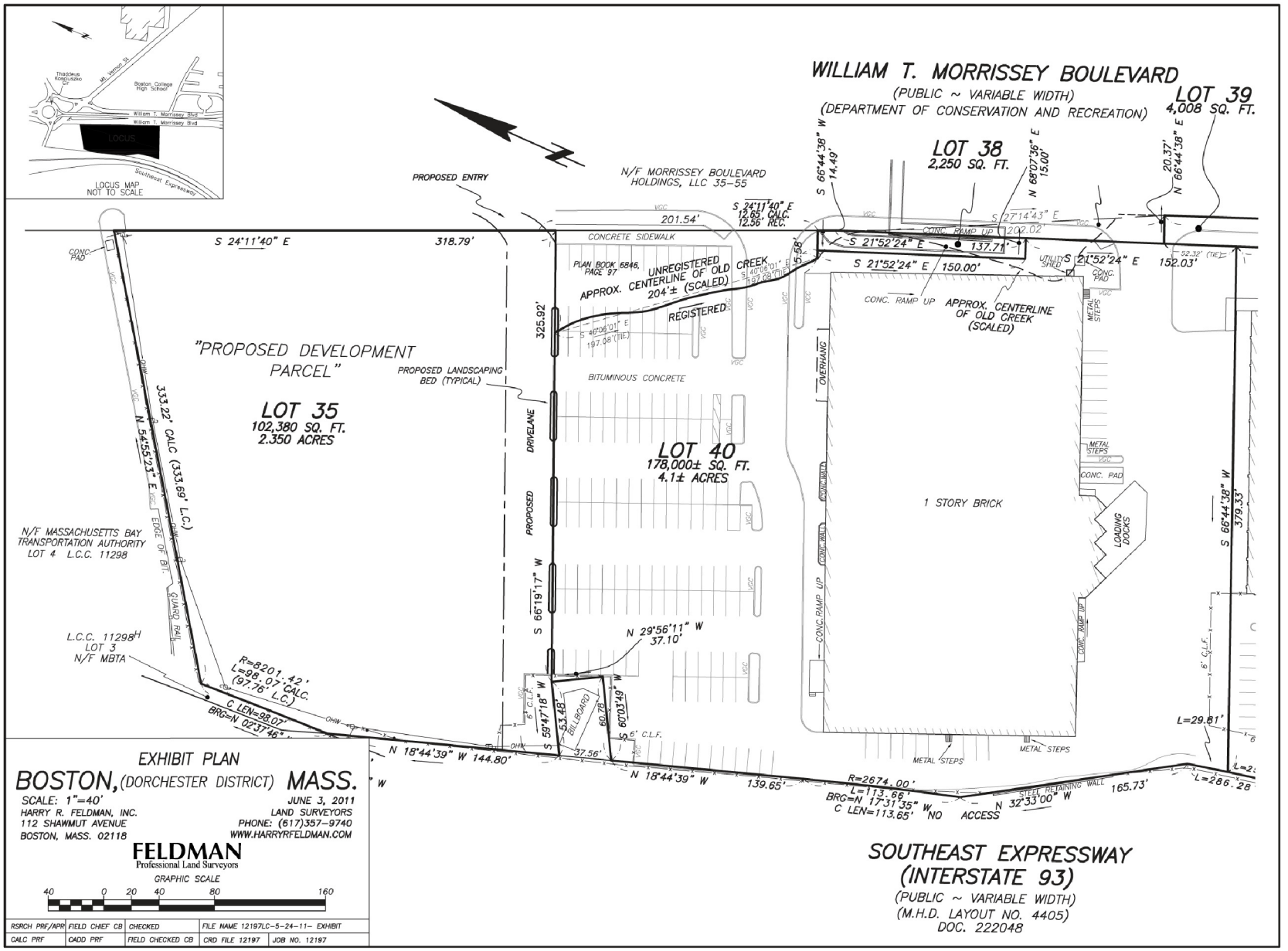


Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-2

Existing Site Plan

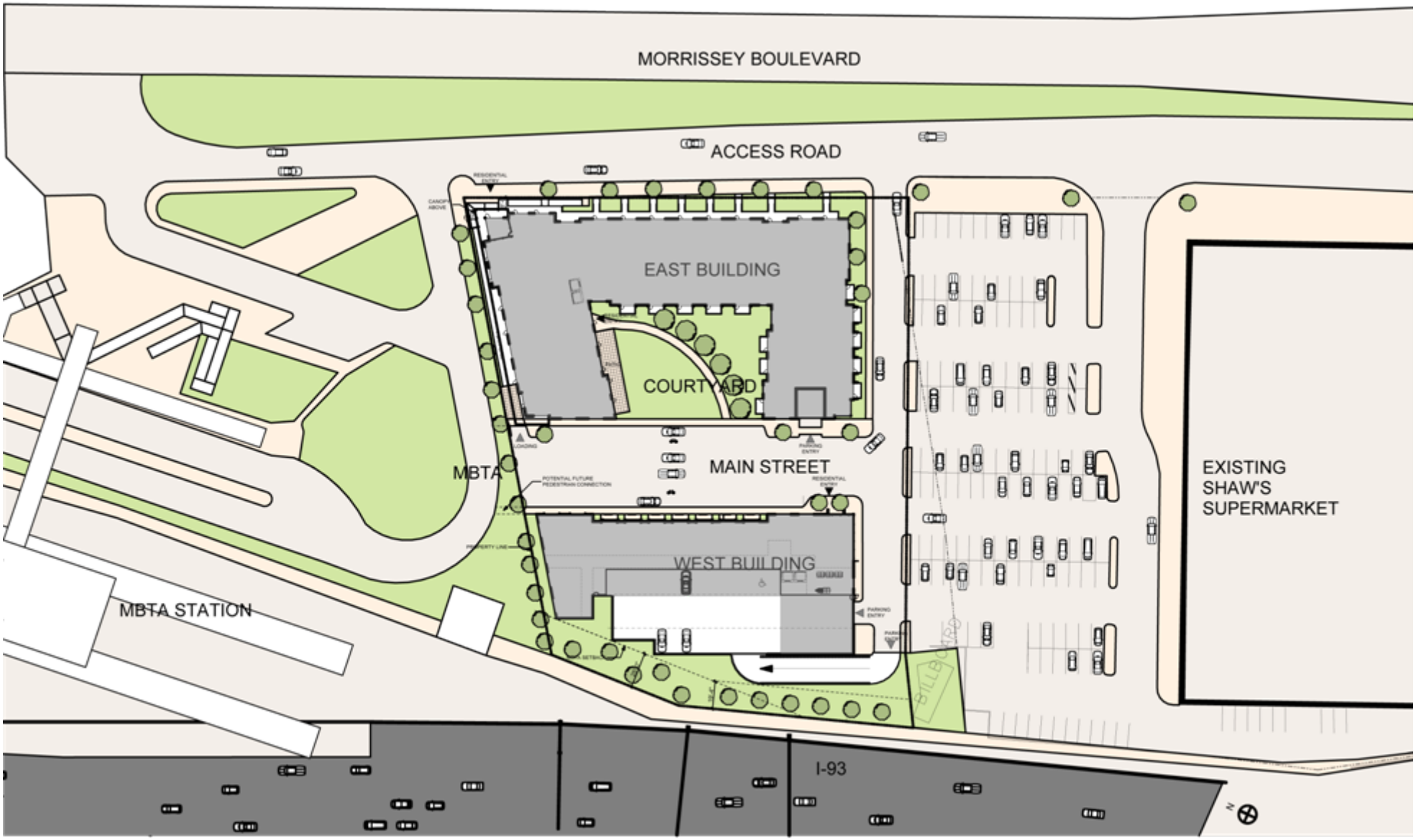


Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-3

Proposed Parcel Plan



Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-4

Proposed Site Plan

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-5

View from the Northwest

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-6

Entry View from Access Road

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-7

View from Main Street

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-8

Courtyard View of East Building

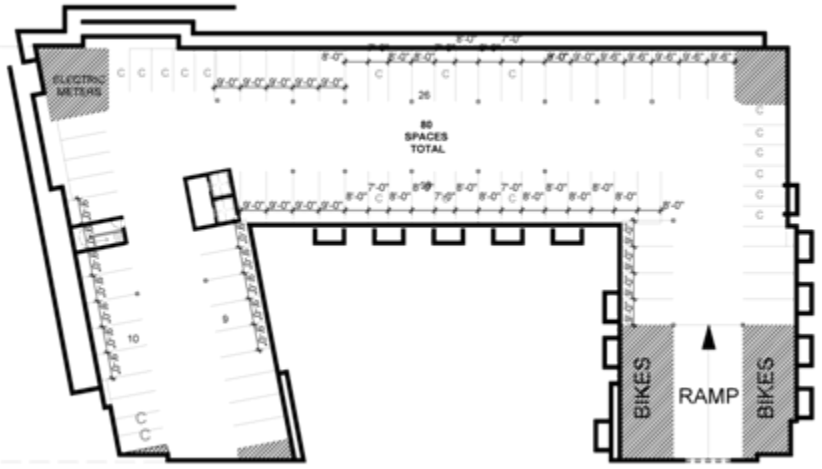
Residences at Morrissey Boulevard Boston, MA

ICON architecture

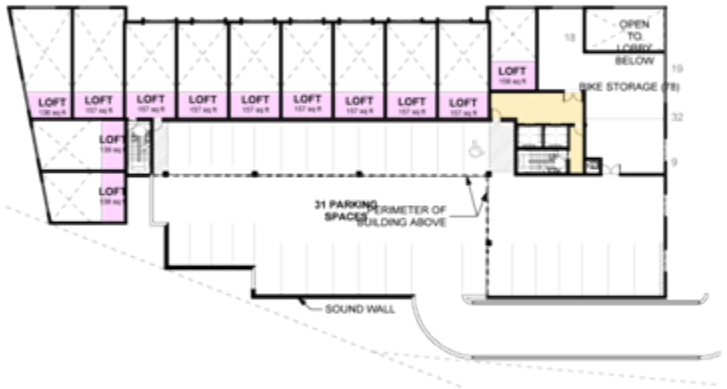
Figure 4-9

View along Access Road from the North

Site and Ground Floor Plan



Parking Level Plan



Mezzanine Level Plan

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-10

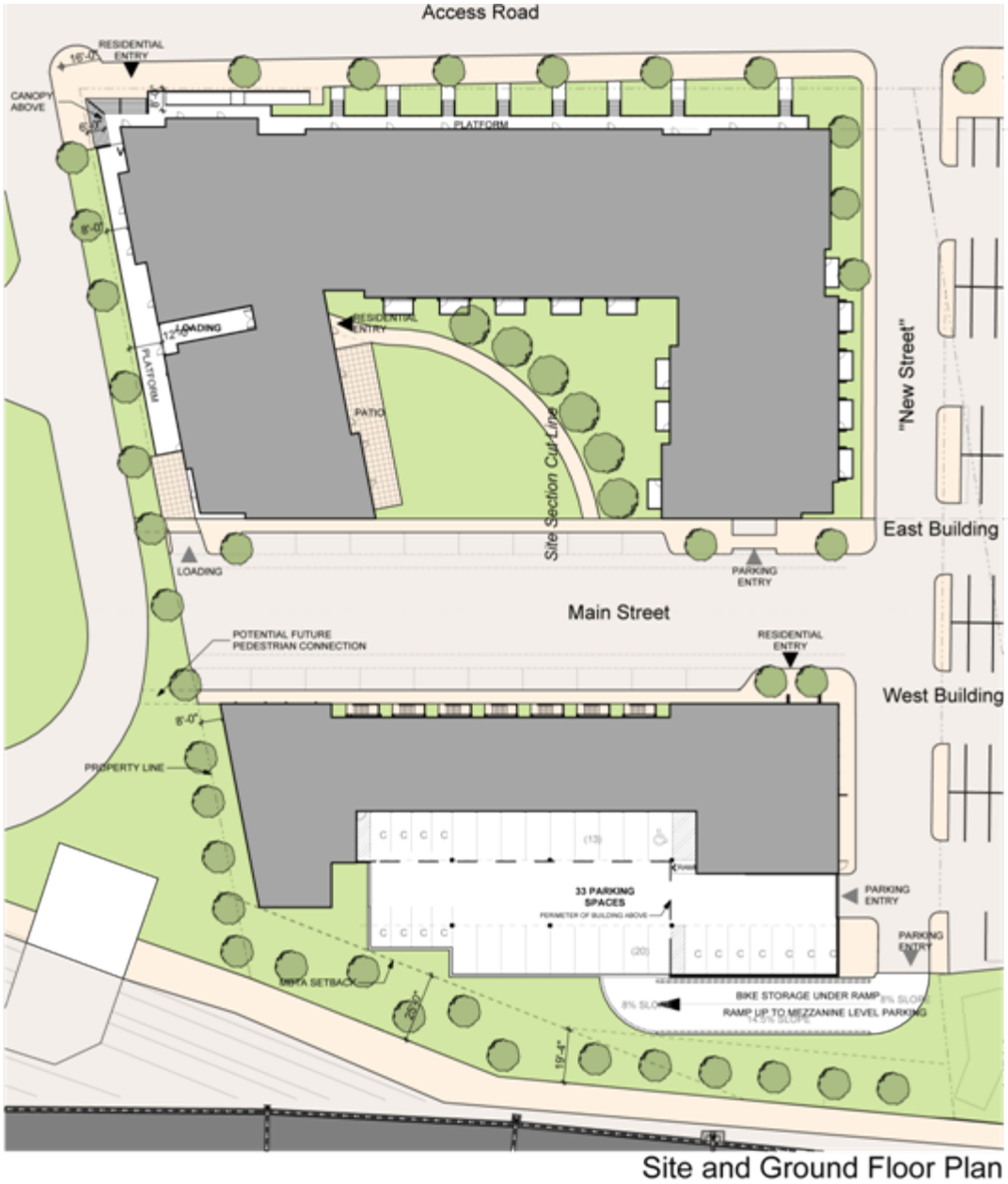
Site, Parking, and Ground Level Floor Plans

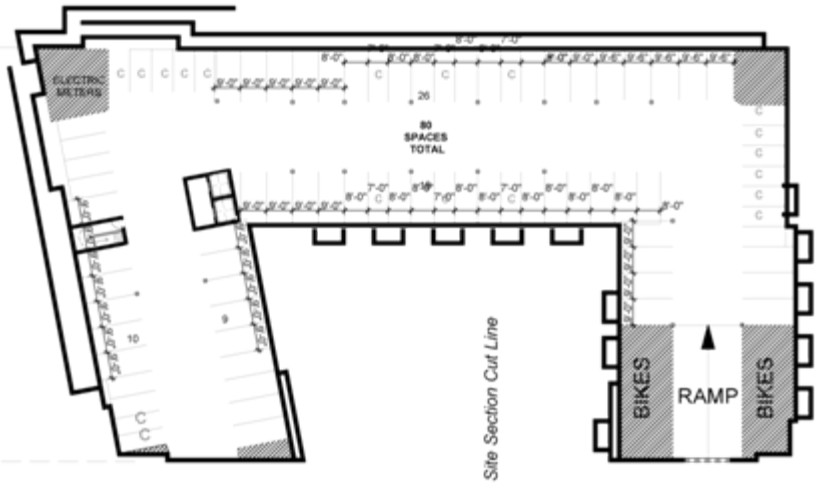
Residences at Morrissey Boulevard Boston, MA

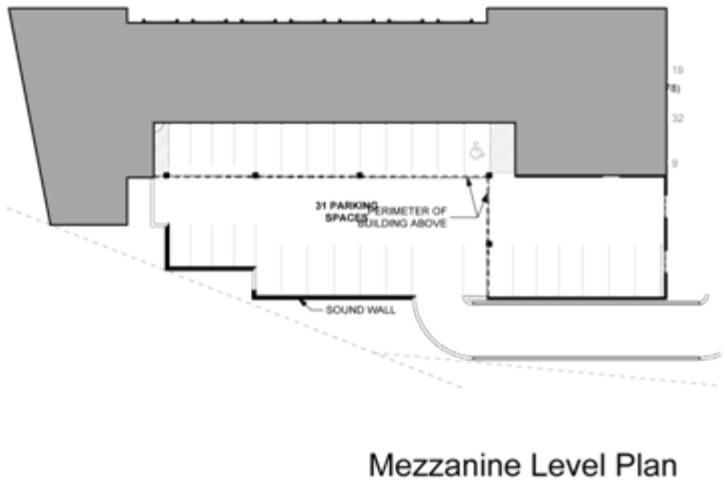
ICON architecture

Figure 4-11

Landscape Plan





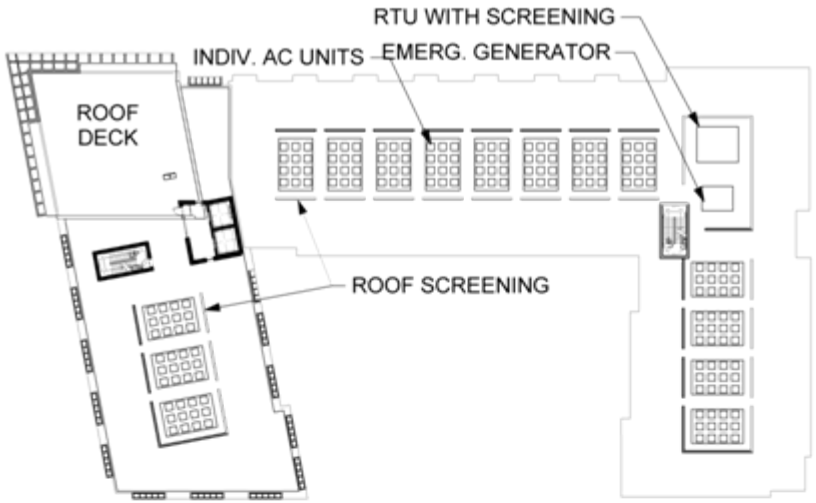


Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-12

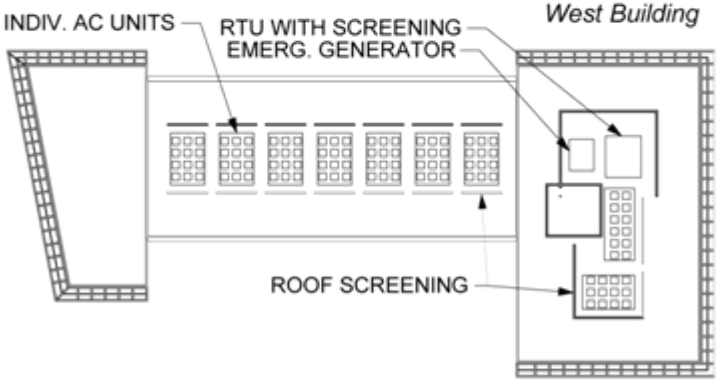
Parking and Loading



East Building

Fifth Floor Loft Plan

East Building



West Building

West Building

Roof Plans

Second through Fifth Floor Plans

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-13

Typical Upper Floor Plans

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-14

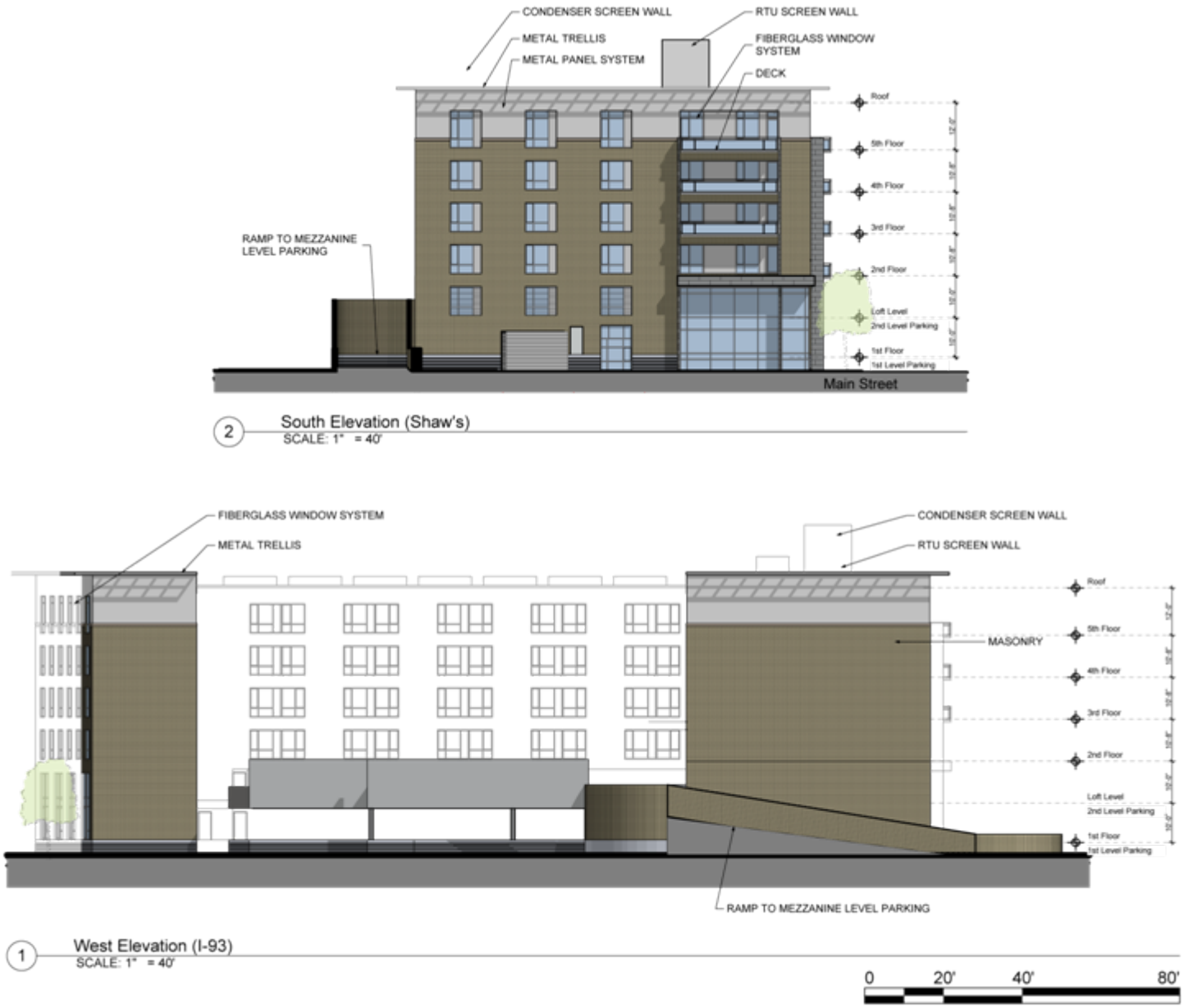
East Building Elevations

Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-15

East Building Elevations



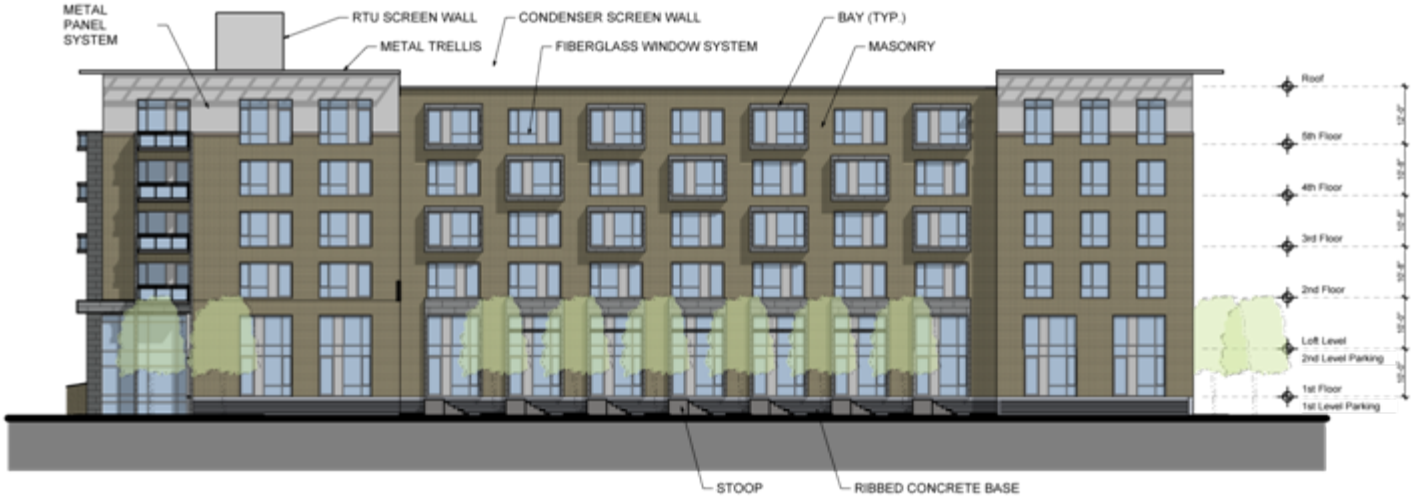
Residences at Morrissey Boulevard Boston, MA

ICON architecture

Figure 4-16

West Building Elevations

2 North Elevation (JFK Station)
SCALE: 1" = 40'



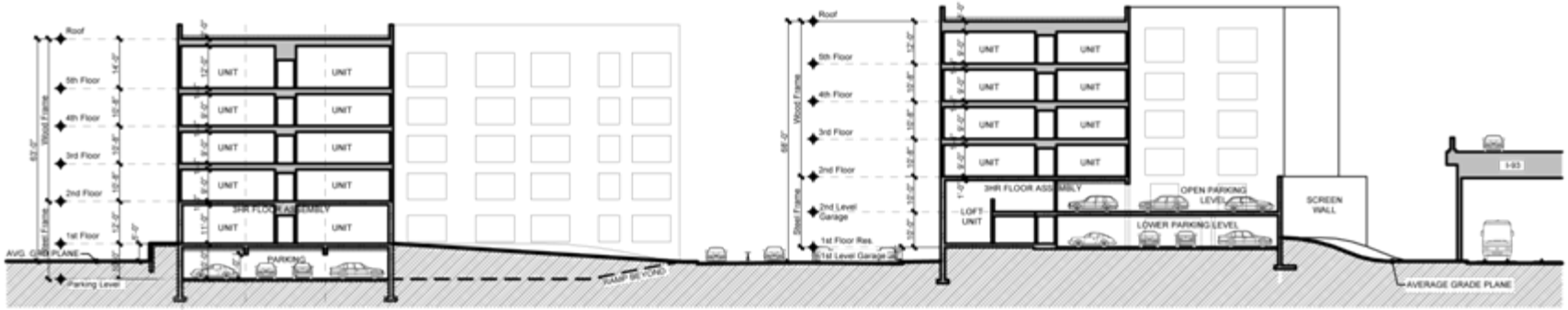
1 East Elevation (Main Street)
SCALE: 1" = 40'

0 20' 40' 80'

Residences at Morrissey Boulevard Boston, MA

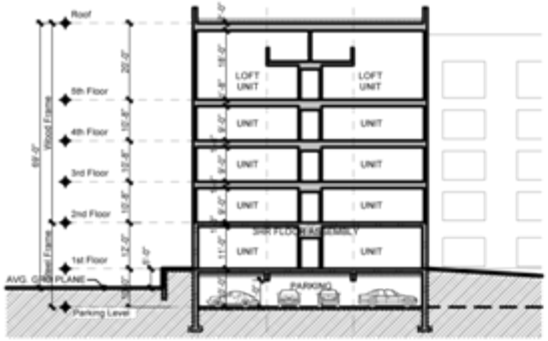
ICON architecture

Figure 4-17
West Building Elevations



1 EAST & WEST BUILDING / SITE SECTION
SCALE: 1" = 50'

0 20' 50' 100'



2 EAST BUILDING SECTION - NORTH WING
SCALE: 1" = 50'

Section 5.0

Infrastructure

5.0 INFRASTRUCTURE

5.1 Introduction

This chapter addresses the existing utilities surrounding the Project Site, the proposed connections required to provide service to the new buildings proposed under the Project, and any impacts on the existing utility systems that may result from the Project.

5.2 Wastewater

5.2.1 Existing Sanitary Sewer System

There are existing Boston Water and Sewer Commission (BWSC) sanitary sewer systems in the Access Road adjacent to the Project site. The site is adjacent to the 12-inch sanitary sewer main in the Access Road that first flows southerly before crossing to the east side of Morrissey Boulevard. Once on the east side of the road, the 12-inch sewer flows north to the intersection of Mt. Vernon Street. The existing sewer system adjacent to the Project Site is illustrated in Figure 5.1-1. The Project site does not have any existing sewer connections to the BWSC system and there is no sanitary sewage discharge currently from the Project Site.

5.2.2 Project Generated Wastewater Flow

The Project's sewer generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program section (314 CMR 7.00), and the proposed building program. Section 7.00 lists typical generation values for the sources listed in Table 5-1 for the Project. Typical generation values are generally conservative values for estimating the sewage flows from new construction. Section 7.00 sewage generation values are used to evaluate new sewage flows or the increase in flows to existing connections. Table 5-1 describes the increased sewage generation in gallons per day (gpd) for each phase of the Project.

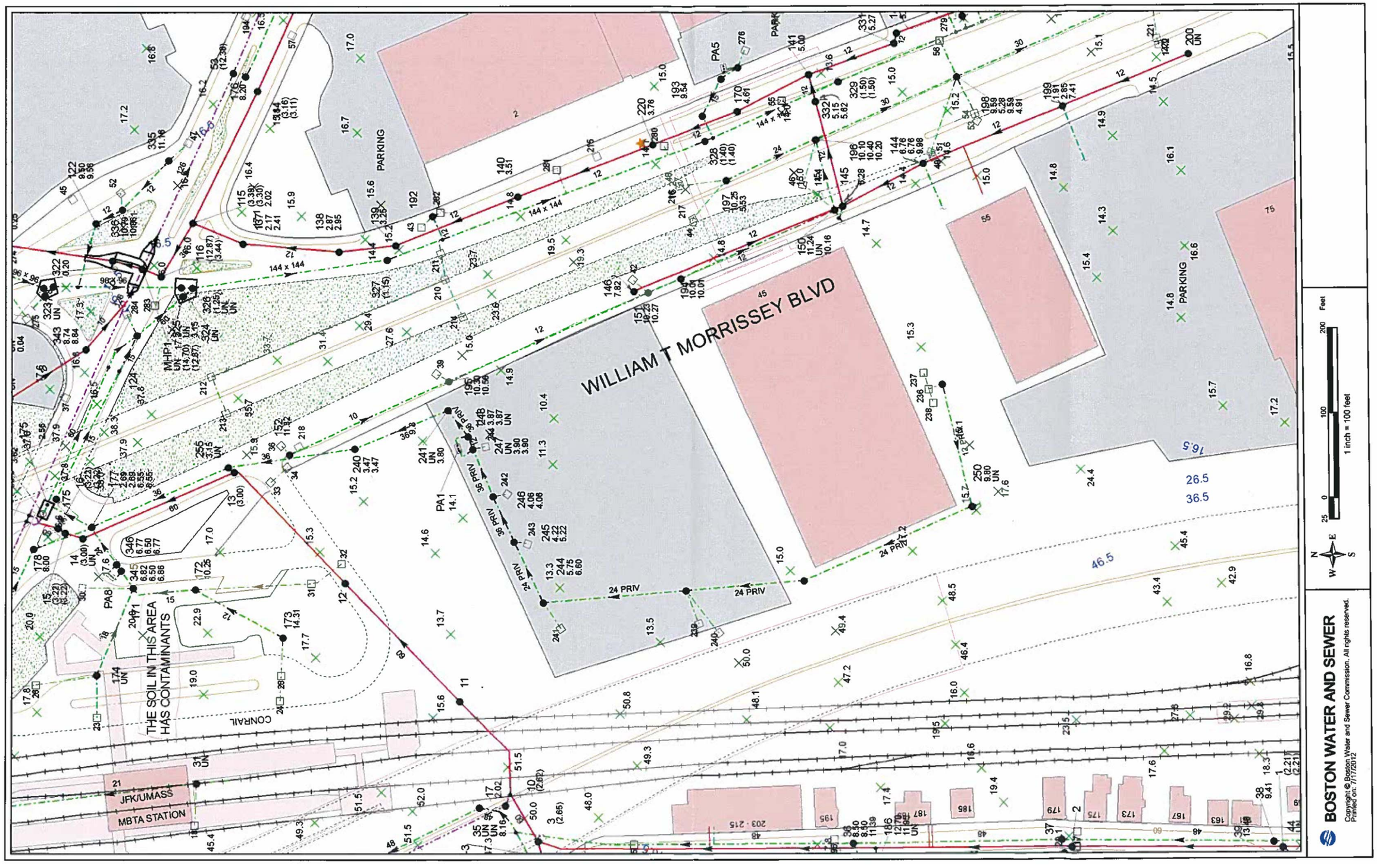
Table 5-1 Proposed Project Sewer Generation

Existing Flows

Room Use	Size	310 CMR Value (gpd/unit)	Total Flow (gpd)
Undeveloped Site			
		Total Existing Flows	**0**

Proposed Flows

Room Use	Size	310 CMR Value (gpd/unit)	Total Flow (gpd)
Residential Units	323 beds	110 /bed	35,530
		Total Proposed Flows	**35,530**



Residences at Morrissey Boulevard Boston, MA

Epsilon ASSOCIATES INC.

Figure 5.1-1

Existing Sewer System

5.2.3 Sanitary Sewer Connection

The Project's impact to the existing BWSC sewer systems in the adjacent streets was analyzed. The analysis was derived from information taken from the BWSC Sewer System GIS data and the Existing Conditions Survey Plan prepared by Harry R. Feldman, Inc. Flow calculations were based on the Manning Equation. With an effort to be conservative in the analysis, the Morrissey Boulevard pipes were assumed to be vitrified clay. The existing sewer system capacity calculations are presented in Table 5-2.

Table 5-2 Sewer Hydraulic Capacity Analysis

Sewer System	Distance (feet)	Invert Elevation (Up)	Invert Elevation (Down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Morrissey Blvd.	278	8.0	6.46	0.55%	12	0.013	2.64	1.71

The existing adjacent roadway sewer system in the Access Road was analyzed for impacts due to the potential building service connections as part of the Project.

Results shown in Table 5-2 indicate the minimum hydraulic capacity of 12-inch sewer main near the Project Site is 1.71 million gallons per day (MGD) or 2.64 cubic feet per second (cfs). Capacity problems are not expected within the 12-inch sewer main based on the average daily flow estimate for the Project of 35,530 gdp or 0.36 MGD.

Sanitary sewage generated by the Project will be discharged to the adjacent BWSC sanitary sewer system. It is anticipated that the proposed buildings will discharge sanitary sewage to the 12-inch sanitary sewer main in the Morrissey Boulevard based on the elevation of the Project Site and the available sewer mains. This will be reviewed and approved by the BWSC engineering staff as part of the design process and the BWSC Site Plan Approval process for the Project.

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. In addition, the Proponent will submit a General Service Application and Site Plan to BWSC for its review as the Project progresses. The Proposed Project will generate new wastewater flows exceeding 15,000 gpd but less than 50,000 gpd, which will require the completion of a MassDEP Compliance Certification (BRP WP 73) for sanitary and industrial connections greater than 15,000 gdp but less than or equal to 50,000 gdp.

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

5.3 Water System

5.3.1 Existing Water Service

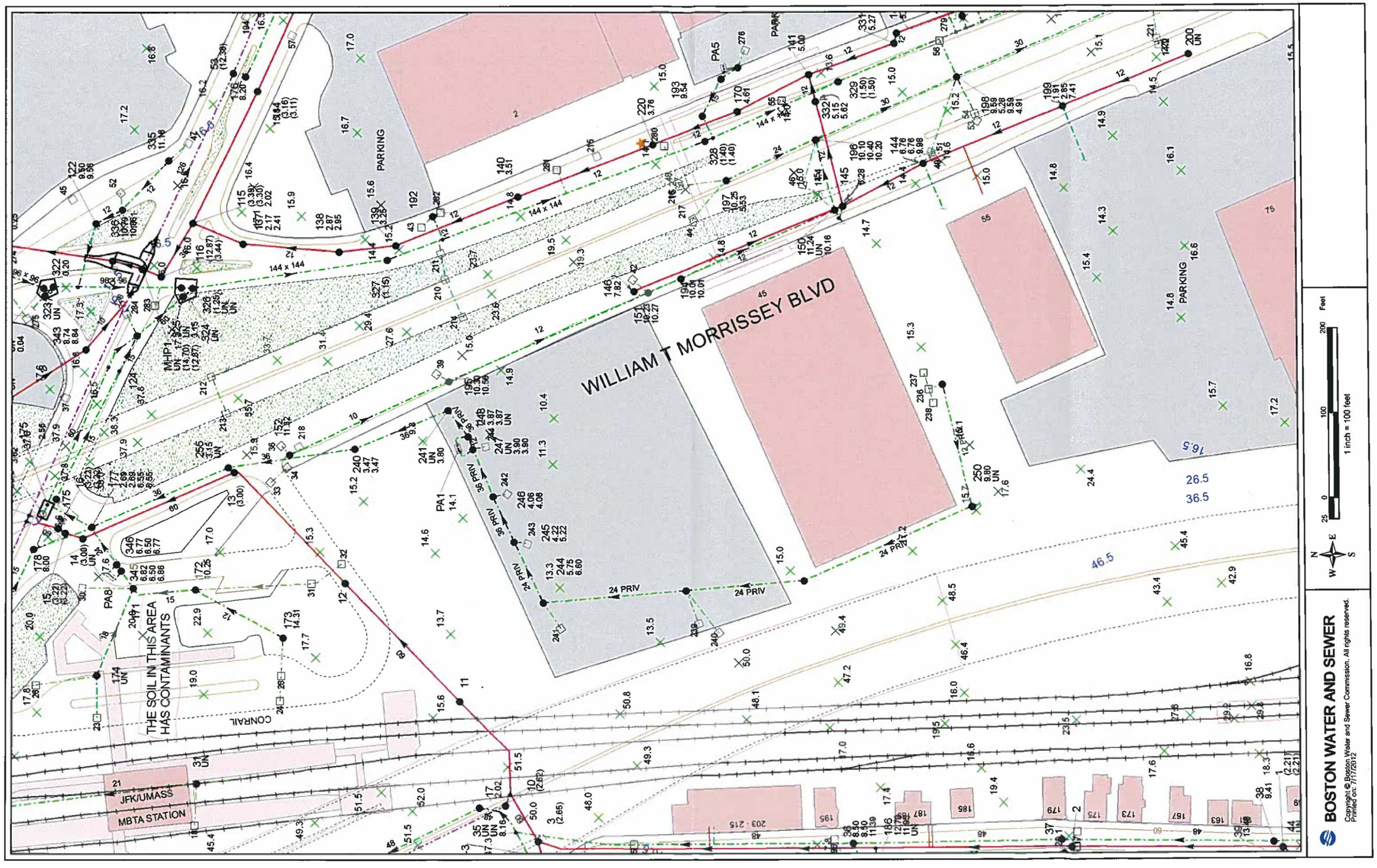
Water for the Project site will be provided by the BWSC. There are five different water systems within the city, and these provide service to portions of the city based on ground-surface elevations. The five BWSC water systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high. There is a 12-inch southern low water main beneath the Access Road. An 8-inch diameter water main connects into the 12-inch main at the southern end of the Project Site. This line proceeds to travel behind and around the existing *Shaw's* supermarket building, through the existing parking area and connects back into the 12-inch water main in Morrissey Boulevard. The existing water system is illustrated in Figure 5.3-1. The Project Site does not have any existing connections to BWSC systems and there is currently no water service at the Project Site.

5.3.2 Project Generated Domestic Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (110%) is applied to the estimated average daily wastewater generation calculated with 314 CMR 7.00 values to account for consumption, system losses, and other usages to estimate an average daily water demand. The total estimated water demand due to the Project is approximately 39,083 gpd (based on a total sewage generation of 35,530 gpd) of domestic water. The water for the Project will be supplied by the BWSC system.

All 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.

BWSC record flow test data containing actual flow and pressure for a hydrant within the vicinity of the Project Site was available. Additional testing will be required once the design progresses, as hydrant flow data should be less than a year old to be used as a design tool. The results of the BWSC testing near the Project Site are shown in Table 5-3.



Residences at Morrissey Boulevard Boston, MA

Epsilon ASSOCIATES INC.

Figure 5.3-1

Existing Water System

Table 5-3 Existing Hydrant Flow Data

Flow Hydrant Number	Date of Test	Static Pressure (psi)	Residual Pressure (psi)	Total Flow (gpm)	Flow (gpm) at 20 psi	Flow (gpm) at 10 psi
H20 Morrissey Blvd.	03/04/04	68	50	3,460	5,876	6,508

5.3.3 Proposed Water Service

The domestic and fire protection water service connections required by the Project will meet the applicable city and state codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review process. This review includes, but is not limited to, 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.

5.3.4 Water Supply Conservation and Mitigation Measures

As part of the Project's compliance with Article 37 of the Boston Zoning Code, the Project will be designed to be certifiable under the LEED system. Through this process, significant efforts to reduce water consumption will be made including the choice of incorporating aeration fixtures and appliances for their water conservation qualities.

5.4 Storm Drainage System

5.4.1 Existing Storm Drainage System

Stormwater runoff from the developed portion of the Site is currently collected into a series of catch basins and flows through a pipe network beginning at the existing *Shaw's* supermarket loading docks on the southern face of that building. The pipe network flows generally from south to north, around the existing building before turning easterly towards the Access Road. Prior to meeting the Right of Way line at the Access Road, the drainage line turns again, then flows to the north before crossing into the Access Road at the north east corner of the Project Site and discharging into a 36-inch diameter pipe on the northern end of the Project Site. An off-line water quality chamber system is located prior to the northern drain line turn at the eastern side of the Project Site.

Stormwater runoff from the undeveloped portion of the Project Site flows overland, across the grass and broken bituminous concrete surface, from southeast to northwest, towards a low area (approximate elevation 13.7). A distinct point of discharge is not indicated on the

plan, however it appears that runoff would eventually leave the Project Site at the northwest corner, after puddling in the low area, and flow onto the site of the MBTA's JFK/UMass station to the north.

A separate 12-inch drain line along the eastern property line of the Project Site collects runoff from the Access Road and carries it in a southerly direction away from the Project Site.

The existing storm drainage system is illustrated in Figure 5.1-1.

5.4.2 Proposed Storm Drainage System

The Project will require the relocation of portions of the existing pipe network. The pipes will be rerouted around the Project Site and through the new "Main Street" to be constructed down the center of the Project Site before eventually connecting into the existing 36-inch diameter pipe in the Access Road. Runoff from the existing supermarket parking area and ground surface areas of the Project Site will be collected into a network of deep sump catch basins, drain manholes and pipes. The runoff will be treated in a particle separator prior to leaving the Project Site.

"Clean" runoff from the roofs of the East and West Buildings to be constructed at the Project Site will be collected and discharged into subsurface infiltration basins. This system will likely be located beneath the courtyard area of the East Building. The infiltration basins will be appropriately sized according to the MassDEP's Stormwater Management Standards to recharge runoff to the aquifer and provide no net increase of peak rate of runoff volume for development from the Project Site. An over flow from the basins will connect into the proposed pipe network to convey runoff generated from large storm events. Any required closed drainage systems required at the Project Site will be designed so there will be no increase in the peak rate of stormwater discharge from the Project compared to the existing condition.

The entire proposed Stormwater Management System will be designed to meet or exceed the MassDEP's Stormwater Management Standards for Water Quality and will utilize Low Impact Development (LID) techniques such as vegetated swales, rain gardens, and bio-retention areas, wherever practical.

All improvements and connections to BSWC infrastructure will be reviewed as part of the BWSC's Site Plan Review process. This process includes a comprehensive design review of the proposed service connections, assessment of Project demands and system capacity.

5.5 Water Quality Impact

The Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch

basins will be protected with filter fabric, hay bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until all areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

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

5.5.1 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 Section 40 of MGL Chapter 131.

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. 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 must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

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

Standard #3: *Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.*

Compliance: The Project will meet this standard to the maximum extent practicable. The Project will at a minimum comply with the requirement to recharge ½-inch of stormwater over the entire new impervious area of the site for mitigation of groundwater recharge.

Standard #4: *For new development, stormwater management systems must be designed to remove 80% of the annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when: Suitable nonstructural practices for source control and pollution prevention are implemented; Stormwater BMPs are sized to capture the prescribed runoff volume; and stormwater management BMPs are maintained as designed.*

Compliance: The proposed design will comply with this Standard. Within the Project's limit of work, there will be roof, landscaping, and pedestrian and parking areas. Any paved areas would contribute unwanted sediments or pollutants to the existing storm drain system, which 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 (MGL Chapter 21, §§ 26-53) and associated regulations (314 CMR 3.00, 314 CMR 4.00 and CMR 5.00).*

Compliance: The proposed design will comply with this standard. The Project is not considered to be a Use with Higher Potential Pollutant Loads (per the Policy, Volume I).

Standard #6: *Stormwater discharge to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public water supplies.*

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

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

Compliance: The proposed design will comply with this standard. The Project is not a redevelopment as defined by applicable regulations.

Standard #8: *Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.*

Compliance: The proposed design will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the Project and employed during construction. The Project is expected to disturb greater than one acre of land and will require filing a Notice of Intention with the EPA under its National Pollutant Discharge Elimination System (NPDES) permit program. The Project will be required to meet the requirement put forth by the 2012 NPDES Construction General Permit.

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.

5.5.2 Protection Proposed During Construction

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

5.6 Energy Systems

The Proponent will work with the appropriate utility providers in the area as the design of the Project progresses.

Section 6.0

Coordination with other Governmental Agencies

6.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

6.1 Architectural Access Board Requirements

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

6.2 Massachusetts Department of Conservation and Recreation

The Access Road, which abuts the easterly lot line of the Project Site, is under the jurisdiction of the Massachusetts Department of Conservation and Recreation. The Project entails relocating an existing curb cut on the Access Road southward, closer to the *Shaw's* supermarket. Accordingly, the Proponent will apply to DCR for the necessary construction and access permit under 302 CMR 11.06(1)(a).

6.3 Massachusetts Environmental Policy Act (MEPA)

Because the Project requires a Construction and Access Permit from DCR, the Project is subject to MEPA jurisdiction. However, the Project does not meet or exceed a MEPA review threshold and accordingly will not require MEPA review.

6.4 Massachusetts Historical Commission

The Massachusetts Historical Commission (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. The Project requires a Construction and Access Permit from DCR and therefore is subject to MHC review in compliance with Sections 27-27 of MG. Chapter 9, as amended by Chapter 254 of the Acts of 1988. MHC's review of the Project under the State Register Review process will be initiated through the filing of an MHC Project Notification Form.

6.5 Boston Civic Design Commission

The Proposed Projects 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 Large Project Review process.

6.6 Boston Parks and Recreation Commission

Pursuant to Article 29 of the Boston Zoning Code, the Proponent will submit plans for the Project to the Boston Parks and Recreation Commission at least 60 days prior to the meeting held by the BRA on the Proponent's request for a conditional use permit or a report by the Parks and Recreation Commission indicating whether it recommends project approval, denial, or modification. Independently of the Boston Zoning Code, the Proponent plans to

obtain approval of the Parks and Recreation Commission prior to erecting the East and West Buildings pursuant to City of Boston Ordinance 7-4.11, even though Morrissey Boulevard is under the jurisdiction of DCR and not the Parks and Recreation Commission.

6.7 Boston Board of Appeal

The Proposed Project requires relief from certain portions of the Boston Zoning Code, by application to the Boston Board of Appeal. Specifically, the Proponent will apply to the Board of Appeal for conditional use permits for multi-family residential use, to allow one dwelling to be located behind another on the same lot, and for development within a Greenbelt Protection Overlay District, as well as variances for maximum floor area ratio and maximum building height.

6.8 Boston Inspectional Services Department

The Proponent will obtain all necessary permits for the Project from the Boston Inspectional Services Department, consistent with the Boston Zoning Code and the State Building Code.

6.9 Boston Transportation Department

As part of Large Project Review under Article 80 of the Boston Zoning Code, the Proponent will prepare and submit a Transportation Access Plan Agreement for execution by the Proponent and the Boston Transportation Department. In addition, a Construction Management Plan (CMP) will be prepared for review by BTD and other City of Boston agencies.

Section 7.0

Project Certification

7.0 PROJECT CERTIFICATION

This form has been submitted to the Boston Redevelopment Authority as required by the Boston Zoning Code, Article 80.

Signature of Proponent's Representative

David Greaney
Manager

Morrissey Holdings LLC
c/o Synergy Investments
100 Franklin Street
Boston, MA. 02110

11/12/12
Date

Signature of Preparer

Laura Rome
Principal

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

11/15/2012
Date

Transportation Appendix

TRANSPORTATION APPENDIX

Traffic Counts (ATRs and TMCs)
Trip Generation and Mode Share
Synchro Reports
- 2012 Existing Condition (AM, PM and Saturday)
- 2017 No Build Condition (AM, PM and Saturday)
- 2017 Build Condition (AM, PM and Saturday)

TRAFFIC COUNTS (ATRs and TMCs)

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Cars - Trucks

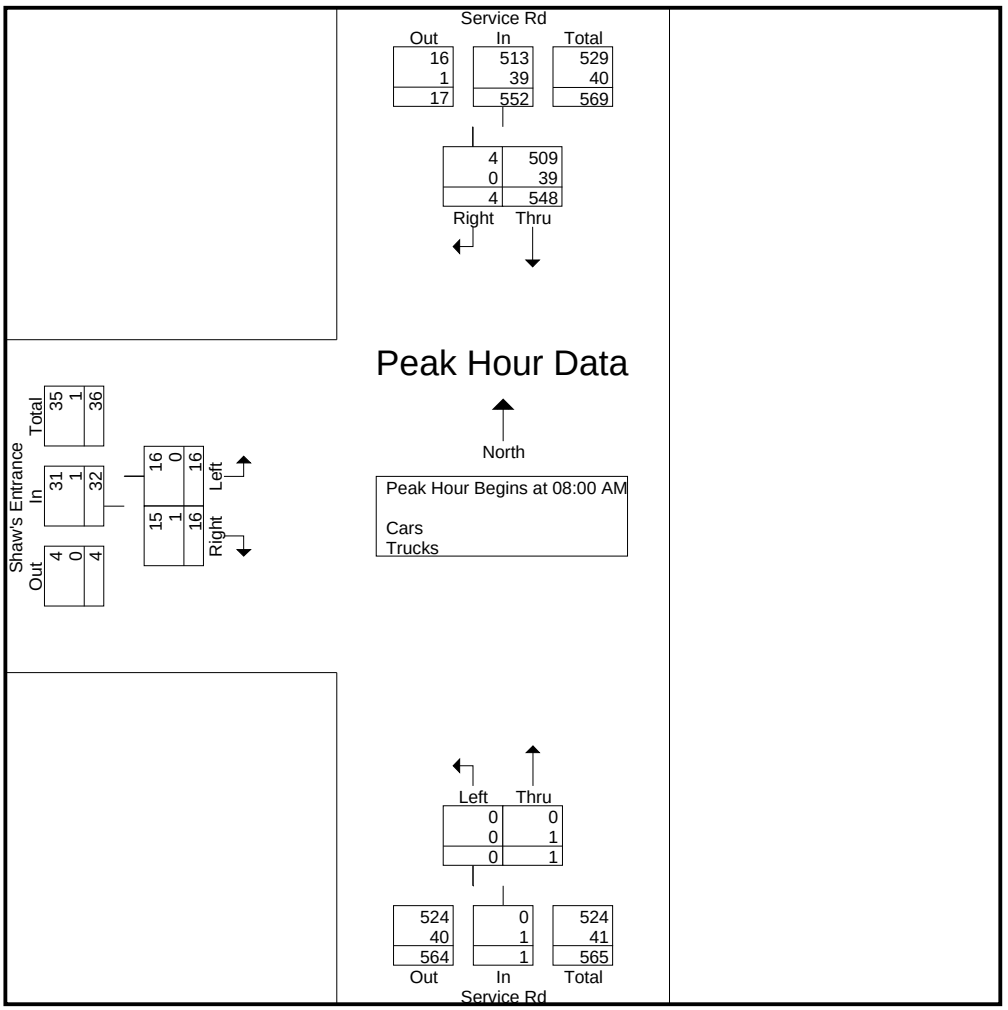
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	99	0	0	1	4	2	106
07:15 AM	142	0	0	1	1	6	150
07:30 AM	150	1	0	1	2	5	159
07:45 AM	115	1	0	1	1	0	118
Total	506	2	0	4	8	13	533
08:00 AM	122	1	0	1	4	5	133
08:15 AM	132	2	0	0	4	3	141
08:30 AM	168	0	0	0	1	1	170
08:45 AM	126	1	0	0	7	7	141
Total	548	4	0	1	16	16	585
Grand Total	1054	6	0	5	24	29	1118
Apprch %	99.4	0.6	0	100	45.3	54.7	
Total %	94.3	0.5	0	0.4	2.1	2.6	
Cars	987	6	0	3	24	28	1048
% Cars	93.6	100	0	60	100	96.6	93.7
Trucks	67	0	0	2	0	1	70
% Trucks	6.4	0	0	40	0	3.4	6.3

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	122	1	123	0	**1**	**1**	4	5	9	133
08:15 AM	132	**2**	134	0	0	0	4	3	7	141
08:30 AM	**168**	0	**168**	0	0	0	1	1	2	**170**
08:45 AM	126	1	127	0	0	0	**7**	**7**	**14**	141
Total Volume	548	4	552	0	1	1	16	16	32	585
% App. Total	99.3	0.7		0	100		50	50		
PHF	.815	.500	.821	.000	.250	.250	.571	.571	.571	.860
Cars	509	4	513	0	0	0	16	15	31	544
% Cars	92.9	100	92.9	0	0	0	100	93.8	96.9	93.0
Trucks	39	0	39	0	1	1	0	1	1	41
% Trucks	7.1	0	7.1	0	100	100	0	6.3	3.1	7.0

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



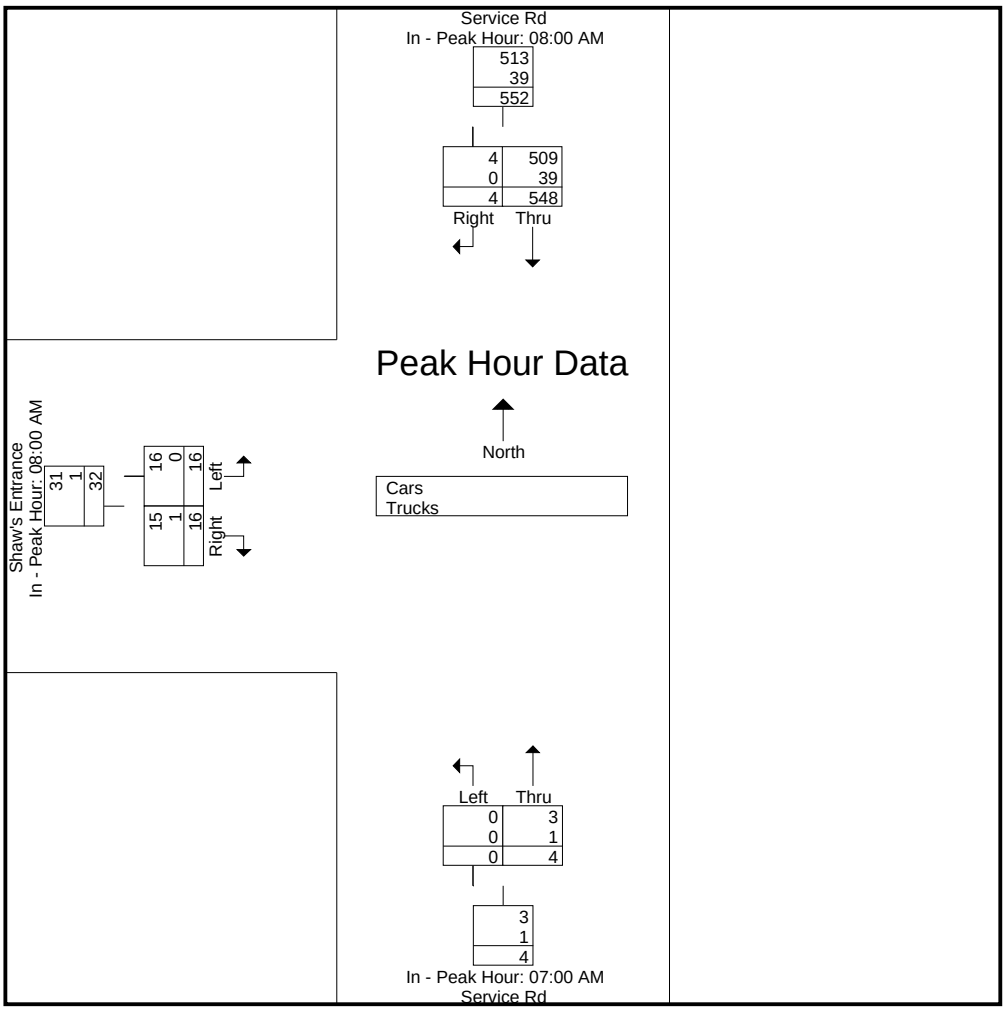
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:00 AM			08:00 AM		
+0 mins.	122	1	123	0	**1**	**1**	4	5	9
+15 mins.	132	**2**	134	0	1	1	4	3	7
+30 mins.	**168**	0	**168**	0	1	1	1	1	2
+45 mins.	126	1	127	0	1	1	**7**	**7**	**14**
Total Volume	548	4	552	0	4	4	16	16	32
% App. Total	99.3	0.7		0	100		50	50	
PHF	.815	.500	.821	.000	1.000	1.000	.571	.571	.571
Cars	509	4	513	0	3	3	16	15	31
% Cars	92.9	100	92.9	0	75	75	100	93.8	96.9
Trucks	39	0	39	0	1	1	0	1	1
% Trucks	7.1	0	7.1	0	25	25	0	6.2	3.1

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Cars

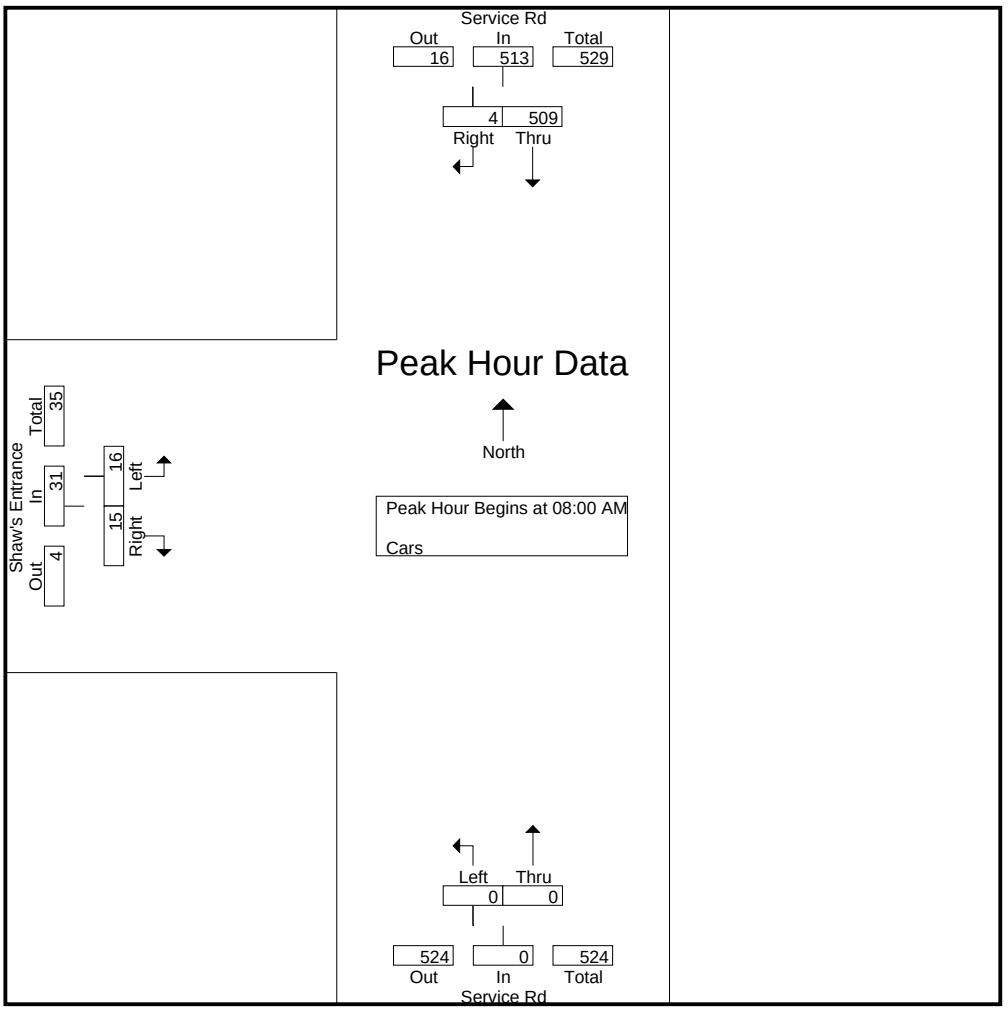
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	95	0	0	1	4	2	102
07:15 AM	133	0	0	1	1	6	141
07:30 AM	141	1	0	0	2	5	149
07:45 AM	109	1	0	1	1	0	112
Total	478	2	0	3	8	13	504
08:00 AM	113	1	0	0	4	4	122
08:15 AM	121	2	0	0	4	3	130
08:30 AM	159	0	0	0	1	1	161
08:45 AM	116	1	0	0	7	7	131
Total	509	4	0	0	16	15	544
Grand Total	987	6	0	3	24	28	1048
Apprch %	99.4	0.6	0	100	46.2	53.8	
Total %	94.2	0.6	0	0.3	2.3	2.7	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	113	1	114	0	0	0	4	4	8	122
08:15 AM	121	**2**	123	0	0	0	4	3	7	130
08:30 AM	**159**	0	**159**	0	0	0	1	1	2	**161**
08:45 AM	116	1	117	0	0	0	**7**	**7**	**14**	131
Total Volume	509	4	513	0	0	0	16	15	31	544
% App. Total	99.2	0.8		0	0		51.6	48.4		
PHF	.800	.500	.807	.000	.000	.000	.571	.536	.554	.845

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



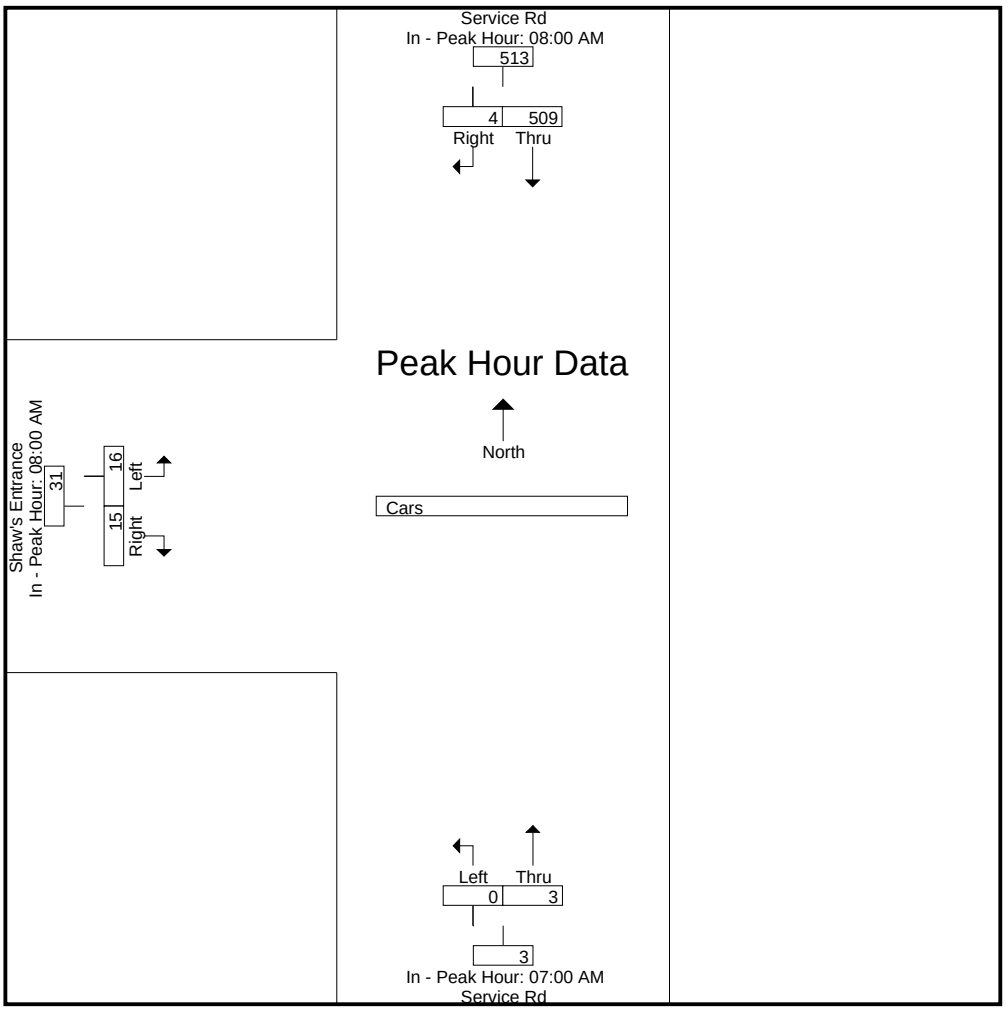
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:00 AM			08:00 AM		
+0 mins.	113	1	114	0	**1**	**1**	4	4	8
+15 mins.	121	**2**	123	0	1	1	4	3	7
+30 mins.	**159**	0	**159**	0	0	0	1	1	2
+45 mins.	116	1	117	0	1	1	**7**	**7**	**14**
Total Volume	509	4	513	0	3	3	16	15	31
% App. Total	99.2	0.8		0	100		51.6	48.4	
PHF	.800	.500	.807	.000	.750	.750	.571	.536	.554

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Trucks

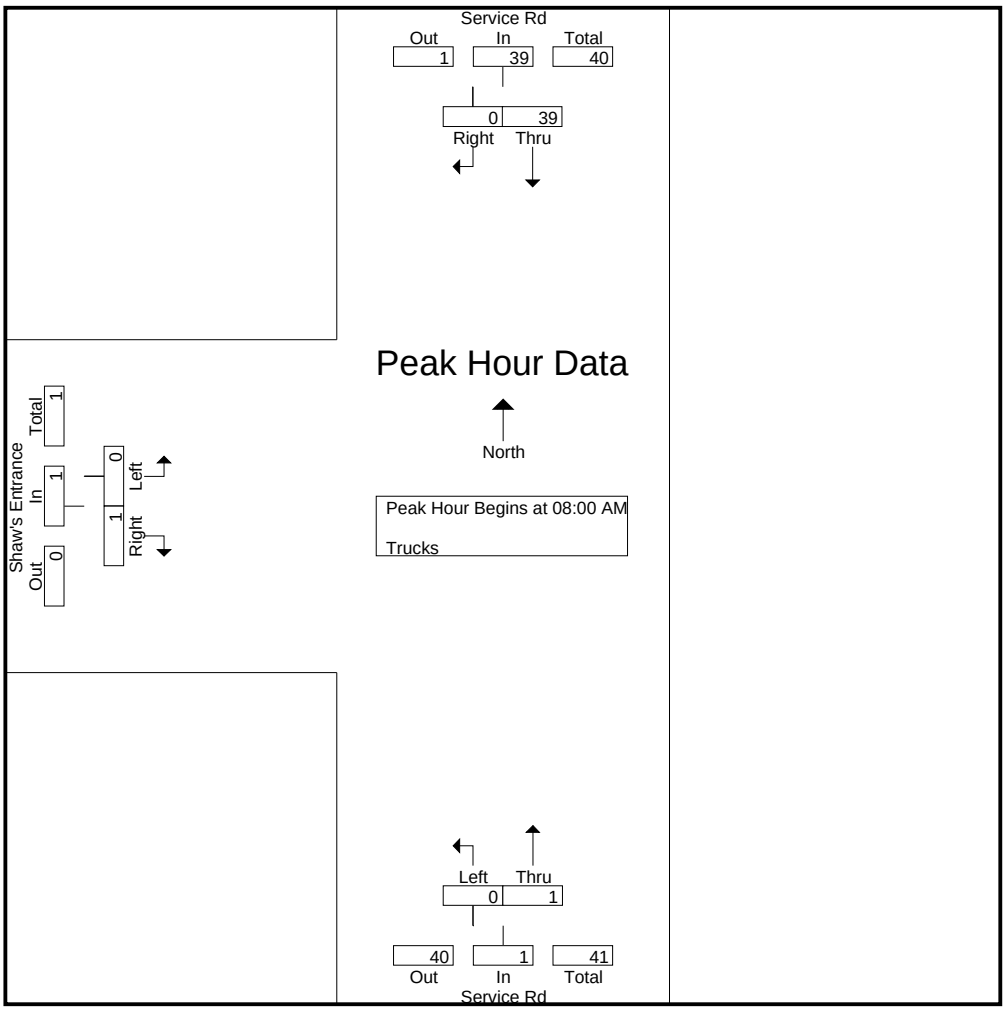
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
07:00 AM	4	0	0	0	0	0	4
07:15 AM	9	0	0	0	0	0	9
07:30 AM	9	0	0	1	0	0	10
07:45 AM	6	0	0	0	0	0	6
Total	28	0	0	1	0	0	29
08:00 AM	9	0	0	1	0	1	11
08:15 AM	11	0	0	0	0	0	11
08:30 AM	9	0	0	0	0	0	9
08:45 AM	10	0	0	0	0	0	10
Total	39	0	0	1	0	1	41
Grand Total	67	0	0	2	0	1	70
Apprch %	100	0	0	100	0	100	
Total %	95.7	0	0	2.9	0	1.4	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	9	0	9	0	**1**	**1**	0	**1**	**1**	**11**
08:15 AM	**11**	0	**11**	0	0	0	0	0	0	11
08:30 AM	9	0	9	0	0	0	0	0	0	9
08:45 AM	10	0	10	0	0	0	0	0	0	10
Total Volume	39	0	39	0	1	1	0	1	1	41
% App. Total	100	0		0	100		0	100		
PHF	.886	.000	.886	.000	.250	.250	.000	.250	.250	.932

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

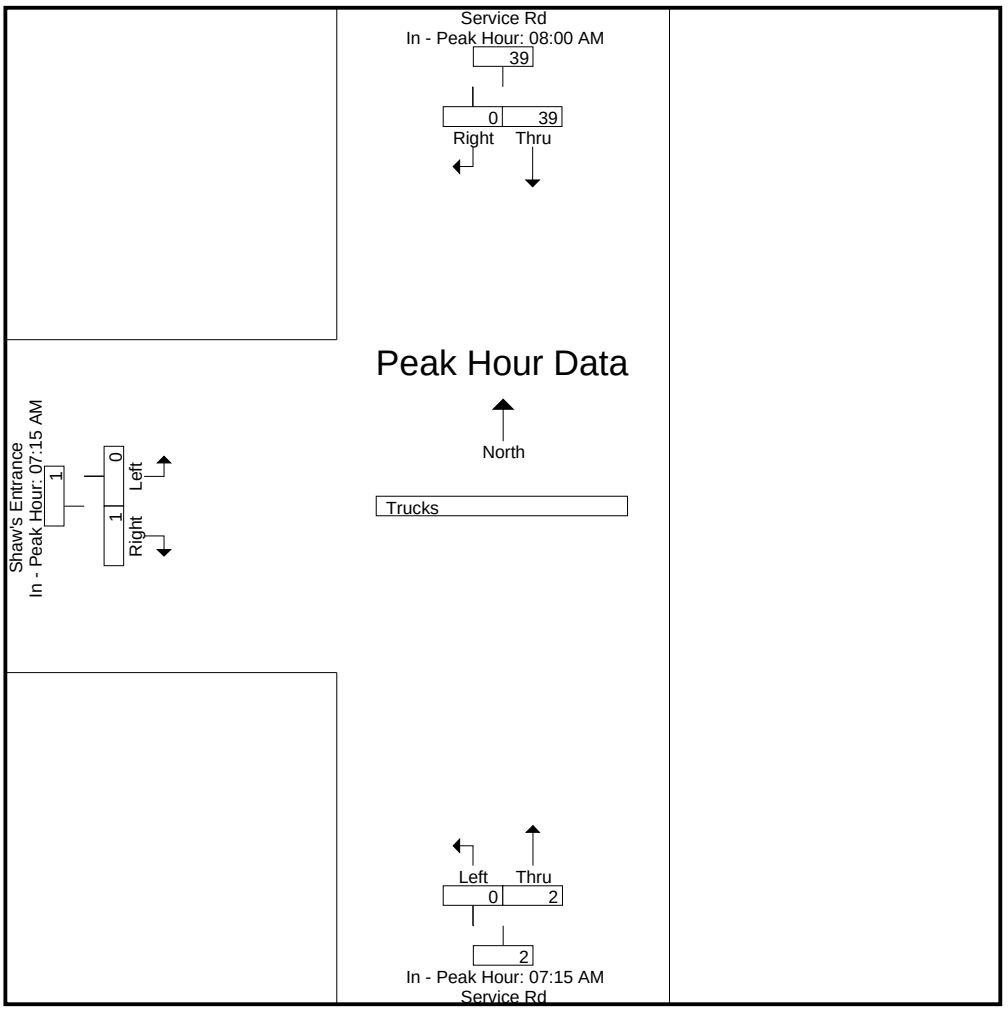
Peak Hour for Each Approach Begins at:

	08:00 AM			07:15 AM			07:15 AM		
+0 mins.	9	0	9	0	0	0	0	0	0
+15 mins.	**11**	0	**11**	0	**1**	**1**	0	0	0
+30 mins.	9	0	9	0	0	0	0	0	0
+45 mins.	10	0	10	0	1	1	0	**1**	**1**
Total Volume	39	0	39	0	2	2	0	1	1
% App. Total	100	0		0	100		0	100	
PHF	.886	.000	.886	.000	.500	.500	.000	.250	.250

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Bikes Peds

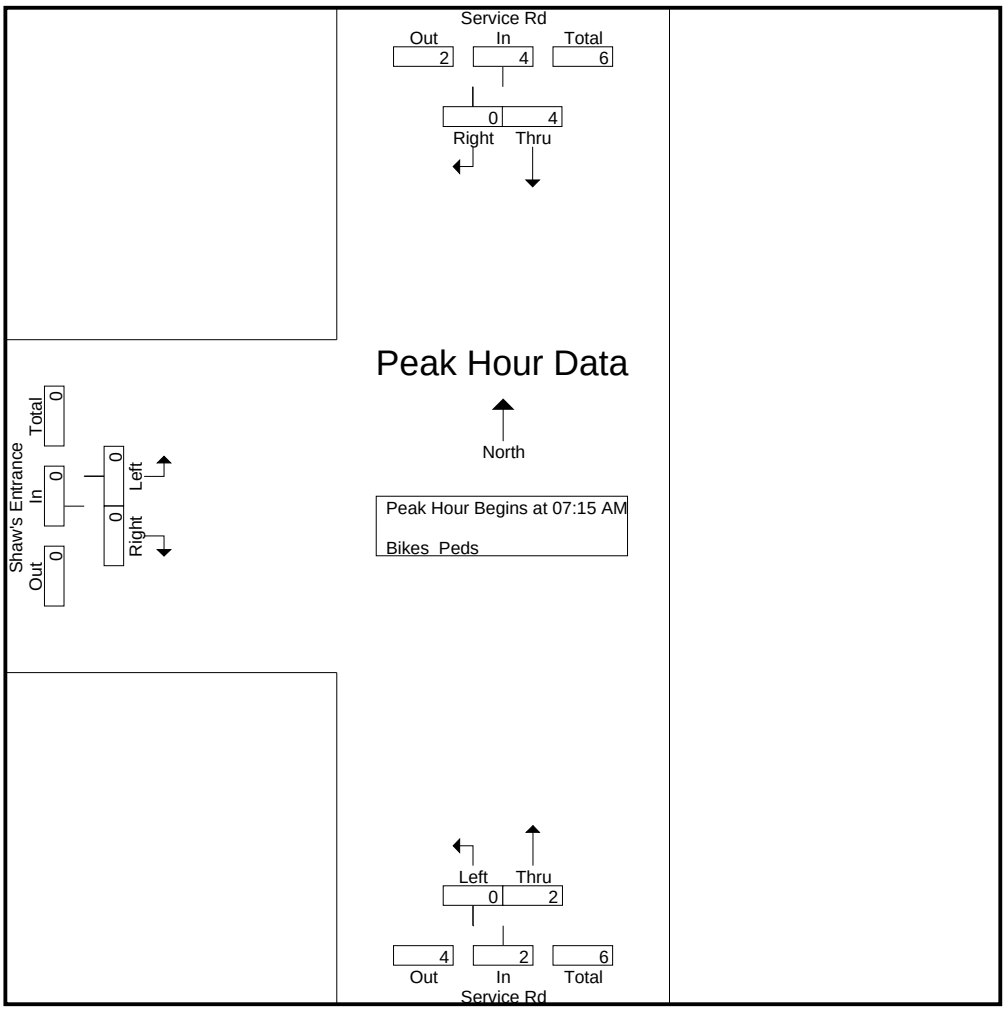
	Service Rd From North			Service Rd From South			Shaw's Entrance From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	27	27	0	27
07:15 AM	2	0	0	0	0	0	0	0	92	92	2	94
07:30 AM	2	0	0	0	0	0	0	0	202	202	2	204
07:45 AM	0	0	0	0	0	0	0	0	131	131	0	131
Total	4	0	0	0	0	0	0	0	452	452	4	456
08:00 AM	0	0	0	0	2	0	0	0	101	101	2	103
08:15 AM	1	0	0	0	1	0	0	0	20	20	2	22
08:30 AM	0	0	0	0	0	0	0	0	14	14	0	14
08:45 AM	1	0	0	0	0	0	0	0	16	16	1	17
Total	2	0	0	0	3	0	0	0	151	151	5	156
Grand Total	6	0	0	0	3	0	0	0	603	603	9	612
Apprch %	100	0		0	100		0	0				
Total %	66.7	0		0	33.3		0	0		98.5	1.5	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	**2**	0	**2**	0	0	0	0	0	0	**2**
07:30 AM	2	0	2	0	0	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	**2**	**2**	0	0	0	2
Total Volume	4	0	4	0	2	2	0	0	0	6
% App. Total	100	0		0	100		0	0		
PHF	.500	.000	.500	.000	.250	.250	.000	.000	.000	.750

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



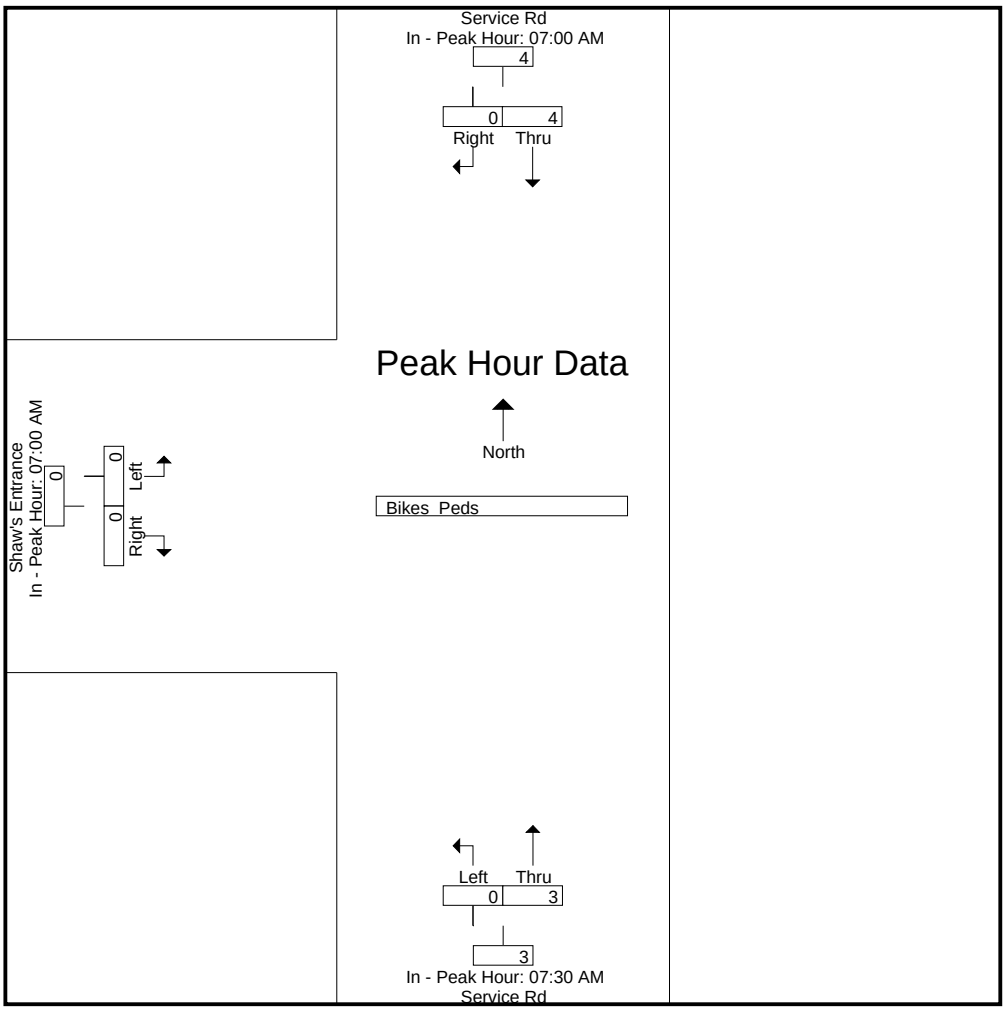
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:30 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	**2**	0	**2**	0	0	0	0	0	0
+30 mins.	2	0	2	0	**2**	**2**	0	0	0
+45 mins.	0	0	0	0	1	1	0	0	0
Total Volume	4	0	4	0	3	3	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.500	.000	.500	.000	.375	.375	.000	.000	.000

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Cars - Trucks

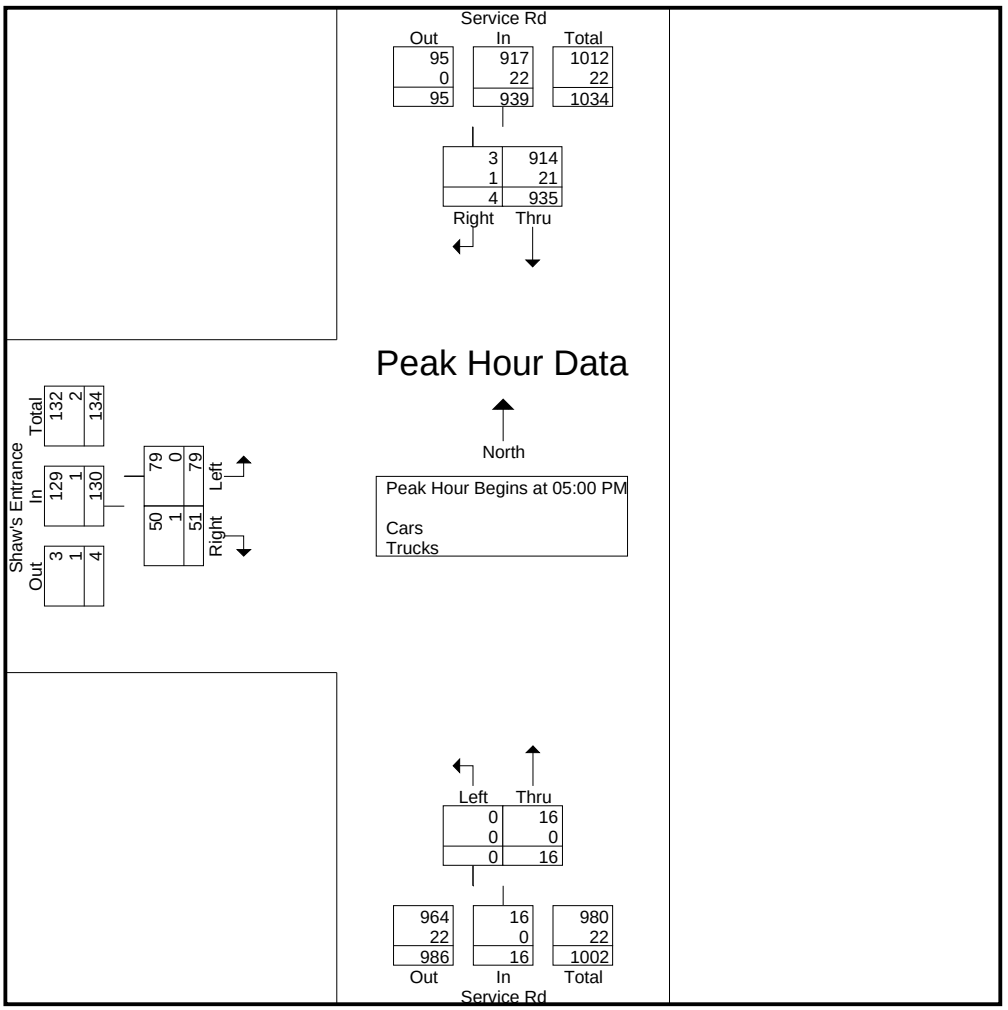
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	169	0	0	0	17	7	193
04:15 PM	265	2	0	0	29	9	305
04:30 PM	228	4	0	1	16	9	258
04:45 PM	202	1	0	0	20	16	239
Total	864	7	0	1	82	41	995
05:00 PM	221	2	0	3	15	17	258
05:15 PM	212	0	0	8	18	7	245
05:30 PM	268	1	0	4	27	14	314
05:45 PM	234	1	0	1	19	13	268
Total	935	4	0	16	79	51	1085
Grand Total	1799	11	0	17	161	92	2080
Apprch %	99.4	0.6	0	100	63.6	36.4	
Total %	86.5	0.5	0	0.8	7.7	4.4	
Cars	1752	9	0	17	160	91	2029
% Cars	97.4	81.8	0	100	99.4	98.9	97.5
Trucks	47	2	0	0	1	1	51
% Trucks	2.6	18.2	0	0	0.6	1.1	2.5

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	221	**2**	223	0	3	3	15	**17**	32	258
05:15 PM	212	0	212	0	**8**	**8**	18	7	25	245
05:30 PM	**268**	1	**269**	0	4	4	**27**	14	**41**	**314**
05:45 PM	234	1	235	0	1	1	19	13	32	268
Total Volume	935	4	939	0	16	16	79	51	130	1085
% App. Total	99.6	0.4		0	100		60.8	39.2		
PHF	.872	.500	.873	.000	.500	.500	.731	.750	.793	.864
Cars	914	3	917	0	16	16	79	50	129	1062
% Cars	97.8	75.0	97.7	0	100	100	100	98.0	99.2	97.9
Trucks	21	1	22	0	0	0	0	1	1	23
% Trucks	2.2	25.0	2.3	0	0	0	0	2.0	0.8	2.1

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



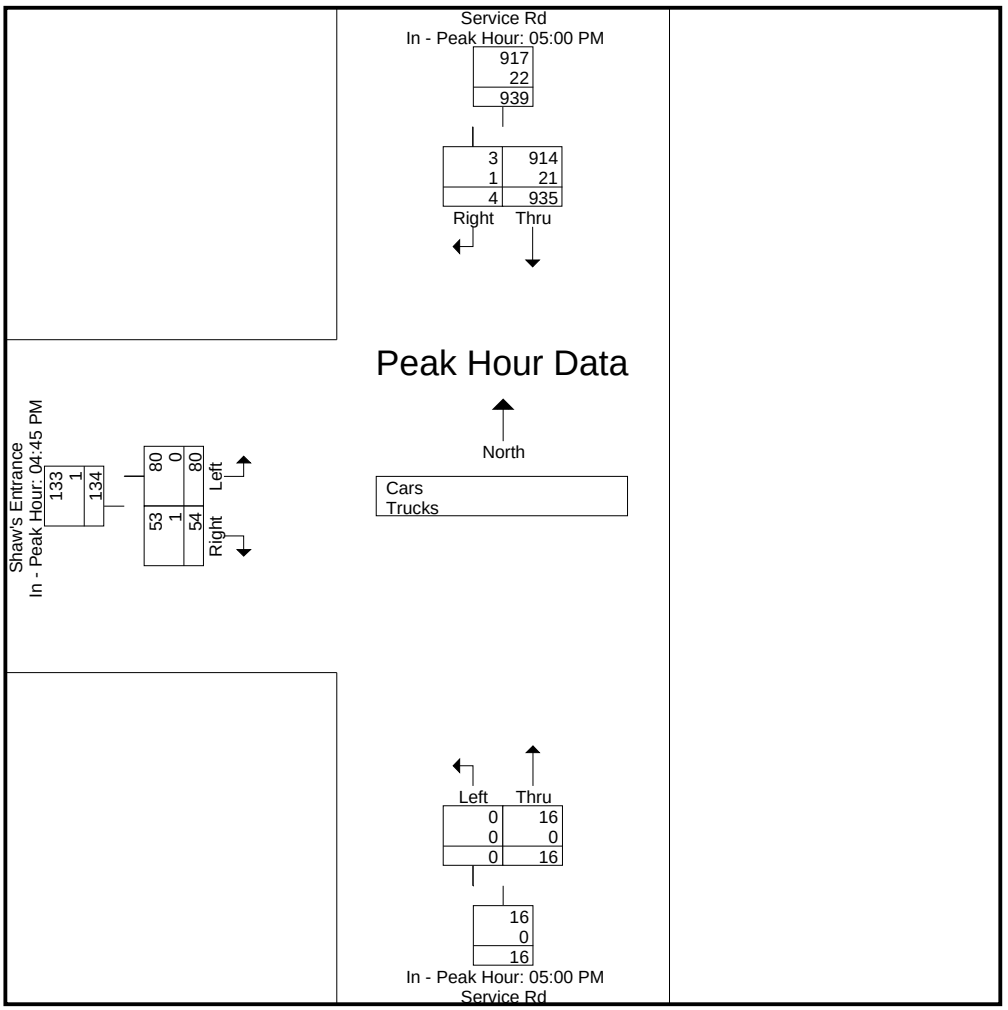
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			04:45 PM		
+0 mins.	221	**2**	223	0	3	3	20	16	36
+15 mins.	212	0	212	0	**8**	**8**	15	**17**	32
+30 mins.	**268**	1	**269**	0	4	4	18	7	25
+45 mins.	234	1	235	0	1	1	**27**	14	**41**
Total Volume	935	4	939	0	16	16	80	54	134
% App. Total	99.6	0.4		0	100		59.7	40.3	
PHF	.872	.500	.873	.000	.500	.500	.741	.794	.817
Cars	914	3	917	0	16	16	80	53	133
% Cars	97.8	75	97.7	0	100	100	100	98.1	99.3
Trucks	21	1	22	0	0	0	0	1	1
% Trucks	2.2	25	2.3	0	0	0	0	1.9	0.7

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Cars

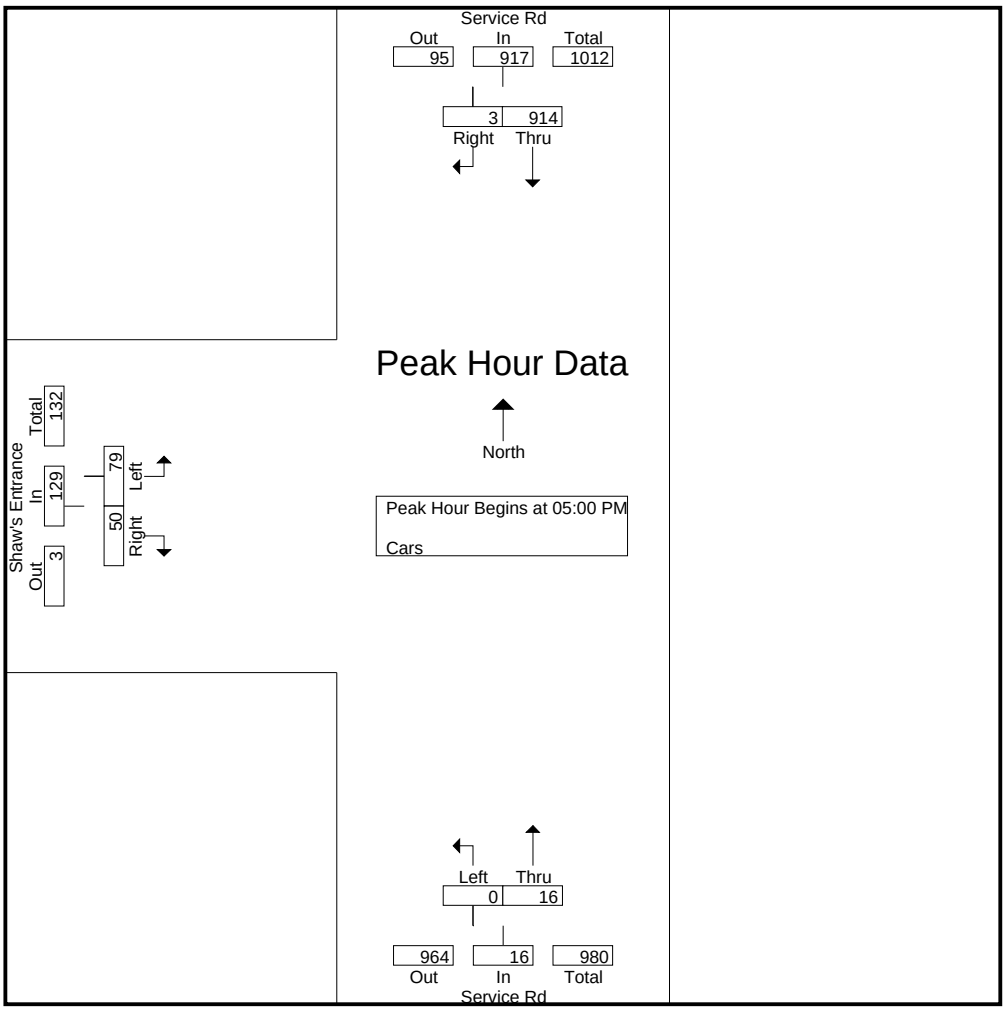
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	163	0	0	0	17	7	187
04:15 PM	260	1	0	0	29	9	299
04:30 PM	222	4	0	1	15	9	251
04:45 PM	193	1	0	0	20	16	230
Total	838	6	0	1	81	41	967
05:00 PM	213	2	0	3	15	16	249
05:15 PM	207	0	0	8	18	7	240
05:30 PM	265	0	0	4	27	14	310
05:45 PM	229	1	0	1	19	13	263
Total	914	3	0	16	79	50	1062
Grand Total	1752	9	0	17	160	91	2029
Apprch %	99.5	0.5	0	100	63.7	36.3	
Total %	86.3	0.4	0	0.8	7.9	4.5	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	213	**2**	215	0	3	3	15	**16**	31	249
05:15 PM	207	0	207	0	**8**	**8**	18	7	25	240
05:30 PM	**265**	0	**265**	0	4	4	**27**	14	**41**	**310**
05:45 PM	229	1	230	0	1	1	19	13	32	263
Total Volume	914	3	917	0	16	16	79	50	129	1062
% App. Total	99.7	0.3		0	100		61.2	38.8		
PHF	.862	.375	.865	.000	.500	.500	.731	.781	.787	.856

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



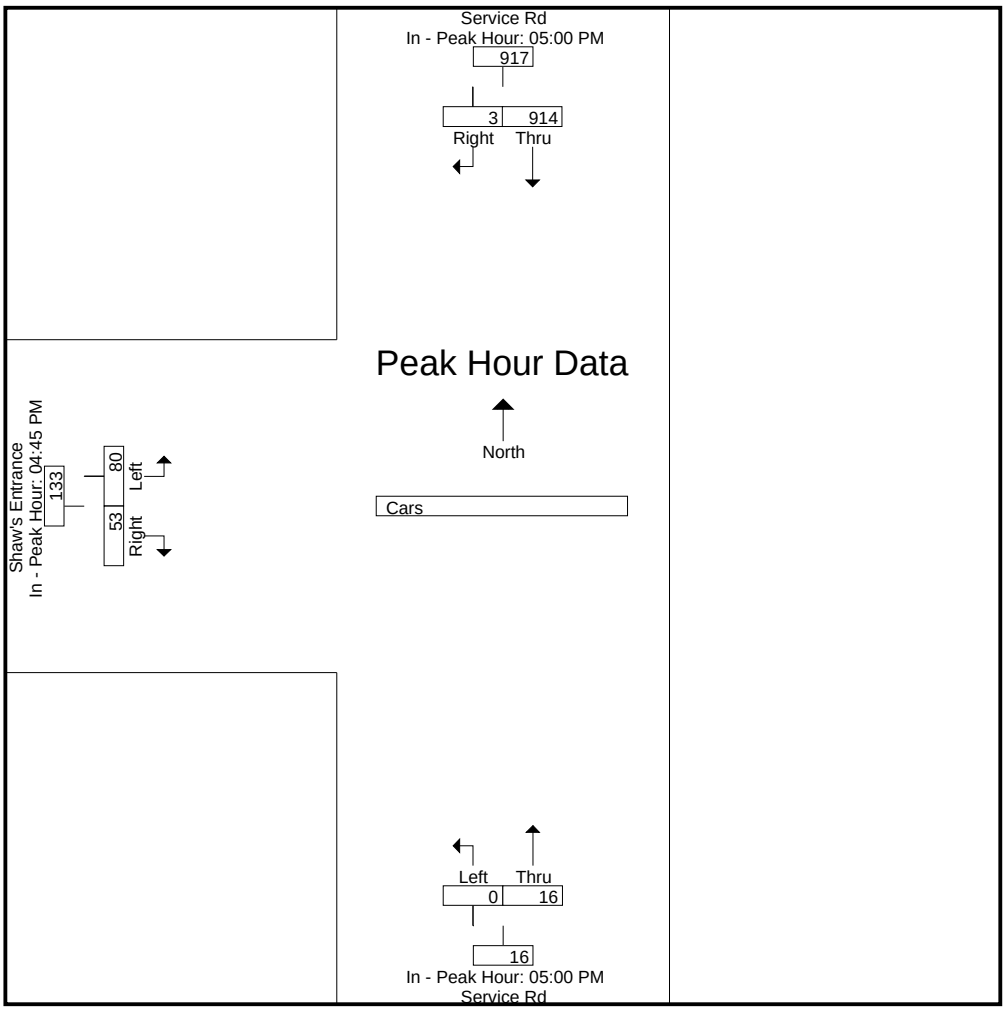
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			04:45 PM		
+0 mins.	213	**2**	215	0	3	3	20	**16**	36
+15 mins.	207	0	207	0	**8**	**8**	15	16	31
+30 mins.	**265**	0	**265**	0	4	4	18	7	25
+45 mins.	229	1	230	0	1	1	**27**	14	**41**
Total Volume	914	3	917	0	16	16	80	53	133
% App. Total	99.7	0.3		0	100		60.2	39.8	
PHF	.862	.375	.865	.000	.500	.500	.741	.828	.811

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Trucks

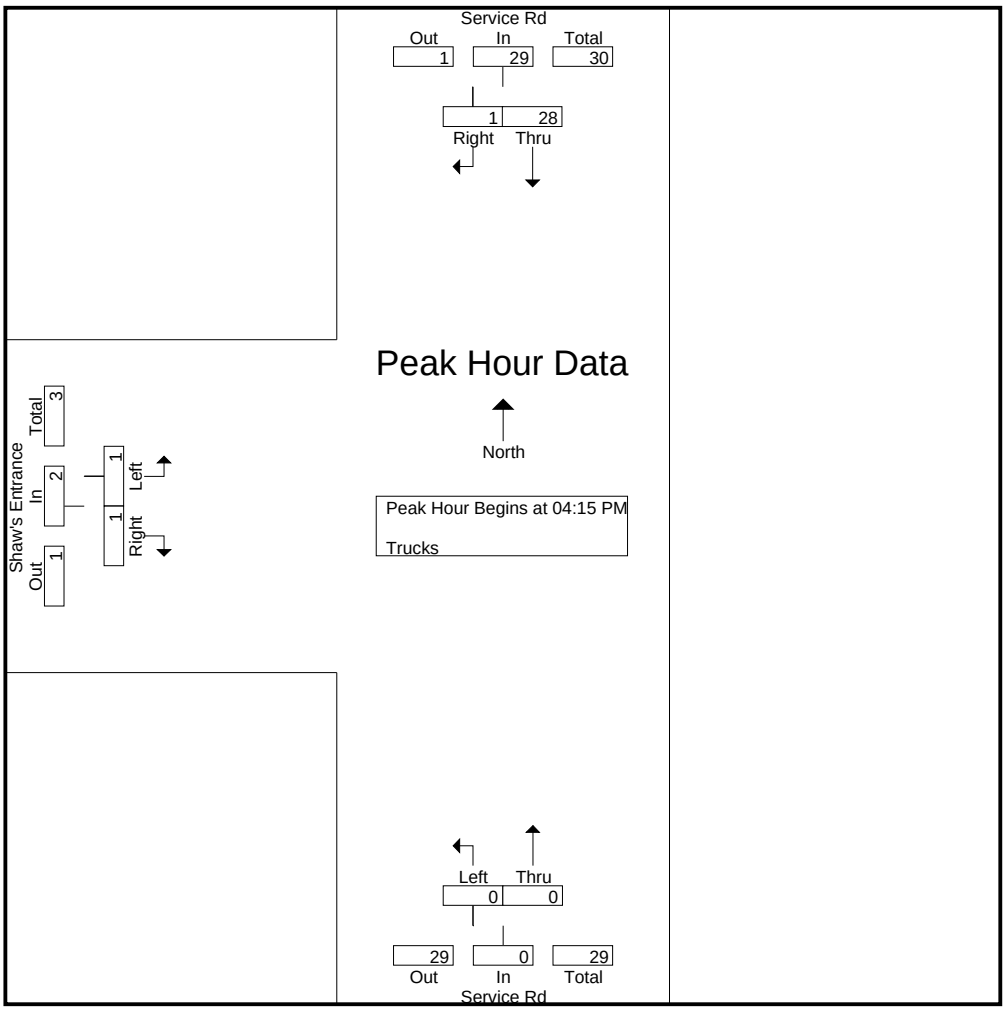
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
04:00 PM	6	0	0	0	0	0	6
04:15 PM	5	1	0	0	0	0	6
04:30 PM	6	0	0	0	1	0	7
04:45 PM	9	0	0	0	0	0	9
Total	26	1	0	0	1	0	28
05:00 PM	8	0	0	0	0	1	9
05:15 PM	5	0	0	0	0	0	5
05:30 PM	3	1	0	0	0	0	4
05:45 PM	5	0	0	0	0	0	5
Total	21	1	0	0	0	1	23
Grand Total	47	2	0	0	1	1	51
Apprch %	95.9	4.1	0	0	50	50	
Total %	92.2	3.9	0	0	2	2	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	5	**1**	6	0	0	0	0	0	0	6
04:30 PM	6	0	6	0	0	0	**1**	0	**1**	7
04:45 PM	**9**	0	**9**	0	0	0	0	0	0	**9**
05:00 PM	8	0	8	0	0	0	0	**1**	1	9
Total Volume	28	1	29	0	0	0	1	1	2	31
% App. Total	96.6	3.4		0	0		50	50		
PHF	.778	.250	.806	.000	.000	.000	.250	.250	.500	.861

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



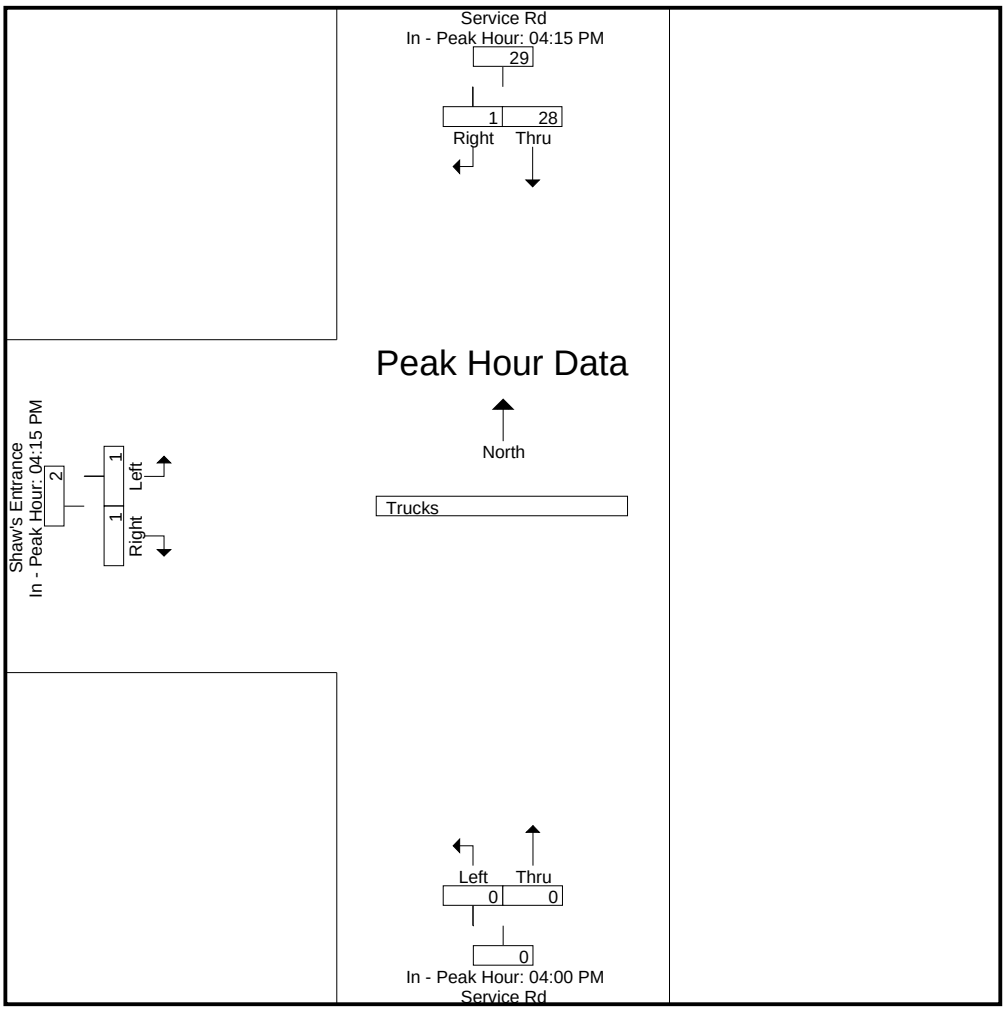
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:00 PM			04:15 PM		
+0 mins.	5	**1**	6	0	0	0	0	0	0
+15 mins.	6	0	6	0	0	0	**1**	0	**1**
+30 mins.	**9**	0	**9**	0	0	0	0	0	0
+45 mins.	8	0	8	0	0	0	0	**1**	1
Total Volume	28	1	29	0	0	0	1	1	2
% App. Total	96.6	3.4		0	0		50	50	
PHF	.778	.250	.806	.000	.000	.000	.250	.250	.500

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 1

Groups Printed- Bikes Peds

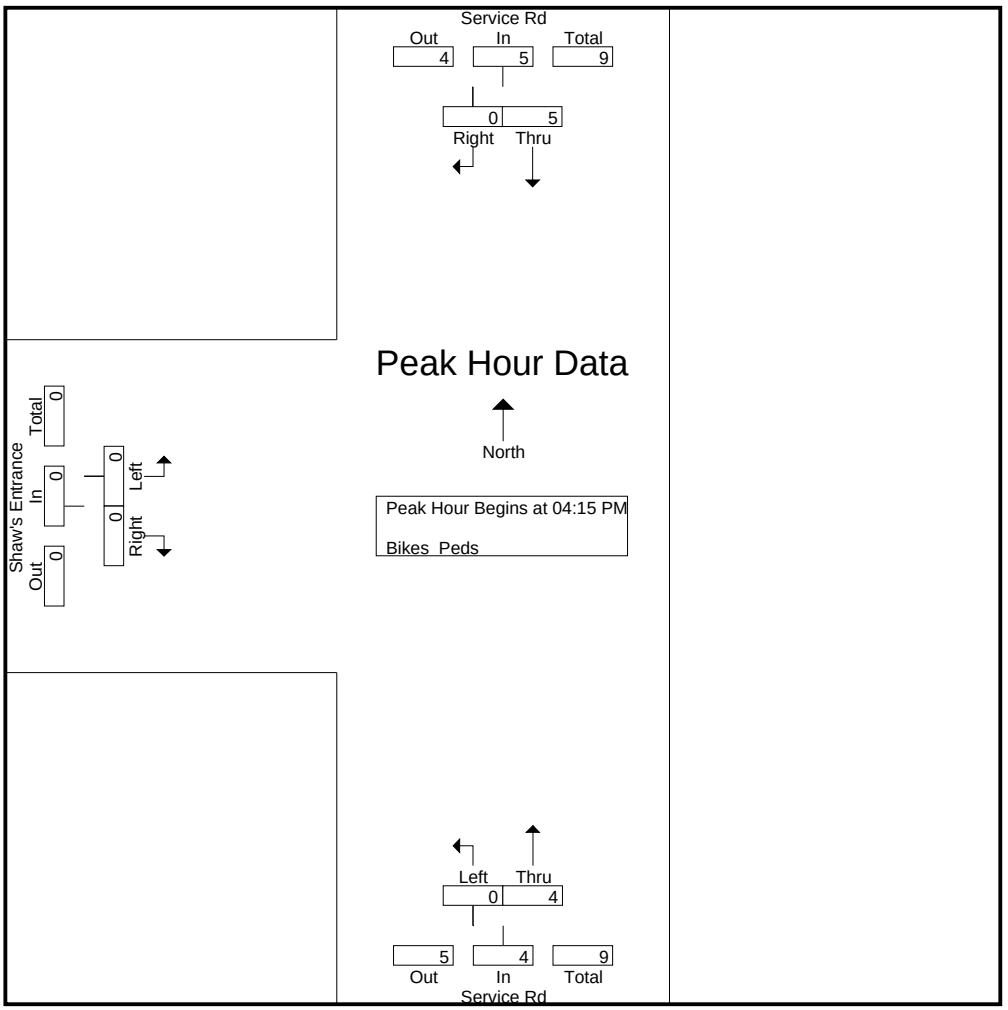
	Service Rd From North			Service Rd From South			Shaw's Entrance From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	53	53	0	53
04:15 PM	2	0	0	0	1	0	0	0	28	28	3	31
04:30 PM	1	0	0	0	1	0	0	0	30	30	2	32
04:45 PM	0	0	0	0	1	0	0	0	29	29	1	30
Total	3	0	0	0	3	0	0	0	140	140	6	146
05:00 PM	2	0	0	0	1	0	0	0	39	39	3	42
05:15 PM	1	0	0	0	2	0	0	0	40	40	3	43
05:30 PM	0	0	0	0	1	0	1	0	47	47	2	49
05:45 PM	0	0	0	0	1	0	0	0	23	23	1	24
Total	3	0	0	0	5	0	1	0	149	149	9	158
Grand Total	6	0	0	0	8	0	1	0	289	289	15	304
Apprch %	100	0		0	100		100	0				
Total %	40	0		0	53.3		6.7	0		95.1	4.9	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	**2**	0	**2**	0	**1**	**1**	0	0	0	**3**
04:30 PM	1	0	1	0	1	1	0	0	0	2
04:45 PM	0	0	0	0	1	1	0	0	0	1
05:00 PM	2	0	2	0	1	1	0	0	0	3
Total Volume	5	0	5	0	4	4	0	0	0	9
% App. Total	100	0		0	100		0	0		
PHF	.625	.000	.625	.000	1.00	1.00	.000	.000	.000	.750

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 2



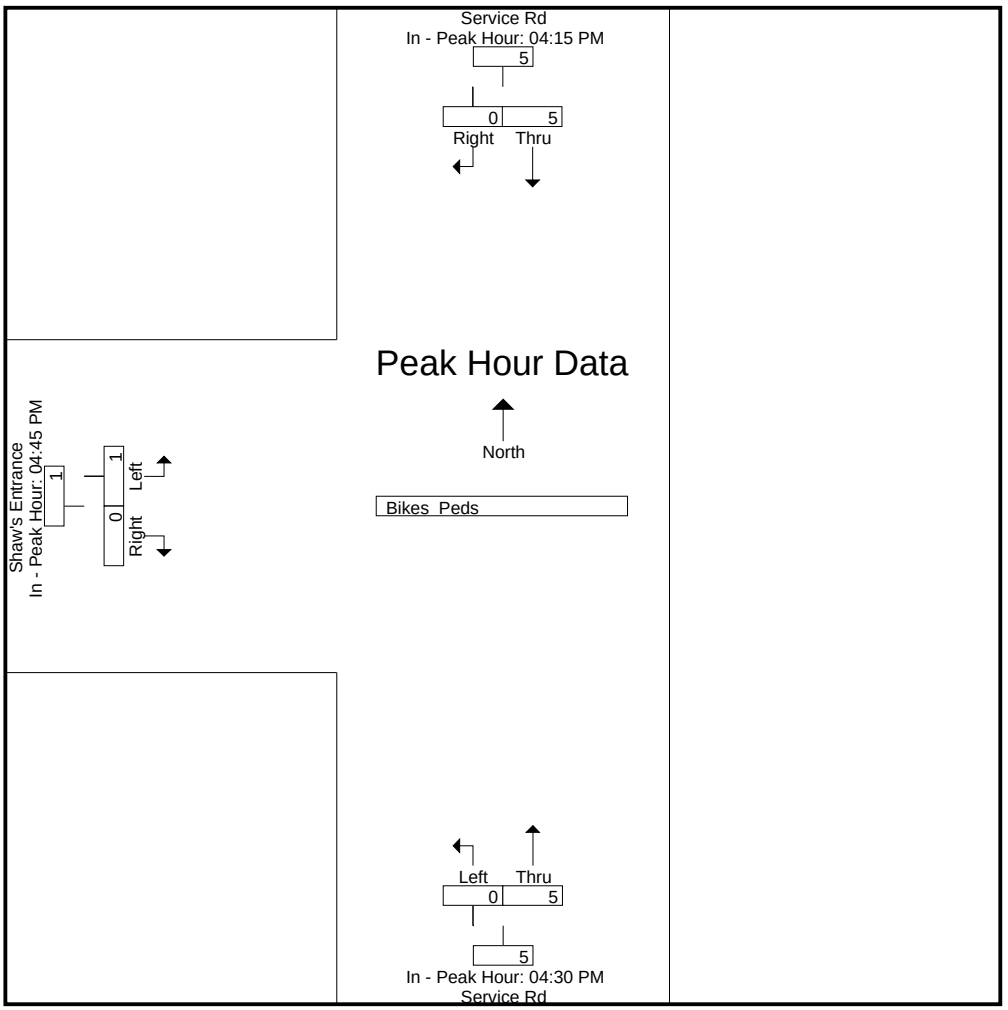
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:30 PM			04:45 PM		
+0 mins.	**2**	0	**2**	0	1	1	0	0	0
+15 mins.	1	0	1	0	1	1	0	0	0
+30 mins.	0	0	0	0	1	1	0	0	0
+45 mins.	2	0	2	0	**2**	**2**	**1**	0	**1**
Total Volume	5	0	5	0	5	5	1	0	1
% App. Total	100	0		0	100		100	0	
PHF	.625	.000	.625	.000	.625	.625	.250	.000	.250

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Cloudy

File Name : 15910001
Site Code : 15910001
Start Date : 10/16/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 1

Groups Printed- Cars - Trucks

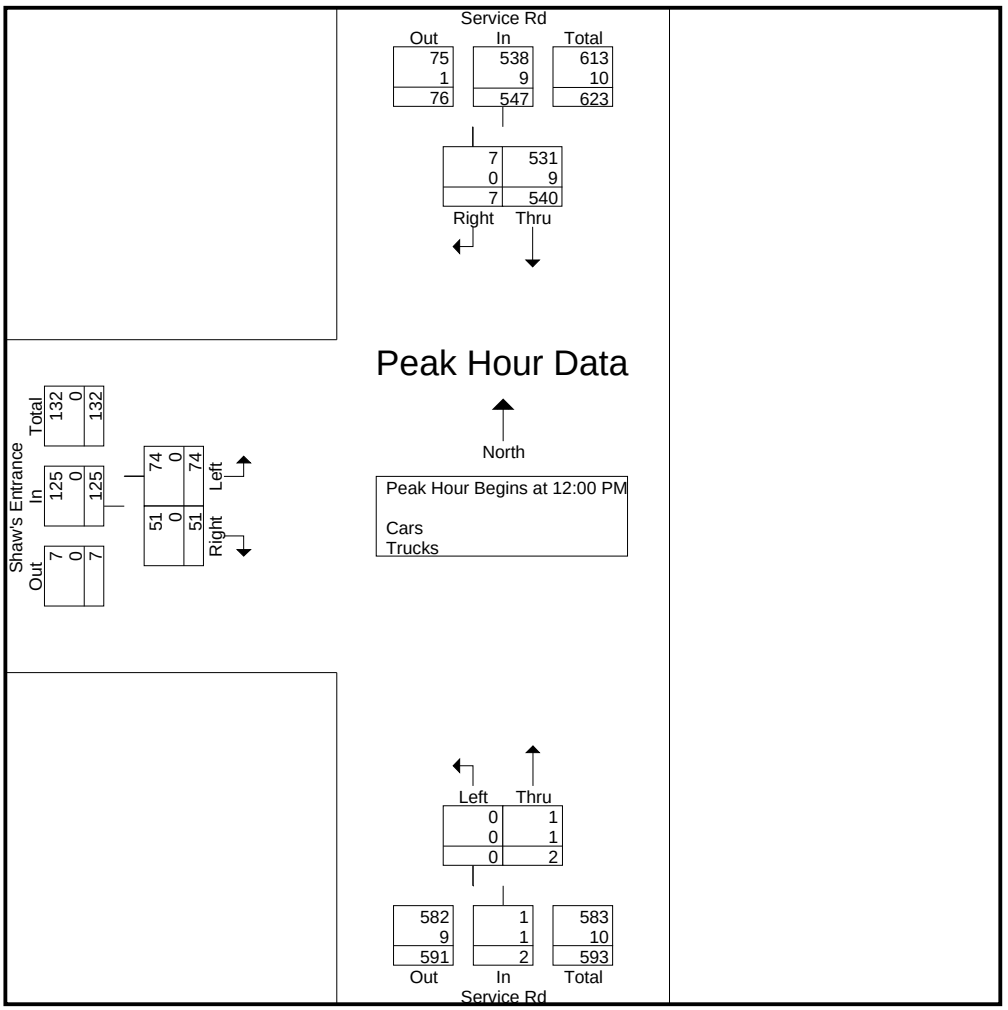
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
11:00 AM	84	0	0	0	11	8	103
11:15 AM	104	1	0	1	12	10	128
11:30 AM	120	2	0	0	11	9	142
11:45 AM	135	0	0	0	16	11	162
Total	443	3	0	1	50	38	535
12:00 PM	128	2	0	1	19	13	163
12:15 PM	150	3	0	0	20	7	180
12:30 PM	121	2	0	1	13	16	153
12:45 PM	141	0	0	0	22	15	178
Total	540	7	0	2	74	51	674
Grand Total	983	10	0	3	124	89	1209
Apprch %	99	1	0	100	58.2	41.8	
Total %	81.3	0.8	0	0.2	10.3	7.4	
Cars	970	10	0	2	124	89	1195
% Cars	98.7	100	0	66.7	100	100	98.8
Trucks	13	0	0	1	0	0	14
% Trucks	1.3	0	0	33.3	0	0	1.2

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	128	2	130	0	**1**	**1**	19	13	32	163
12:15 PM	**150**	**3**	**153**	0	0	0	20	7	27	**180**
12:30 PM	121	2	123	0	1	1	13	**16**	29	153
12:45 PM	141	0	141	0	0	0	**22**	15	**37**	178
Total Volume	540	7	547	0	2	2	74	51	125	674
% App. Total	98.7	1.3		0	100		59.2	40.8		
PHF	.900	.583	.894	.000	.500	.500	.841	.797	.845	.936
Cars	531	7	538	0	1	1	74	51	125	664
% Cars	98.3	100	98.4	0	50.0	50.0	100	100	100	98.5
Trucks	9	0	9	0	1	1	0	0	0	10
% Trucks	1.7	0	1.6	0	50.0	50.0	0	0	0	1.5

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 2



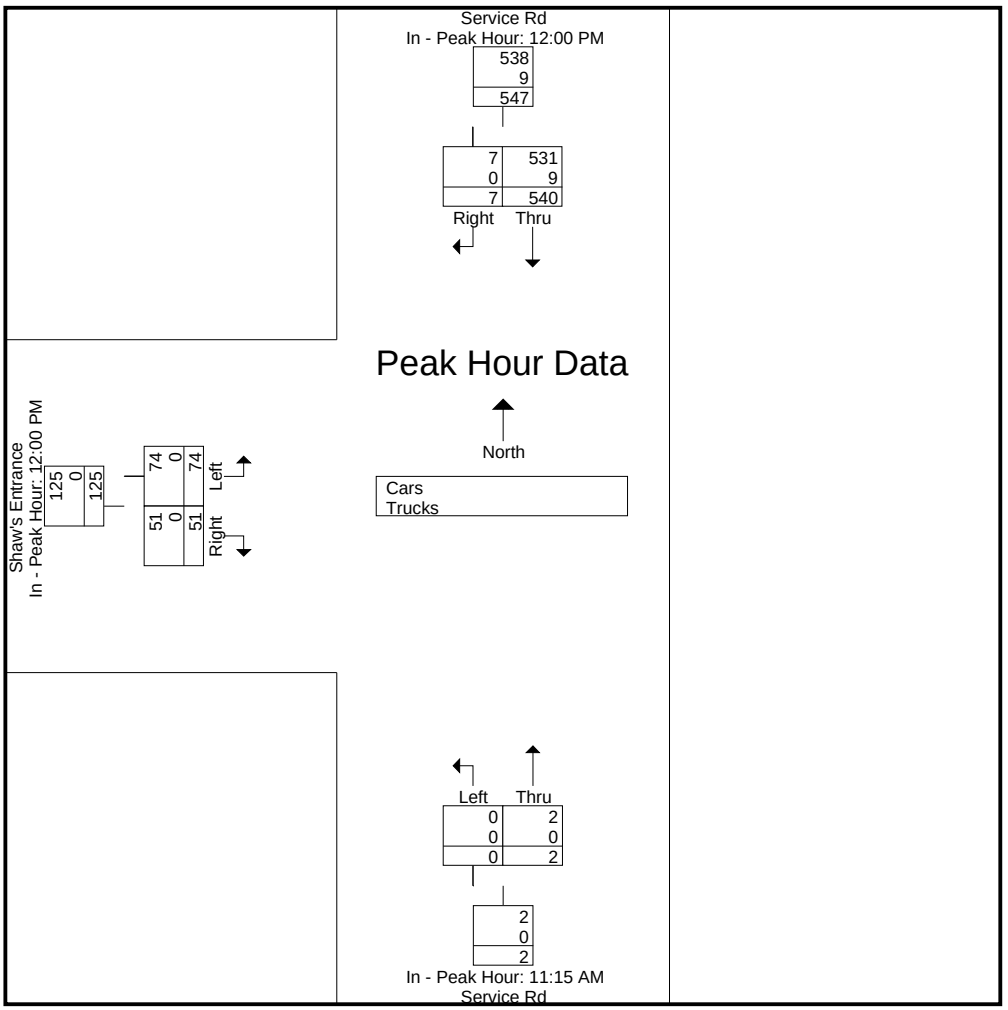
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM			11:15 AM			12:00 PM		
+0 mins.	128	2	130	0	**1**	**1**	19	13	32
+15 mins.	**150**	**3**	**153**	0	0	0	20	7	27
+30 mins.	121	2	123	0	0	0	13	**16**	29
+45 mins.	141	0	141	0	1	1	**22**	15	**37**
Total Volume	540	7	547	0	2	2	74	51	125
% App. Total	98.7	1.3		0	100		59.2	40.8	
PHF	.900	.583	.894	.000	.500	.500	.841	.797	.845
Cars	531	7	538	0	2	2	74	51	125
% Cars	98.3	100	98.4	0	100	100	100	100	100
Trucks	9	0	9	0	0	0	0	0	0
% Trucks	1.7	0	1.6	0	0	0	0	0	0

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 1

Groups Printed- Cars

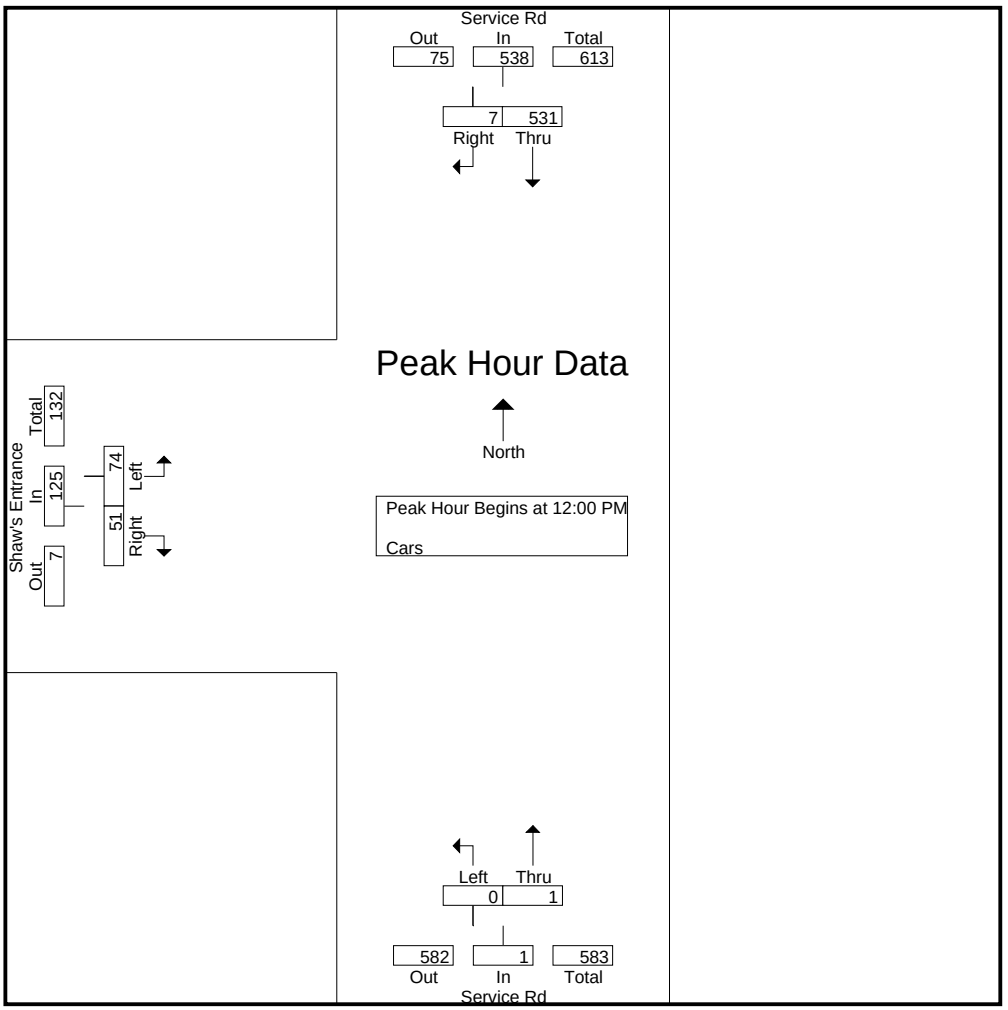
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
11:00 AM	83	0	0	0	11	8	102
11:15 AM	104	1	0	1	12	10	128
11:30 AM	118	2	0	0	11	9	140
11:45 AM	134	0	0	0	16	11	161
Total	439	3	0	1	50	38	531
12:00 PM	126	2	0	1	19	13	161
12:15 PM	149	3	0	0	20	7	179
12:30 PM	118	2	0	0	13	16	149
12:45 PM	138	0	0	0	22	15	175
Total	531	7	0	1	74	51	664
Grand Total	970	10	0	2	124	89	1195
Apprch %	99	1	0	100	58.2	41.8	
Total %	81.2	0.8	0	0.2	10.4	7.4	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	126	2	128	0	**1**	**1**	19	13	32	161
12:15 PM	**149**	**3**	**152**	0	0	0	20	7	27	**179**
12:30 PM	118	2	120	0	0	0	13	**16**	29	149
12:45 PM	138	0	138	0	0	0	**22**	15	**37**	175
Total Volume	531	7	538	0	1	1	74	51	125	664
% App. Total	98.7	1.3		0	100		59.2	40.8		
PHF	.891	.583	.885	.000	.250	.250	.841	.797	.845	.927

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 2



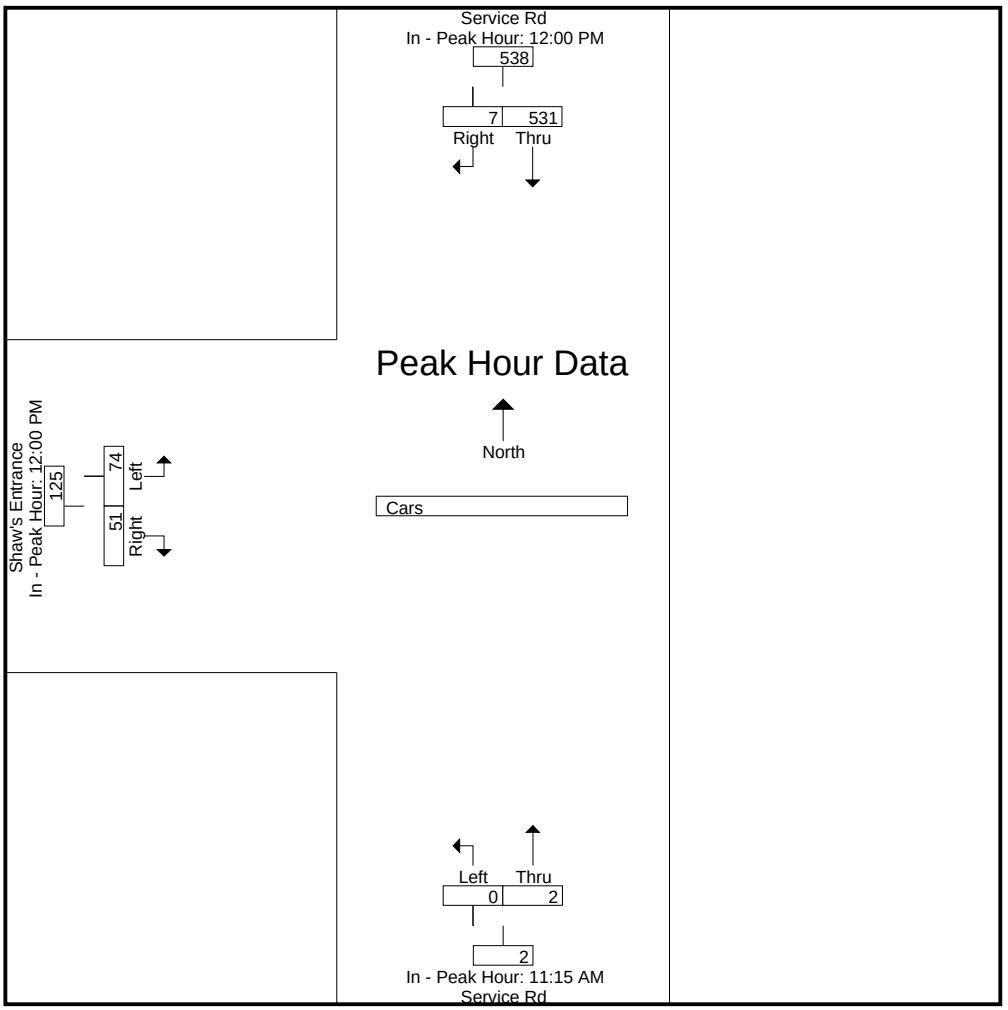
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM			11:15 AM			12:00 PM		
+0 mins.	126	2	128	0	**1**	**1**	19	13	32
+15 mins.	**149**	**3**	**152**	0	0	0	20	7	27
+30 mins.	118	2	120	0	0	0	13	**16**	29
+45 mins.	138	0	138	0	1	1	**22**	15	**37**
Total Volume	531	7	538	0	2	2	74	51	125
% App. Total	98.7	1.3		0	100		59.2	40.8	
PHF	.891	.583	.885	.000	.500	.500	.841	.797	.845

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 1

Groups Printed- Trucks

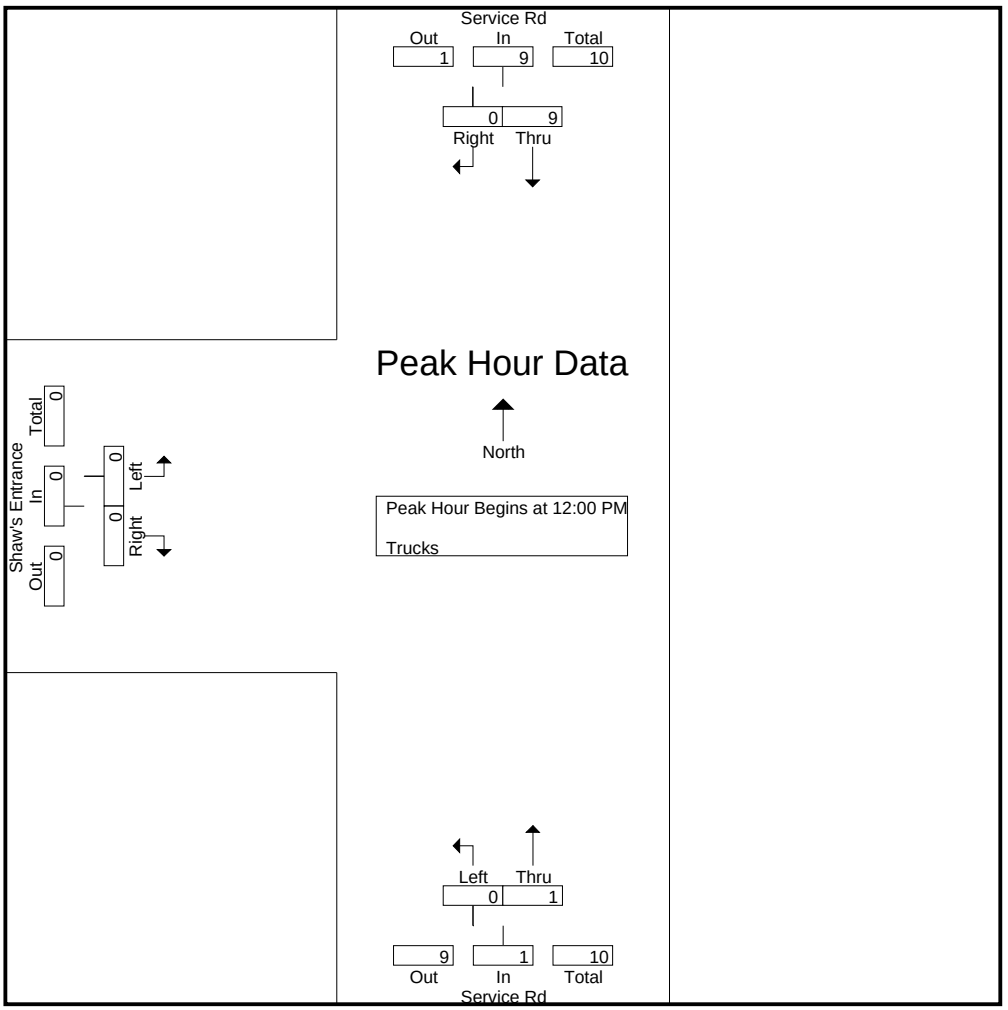
	Service Rd From North		Service Rd From South		Shaw's Entrance From West		
Start Time	Thru	Right	Left	Thru	Left	Right	Int. Total
11:00 AM	1	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0
11:30 AM	2	0	0	0	0	0	2
11:45 AM	1	0	0	0	0	0	1
Total	4	0	0	0	0	0	4
12:00 PM	2	0	0	0	0	0	2
12:15 PM	1	0	0	0	0	0	1
12:30 PM	3	0	0	1	0	0	4
12:45 PM	3	0	0	0	0	0	3
Total	9	0	0	1	0	0	10
Grand Total	13	0	0	1	0	0	14
Apprch %	100	0	0	100	0	0	
Total %	92.9	0	0	7.1	0	0	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	2	0	2	0	0	0	0	0	0	2
12:15 PM	1	0	1	0	0	0	0	0	0	1
12:30 PM	**3**	0	**3**	0	**1**	**1**	0	0	0	**4**
12:45 PM	3	0	3	0	0	0	0	0	0	3
Total Volume	9	0	9	0	1	1	0	0	0	10
% App. Total	100	0		0	100		0	0		
PHF	.750	.000	.750	.000	.250	.250	.000	.000	.000	.625

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 2



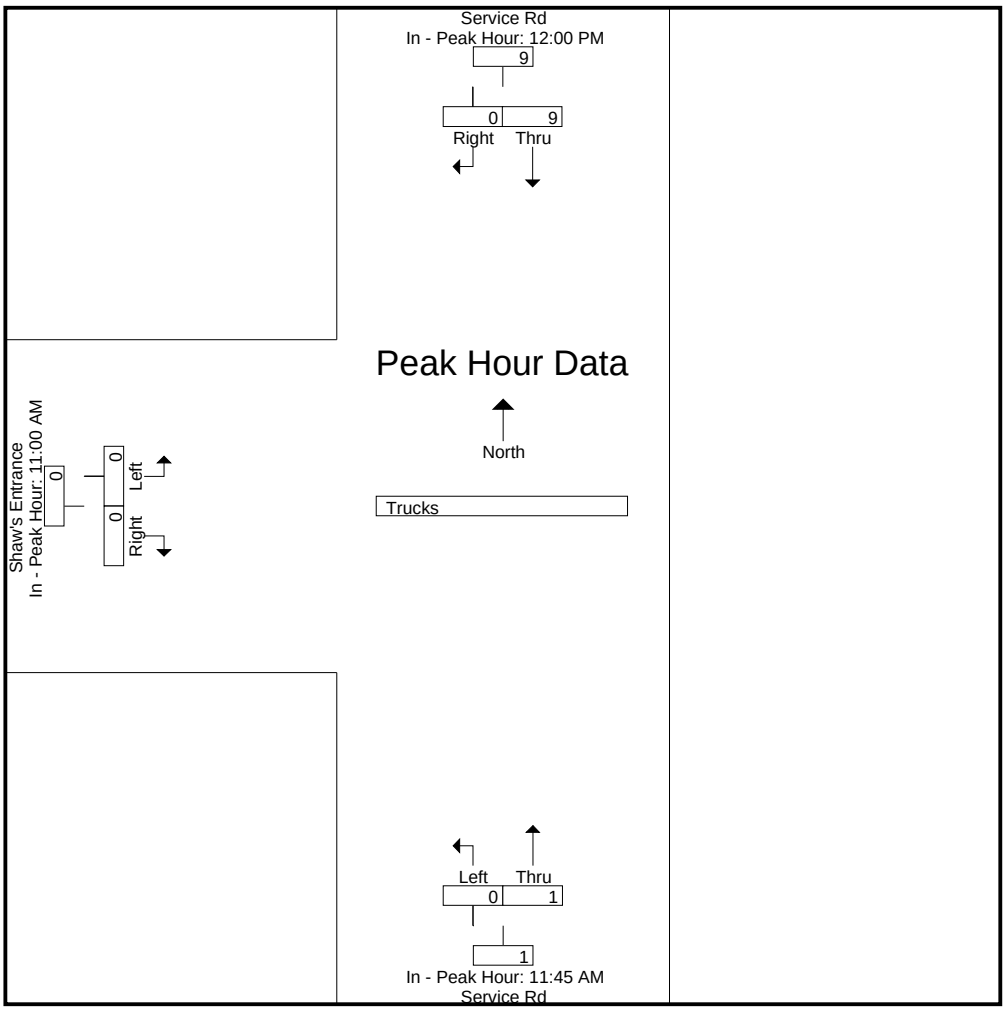
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM			11:45 AM			11:00 AM		
+0 mins.	2	0	2	0	0	0	0	0	0
+15 mins.	1	0	1	0	0	0	0	0	0
+30 mins.	**3**	0	**3**	0	0	0	0	0	0
+45 mins.	3	0	3	0	**1**	**1**	0	0	0
Total Volume	9	0	9	0	1	1	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.750	.000	.750	.000	.250	.250	.000	.000	.000

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 1

Groups Printed- Bikes Peds

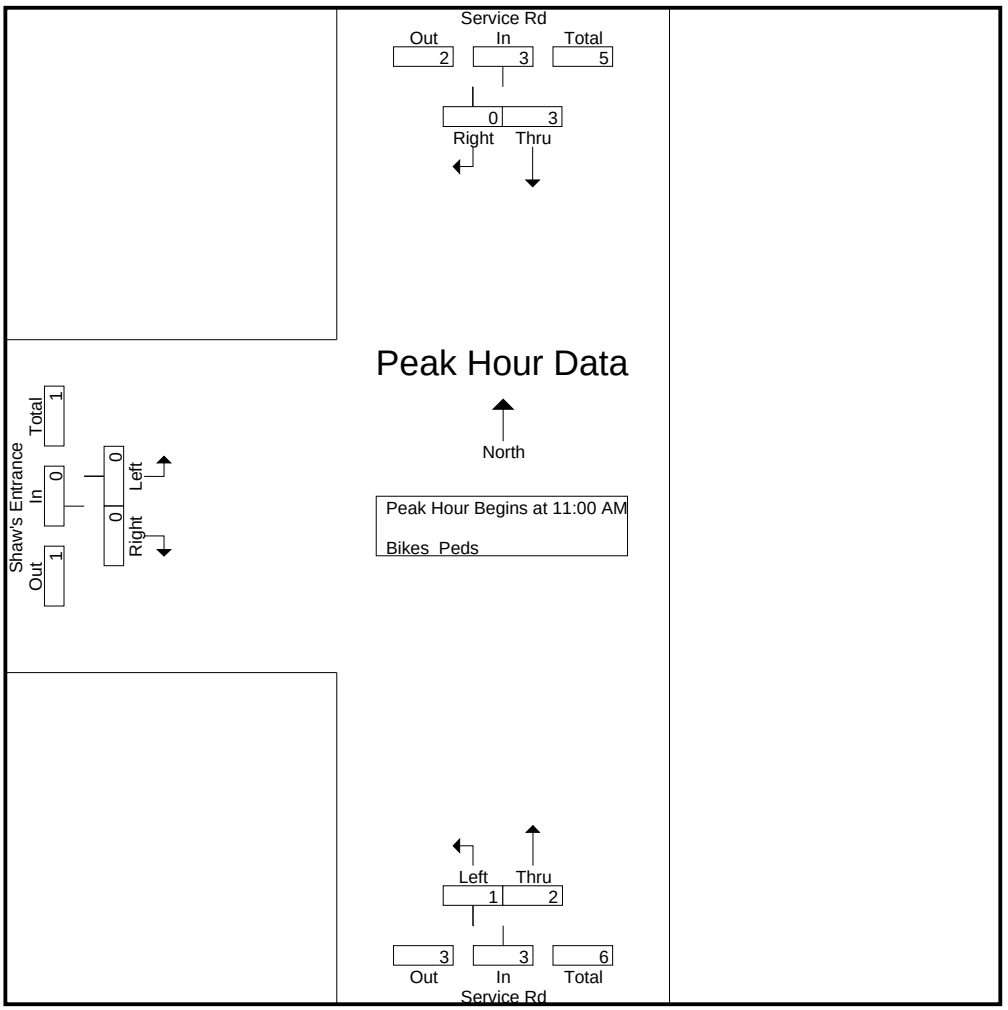
	Service Rd From North			Service Rd From South			Shaw's Entrance From West					
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	1	0	0	0	0	0	0	0	5	5	1	6
11:15 AM	0	0	0	1	0	0	0	0	3	3	1	4
11:30 AM	1	0	0	0	1	0	0	0	5	5	2	7
11:45 AM	1	0	0	0	1	0	0	0	2	2	2	4
Total	3	0	0	1	2	0	0	0	15	15	6	21
12:00 PM	1	0	0	0	0	0	0	0	6	6	1	7
12:15 PM	0	0	0	0	0	0	0	1	11	11	1	12
12:30 PM	0	0	0	0	0	0	0	0	3	3	0	3
12:45 PM	1	0	0	0	0	0	0	0	5	5	1	6
Total	2	0	0	0	0	0	0	1	25	25	3	28
Grand Total	5	0	0	1	2	0	0	1	40	40	9	49
Apprch %	100	0		33.3	66.7		0	100				
Total %	55.6	0		11.1	22.2		0	11.1		81.6	18.4	

	Service Rd From North			Service Rd From South			Shaw's Entrance From West			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:00 AM										
11:00 AM	**1**	0	**1**	0	0	0	0	0	0	1
11:15 AM	0	0	0	**1**	0	**1**	0	0	0	1
11:30 AM	1	0	1	0	**1**	1	0	0	0	**2**
11:45 AM	1	0	1	0	1	1	0	0	0	2
Total Volume	3	0	3	1	2	3	0	0	0	6
% App. Total	100	0		33.3	66.7		0	0		
PHF	.750	.000	.750	.250	.500	.750	.000	.000	.000	.750

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 2



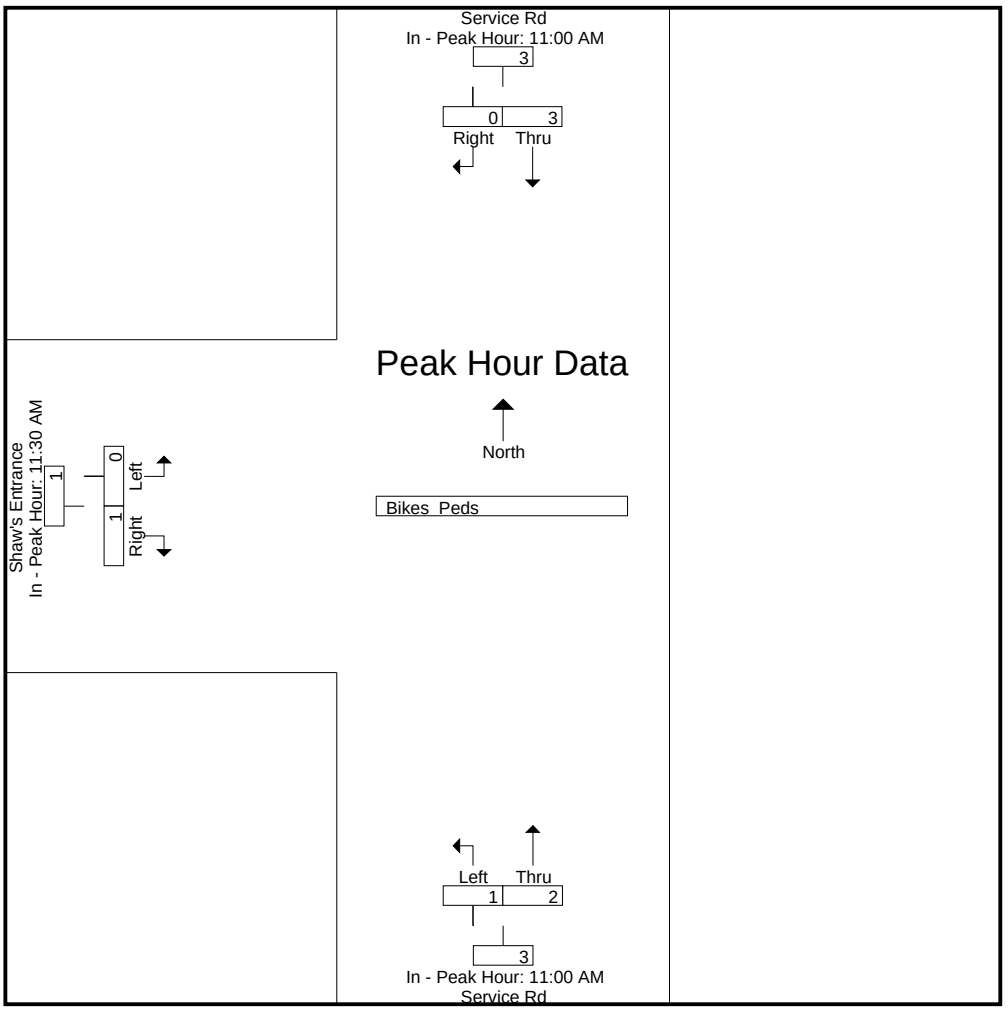
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	11:00 AM			11:00 AM			11:30 AM		
+0 mins.	**1**	0	**1**	0	0	0	0	0	0
+15 mins.	0	0	0	**1**	0	**1**	0	0	0
+30 mins.	1	0	1	0	**1**	1	0	0	0
+45 mins.	1	0	1	0	1	1	0	**1**	**1**
Total Volume	3	0	3	1	2	3	0	1	1
% App. Total	100	0		33.3	66.7		0	100	
PHF	.750	.000	.750	.250	.500	.750	.000	.250	.250

Accurate Counts
978-664-2565

N/S Street : Morrissey Service Road
E/W Street: Shaw's Main Entrance
City/State : Boston, MA
Weather : Clear

File Name : 159100S1
Site Code : 15910001
Start Date : 10/20/2012
Page No : 3



Accurate Counts

978-664-2565

Location : Shaw's Entrance Only
Location : West of Service Road
City/State: Boston, MA

Start	Fri	02-Nov-1		Sat	03-Nov-1		Sun	04-Nov-1		Daily Average	
Time	A.M.	P.M.		A.M.	P.M.		A.M.	P.M.		A.M.	P.M.
12:00	0	31		1	33		4	44		2	36
12:15	0	28		3	44		2	44		2	39
12:30	0	48		1	40		0	41		0	43
12:45	0	20		0	28		1	43		0	30
01:00	0	42		0	41		0	35		0	39
01:15	0	26		0	47		0	46		0	40
01:30	0	20		0	36		0	39		0	32
01:45	0	18		1	42		1	33		1	31
02:00	0	30		0	27		0	33		0	30
02:15	1	24		2	36		0	37		1	32
02:30	0	35		2	36		0	32		1	34
02:45	0	27		0	32		0	46		0	35
03:00	0	38		0	29		0	44		0	37
03:15	0	19		1	47		0	54		0	40
03:30	1	41		0	35		0	32		0	36
03:45	1	36		0	45		2	25		1	35
04:00	0	31		3	40		0	**50**		1	40
04:15	0	53		0	33		2	**58**		1	**48**
04:30	0	35		0	**42**		0	**42**		0	**40**
04:45	0	30		0	**44**		1	**43**		0	**39**
05:00	0	29		0	**55**		0	39		0	**41**
05:15	0	30		0	**37**		0	50		0	39
05:30	1	32		2	19		0	38		1	30
05:45	1	**41**		4	43		0	48		2	44
06:00	3	**39**		2	39		0	39		2	39
06:15	6	**39**		2	31		1	32		3	34
06:30	4	**44**		4	25		1	46		3	38
06:45	2	34		4	32		0	36		2	34
07:00	7	24		9	24		0	35		5	28
07:15	6	36		5	39		1	31		4	35
07:30	9	26		6	24		2	28		6	26
07:45	8	34		5	24		8	20		7	26
08:00	22	27		9	21		8	13		13	20
08:15	11	19		13	21		7	21		10	20
08:30	12	16		8	17		2	15		7	16
08:45	23	21		24	25		16	13		21	20
09:00	19	20		16	21		20	14		18	18
09:15	17	25		16	19		17	19		17	21
09:30	18	15		24	15		11	12		18	14
09:45	16	17		24	19		19	10		20	15
10:00	25	14		27	19		14	8		22	14
10:15	23	12		30	15		30	11		28	13
10:30	24	19		26	12		25	6		25	12
10:45	31	19		26	11		18	2		25	11
11:00	**27**	6		**25**	2		**34**	3		**29**	4
11:15	**26**	1		**26**	6		**27**	12		**26**	6
11:30	**28**	2		**49**	3		**35**	2		**37**	2
11:45	**38**	5		**27**	2		**38**	4		**34**	4
Total	410	1278		427	1377		347	1428		395	1360
Combined Total	1688			1804			1775			1755	
Peak	11:00	05:45	-	11:00	04:30	-	11:00	04:00	-	11:00	04:15
Vol.	119	163	-	127	178	-	134	193	-	126	168
P.H.F.	0.783	0.769		0.648	0.809		0.882	0.832		0.851	0.875

Accurate Counts

978-664-2565

Location : Shaw's Entrance Only
Location : West of Service Road
City/State: Boston, MA

Start Time	Mon A.M.	05-Nov-1 P.M.		Tue A.M.	06-Nov-1 P.M.		Wed A.M.	07-Nov-1 P.M.		Daily Average A.M.	Daily Average P.M.
12:00	3	27		2	22		5	20		3	23
12:15	4	37		0	13		5	25		3	25
12:30	5	28		3	32		1	21		3	27
12:45	0	16		0	22		0	29		0	22
01:00	1	27		3	31		1	35		2	31
01:15	0	29		1	28		0	27		0	28
01:30	0	26		1	26		0	37		0	30
01:45	0	29		0	31		1	26		0	29
02:00	1	34		1	22		0	30		1	29
02:15	0	29		0	19		0	35		0	28
02:30	0	28		0	26		0	24		0	26
02:45	0	34		0	23		0	20		0	26
03:00	0	25		0	18		0	33		0	25
03:15	1	30		0	19		0	27		0	25
03:30	0	21		2	32		0	23		1	25
03:45	0	32		0	24		1	25		0	27
04:00	0	26		0	23		1	23		0	24
04:15	1	39		1	29		0	27		1	32
04:30	0	23		1	32		0	42		0	32
04:45	1	**49**		0	23		0	38		0	37
05:00	0	**33**		0	26		0	26		0	28
05:15	0	**42**		0	29		2	26		1	32
05:30	0	**47**		0	31		0	45		0	41
05:45	2	31		1	29		0	35		1	32
06:00	1	37		0	30		1	27		1	31
06:15	0	38		0	27		0	**48**		0	**38**
06:30	1	52		1	25		4	**36**		2	**38**
06:45	2	42		5	**39**		2	**41**		3	**41**
07:00	2	35		5	**42**		0	**32**		2	**36**
07:15	2	32		2	**33**		2	42		2	36
07:30	2	51		8	**39**		5	21		5	37
07:45	7	51		4	35		4	28		5	38
08:00	4	28		6	37		4	32		5	32
08:15	6	33		12	23		5	13		8	23
08:30	10	21		7	36		6	24		8	27
08:45	4	36		11	30		3	20		6	29
09:00	8	20		10	22		14	14		11	19
09:15	10	28		8	26		13	18		10	24
09:30	13	9		13	13		10	16		12	13
09:45	12	16		12	27		19	16		14	20
10:00	23	20		9	14		11	23		14	19
10:15	7	12		9	16		16	12		11	13
10:30	11	11		19	3		**25**	8		18	7
10:45	16	12		21	12		**20**	9		19	11
11:00	**19**	13		**15**	6		**16**	6		**17**	8
11:15	**27**	10		**18**	10		**26**	11		**24**	10
11:30	**17**	8		**19**	6		17	4		**18**	6
11:45	**26**	13		**23**	4		18	12		**22**	10
Total	249	1370		253	1165		258	1212		253	1250
Combined Total	1619			1418			1470			1503	
Peak	11:00	04:45	-	11:00	06:45	-	10:30	06:15	-	11:00	06:15
Vol.	89	171	-	75	153	-	87	157	-	81	153
P.H.F.	0.824	0.872		0.815	0.911		0.837	0.818		0.844	0.933

Accurate Counts

978-664-2565

Location : Shaw's Entrance Only
Location : West of Service Road
City/State: Boston, MA

Start Time	Thu 08-Nov-1 A.M.	P.M.	Fri 09-Nov-1 A.M.	P.M.	Sat 10-Nov-1 A.M.	P.M.	Daily Average A.M.	P.M.
12:00	1	29	*	*	*	*	1	29
12:15	6	29	*	*	*	*	6	29
12:30	2	21	*	*	*	*	2	21
12:45	3	31	*	*	*	*	3	31
01:00	1	32	*	*	*	*	1	32
01:15	0	21	*	*	*	*	0	21
01:30	0	26	*	*	*	*	0	26
01:45	0	25	*	*	*	*	0	25
02:00	0	27	*	*	*	*	0	27
02:15	0	29	*	*	*	*	0	29
02:30	0	31	*	*	*	*	0	31
02:45	0	36	*	*	*	*	0	36
03:00	0	27	*	*	*	*	0	27
03:15	0	28	*	*	*	*	0	28
03:30	0	31	*	*	*	*	0	31
03:45	0	45	*	*	*	*	0	45
04:00	0	26	*	*	*	*	0	26
04:15	0	27	*	*	*	*	0	27
04:30	0	35	*	*	*	*	0	35
04:45	0	37	*	*	*	*	0	37
05:00	1	41	*	*	*	*	1	41
05:15	1	32	*	*	*	*	1	32
05:30	0	24	*	*	*	*	0	24
05:45	1	33	*	*	*	*	1	33
06:00	0	31	*	*	*	*	0	31
06:15	3	**41**	*	*	*	*	3	**41**
06:30	2	**38**	*	*	*	*	2	**38**
06:45	1	**39**	*	*	*	*	1	**39**
07:00	3	**48**	*	*	*	*	3	**48**
07:15	2	19	*	*	*	*	2	19
07:30	7	25	*	*	*	*	7	25
07:45	8	27	*	*	*	*	8	27
08:00	3	43	*	*	*	*	3	43
08:15	13	25	*	*	*	*	13	25
08:30	4	24	*	*	*	*	4	24
08:45	4	20	*	*	*	*	4	20
09:00	13	27	*	*	*	*	13	27
09:15	14	24	*	*	*	*	14	24
09:30	10	11	*	*	*	*	10	11
09:45	14	24	*	*	*	*	14	24
10:00	15	17	*	*	*	*	15	17
10:15	12	18	*	*	*	*	12	18
10:30	13	15	*	*	*	*	13	15
10:45	**21**	16	*	*	*	*	**21**	16
11:00	**16**	7	*	*	*	*	**16**	7
11:15	**18**	17	*	*	*	*	**18**	17
11:30	**29**	7	*	*	*	*	**29**	7
11:45	18	13	*	*	*	*	18	13
Total	259	1299	0	0	0	0	259	1299
Combined Total	1558		0		0		1558	
Peak	10:45	06:15	-	-	-	-	10:45	06:15
Vol.	84	166	-	-	-	-	84	166
P.H.F.	0.724	0.865					0.724	0.865
ADT		ADT 1,619		AADT 1,619				

Accurate Counts

978-664-2565

Location : Shaw's Entrance Only
Location : West of Service Road
City/State: Boston, MA

Start Time	Mon 29-Oct-12	Tue 30-Oct-12	Wed 31-Oct-12	Thu 01-Nov-12	Fri 02-Nov-12	Average Day	Sat 03-Nov-12	Sun 04-Nov-12	Week Average
12:00 AM	*	*	*	*	0	0	5	7	4
01:00	*	*	*	*	0	0	1	1	1
02:00	*	*	*	*	1	1	4	0	2
03:00	*	*	*	*	2	2	1	2	2
04:00	*	*	*	*	0	0	3	3	2
05:00	*	*	*	*	2	2	6	0	3
06:00	*	*	*	*	15	15	12	2	10
07:00	*	*	*	*	30	30	25	11	22
08:00	*	*	*	*	68	68	54	33	52
09:00	*	*	*	*	70	70	80	67	72
10:00	*	*	*	*	103	103	109	87	100
11:00	*	*	*	*	**119**	**119**	**127**	**134**	**127**
12:00 PM	*	*	*	*	127	127	145	172	148
01:00	*	*	*	*	106	106	**166**	153	142
02:00	*	*	*	*	116	116	131	148	132
03:00	*	*	*	*	134	134	156	155	148
04:00	*	*	*	*	149	149	159	**193**	**167**
05:00	*	*	*	*	132	132	154	175	154
06:00	*	*	*	*	**156**	**156**	127	153	145
07:00	*	*	*	*	120	120	111	114	115
08:00	*	*	*	*	83	83	84	62	76
09:00	*	*	*	*	77	77	74	55	69
10:00	*	*	*	*	64	64	57	27	49
11:00	*	*	*	*	14	14	13	21	16
Day Total	0	0	0	0	1688	1688	1804	1775	1758
% Avg. WkDay	0.0%	0.0%	0.0%	0.0%	100.0%				
% Avg. Week	0.0%	0.0%	0.0%	0.0%	96.0%	96.0%	102.6%	101.0%	
AM Peak	-	-	-	-	11:00	- 11:00	- 11:00	11:00	- 11:00	-	-
Vol.	-	-	-	-	119	- 119	- 127	134	- 127	-	-
PM Peak	-	-	-	-	18:00	- 18:00	- 13:00	16:00	- 16:00	-	-
Vol.	-	-	-	-	156	- 156	- 166	193	- 167	-	-

Accurate Counts

978-664-2565

Location : Shaw's Entrance Only
Location : West of Service Road
City/State: Boston, MA

Start Time	Mon 05-Nov-12	Tue 06-Nov-12	Wed 07-Nov-12	Thu 08-Nov-12	Fri 09-Nov-12	Average Day	Sat 10-Nov-12	Sun 11-Nov-12	Week Average
12:00 AM	12	5	11	12	*	10	*	*	10
01:00	1	5	2	1	*	2	*	*	2
02:00	1	1	0	0	*	0	*	*	0
03:00	1	2	1	0	*	1	*	*	1
04:00	2	2	1	0	*	1	*	*	1
05:00	2	1	2	3	*	2	*	*	2
06:00	4	6	7	6	*	6	*	*	6
07:00	13	19	11	20	*	16	*	*	16
08:00	24	36	18	24	*	26	*	*	26
09:00	43	43	56	51	*	48	*	*	48
10:00	57	58	72	61	*	62	*	*	62
11:00	**89**	**75**	**77**	**81**	*	**80**	*	*	**80**
12:00 PM	108	89	95	110	*	100	*	*	100
01:00	111	116	125	104	*	114	*	*	114
02:00	125	90	109	123	*	112	*	*	112
03:00	108	93	108	131	*	110	*	*	110
04:00	137	107	130	125	*	125	*	*	125
05:00	153	115	132	130	*	132	*	*	132
06:00	**169**	121	**152**	**149**	*	**148**	*	*	**148**
07:00	169	**149**	123	119	*	140	*	*	140
08:00	118	126	89	112	*	111	*	*	111
09:00	73	88	64	86	*	78	*	*	78
10:00	55	45	52	66	*	54	*	*	54
11:00	44	26	33	44	*	37	*	*	37
Day Total	1619	1418	1470	1558	0	1515	0	0	1515
% Avg. WkDay	106.9%	93.6%	97.0%	102.8%	0.0%				
% Avg. Week	106.9%	93.6%	97.0%	102.8%	0.0%	100.0%	0.0%	0.0%	
AM Peak	11:00	11:00	11:00	11:00	-	11:00	-	-	11:00
Vol.	89	75	77	81	-	80	-	-	80
PM Peak	18:00	19:00	18:00	18:00	-	18:00	-	-	18:00
Vol.	169	149	152	149	-	148	-	-	148
Grand Total	1619	1418	1470	1558	1688	3203	1804	1775	3273

ADT ADT 1,619 AADT 1,619

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	02-Nov-12	In		Hour Totals		Out		Hour Totals		Combined Totals	
Time	Fri	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	1			6	29				
12:15		0	1			0	28				
12:30		0	0			0	26				
12:45		0	2	0	4	0	20	6	103	6	107
01:00		0	0			0	39				
01:15		0	1			0	23				
01:30		0	0			0	21				
01:45		0	1	0	2	0	24	0	107	0	109
02:00		0	1			0	20				
02:15		0	0			0	26				
02:30		0	1			0	24				
02:45		0	0	0	2	1	18	1	88	1	90
03:00		0	0			0	21				
03:15		0	1			0	35				
03:30		0	2			0	31				
03:45		0	1	0	4	2	32	2	119	2	123
04:00		0	2			0	27				
04:15		0	2			0	26				
04:30		0	0			0	28				
04:45		0	0	0	4	0	31	0	112	0	116
05:00		0	3			0	27				
05:15		0	0			0	26				
05:30		0	0			0	30				
05:45		0	2	0	5	0	29	0	112	0	117
06:00		0	2			1	35				
06:15		0	1			1	34				
06:30		0	2			1	31				
06:45		0	0	0	5	3	33	6	133	6	138
07:00		0	2			5	36				
07:15		0	1			6	28				
07:30		0	2			4	31				
07:45		0	1	0	6	1	27	16	122	16	128
08:00		0	2			8	30				
08:15		0	1			8	13				
08:30		0	0			13	26				
08:45		0	0	0	3	7	17	36	86	36	89
09:00		0	1			16	17				
09:15		0	2			16	24				
09:30		0	1			10	19				
09:45		0	0	0	4	12	21	54	81	54	85
10:00		0	1			11	14				
10:15		6	0			16	7				
10:30		1	1			16	18				
10:45		0	2	7	4	24	21	67	60	74	64
11:00		3	2			29	13				
11:15		0	0			15	7				
11:30		0	0			23	3				
11:45		3	2	6	4	32	5	99	28	105	32
Total		13	47			287	1151			300	1198
Percent		21.7%	78.3%			20.0%	80.0%			20.0%	80.0%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	03-Nov-12	In		Hour Totals		Out		Hour Totals		Combined Totals	
Time	Sat	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	1			8	27				
12:15		1	0			1	22				
12:30		0	1			2	38				
12:45		0	2	1	4	0	37	11	124	12	128
01:00		0	1			0	25				
01:15		0	7			0	32				
01:30		0	1			0	53				
01:45		1	1	1	10	1	33	1	143	2	153
02:00		0	0			0	29				
02:15		0	1			0	36				
02:30		0	1			1	31				
02:45		0	0	0	2	1	27	2	123	2	125
03:00		0	0			0	33				
03:15		0	1			1	28				
03:30		1	1			2	32				
03:45		0	1	1	3	0	32	3	125	4	128
04:00		0	0			0	42				
04:15		0	1			0	30				
04:30		0	1			0	37				
04:45		0	0	0	2	0	28	0	137	0	139
05:00		0	0			0	33				
05:15		0	1			0	48				
05:30		0	1			0	39				
05:45		1	0	1	2	2	34	2	154	3	156
06:00		1	2			2	38				
06:15		0	1			1	30				
06:30		0	1			2	27				
06:45		1	1	2	5	3	32	8	127	10	132
07:00		0	0			4	31				
07:15		0	0			4	28				
07:30		1	1			4	26				
07:45		0	0	1	1	4	24	16	109	17	110
08:00		0	0			5	20				
08:15		0	0			7	26				
08:30		0	0			3	17				
08:45		0	0	0	0	9	22	24	85	24	85
09:00		0	1			15	27				
09:15		0	0			11	18				
09:30		0	0			13	20				
09:45		0	1	0	2	23	12	62	77	62	79
10:00		0	1			18	20				
10:15		0	0			21	11				
10:30		2	2			20	14				
10:45		0	3	2	6	26	15	85	60	87	66
11:00		1	0			24	13				
11:15		1	0			24	6				
11:30		1	0			22	5				
11:45		0	1	3	1	22	4	92	28	95	29
Total		12	38			306	1292			318	1330
Percent		24.0%	76.0%			19.1%	80.9%			19.3%	80.7%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	04-Nov-12	In		Hour Totals		Out		Hour Totals		Combined Totals	
Time	Sun	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	1			6	35				
12:15		0	1			1	36				
12:30		0	0			2	39				
12:45		0	0	0	2	3	41	12	151	12	153
01:00		0	4			0	39				
01:15		0	1			0	40				
01:30		1	1			0	36				
01:45		0	0	1	6	2	45	2	160	3	166
02:00		0	0			0	30				
02:15		0	1			0	37				
02:30		0	0			2	29				
02:45		0	1	0	2	1	35	3	131	3	133
03:00		0	0			0	32				
03:15		0	2			0	38				
03:30		0	1			0	29				
03:45		0	2	0	5	0	52	0	151	0	156
04:00		0	2			0	38				
04:15		0	0			0	42				
04:30		0	2			1	50				
04:45		0	1	0	5	0	38	1	168	1	173
05:00		0	0			0	41				
05:15		0	2			0	36				
05:30		0	2			0	39				
05:45		0	3	0	7	0	48	0	164	0	171
06:00		0	0			0	49				
06:15		0	0			0	32				
06:30		0	1			0	34				
06:45		0	1	0	2	0	32	0	147	0	149
07:00		0	1			0	35				
07:15		0	1			3	36				
07:30		0	1			2	32				
07:45		0	2	0	5	1	32	6	135	6	140
08:00		1	1			3	26				
08:15		0	2			6	23				
08:30		0	0			5	9				
08:45		0	0	1	3	1	20	15	78	16	81
09:00		1	1			5	5				
09:15		0	0			11	22				
09:30		0	0			14	11				
09:45		5	0	6	1	8	18	38	56	44	57
10:00		0	0			22	8				
10:15		1	0			14	10				
10:30		0	0			21	11				
10:45		1	0	2	0	21	11	78	40	80	40
11:00		1	0			19	5				
11:15		0	0			19	6				
11:30		0	0			20	5				
11:45		0	2	1	2	34	1	92	17	93	19
Total		11	40			247	1398			258	1438
Percent		21.6%	78.4%			15.0%	85.0%			15.2%	84.8%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start Time	05-Nov-12 Mon	In		Hour Totals		Out		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	0			5	28				
12:15		0	0			5	18				
12:30		1	1			2	30				
12:45		1	0	2	1	3	20	15	96	17	97
01:00		0	0			1	20				
01:15		0	0			0	24				
01:30		0	3			1	22				
01:45		0	1	0	4	0	19	2	85	2	89
02:00		1	0			0	24				
02:15		0	0			0	30				
02:30		0	0			0	26				
02:45		0	0	1	0	0	28	0	108	1	108
03:00		0	1			0	28				
03:15		0	0			1	23				
03:30		0	0			0	23				
03:45		0	0	0	1	0	23	1	97	1	98
04:00		0	1			0	23				
04:15		0	0			0	24				
04:30		0	0			1	24				
04:45		0	0	0	1	1	23	2	94	2	95
05:00		0	2			0	32				
05:15		0	1			1	28				
05:30		0	0			0	30				
05:45		0	0	0	3	0	32	1	122	1	125
06:00		0	0			1	32				
06:15		0	0			0	26				
06:30		0	3			0	39				
06:45		0	2	0	5	0	40	1	137	1	142
07:00		0	2			1	41				
07:15		0	1			0	28				
07:30		0	1			0	39				
07:45		0	2	0	6	1	39	2	147	2	153
08:00		0	0			1	46				
08:15		1	1			6	31				
08:30		0	1			4	25				
08:45		0	1	1	3	5	33	16	135	17	138
09:00		0	0			5	33				
09:15		1	0			2	24				
09:30		0	1			11	20				
09:45		0	1	1	2	9	10	27	87	28	89
10:00		0	0			8	22				
10:15		0	0			12	17				
10:30		0	0			9	14				
10:45		0	0	0	0	14	14	43	67	43	67
11:00		1	1			11	12				
11:15		1	0			13	10				
11:30		0	1			14	11				
11:45		1	1	3	3	16	9	54	42	57	45
Total		8	29			164	1217			172	1246
Percent		21.6%	78.4%			11.9%	88.1%			12.1%	87.9%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	06-Nov-12	In		Hour Totals		Out		Hour Totals		Combined Totals	
Time	Tue	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	2			10	17				
12:15		0	2			4	18				
12:30		0	0			1	17				
12:45		0	2	1	6	1	16	16	68	17	74
01:00		0	0			3	22				
01:15		0	1			0	20				
01:30		0	2			2	25				
01:45		0	1	0	4	0	29	5	96	5	100
02:00		1	1			2	22				
02:15		1	1			2	25				
02:30		0	1			1	21				
02:45		0	0	2	3	0	21	5	89	7	92
03:00		1	1			1	20				
03:15		0	1			0	24				
03:30		0	0			0	17				
03:45		0	0	1	2	0	17	1	78	2	80
04:00		0	2			0	24				
04:15		1	2			0	20				
04:30		0	0			1	27				
04:45		0	1	1	5	0	24	1	95	2	100
05:00		0	1			0	22				
05:15		0	2			0	25				
05:30		0	1			0	23				
05:45		0	1	0	5	0	30	0	100	0	105
06:00		0	2			0	31				
06:15		0	1			0	27				
06:30		0	0			0	24				
06:45		1	5	1	8	3	23	3	105	4	113
07:00		0	2			1	29				
07:15		0	0			0	27				
07:30		0	2			2	32				
07:45		0	1	0	5	0	32	3	120	3	125
08:00		1	0			10	34				
08:15		0	1			5	30				
08:30		0	1			3	25				
08:45		0	1	1	3	6	33	24	122	25	125
09:00		1	1			9	32				
09:15		0	0			8	27				
09:30		0	1			4	20				
09:45		1	2	2	4	4	15	25	94	27	98
10:00		0	1			9	28				
10:15		0	0			9	19				
10:30		1	0			10	11				
10:45		2	1	3	2	13	14	41	72	44	74
11:00		1	0			18	15				
11:15		0	0			19	6				
11:30		1	1			14	5				
11:45		0	0	2	1	16	8	67	34	69	35
Total		14	48			191	1073			205	1121
Percent		22.6%	77.4%			15.1%	84.9%			15.5%	84.5%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start Time	07-Nov-12 Wed	In		Hour Totals		Out		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	2			5	11				
12:15		0	3			2	27				
12:30		0	0			2	20				
12:45		1	0	1	5	4	20	13	78	14	83
01:00		0	1			4	19				
01:15		0	0			0	29				
01:30		0	0			0	28				
01:45		0	2	0	3	0	25	4	101	4	104
02:00		0	1			1	23				
02:15		0	0			0	21				
02:30		0	0			0	27				
02:45		0	3	0	4	0	25	1	96	1	100
03:00		0	0			0	25				
03:15		0	1			0	16				
03:30		0	0			0	21				
03:45		0	0	0	1	0	23	0	85	0	86
04:00		0	0			1	24				
04:15		0	3			1	24				
04:30		0	0			0	23				
04:45		0	0	0	3	0	29	2	100	2	103
05:00		0	2			0	26				
05:15		0	1			0	31				
05:30		0	1			0	22				
05:45		0	0	0	4	0	24	0	103	0	107
06:00		1	0			1	26				
06:15		0	2			0	31				
06:30		0	0			1	36				
06:45		0	0	1	2	1	32	3	125	4	127
07:00		0	1			0	38				
07:15		0	1			3	28				
07:30		0	2			1	32				
07:45		0	0	0	4	3	31	7	129	7	133
08:00		0	0			6	20				
08:15		1	0			3	21				
08:30		0	0			5	24				
08:45		0	2	1	2	1	18	15	83	16	85
09:00		1	1			5	17				
09:15		0	0			9	15				
09:30		1	0			3	17				
09:45		0	2	2	3	7	16	24	65	26	68
10:00		1	0			9	19				
10:15		0	0			9	19				
10:30		0	1			19	13				
10:45		0	1	1	2	14	13	51	64	52	66
11:00		0	0			19	9				
11:15		0	0			12	6				
11:30		4	0			17	10				
11:45		0	0	4	0	11	8	59	33	63	33
Total		10	33			179	1062			189	1095
Percent		23.3%	76.7%			14.4%	85.6%			14.7%	85.3%

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start Time	08-Nov-12 Thu	In Morning	In Afternoon	Hour Totals Morning	Hour Totals Afternoon	Out Morning	Out Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	0			11	18				
12:15		0	0			5	19				
12:30		2	2			4	19				
12:45		0	0	2	2	2	19	22	75	24	77
01:00		1	2			3	25				
01:15		0	1			1	24				
01:30		0	2			1	18				
01:45		0	2	1	7	0	25	5	92	6	99
02:00		0	0			0	20				
02:15		0	0			0	19				
02:30		0	1			1	15				
02:45		0	0	0	1	0	28	1	82	1	83
03:00		0	0			0	21				
03:15		0	1			0	27				
03:30		0	0			2	24				
03:45		1	1	1	2	0	33	2	105	3	107
04:00		0	0			0	25				
04:15		0	0			1	29				
04:30		0	1			0	26				
04:45		1	1	1	2	0	22	1	102	2	104
05:00		0	0			1	36				
05:15		0	0			1	32				
05:30		0	0			0	22				
05:45		0	1	0	1	0	31	2	121	2	122
06:00		0	0			1	22				
06:15		0	4			0	27				
06:30		0	0			0	31				
06:45		0	2	0	6	0	34	1	114	1	120
07:00		0	0			0	40				
07:15		0	1			3	33				
07:30		0	1			3	33				
07:45		0	1	0	3	3	22	9	128	9	131
08:00		0	0			1	28				
08:15		0	1			4	31				
08:30		2	1			5	26				
08:45		0	2	2	4	3	23	13	108	15	112
09:00		1	0			3	22				
09:15		1	2			7	31				
09:30		0	2			10	23				
09:45		1	0	3	4	5	13	25	89	28	93
10:00		0	2			13	18				
10:15		0	0			7	20				
10:30		1	0			7	16				
10:45		1	0	2	2	16	9	43	63	45	65
11:00		2	1			17	15				
11:15		1	0			15	16				
11:30		0	0			10	13				
11:45		1	0	4	1	19	12	61	56	65	57
Total		16	35			185	1135			201	1170
Percent		31.4%	68.6%			14.0%	86.0%			14.7%	85.3%
Grand Total		84	270			1559	8328			1643	8598
Percent		23.7%	76.3%			15.8%	84.2%			16.0%	84.0%
ADT		ADT 1,463		AADT 1,463							

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	29-Oct-12		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
12:00 AM	*	*	*	*	*	*	*	*	0	6	1	11	0	12	0	10
01:00	*	*	*	*	*	*	*	*	0	0	1	1	1	2	1	1
02:00	*	*	*	*	*	*	*	*	0	1	0	2	0	3	0	2
03:00	*	*	*	*	*	*	*	*	0	2	1	3	0	0	0	2
04:00	*	*	*	*	*	*	*	*	0	0	0	0	0	1	0	0
05:00	*	*	*	*	*	*	*	*	0	0	1	2	0	0	0	1
06:00	*	*	*	*	*	*	*	*	0	6	2	8	0	0	1	5
07:00	*	*	*	*	*	*	*	*	0	16	1	16	0	6	0	13
08:00	*	*	*	*	*	*	*	*	0	36	0	24	1	15	0	25
09:00	*	*	*	*	*	*	*	*	0	54	0	62	**6**	38	2	51
10:00	*	*	*	*	*	*	*	*	**7**	67	2	85	2	78	**4**	77
11:00	*	*	*	*	*	*	*	*	6	**99**	**3**	**92**	1	**92**	3	**94**
12:00 PM	*	*	*	*	*	*	*	*	4	103	4	124	2	151	3	126
01:00	*	*	*	*	*	*	*	*	2	107	**10**	143	6	160	**6**	137
02:00	*	*	*	*	*	*	*	*	2	88	2	123	2	131	2	114
03:00	*	*	*	*	*	*	*	*	4	119	3	125	5	151	4	132
04:00	*	*	*	*	*	*	*	*	4	112	2	137	5	**168**	4	139
05:00	*	*	*	*	*	*	*	*	5	112	2	**154**	**7**	164	5	**143**
06:00	*	*	*	*	*	*	*	*	5	**133**	5	127	2	147	4	136
07:00	*	*	*	*	*	*	*	*	**6**	122	1	109	5	135	4	122
08:00	*	*	*	*	*	*	*	*	3	86	0	85	3	78	2	83
09:00	*	*	*	*	*	*	*	*	4	81	2	77	1	56	2	71
10:00	*	*	*	*	*	*	*	*	4	60	6	60	0	40	3	53
11:00	*	*	*	*	*	*	*	*	4	28	1	28	2	17	2	24
Lane	0	0	0	0	0	0	0	0	60	1438	50	1598	51	1645	52	1561
Day	0		0		0		0		1498		1648		1696		1613	
AM Peak	-	-	-	-	-	-	-	-	10:00	11:00	11:00	11:00	09:00	11:00	10:00	11:00
Vol.	-	-	-	-	-	-	-	-	7	99	3	92	6	92	4	94
PM Peak	-	-	-	-	-	-	-	-	19:00	18:00	13:00	17:00	17:00	16:00	13:00	17:00
Vol.	-	-	-	-	-	-	-	-	6	133	10	154	7	168	6	143

Accurate Counts

978-664-2565

Location : Shaw's Main Entrance / Exit
Location : West of Service Road
City/State: Boston, MA

Start	05-Nov-12		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
12:00 AM	2	15	1	16	1	13	2	22	*	*	*	*	*	*	2	16
01:00	0	2	0	5	0	4	1	5	*	*	*	*	*	*	0	4
02:00	1	0	2	5	0	1	0	1	*	*	*	*	*	*	1	2
03:00	0	1	1	1	0	0	1	2	*	*	*	*	*	*	0	1
04:00	0	2	1	1	0	2	1	1	*	*	*	*	*	*	0	2
05:00	0	1	0	0	0	0	0	2	*	*	*	*	*	*	0	1
06:00	0	1	1	3	1	3	0	1	*	*	*	*	*	*	0	2
07:00	0	2	0	3	0	7	0	9	*	*	*	*	*	*	0	5
08:00	1	16	1	24	1	15	2	13	*	*	*	*	*	*	1	17
09:00	1	27	2	25	2	24	3	25	*	*	*	*	*	*	2	25
10:00	0	43	**3**	41	1	51	2	43	*	*	*	*	*	*	2	44
11:00	**3**	**54**	2	**67**	**4**	**59**	**4**	**61**	*	*	*	*	*	*	**3**	**60**
12:00 PM	1	96	6	68	**5**	78	2	75	*	*	*	*	*	*	4	79
01:00	4	85	4	96	3	101	**7**	92	*	*	*	*	*	*	4	94
02:00	0	108	3	89	4	96	1	82	*	*	*	*	*	*	2	94
03:00	1	97	2	78	1	85	2	105	*	*	*	*	*	*	2	91
04:00	1	94	5	95	3	100	2	102	*	*	*	*	*	*	3	98
05:00	3	122	5	100	4	103	1	121	*	*	*	*	*	*	3	112
06:00	5	137	**8**	105	2	125	6	114	*	*	*	*	*	*	**5**	120
07:00	**6**	**147**	5	120	4	**129**	3	**128**	*	*	*	*	*	*	4	**131**
08:00	3	135	3	**122**	2	83	4	108	*	*	*	*	*	*	3	112
09:00	2	87	4	94	3	65	4	89	*	*	*	*	*	*	3	84
10:00	0	67	2	72	2	64	2	63	*	*	*	*	*	*	2	66
11:00	3	42	1	34	0	33	1	56	*	*	*	*	*	*	1	41
Lane	37	1381	62	1264	43	1241	51	1320	0	0	0	0	0	0	47	1301
Day	1418		1326		1284		1371		0		0		0		1348	
AM Peak	11:00	11:00	10:00	11:00	11:00	11:00	11:00	11:00	-	-	-	-	-	-	11:00	11:00
Vol.	3	54	3	67	4	59	4	61	-	-	-	-	-	-	3	60
PM Peak	19:00	19:00	18:00	20:00	12:00	19:00	13:00	19:00	-	-	-	-	-	-	18:00	19:00
Vol.	6	147	8	122	5	129	7	128	-	-	-	-	-	-	5	131

Comb. Total	1418	1326	1284	1371	1498	1648	1696	2961

ADT ADT 1,463 AADT 1,463

Accurate Counts

978-664-2565

Location : Morrissey Service Road
Location : Between Shaw's Driveways
City/State: Boston, MA

Start Time	01-Nov-12 Thu	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		16	81			0	14				
12:15		9	102			2	9				
12:30		19	101			3	13				
12:45		8	83	52	367	1	18	6	54	58	421
01:00		6	76			0	16				
01:15		12	86			0	15				
01:30		4	90			0	12				
01:45		6	120	28	372	0	23	0	66	28	438
02:00		5	119			0	12				
02:15		7	104			0	12				
02:30		5	152			2	20				
02:45		4	184	21	559	0	16	2	60	23	619
03:00		8	200			0	21				
03:15		13	192			0	18				
03:30		6	245			0	20				
03:45		13	245	40	882	0	19	0	78	40	960
04:00		17	186			0	15				
04:15		16	258			4	22				
04:30		16	204			0	21				
04:45		8	185	57	833	0	25	4	83	61	916
05:00		10	192			0	32				
05:15		10	244			0	34				
05:30		15	223			1	30				
05:45		28	171	63	830	0	28	1	124	64	954
06:00		41	138			4	31				
06:15		45	118			5	29				
06:30		56	110			2	25				
06:45		72	101	214	467	1	27	12	112	226	579
07:00		84	93			3	29				
07:15		117	80			5	34				
07:30		109	53			1	26				
07:45		124	64	434	290	8	16	17	105	451	395
08:00		126	70			3	16				
08:15		132	56			5	16				
08:30		155	52			3	10				
08:45		146	50	559	228	5	14	16	56	575	284
09:00		148	50			2	17				
09:15		103	48			9	11				
09:30		94	34			5	12				
09:45		103	27	448	159	11	12	27	52	475	211
10:00		86	15			9	13				
10:15		87	32			17	10				
10:30		79	20			9	6				
10:45		73	21	325	88	13	6	48	35	373	123
11:00		88	25			9	4				
11:15		75	26			10	3				
11:30		88	23			17	2				
11:45		64	21	315	95	10	1	46	10	361	105
Total		2556	5170			179	835			2735	6005
Percent		33.1%	66.9%			17.7%	82.3%			31.3%	68.7%

Accurate Counts

978-664-2565

Location : Morrissey Service Road
Location : Between Shaw's Driveways
City/State: Boston, MA

Start Time	02-Nov-12 Fri	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		20	94			6	17				
12:15		14	112			0	16				
12:30		12	81			0	20				
12:45		9	111	55	398	0	14	6	67	61	465
01:00		8	103			0	27				
01:15		10	100			0	17				
01:30		5	96			0	13				
01:45		7	97	30	396	0	17	0	74	30	470
02:00		8	126			0	17				
02:15		9	119			0	21				
02:30		6	172			2	17				
02:45		9	180	32	597	1	17	3	72	35	669
03:00		2	249			0	15				
03:15		7	251			0	26				
03:30		11	269			0	25				
03:45		12	221	32	990	1	18	1	84	33	1074
04:00		21	251			0	12				
04:15		13	222			0	29				
04:30		7	217			0	19				
04:45		7	187	48	877	1	28	1	88	49	965
05:00		10	168			0	33				
05:15		14	260			0	18				
05:30		23	255			0	25				
05:45		35	235	82	918	1	20	1	96	83	1014
06:00		16	157			2	20				
06:15		39	152			2	27				
06:30		66	163			1	24				
06:45		77	118	198	590	3	31	8	102	206	692
07:00		103	111			4	29				
07:15		128	106			4	24				
07:30		124	75			2	27				
07:45		117	89	472	381	4	19	14	99	486	480
08:00		126	68			6	20				
08:15		116	53			4	10				
08:30		134	48			10	21				
08:45		130	46	506	215	7	11	27	62	533	277
09:00		112	65			12	13				
09:15		128	55			10	15				
09:30		90	36			11	19				
09:45		74	29	404	185	8	11	41	58	445	243
10:00		91	24			12	9				
10:15		72	25			10	4				
10:30		84	29			6	12				
10:45		62	22	309	100	18	14	46	39	355	139
11:00		83	37			15	11				
11:15		79	31			11	4				
11:30		84	34			20	0				
11:45		85	27	331	129	19	5	65	20	396	149
Total		2499	5776			213	861			2712	6637
Percent		30.2%	69.8%			19.8%	80.2%			29.0%	71.0%

Accurate Counts

978-664-2565

Location : Morrissey Service Road
Location : Between Shaw's Driveways
City/State: Boston, MA

Start Time	03-Nov-12 Sat	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		15	94			2	23				
12:15		30	94			2	13				
12:30		22	103			5	27				
12:45		17	74	84	365	0	30	9	93	93	458
01:00		11	134			0	18				
01:15		17	143			0	24				
01:30		13	64			0	28				
01:45		9	74	50	415	0	28	0	98	50	513
02:00		7	95			0	23				
02:15		8	84			1	33				
02:30		11	75			2	24				
02:45		13	72	39	326	0	21	3	101	42	427
03:00		7	89			0	27				
03:15		7	78			0	19				
03:30		7	85			1	20				
03:45		7	81	28	333	0	21	1	87	29	420
04:00		12	86			0	30				
04:15		11	77			0	21				
04:30		4	69			0	23				
04:45		9	84	36	316	0	23	0	97	36	413
05:00		7	63			0	30				
05:15		10	62			2	30				
05:30		9	60			0	23				
05:45		17	63	43	248	1	28	3	111	46	359
06:00		12	55			2	20				
06:15		14	46			1	21				
06:30		20	52			2	17				
06:45		21	36	67	189	2	25	7	83	74	272
07:00		30	33			5	28				
07:15		24	37			1	14				
07:30		59	41			3	17				
07:45		38	31	151	142	2	12	11	71	162	213
08:00		50	31			3	16				
08:15		53	30			2	14				
08:30		56	28			4	14				
08:45		45	30	204	119	8	18	17	62	221	181
09:00		45	34			2	21				
09:15		54	26			8	16				
09:30		58	30			10	17				
09:45		51	27	208	117	11	12	31	66	239	183
10:00		51	23			15	14				
10:15		61	32			7	10				
10:30		59	21			17	15				
10:45		62	22	233	98	23	6	62	45	295	143
11:00		63	29			12	12				
11:15		90	22			15	4				
11:30		97	22			9	3				
11:45		78	27	328	100	19	2	55	21	383	121
Total		1471	2768			199	935			1670	3703
Percent		34.7%	65.3%			17.5%	82.5%			31.1%	68.9%
Grand Total		6526	13714			591	2631			7117	16345
Percent		32.2%	67.8%			18.3%	81.7%			30.3%	69.7%
ADT		ADT 7,821		AADT 7,821							

Accurate Counts

978-664-2565

Location : Morrissey Service Road
Location : Between Shaw's Driveways
City/State: Boston, MA

Start	29-Oct-12		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	*	*	*	*	52	6	55	6	84	9	*	*	64	7
01:00	*	*	*	*	*	*	28	0	30	0	50	0	*	*	36	0
02:00	*	*	*	*	*	*	21	2	32	3	39	3	*	*	31	3
03:00	*	*	*	*	*	*	40	0	32	1	28	1	*	*	33	1
04:00	*	*	*	*	*	*	57	4	48	1	36	0	*	*	47	2
05:00	*	*	*	*	*	*	63	1	82	1	43	3	*	*	63	2
06:00	*	*	*	*	*	*	214	12	198	8	67	7	*	*	160	9
07:00	*	*	*	*	*	*	434	17	472	14	151	11	*	*	352	14
08:00	*	*	*	*	*	*	**559**	16	**506**	27	204	17	*	*	**423**	20
09:00	*	*	*	*	*	*	448	27	404	41	208	31	*	*	353	33
10:00	*	*	*	*	*	*	325	**48**	309	46	233	**62**	*	*	289	52
11:00	*	*	*	*	*	*	315	46	331	**65**	**328**	55	*	*	325	**55**
12:00 PM	*	*	*	*	*	*	367	54	398	67	365	93	*	*	377	71
01:00	*	*	*	*	*	*	372	66	396	74	**415**	98	*	*	394	79
02:00	*	*	*	*	*	*	559	60	597	72	326	101	*	*	494	78
03:00	*	*	*	*	*	*	**882**	78	**990**	84	333	87	*	*	**735**	83
04:00	*	*	*	*	*	*	833	83	877	88	316	97	*	*	675	89
05:00	*	*	*	*	*	*	830	**124**	918	96	248	**111**	*	*	665	**110**
06:00	*	*	*	*	*	*	467	112	590	**102**	189	83	*	*	415	99
07:00	*	*	*	*	*	*	290	105	381	99	142	71	*	*	271	92
08:00	*	*	*	*	*	*	228	56	215	62	119	62	*	*	187	60
09:00	*	*	*	*	*	*	159	52	185	58	117	66	*	*	154	59
10:00	*	*	*	*	*	*	88	35	100	39	98	45	*	*	95	40
11:00	*	*	*	*	*	*	95	10	129	20	100	21	*	*	108	17
Lane	0	0	0	0	0	0	7726	1014	8275	1074	4239	1134	0	0	6746	1075
Day	0		0		0		8740		9349		5373		0		7821	
AM Peak	-	-	-	-	-	-	08:00	10:00	08:00	11:00	11:00	10:00	-	-	08:00	11:00
Vol.	-	-	-	-	-	-	559	48	506	65	328	62	-	-	423	55
PM Peak	-	-	-	-	-	-	15:00	17:00	15:00	18:00	13:00	17:00	-	-	15:00	17:00
Vol.	-	-	-	-	-	-	882	124	990	102	415	111	-	-	735	110

Comb. Total	0		0		0		8740		9349		5373		0		7821	

ADT ADT 7,821 AADT 7,821

TRIP GENERATION AND MODE SHARE

ITE TRIP GENERATION WORKSHEET
(8th Edition, Updated 2012)

LANDUSE: Apartment
LANDUSE CODE: 220

Independent Variable --- Number of Units

JOB NAME: Synergy
JOB NUMBER:

UNITS (#): 278

WEEKDAY

RATES:			Total Trip Ends			Independent Variable Range			Directional Distribution	
	# Studies	R^2	Average	Low	High	Average	Low	High	Enter	Exit
DAILY	88	0.87	6.65	1.27	12.50				50%	50%
AM PEAK (ADJACENT ST)	78	0.83	0.51	0.10	1.02				20%	80%
PM PEAK (ADJACENT ST)	90	0.77	0.62	0.10	1.64				65%	35%

TRIPS:	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	1,849	924	924	1821	911	911
AM PEAK (ADJACENT ST)	142	28	113	140	28	112
PM PEAK (ADJACENT ST)	172	112	60	171	111	60

SATURDAY

RATES:			Total Trip Ends			Independent Variable Range			Directional Distribution	
	# Studies	R^2	Average	Low	High	Average	Low	High	Enter	Exit
DAILY	15	0.85	6.39	2.84	8.40				50%	50%
PEAK OF GENERATOR	14	0.56	0.52	0.26	1.05				*Peak Distribution Not Availble*	

TRIPS:	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	1,776	888	888	1926	963	963
PEAK OF GENERATOR	145	NA	NA	133	NA	NA

Synergy

JTW mode share - tract 909 (master plan)	
Auto a.	43%
Transit b.	53%
Walk c.	4%

Vehicle Occupancy		
VOR (National) d.	1.2	(used to ch
VOR (Local) e.	1.08	(Used to ch

Trips by Mode Share

Period	ITE Trips	Person Trips national VOR	Auto-Person Trips 43.0%	Auto Trips local VOR	Transit Trips 53.0%	Walk Trips 4.0%
Weekday Daily						
Entering	924	1,109	477	442	588	44
Exiting	924	1,109	477	442	588	44
Total	1,849	2,218	954	883	1,176	89
Weekday Morning						
Entering	28	34	15	14	18	1
Exiting	113	136	59	54	72	5
Total	142	170	73	68	90	7
Weekday Evening						
Entering	112	134	58	54	71	5
Exiting	60	72	31	29	38	3
Total	172	207	89	82	110	8
Saturday Mid-day						
Entering	72	87	37	35	46	3
Exiting	72	87	37	35	46	3
Total	145	173	75	69	92	7

PROJECT TRIPS
FOR VOLUME NETWORKS

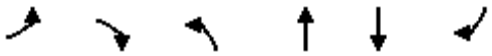
SYNCHRO REPORTS

2012 Existing Condition
2017 No Build Condition
2017 Build Condition

2012 Existing Condition – Synchro Reports

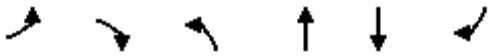
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	56	4	673
v/c Ratio	0.52	0.00	0.28
Control Delay	50.1	5.0	5.5
Queue Delay	0.0	0.0	0.0
Total Delay	50.1	5.0	5.5
Queue Length 50th (ft)	22	1	76
Queue Length 95th (ft)	33	1	100
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	252	1180	2431
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.00	0.28

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.93			1.00	1.00	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1622			1583	3259	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1622			1583	3259	
Volume (vph)	16	16	0	1	548	4
Peak-hour factor, PHF	0.57	0.57	0.25	0.25	0.82	0.82
Adj. Flow (vph)	28	28	0	4	668	5
RTOR Reduction (vph)	27	0	0	0	0	0
Lane Group Flow (vph)	29	0	0	4	673	0
Heavy Vehicles (%)	0%	6%	0%	20%	7%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	6.0			90.0	90.0	
Effective Green, g (s)	6.0			91.0	91.0	
Actuated g/C Ratio	0.05			0.75	0.75	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	80			1181	2431	
v/s Ratio Prot	c0.02			0.00	c0.21	
v/s Ratio Perm						
v/c Ratio	0.37			0.00	0.28	
Uniform Delay, d1	56.2			3.9	5.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.0			0.0	0.3	
Delay (s)	57.2			4.0	5.2	
Level of Service	E			A	A	
Approach Delay (s)	57.2			4.0	5.2	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	122.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



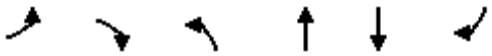
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	17	552	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	18	600	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	630	312	600			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	630	312	600			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	414	684	973			

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	18	400	224
Volume Left	0	0	0
Volume Right	0	0	24
cSH	1700	1700	1700
Volume to Capacity	0.01	0.24	0.13
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	19.3%	ICU Level of Service	A
Analysis Period (min)	15		

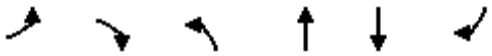
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	165	32	1080
v/c Ratio	0.83	0.02	0.45
Control Delay	81.0	6.9	9.7
Queue Delay	0.0	0.0	0.0
Total Delay	81.0	6.9	9.7
Queue Length 50th (ft)	122	8	195
Queue Length 95th (ft)	171	11	250
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	253	1329	2389
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.65	0.02	0.45

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.95			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1675			1900	3415	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1675			1900	3415	
Volume (vph)	79	51	0	16	935	4
Peak-hour factor, PHF	0.79	0.79	0.50	0.50	0.87	0.87
Adj. Flow (vph)	100	65	0	32	1075	5
RTOR Reduction (vph)	18	0	0	0	0	0
Lane Group Flow (vph)	147	0	0	32	1080	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	25%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	14.1			90.1	90.1	
Effective Green, g (s)	14.1			91.1	91.1	
Actuated g/C Ratio	0.11			0.70	0.70	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	181			1329	2389	
v/s Ratio Prot	c0.09			0.02	c0.32	
v/s Ratio Perm						
v/c Ratio	0.81			0.02	0.45	
Uniform Delay, d1	56.8			6.0	8.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	22.5			0.0	0.6	
Delay (s)	79.2			6.0	9.2	
Level of Service	E			A	A	
Approach Delay (s)	79.2			6.0	9.2	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	130.2	Sum of lost time (s)	25.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



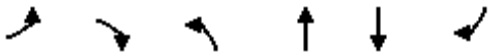
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	95	939	122
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	103	1021	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	1190	577	1021			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1190	577	1021			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	180	460	676			

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	103	680	473
Volume Left	0	0	0
Volume Right	0	0	133
cSH	1700	1700	1700
Volume to Capacity	0.06	0.40	0.28
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

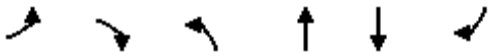
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	149	4	615
v/c Ratio	0.79	0.00	0.26
Control Delay	75.9	7.0	7.5
Queue Delay	0.0	0.0	0.0
Total Delay	75.9	7.0	7.5
Queue Length 50th (ft)	105	1	87
Queue Length 95th (ft)	166	3	130
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	256	894	2411
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.58	0.00	0.26

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.94			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1685			1267	3415	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1685			1267	3415	
Volume (vph)	74	51	0	2	540	7
Peak-hour factor, PHF	0.84	0.84	0.50	0.50	0.89	0.89
Adj. Flow (vph)	88	61	0	4	607	8
RTOR Reduction (vph)	20	0	0	0	1	0
Lane Group Flow (vph)	129	0	0	4	614	0
Heavy Vehicles (%)	0%	0%	0%	50%	2%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	12.9			90.1	90.1	
Effective Green, g (s)	12.9			91.1	91.1	
Actuated g/C Ratio	0.10			0.71	0.71	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	169			895	2412	
v/s Ratio Prot	c0.08			0.00	c0.18	
v/s Ratio Perm						
v/c Ratio	0.76			0.00	0.25	
Uniform Delay, d1	56.6			5.6	6.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	16.7			0.0	0.3	
Delay (s)	73.3			5.6	7.0	
Level of Service	E			A	A	
Approach Delay (s)	73.3			5.6	7.0	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	129.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	76	547	134
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	83	595	146
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	750	370	595			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	750	370	595			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	347	627	978			

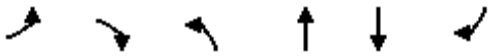
Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	83	396	344
Volume Left	0	0	0
Volume Right	0	0	146
cSH	1700	1700	1700
Volume to Capacity	0.05	0.23	0.20
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

2017 No Build Condition – Synchro Reports

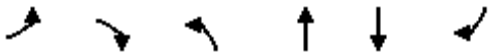
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	56	4	690
v/c Ratio	0.52	0.00	0.28
Control Delay	50.1	5.0	5.5
Queue Delay	0.0	0.0	0.0
Total Delay	50.1	5.0	5.5
Queue Length 50th (ft)	22	1	78
Queue Length 95th (ft)	33	1	102
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	252	1180	2431
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.00	0.28

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.93			1.00	1.00	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1622			1583	3259	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1622			1583	3259	
Volume (vph)	16	16	0	1	562	4
Peak-hour factor, PHF	0.57	0.57	0.25	0.25	0.82	0.82
Adj. Flow (vph)	28	28	0	4	685	5
RTOR Reduction (vph)	27	0	0	0	0	0
Lane Group Flow (vph)	29	0	0	4	690	0
Heavy Vehicles (%)	0%	6%	0%	20%	7%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	6.0			90.0	90.0	
Effective Green, g (s)	6.0			91.0	91.0	
Actuated g/C Ratio	0.05			0.75	0.75	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	80			1181	2431	
v/s Ratio Prot	c0.02			0.00	c0.21	
v/s Ratio Perm						
v/c Ratio	0.37			0.00	0.28	
Uniform Delay, d1	56.2			3.9	5.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.0			0.0	0.3	
Delay (s)	57.2			4.0	5.3	
Level of Service	E			A	A	
Approach Delay (s)	57.2			4.0	5.3	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	122.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



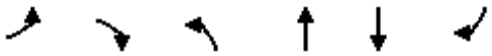
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	17	566	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	18	615	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	646	320	615			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	646	320	615			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	404	676	960			

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	18	410	230
Volume Left	0	0	0
Volume Right	0	0	25
cSH	1700	1700	1700
Volume to Capacity	0.01	0.24	0.14
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

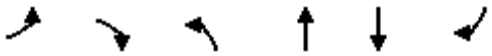
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	169	32	1107
v/c Ratio	0.84	0.02	0.46
Control Delay	81.7	6.9	10.0
Queue Delay	0.0	0.0	0.0
Total Delay	81.7	6.9	10.0
Queue Length 50th (ft)	126	8	204
Queue Length 95th (ft)	175	11	260
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	253	1326	2383
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.67	0.02	0.46

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.95			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1675			1900	3415	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1675			1900	3415	
Volume (vph)	81	52	0	16	959	4
Peak-hour factor, PHF	0.79	0.79	0.50	0.50	0.87	0.87
Adj. Flow (vph)	103	66	0	32	1102	5
RTOR Reduction (vph)	18	0	0	0	0	0
Lane Group Flow (vph)	151	0	0	32	1107	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	25%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	14.4			90.1	90.1	
Effective Green, g (s)	14.4			91.1	91.1	
Actuated g/C Ratio	0.11			0.70	0.70	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	185			1326	2384	
v/s Ratio Prot	c0.09			0.02	c0.32	
v/s Ratio Perm						
v/c Ratio	0.82			0.02	0.46	
Uniform Delay, d1	56.8			6.0	8.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	22.5			0.0	0.7	
Delay (s)	79.3			6.1	9.5	
Level of Service	E			A	A	
Approach Delay (s)	79.3			6.1	9.5	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	130.5	Sum of lost time (s)	25.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



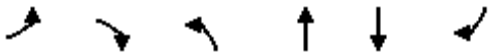
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	97	963	125
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	105	1047	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	1220	591	1047			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1220	591	1047			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	172	450	660			

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	105	698	485
Volume Left	0	0	0
Volume Right	0	0	136
cSH	1700	1700	1700
Volume to Capacity	0.06	0.41	0.29
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

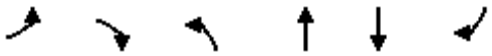
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	152	4	630
v/c Ratio	0.80	0.00	0.26
Control Delay	77.0	7.0	7.6
Queue Delay	0.0	0.0	0.0
Total Delay	77.0	7.0	7.6
Queue Length 50th (ft)	109	1	92
Queue Length 95th (ft)	170	3	133
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	255	893	2406
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.60	0.00	0.26

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.94			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1686			1267	3416	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1686			1267	3416	
Volume (vph)	76	52	0	2	554	7
Peak-hour factor, PHF	0.84	0.84	0.50	0.50	0.89	0.89
Adj. Flow (vph)	90	62	0	4	622	8
RTOR Reduction (vph)	19	0	0	0	1	0
Lane Group Flow (vph)	133	0	0	4	629	0
Heavy Vehicles (%)	0%	0%	0%	50%	2%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	13.2			90.1	90.1	
Effective Green, g (s)	13.2			91.1	91.1	
Actuated g/C Ratio	0.10			0.70	0.70	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	172			893	2407	
v/s Ratio Prot	c0.08			0.00	c0.18	
v/s Ratio Perm						
v/c Ratio	0.77			0.00	0.26	
Uniform Delay, d1	56.6			5.7	6.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	17.7			0.0	0.3	
Delay (s)	74.3			5.7	7.2	
Level of Service	E			A	A	
Approach Delay (s)	74.3			5.7	7.2	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	25.0
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	78	561	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	85	610	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	769	379	610			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	769	379	610			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	338	618	965			

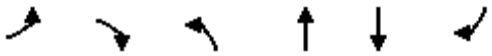
Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	85	407	352
Volume Left	0	0	0
Volume Right	0	0	149
cSH	1700	1700	1700
Volume to Capacity	0.05	0.24	0.21
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0	0.0	
Approach LOS			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

2017 Build Condition – Synchro Reports

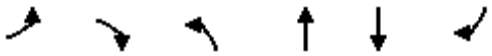
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	38	4	720
v/c Ratio	0.42	0.00	0.29
Control Delay	48.0	4.0	5.4
Queue Delay	0.0	0.0	0.0
Total Delay	48.0	4.0	5.4
Queue Length 50th (ft)	15	1	80
Queue Length 95th (ft)	27	1	102
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	245	1186	2443
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.16	0.00	0.29

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.93			1.00	1.00	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1622			1583	3259	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1622			1583	3259	
Volume (vph)	11	11	0	1	586	4
Peak-hour factor, PHF	0.57	0.57	0.25	0.25	0.82	0.82
Adj. Flow (vph)	19	19	0	4	715	5
RTOR Reduction (vph)	18	0	0	0	0	0
Lane Group Flow (vph)	20	0	0	4	720	0
Heavy Vehicles (%)	0%	6%	0%	20%	7%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	5.4			90.0	90.0	
Effective Green, g (s)	5.4			91.0	91.0	
Actuated g/C Ratio	0.04			0.75	0.75	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	72			1187	2443	
v/s Ratio Prot	c0.01			0.00	c0.22	
v/s Ratio Perm						
v/c Ratio	0.28			0.00	0.29	
Uniform Delay, d1	56.1			3.8	4.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			0.0	0.3	
Delay (s)	56.9			3.8	5.2	
Level of Service	E			A	A	
Approach Delay (s)	56.9			3.8	5.2	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	121.4	Sum of lost time (s)	25.0
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



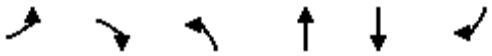
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	40	24	0	12	566	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	26	0	13	615	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	648	328	615			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	648	328	615			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	100			
cM capacity (veh/h)	403	668	960			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	70	13	410	245
Volume Left	43	0	0	0
Volume Right	26	0	0	40
cSH	473	960	1700	1700
Volume to Capacity	0.15	0.00	0.24	0.14
Queue Length 95th (ft)	13	0	0	0
Control Delay (s)	13.9	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.9	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

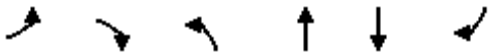
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	112	32	1138
v/c Ratio	0.72	0.02	0.46
Control Delay	70.8	5.9	8.5
Queue Delay	0.0	0.0	0.0
Total Delay	70.8	5.9	8.5
Queue Length 50th (ft)	74	7	183
Queue Length 95th (ft)	117	10	252
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	253	1368	2459
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.44	0.02	0.46

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.95			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1675			1900	3416	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1675			1900	3416	
Volume (vph)	54	35	0	16	986	4
Peak-hour factor, PHF	0.79	0.79	0.50	0.50	0.87	0.87
Adj. Flow (vph)	68	44	0	32	1133	5
RTOR Reduction (vph)	18	0	0	0	0	0
Lane Group Flow (vph)	94	0	0	32	1138	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	25%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	10.4			90.1	90.1	
Effective Green, g (s)	10.4			91.1	91.1	
Actuated g/C Ratio	0.08			0.72	0.72	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	138			1368	2460	
v/s Ratio Prot	c0.06			0.02	c0.33	
v/s Ratio Perm						
v/c Ratio	0.68			0.02	0.46	
Uniform Delay, d1	56.4			5.0	7.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	9.9			0.0	0.6	
Delay (s)	66.4			5.1	8.1	
Level of Service	E			A	A	
Approach Delay (s)	66.4			5.1	8.1	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	126.5	Sum of lost time (s)	25.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



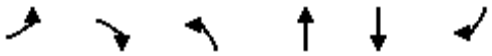
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	46	27	0	70	963	179
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	29	0	76	1047	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	1220	621	1047			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1220	621	1047			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	93	100			
cM capacity (veh/h)	172	430	660			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	79	76	698	543
Volume Left	50	0	0	0
Volume Right	29	0	0	195
cSH	222	660	1700	1700
Volume to Capacity	0.36	0.00	0.41	0.32
Queue Length 95th (ft)	39	0	0	0
Control Delay (s)	30.1	0.0	0.0	0.0
Lane LOS	D			
Approach Delay (s)	30.1	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

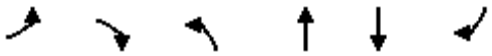
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	103	4	663
v/c Ratio	0.70	0.00	0.27
Control Delay	68.9	6.0	6.5
Queue Delay	0.0	0.0	0.0
Total Delay	68.9	6.0	6.5
Queue Length 50th (ft)	66	1	85
Queue Length 95th (ft)	116	3	127
Internal Link Dist (ft)	120	56	169
Turn Bay Length (ft)			
Base Capacity (vph)	255	919	2477
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.40	0.00	0.27

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	8	12	11	11
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	0.95	
Frt	0.94			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1686			1267	3416	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1686			1267	3416	
Volume (vph)	51	35	0	2	583	7
Peak-hour factor, PHF	0.84	0.84	0.50	0.50	0.89	0.89
Adj. Flow (vph)	61	42	0	4	655	8
RTOR Reduction (vph)	19	0	0	0	1	0
Lane Group Flow (vph)	84	0	0	4	662	0
Heavy Vehicles (%)	0%	0%	0%	50%	2%	0%
Turn Type			Perm			
Protected Phases	4			1	1	
Permitted Phases			1			
Actuated Green, G (s)	9.5			90.1	90.1	
Effective Green, g (s)	9.5			91.1	91.1	
Actuated g/C Ratio	0.08			0.73	0.73	
Clearance Time (s)	4.0			5.0	5.0	
Vehicle Extension (s)	1.0			1.0	1.0	
Lane Grp Cap (vph)	128			919	2478	
v/s Ratio Prot	c0.05			0.00	c0.19	
v/s Ratio Perm						
v/c Ratio	0.65			0.00	0.27	
Uniform Delay, d1	56.4			4.8	5.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	8.8			0.0	0.3	
Delay (s)	65.2			4.8	6.1	
Level of Service	E			A	A	
Approach Delay (s)	65.2			4.8	6.1	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	125.6	Sum of lost time (s)	25.0
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	48	30	0	53	561	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	33	0	58	610	187
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				249	563	
pX, platoon unblocked						
vC, conflicting volume	732	398	610			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	732	398	610			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	95	100			
cM capacity (veh/h)	356	601	965			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	85	19	38	407	390
Volume Left	52	0	0	0	0
Volume Right	33	0	0	0	187
cSH	423	965	1700	1700	1700
Volume to Capacity	0.20	0.00	0.02	0.24	0.23
Queue Length 95th (ft)	19	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Wind Appendix

The Residences at Morrissey Boulevard

Boston, MA

Pedestrian Wind Assessment

RWDI # 1300617
November 12, 2012

SUBMITTED TO

Tyler Norod
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Boston, MA
tnorod@epsilonassociates.com

SUBMITTED BY

Rowan Williams Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada N1K 1B8
519.823.1311

Sonia Beaulieu, M.Sc., P.Eng., ing.
Senior Project Manager / Associate
Sonia.Beaulieu@rwdi.com

Hanqing Wu, Ph.D., P.Eng.
Technical Director / Principal
Hanqing.Wu@rwdi.com

1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Epsilon Associates, Inc. to assess the potential wind conditions around the proposed Residences at Morrissey Boulevard in Boston, MA. The objective of this assessment was to provide a qualitative evaluation of wind comfort conditions on and around the development and recommend mitigation measures, if necessary.

This qualitative assessment is based on the following:

- a review of regional long-term meteorological data;
- our previous wind-tunnel tests on buildings in the Boston area;
- design drawings received by RWDI on November 2 and 6, 2012;
- our engineering judgment and knowledge of wind flows around buildings[1,2]; and
- Use of software developed by RWDI (*Windestimator*[3]) for estimating the potential wind comfort conditions around generalized building forms.

This qualitative approach provides a screening-level estimation of potential wind conditions. To quantify these conditions or refine any conceptual mitigation measures, physical scale model tests would typically be required.

Note that other wind issues, such as those relating to door pressures, exhaust re-entrainment, rain infiltration, snowdrifts, etc. are not considered in the scope of this assessment.

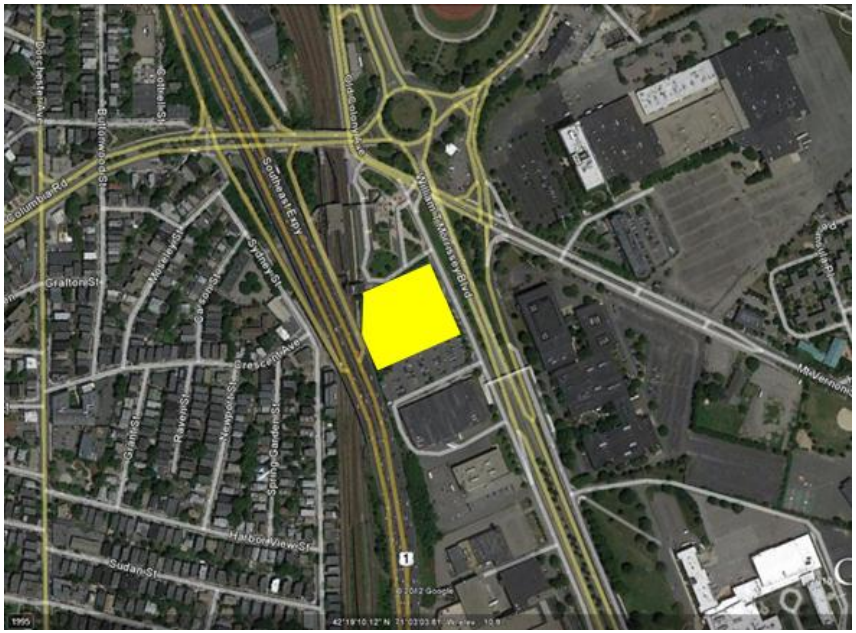


Figure 1: Existing Site and Surroundings (Courtesy of Google earth™)

[1] H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.

[2] C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.

[3] H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

2. BUILDING AND SITE INFORMATION

The proposed development site is located between Morrissey Boulevard and the Southeast Expressway (Interstate 93) in Boston, MA, as shown in Figure 1. To the north of the site is the JFK MBTA Station and to the south is a one-story supermarket. The surrounding buildings are generally low, with the Dorchester Bay to the east and the Boston downtown to the distant north.

Currently, the site consists of a parking lot and a green field. The development will include two five-story residential buildings. As shown in Figure 2, both the East and West Buildings are C-shaped. The East Building has a large courtyard on the west side, while the West Building has a two-story parking structure attached to the west. The total height is approximately 72 ft for both buildings. The East Building also has a roof top terrace at the northeast corner.

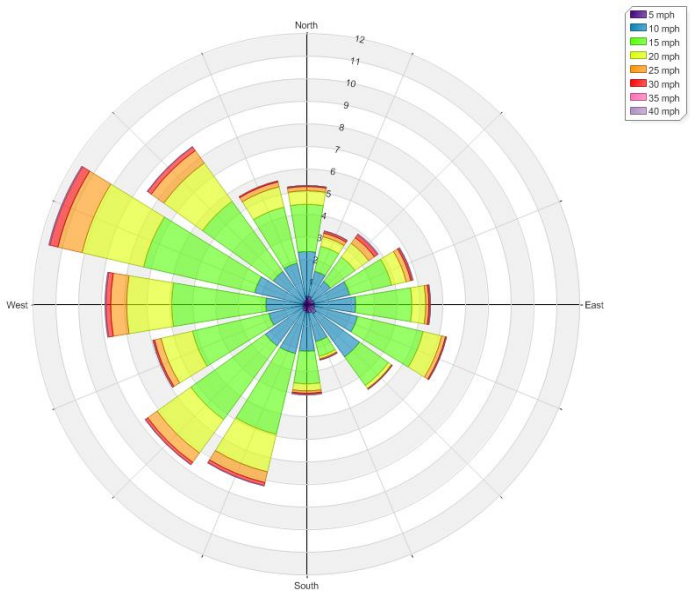
Pedestrian areas on and around the development include building entrances (A1, A2 and A3), sidewalks (B, B1 and B2), parking lots (C), as well as the courtyard (D and D1) and the roof terrace (E) on the East Building.

Figure 2: Reference Plan

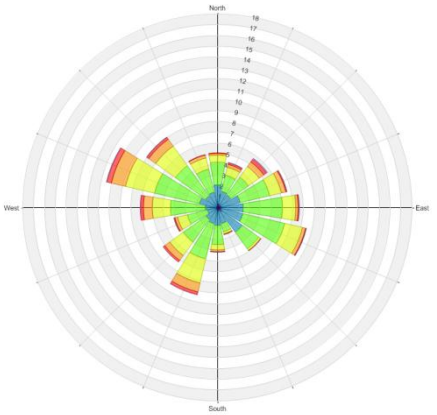
3. LOCAL WIND DATA

Wind roses shown in Figure 3 summarize the seasonal wind climates in the Boston area, based on the long-term data from the Boston Logan International Airport between 1982 and 2011. The prevailing winds are from the west-northwest year-round, especially in the spring and winter seasons. Easterly winds are also frequent. In the summer and fall, the prevailing winds are from the southwest direction, but of lower speeds in general.

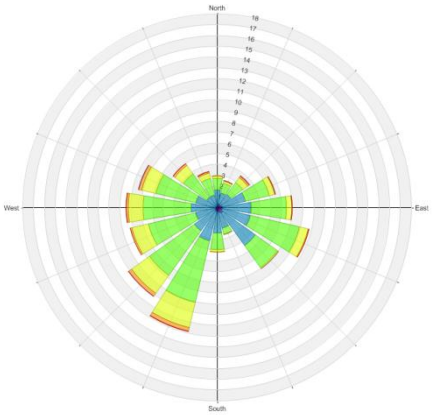
On an annual basis, the most common wind directions are those that originate between the southwest and northwest. Winds from the east are also relatively common. In the case of strong winds, west-northwest and northeast are the dominant directions. Based on the local wind directionality and the orientation of the buildings and streets in the area, winds from the west-northwest and northeast are considered most important, although winds from all other directions have also been taken into account in the analysis.



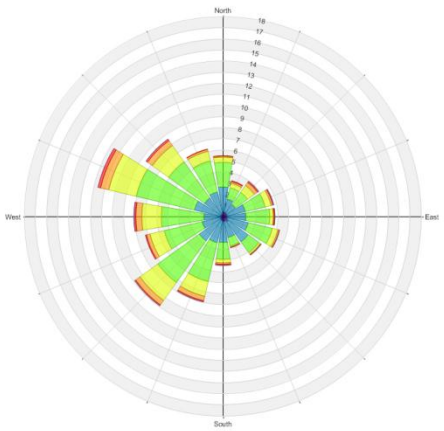
Annual winds



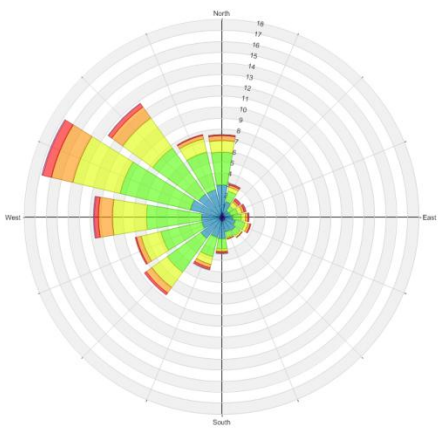
Spring (Mar. to May)



Summer (Jun. to Aug.)



Fall (Sept. to Nov.)



Winter (Dec. to Feb.)

Figure 3: Annual and Seasonal Wind Climate (at Boston Logan International Airport)

4. WIND COMFORT CRITERIA

The Boston Redevelopment Agency (BRA) has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed plus 1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than 1% of the time.

The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[4]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows:

Table 1: BRA Mean Wind Criteria*

Dangerous	> 27 mph
Uncomfortable for Walking	> 19 mph and ≤ 27 mph
Comfortable for Walking	> 15 mph and ≤ 19 mph
Comfortable for Standing	> 12 mph and ≤15 mph
Comfortable for Sitting	< 12 mph
* Applicable to the hourly mean wind speed exceeded 1% of the time.	

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

5. PREDICTED WIND CONDITIONS

5.1 General

Typically the summer and fall winds in Boston tend to be more comfortable than the annual winds, while the winter and spring winds are less comfortable than the annual winds. Wind data collected at the Logan Airport (Section 3) were adjusted for the project site based on an analytical procedure that considered the topographic features of surrounding areas around both the airport and the site.

Wind conditions comfortable for walking are appropriate for sidewalks and parking lots. Lower wind speeds comfortable for standing are desired for main building entrances. Calm wind conditions comfortable for sitting are desirable for courtyards and roof-top terraces in the summer when these areas will typically in use.

Given the limited status of the proposed buildings, the existing wind conditions in the surrounding areas will not be negatively affected by the new project. The wind conditions are expected to be comfortable for intended use in general once the development is complete. However, localized wind flow accelerations will occur around building corners (as illustrated in Figure 4), which may resulte in uncomfortable wind conditions from time to time, especially during the winter and spring seasons.

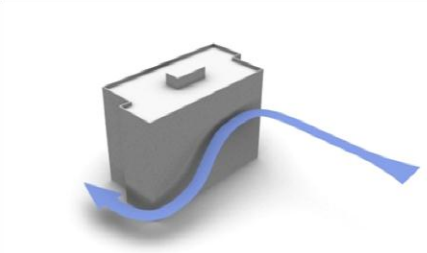


Figure 4: Example of Wind Accelerations Around Building Corners

General flow patterns are shown below for the prevailing west-northwest and northeast winds.

Figure 5: Wind Flow Pattern for West-northwest Winds

Figure 6: Wind Flow Pattern for Northeast Winds

5.2 Predicted Wind Conditions

Building Entrances (Locations A1, A2 and A3)

There are two main entrances to the proposed East Building: one at the wind-exposed northeast corner (A1 in Figure 2) and the other at the inner corner (A2), open to the courtyard, as shown in Figure 7 below. While suitable wind conditions are expected at Entrance A2 due to the sheltering from the proposed buildings, the wind conditions at Entrance A1 will potentially be uncomfortable from time to time in the spring and winter seasons. This is primarily due to accelerations of the prevailing west-northwest winds which will be redirected by the proposed buildings. This corner is also fully exposed to the northeasterly winds.

Figure 7: Building Entrances - A1 and A2

There are several positive design features for wind control at this corner entrance, inlcuding a large canopy wrapping around the corner; landscaping along the north and east sidewalks; doors being recessed from the main north and east façade; and a lobby (vestibule) for the entrance. These design features should be retained in the final design.

To further improve the wind conditions, the following mitigation measures may be considered by the design team and several examples are provided below for reference.

- Relocate the entracnes away form the corner;
- Increase the depth of the canopy or recess the entries further;
- Use sliding doors for a better door operability;
- Plant coniferous trees along sidewalks; and
- Install wind screens and/or planters on the west side of the entrance or increase the height of west railings.

Figure 8: Mitigation Examples for the Northeast Entrance to East Building

The other main entrance to the East Building (A2) is sheltered by the proposed building from the prevailing winds. As such, suitable wind conditions are predicted at this location throughout the year.

The main entrance to the West Building (A3) is also located close to a building corner, where the northeasterly winds over the East Building may be deflected down by the West Building, causing wind flow accelerations in this area. However, it is sheltered by the building from the prevailing west-northwest winds and, hence, suitable wind conditions are expected for the majority of the time. If lower wind activity is desired for this entrance, wind mitigation measures that consist of an entrance canopy and wind screens/planters on both sides of the entrance could be implemented.

Sidewalks (Locations B, B1 and B2)

Sidewalks are generally sheltered by the proposed development for one or more prevailing wind directions. Overall, wind conditions on sidewalks are predicted to be similar to those that currently exist. These wind conditions are considered suitable for the intended pedestrian use throughout the year.

Exceptions are Locations B1 and B2, at the northeast corner of the East Building and the southwest corner of the West Building, respectively (see Figure 2). Uncomfortable wind conditions may occur in these areas in the winter and spring seasons due to accelerations of the prevailing west-northwest winds. Note that limited pedestrian usage is anticipated at Location B2 and, thus, wind conditions at this corner are not of a concern. Wind mitigation measures proposed for the northeast entrance to the East Building, such as wind screens and landscaping along the north sidewalk, and a lager canopy wrapping around the corner, will reduce the wind activity on the sidewalk, including Location B1.

Parking Lots (Location C)

Parking lot users will be active and not stay in one area for a prolonged period of the time. Therefore, wind comfort conditions are not of a serious concern.

Wind conditions on the parking areas south of the proposed development and west of the West Building are expected to be similar to or better than the existing wind conditions on the site. These wind conditions are considered appropriate.

Courtyard (Locations D and D1)

As shown in Figure 2, the courtyard is enclosed by the proposed buildings, where low wind speeds comfortable for standing or sitting are predicted for the summer season. These wind conditions are acceptable for the intended use.

The southwesterly winds are frequent in the summer season, but they are typically of lower wind speeds, when compared to those from the west-northwest and northeast directions. These winds may be channeled between the two proposed buildings and affect the wind conditions in the courtyard.

If lower wind speeds are desired, wind screens or landscaping (see Figure 9) can be considered at the southwest corner of the courtyard (Location D1). Overhead trellises and/or canopy-type trees (right image) can also be installed throughout the courtyard.

Figure 9: Wind Mitigation for the Courtyard

Roof Deck (Location E)

There is an outdoor deck at the northeast corner of the roof of the East Building (Figure 10). Due to the increased elevation, the wind speeds on the deck are anticipated to be higher than those desired for passive activities such as sitting, even in the summer season.

Wind mitigation will be required for this area which would take the form of tall parapets (8 ft or taller) along the entire perimeter of the roof deck, and landscaping/screens on the deck, as shown in Figure 11.

Figure 10: Roof Deck on East Building

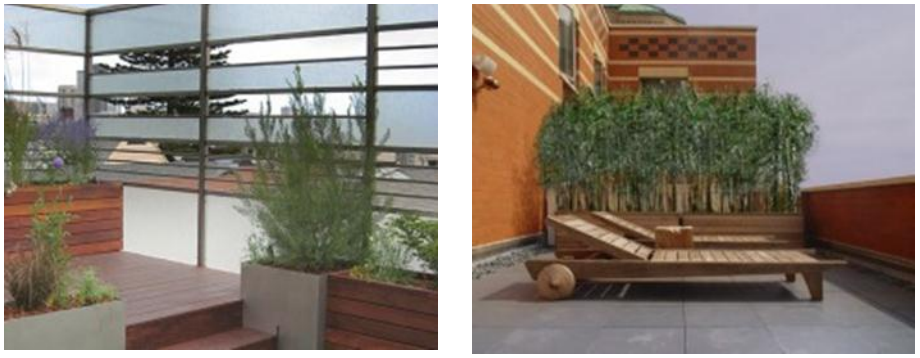


Figure 11: Wind Mitigation for the Roof Deck

6. SUMMARY AND RECOMMENDATIONS

Based on our analysis of the local wind data, the limited size of the proposed development, together with our past wind tunnel experience for building projects in the Boston area, wind conditions on and around the proposed Residences at Morrissey Boulevard are predicted to be similar to those that currently exist and are considered suitable for the intended use for most pedestrian areas.

Higher-than-desired wind speeds are expected at the northeast entrance to the East Building and the roof-top deck on the East Building. Conceptual wind mitigation measures are discussed and examples are provided for consideration to improve the wind conditions to an appropriate level.

7. APPLICABILITY OF RESULTS

The assessment and recommendations presented in this report are based on the proposed geometry and design drawings provided to RWDI. The interpretation of wind flows determined by this pedestrian wind assessment are applicable to the particular building configurations examined and the existing and future surroundings identified to RWDI.

In the event of any significant changes to the design, construction or operation of the building or addition to the surroundings in the future, RWDI could provide an assessment of their impact on the design considered in this report. It is the responsibility of the design team to contact RWDI to initiate this process.

LEED Checklist Appendix

LEED for Homes Mid-rise Pilot Simplified Project Checklist

for Homes

Builder Name:	
Project Team Leader (if different):	
Home Address (Street/City/State):	

Project Description:

Building type: ***Mid-rise multi-family*** # of stories: ***5***

# of units: ***278*** Avg. Home Size Adjustment: ***-9.5***

Adjusted Certification Thresholds

Certified: ***35.5*** Gold: ***65.5***

Silver: ***50.5*** Platinum: ***80.5***

Project Point Total

Prelim: ***51 + 18 maybe pts*** **Final:** ***52***

Certification Level

Prelim: ***Silver*** **Final:** ***Certified***

Final Credit Category Total Points

ID: 3 ***SS: 13*** ***EA: 2*** ***EQ: 7.5***

LL: 7 ***WE: 4*** ***MR: 9.5*** ***AE: 1***

date last updated :

last updated by :

					Max Pts	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Innovation and Design Process (ID)			(No Minimum Points Required)		Max				
1. Integrated Project Planning		1.1	Preliminary Rating		Prereq	Y			
		1.2	Energy Expertise for MID-RISE		Prereq	Y			
		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
		1.6	Trades Training for MID-RISE		1	1	0		1
2. Durability Management Process		2.1	Durability Planning		Prereq	Y			
		2.2	Durability Management		Prereq	Y			
		2.3	Third-Party Durability Management Verification		3	0	3		0
3.Innovative or Regional Design	✎	3.1	Innovation #1 _____		1	0	0		0
	✎	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	3		3
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max				
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		1	0	0		0
		3.2	Infill	**LL 3.1**	2	2	0		2
		3.3	Brownfield Redevelopment for MID-RISE		1	0	0		0
4. Infrastructure		4	Existing Infrastructure		1	1	0		1
5. Community Resources/ Transit		5.1	Basic Community Resources for MID-RISE		1	1	0		1
		5.2	Extensive Community Resources for MID-RISE	**LL 5.1, 5.3**	2	0	0		0
		5.3	Outstanding Community Resources for MID-RISE	**LL 5.1, 5.2**	3	0	0		0
6. Access to Open Space		6	Access to Open Space		1	1	0		1
				Sub-Total for LL Category:	**10**	7	0		7
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max				
1. Site Stewardship		1.1	Erosion Controls During Construction		Prerequisite	Y			
		1.2	Minimize Disturbed Area of Site for MID-RISE		1	1	0		1
2. Landscaping	✎	2.1	No Invasive Plants		Prerequisite	Y			
	✎	2.2	Basic Landscape Design	**SS 2.5**	1	0	1		0
	✎	2.3	Limit Conventional Turf for MID-RISE	**SS 2.5**	2	1	0		1
	✎	2.4	Drought Tolerant Plants for MID-RISE	**SS 2.5**	1	0	0		0
	✎	2.5	Reduce Overall Irrigation Demand by at Least 20% for MID-RISE		3	0	0		0
3. Local Heat Island Effects	✎	3.1	Reduce Site Heat Island Effects for MID-RISE		1	0	0		0
	✎	3.2	Reduce Roof Heat Island Effects for MID-RISE		1	1	0		1
4. Surface Water Management	✎	4.1	Permeable Lot for MID-RISE		2	0	0		0
		4.2	Permanent Erosion Controls		1	0	0		0
	✎	4.3	Stormwater Quality Control for MID-RISE		2	0	0		0
5. Nontoxic Pest Control		5	Pest Control Alternatives		2	2	0		2
6. Compact Development		6.1	Moderate Density for MID-RISE		2	0	0		0
		6.2	High Density for MID-RISE	**SS 6.1, 6.3**	3	0	0		0
		6.3	Very High Density for MID-RISE	**SS 6.1, 6.2**	4	4	0		4
7. Alternative Transportation		7.1	Public Transit for MID-RISE		2	2	0		2
		7.2	Bicycle Storage for MID-RISE		1	1	0		1
		7.3	Parking Capacity/Low-Emitting Vehicles for MID-RISE		1	1	0		1
				Sub-Total for SS Category:	**22**	13	1		13

LEED for Homes Mid-rise Pilot Simplified Project Checklist (continued)

					Max Pts	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	Water Reuse for MID-RISE		5	0	1		0
2. Irrigation System		2.1	High Efficiency Irrigation System for MID-RISE	**WE 2.2**	2	0	2		0
		2.2	Reduce Overall Irrigation Demand by at Least 45% for MID-RISE		2	0	0.5		0
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	2	0		2
		3.2	Very High Efficiency Fixtures and Fittings		6	0	0		0
		3.3	Water Efficient Appliances for MID-RISE		2	2	2		2
				Sub-Total for WE Category:	**15**	4	5		4
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance		1.1	Minimum Energy Performance for MID-RISE		Prereq	Y			
		1.2	Testing and Verification for MID-RISE		Prereq	Y			
		1.3	Optimize Energy Performance for MID-RISE		34	5	0		
7. Water Heating		7.1	Efficient Hot Water Distribution		2	0	2		0
		7.2	Pipe Insulation		1	1	0		1
11. Residential Refrigerant		11.1	Refrigerant Charge Test		Prereq	Y			
Management		11.2	Appropriate HVAC Refrigerants		1	1	0		1
				Sub-Total for EA Category:	**38**	7	2		2
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			
		1.2	Detailed Framing Documents	**MR 1.5**	1	1	0		1
		1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	1	0		1
		1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
		1.5	Off-site Fabrication		4	4	0		4
2. Environmentally Preferable		2.1	FSC Certified Tropical Wood		Prereq	Y			
Products		2.2	Environmentally Preferable Products		8	2.5	1		2.5
3. Waste Management		3.1	Construction Waste Management Planning		Prereq	Y			
		3.2	Construction Waste Reduction		3	3	0		3
				Sub-Total for MR Category:	**16**	9.5	1		9.5
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
2. Combustion Venting		2	Basic Combustion Venting Measures		Prereq	Y			
3. Moisture Control		3	Moisture Load Control		1	0	0		0
4. Outdoor Air Ventilation		4.1	Basic Outdoor Air Ventilation for MID-RISE		Prereq	Y			
		4.2	Enhanced Outdoor Air Ventilation for MID-RISE		2	0	0		0
		4.3	Third-Party Performance Testing for MID-RISE		1	0	1		0
5. Local Exhaust		5.1	Basic Local Exhaust		Prerequisite	Y			
		5.2	Enhanced Local Exhaust		1	1	0		1
		5.3	Third-Party Performance Testing		1	1	0		1
6. Distribution of Space		6.1	Room-by-Room Load Calculations		Prereq	Y			
Heating and Cooling		6.2	Return Air Flow / Room by Room Controls		1	1	0		1
		6.3	Third-Party Performance Test / Multiple Zones		2	0	2		0
7. Air Filtering		7.1	Good Filters		Prereq	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		1	1	0		1
		8.2	Indoor Contaminant Control for MID-RISE		2	0	0		0
		8.3	Preoccupancy Flush		1	0	1		0
9. Radon Protection		9.1	Radon-Resistant Construction in High-Risk Areas		Prereq	Y			
		9.2	Radon-Resistant Construction in Moderate-Risk Areas		1	0	0		0
10. Garage Pollutant Protection		10.1	No HVAC in Garage for MID-RISE		Prereq	Y			
		10.2	Minimize Pollutants from Garage for MID-RISE	**EQ 10.3**	2	2	0		2
		10.3	Detached Garage or No Garage for MID-RISE		3	0	0		3
11. ETS Control		11	Environnmental Tobacco Smoke Reduction for MID-RISE		1	0.5	0		0.5
12. Compartmentalization		12.1	Compartmentalization of Units		Prereq	Y			
of Units		12.2	Enhanced Compartmentalization of Units		1	0	0		0
				Sub-Total for EQ Category:	**21**	6.5	4		7.5
Awareness and Education (AE)			(Minimum of 0 AE Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the		1.1	Basic Operations Training		Prereq	Y			
Homeowner or Tenant		1.2	Enhanced Training		1	1	0		1
		1.3	Public Awareness		1	0	1		0
2. Education of Building Manager		2	Education of Building Manager		1	0	1		0
				Sub-Total for AE Category:	**3**	1	2		1