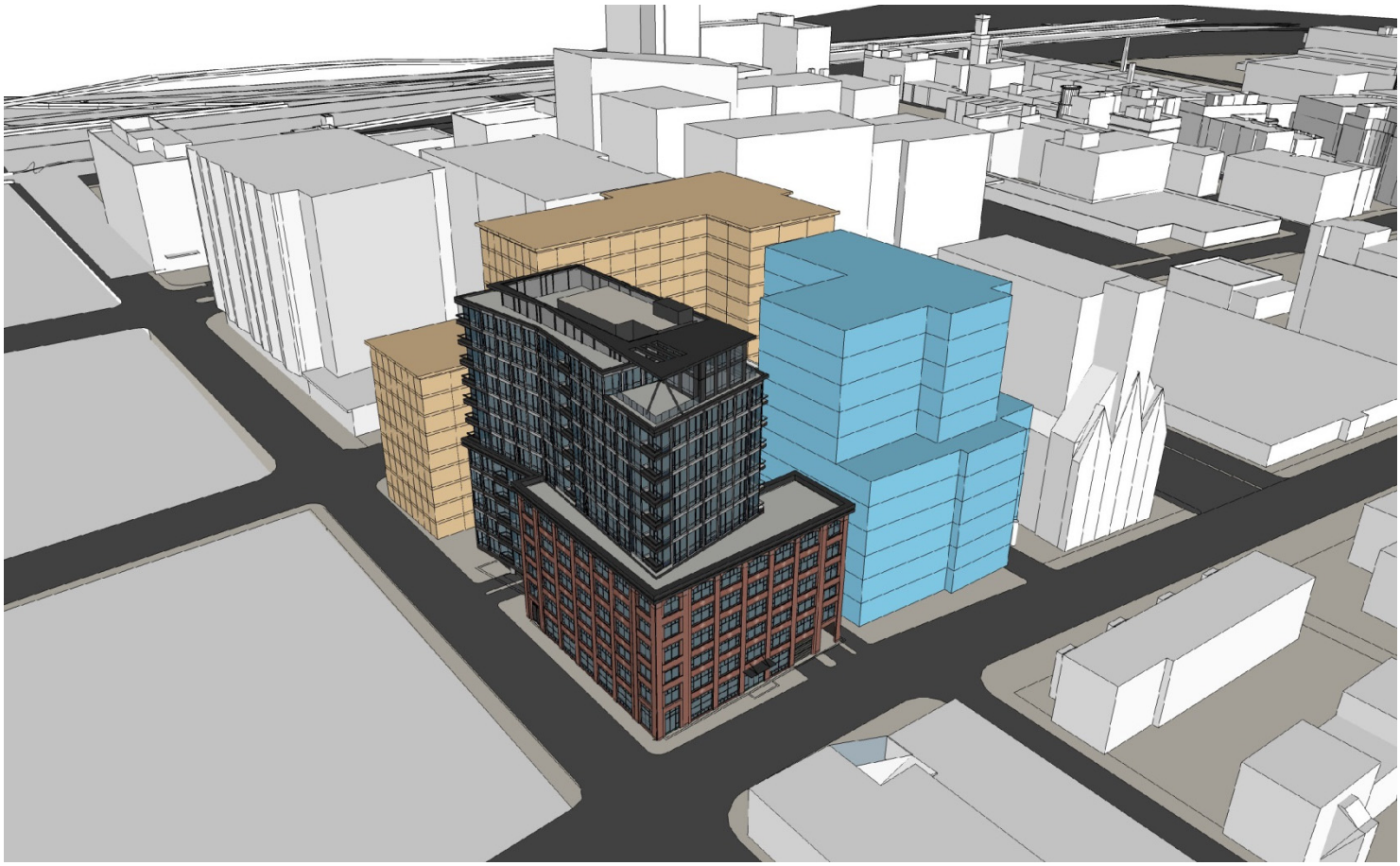
Supplemental Information



SHAWMUT AVENUE/ WASHINGTON STREET BLOCK

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

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

Submitted by:
DIV Shawmut, LLC
Boston Chinese Evangelical Church
Chinese Consolidated Benevolent Association of New England, Inc.

In Association with:
The Architectural Team, Inc.
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
Howard Stein Hudson
Glenn Knowles

September 28, 2017

Epsilon ASSOCIATES INC.

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Chapter 1

Introduction

1.0 INTRODUCTION

1.1 Overview

This Supplemental Submission is being submitted by DIV Shawmut, LLC (an affiliate of The Davis Companies), the Boston Chinese Evangelical Church ("BCEC"), and the Chinese Consolidated Benevolent Association of New England, Inc. ("CCBA", and collectively with DIV Shawmut, LLC and BCEC, the "Proponents") in support of the expanded Project Notification Form ("PNF") filed by DIV Shawmut, LLC with the Boston Planning & Development Agency ("BPDA") on August 29, 2017 pursuant to the provisions of Article 80B of the Boston Zoning Code, as amended (the "Zoning Code"), for the112 Shawmut Avenue project, as described in the PNF and further described in this supplemental filing. The developments by DIV Shawmut, LLC, BCEC (as described herein) and CCBA (as described herein) (collectively, the "Project") will be developed on three parcels of land comprising approximately 82,557 square foot ("sf") located in the South End neighborhood of Boston ("Project Site") bounded by Washington Street to the east, Shawmut Avenue to the west, Herald Street to the north, and privately-owned property to the south (see Figure 1-1).

This Supplemental Submission provides additional information on the 112 Shawmut Avenue building, as well as on the two other buildings to be developed as part of the Project, which will be developed by BCEC and the CCBA, respectively, as more fully described below. As described in Section 1.5.2 of the PNF, the Proponents propose to submit to the BPDA a Development Plan for a new Planned Development Area ("PDA") to encompass the Project Site (the "PDA Plan").

The proposed PDA would include three discrete Lots (as defined in the Zoning Code) that make up the Project Site as described below and shown on the plan included in Figure 1-1:

- the land with the existing building and associated parking lot located thereon at 112 Shawmut Avenue is owned by DIV Shawmut, LLC and is 28,380± sf in size (the "112 Shawmut Avenue Property"; see Figure 1-2);
- the land with the existing building and surface parking lot located at 50 Herald Street is owned by CCBA and is 32,909± sf in size (the "CCBA Property"; see Figure 1-3); and
- the land with the building located at 120 Shawmut Avenue is owned by BCEC and is 21,268± sf in size (the "BCEC Property"; see Figure 1-4).

Each of the Lots will be developed and financed separately by its respective owner. The Proponents are hereby commencing Article 80B review of the Project with this Supplemental Submission and the previously submitted PNF with the BPDA.

In 2016, DIV Shawmut, LLC initiated conversations with BCEC and CCBA about the possibility of coordinated planning and permitting for their respective parcels of land. DIV Shawmut, LLC, BCEC and CCBA discussed a coordinated approach to future development of the three properties that would yield compatible development on each property, as well as coordinated streetscape improvements such as street trees, street furniture (e.g., benches, bicycle racks) and improved street lighting in this area which lacks the pedestrian-friendly character that is so characteristic of the South End neighborhood (see Figure 1-5).

An important new public amenity associated with the development of the three properties could be a new east-west pedestrian connection that could be established at the southern boundaries of the CCBA and BCEC properties to provide through-block pedestrian connectivity between Washington Street and Shawmut Avenue, as well as a private way on the CCBA Property that could provide service, loading and parking access for the new residential project proposed to be constructed there. This new through-block connection could provide a route that connects residents living to the west of the three projects to streets, commercial establishments and other amenities located to the east, such as the new open space/recreational area created by the Massachusetts Department of Transportation under the I-93 overpass at Albany Street. Overall, the three new buildings as presented herein would occupy approximately 74% of the total lot area included within the PDA.

As a result, the three parties—DIV Shawmut, LLC, BCEC and CCBA—have collaborated on a proposed PDA Plan for submission to the BPDA pursuant to the provisions of Section 3-1A(a), Section 64-28 and Article 80C of the Zoning Code. The underlying South End zoning (Article 64 of the Zoning Code) permits the creation of planned development areas within the area proposed to be designated as a PDA. The proposed PDA Plan would create use, height and density requirements for each of the three properties, although the height of each of the buildings would be consistent with the 150-foot height limit for this area of the South End prescribed by Article 64 of the Zoning Code.

1.2 Proponents

DIV Shawmut, LLC

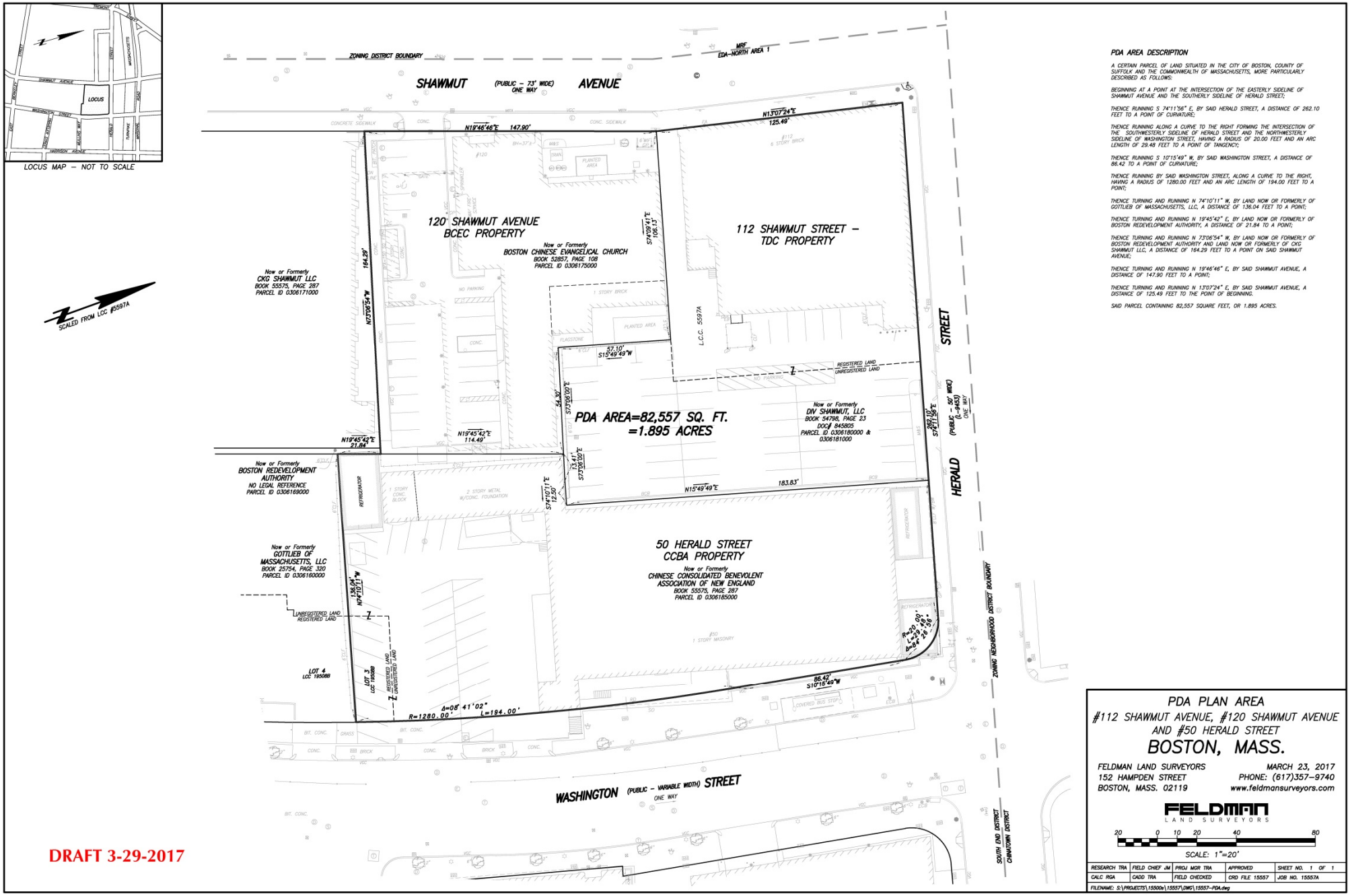
DIV Shawmut, LLC is an affiliate of The Davis Companies, which is a Boston-based national real estate investment, development and management company that has developed or rehabilitated over 3.5 million square feet of buildings across the United States, including residential and commercial developments in the Greater Boston area, such as the River Court condominiums in Cambridge, the Reservoir Woods office park in Waltham, the Telford 180 residential condominiums in the Allston-Brighton neighborhood of Boston, and the Charles River Plaza mixed-use complex in the Beacon Hill/West End neighborhood of Boston.

Chinese Consolidated Benevolent Association of New England, Inc.

CCBA is a non-profit organization established in 1986 to serve and unite the Chinese community, promote and preserve Chinese culture and traditions, and serve as a coordinating body for Chinese community charitable and educational activities. It sponsors an array of social and civic events, including the annual Lunar New Year and August Moon celebrations in Boston's Chinatown. Through separate affiliates, CCBA owns and operates two major affordable housing developments in Boston's Chinatown neighborhood: Tai Tung Village and Waterford Place. CCBA is headquartered at the former Quincy School at 90 Tyler Street in Chinatown, which was built in 1847 and has been nominated for inclusion on the National Register of Historic Places.

Boston Chinese Evangelical Church

Established in 1962, BCEC is a non-profit religious organization that comprises the largest Asian church in New England, with weekly attendance of over 1,200 people at its services. BCEC is composed of seven congregations conversant in English and/or Cantonese or Mandarin Chinese. BCEC has church facilities in the Chinatown neighborhood of Boston at 249 Harrison Avenue and in Newton, MA. As part of its religious mission, BCEC provides an array of social service, educational and recreational services to its congregation and members of the larger community, including English as a Second Language and citizenship classes, summer day camp for middle school students, and after-school program for middle and high school students, senior citizen programs, and youth programs. It also provides other community services on an as-needed basis, such as recently housing low-income persons displaced by a large Chinatown fire temporarily until permanent housing could be found for them.



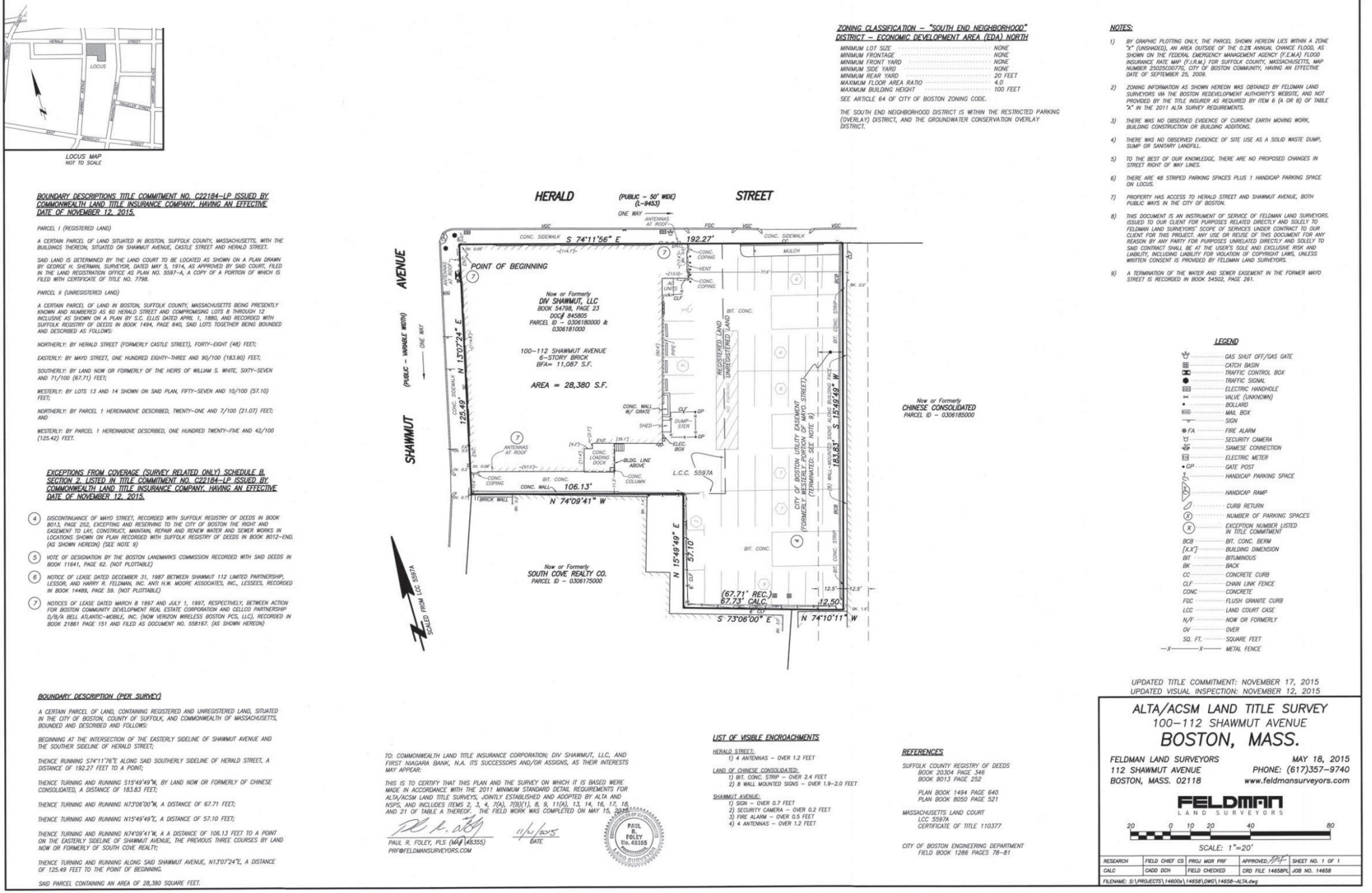
DRAFT 3-29-2017

Shawmut Avenue/Washington Street Block Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1

PDA Area Plan



LOCUS MAP
NOT TO SCALE

BOUNDARY DESCRIPTIONS TITLE COMMITMENT NO. C22184–LP ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY, HAVING AN EFFECTIVE DATE OF NOVEMBER 12, 2015.

PARCEL I (REGISTERED LAND)

A CERTAIN PARCEL OF LAND SITUATED IN BOSTON, SUFFOLK COUNTY, MASSACHUSETTS, WITH THE BUILDINGS THEREON, SITUATED ON SHAWMUT AVENUE, CASTLE STREET AND HERALD STREET.

SAID LAND IS DETERMINED BY THE LAND COURT TO BE LOCATED AS SHOWN ON A PLAN DRAWN BY GEORGE H. SHERMAN, SURVEYOR, DATED MAY 5, 1914, AS APPROVED BY SAID COURT, FILED IN THE LAND REGISTRATION OFFICE AS PLAN NO. 5597–A, A COPY OF A PORTION OF WHICH IS FILED WITH CERTIFICATE OF TITLE NO. 7798.

PARCEL II (UNREGISTERED LAND)

A CERTAIN PARCEL OF LAND IN BOSTON, SUFFOLK COUNTY, MASSACHUSETTS BEING PRESENTLY KNOWN AND NUMBERED AS 60 HERALD STREET AND COMPROMISING LOTS 8 THROUGH 12 INCLUSIVE AS SHOWN ON A PLAN BY S.C. ELLIS DATED APRIL 1, 1880, AND RECORDED WITH SUFFOLK REGISTRY OF DEEDS IN BOOK 1494, PAGE 640, SAID LOTS TOGETHER BEING BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHERLY: BY HERALD STREET (FORMERLY CASTLE STREET), FORTY–EIGHT (48) FEET;

EASTERLY: BY MAYO STREET, ONE HUNDRED EIGHTY–THREE AND 90/100 (183.90) FEET;

SOUTHERLY: BY LAND NOW OR FORMERLY OF THE HEIRS OF WILLIAM S. WHITE, SIXTY–SEVEN AND 71/100 (67.71) FEET;

WESTERLY: BY LOTS 13 AND 14 SHOWN ON SAID PLAN, FIFTY–SEVEN AND 10/100 (57.10) FEET;

NORTHERLY: BY PARCEL 1 HEREINABOVE DESCRIBED, TWENTY–ONE AND 7/100 (21.07) FEET; AND

WESTERLY: BY PARCEL 1 HEREINABOVE DESCRIBED, ONE HUNDRED TWENTY–FIVE AND 42/100 (125.42) FEET.

EXCEPTIONS FROM COVERAGE (SURVEY RELATED ONLY) SCHEDULE B, SECTION 2, LISTED IN TITLE COMMITMENT NO. C22184–LP ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY, HAVING AN EFFECTIVE DATE OF NOVEMBER 12, 2015.

(4) DISCONTINUANCE OF MAYO STREET, RECORDED WITH SUFFOLK REGISTRY OF DEEDS IN BOOK 8013, PAGE 252, EXCEPTING AND RESERVING TO THE CITY OF BOSTON THE RIGHT AND EASEMENT TO LAY, CONSTRUCT, MAINTAIN, REPAIR AND RENEW WATER AND SEWER WORKS IN LOCATIONS SHOWN ON PLAN RECORDED WITH SUFFOLK REGISTRY OF DEEDS IN BOOK 8012–END. (AS SHOWN HEREON) (SEE NOTE 9)

(5) VOTE OF DESIGNATION BY THE BOSTON LANDMARKS COMMISSION RECORDED WITH SAID DEEDS IN BOOK 11641, PAGE 82. (NOT PLOTTABLE)

(6) NOTICE OF LEASE DATED DECEMBER 31, 1987 BETWEEN SHAWMUT 112 LIMITED PARTNERSHIP, LESSOR, AND HARRY R. FELDMAN, INC. AND H.W. MOORE ASSOCIATES, INC., LESSEES, RECORDED IN BOOK 14489, PAGE 59. (NOT PLOTTABLE)

(7) NOTICES OF LEASE DATED MARCH 8 1997 AND JULY 1, 1997, RESPECTIVELY, BETWEEN ACTION FOR BOSTON COMMUNITY DEVELOPMENT REAL ESTATE CORPORATION AND CELLCO PARTNERSHIP D/B/A BELL ATLANTIC–MOBILE, INC. (NOW VERIZON WIRELESS BOSTON PCS, LLC), RECORDED IN BOOK 21861 PAGE 151 AND FILED AS DOCUMENT NO. 558167. (AS SHOWN HEREON)

BOUNDARY DESCRIPTION (PER SURVEY)

A CERTAIN PARCEL OF LAND, CONTAINING REGISTERED AND UNREGISTERED LAND, SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND COMMONWEALTH OF MASSACHUSETTS, BOUNDED AND DESCRIBED AND FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EASTERLY SIDELINE OF SHAWMUT AVENUE AND THE SOUTHER SIDELINE OF HERALD STREET;

THENCE RUNNING S74°11'76"E ALONG SAID SOUTHERLY SIDELINE OF HERALD STREET, A DISTANCE OF 192.27 FEET TO A POINT;

THENCE TURNING AND RUNNING S15°49'49"W, BY LAND NOW OR FORMERLY OF CHINESE CONSOLIDATED, A DISTANCE OF 183.83 FEET;

THENCE TURNING AND RUNNING N73°06'00"W, A DISTANCE OF 67.71 FEET;

THENCE TURNING AND RUNNING N15°49'49"E, A DISTANCE OF 57.10 FEET;

THENCE TURNING AND RUNNING N74°09'41"W, A A DISTANCE OF 106.13 FEET TO A POINT ON THE EASTERLY SIDELINE OF SHAWMUT AVENUE, THE PREVIOUS THREE COURSES BY LAND NOW OR FORMERLY OF SOUTH COVE REALTY;

THENCE TURNING AND RUNNING ALONG SAID SHAWMUT AVENUE, N13°07'24"E, A DISTANCE OF 125.49 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINING AN AREA OF 28,380 SQUARE FEET.

ZONING CLASSIFICATION – "SOUTH END NEIGHBORHOOD" DISTRICT – ECONOMIC DEVELOPMENT AREA (EDA) NORTH

MINIMUM LOT SIZE	NONE
MINIMUM FRONTAGE	NONE
MINIMUM FRONT YARD	NONE
MINIMUM SIDE YARD	NONE
MINIMUM REAR YARD	20 FEET
MAXIMUM FLOOR AREA RATIO	4.0
MAXIMUM BUILDING HEIGHT	100 FEET

SEE ARTICLE 64 OF CITY OF BOSTON ZONING CODE.

THE SOUTH END NEIGHBORHOOD DISTRICT IS WITHIN THE RESTRICTED PARKING (OVERLAY) DISTRICT, AND THE GROUNDWATER CONSERVATION OVERLAY DISTRICT.

NOTES:

1) BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A.) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0077G, CITY OF BOSTON COMMUNITY; HAVING AN EFFECTIVE DATE OF SEPTEMBER 25, 2009.
2) ZONING INFORMATION AS SHOWN HEREON WAS OBTAINED BY FELDMAN LAND SURVEYORS VIA THE BOSTON REDEVELOPMENT AUTHORITY'S WEBSITE, AND NOT PROVIDED BY THE TITLE INSURER AS REQUIRED BY ITEM 6 (A OR B) OF TABLE "A" IN THE 2011 ALTA SURVEY REQUIREMENTS.
3) THERE WAS NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
4) THERE WAS NO OBSERVED EVIDENCE OF SITE USE AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
5) TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO PROPOSED CHANGES IN STREET RIGHT OF WAY LINES.
6) THERE ARE 48 STRIPED PARKING SPACES PLUS 1 HANDICAP PARKING SPACE ON LOCUS.
7) PROPERTY HAS ACCESS TO HERALD STREET AND SHAWMUT AVENUE, BOTH PUBLIC WAYS IN THE CITY OF BOSTON.
8) THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN LAND SURVEYORS. ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN LAND SURVEYORS' SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN LAND SURVEYORS.
9) A TERMINATION OF THE WATER AND SEWER EASEMENT IN THE FORMER MAYO STREET IS RECORDED IN BOOK 54502, PAGE 261.

LEGEND

- GAS SHUT OFF/GAS GATE
- CATCH BASIN
- TRAFFIC CONTROL BOX
- TRAFFIC SIGNAL
- ELECTRIC HANDHOLE
- VALVE (UNKNOWN)
- BOLLARD
- MAIL BOX
- SIGN
- FA – FIRE ALARM
- SECURITY CAMERA
- SIAMESE CONNECTION
- ELECTRIC METER
- GP – GATE POST
- HANDICAP PARKING SPACE
- HANDICAP RAMP
- CURB RETURN
- (X) – NUMBER OF PARKING SPACES
- (X) – EXCEPTION NUMBER LISTED IN TITLE COMMITMENT
- BCB – BIT. CONC. BERM
- [X.X'] – BUILDING DIMENSION
- BIT – BITUMINOUS
- BK – BACK
- CC – CONCRETE CURB
- CLF – CHAIN LINK FENCE
- CONC – CONCRETE
- FGC – FLUSH GRANITE CURB
- LCC – LAND COURT CASE
- N/F – NOW OR FORMERLY
- OV – OVER
- SQ. FT. – SQUARE FEET
- –X–X– METAL FENCE

TO: COMMONWEALTH LAND TITLE INSURANCE CORPORATION; DIV SHAWMUT, LLC, AND FIRST NIAGARA BANK, N.A. ITS SUCCESSORS AND/OR ASSIGNS, AS THEIR INTERESTS MAY APPEAR:

THIS IS TO CERTIFY THAT THIS PLAN AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 7(A), 7(B)(1), 8, 9, 11(A), 13, 14, 16, 17, 18, AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MAY 15, 2015.

PAUL R. FOLEY, PLS (MA 48355)
PRF@FELDMANSURVEYORS.COM

11/12/2015
DATE

PAUL R. FOLEY No. 48355 REGISTERED LAND SURVEYOR

LIST OF VISIBLE ENCROACHMENTS

HERALD STREET:
1) 4 ANTENNAS – OVER 1.2 FEET

LAND OF CHINESE CONSOLIDATED:
1) BIT. CONC. STRIP – OVER 2.4 FEET
2) 8 WALL MOUNTED SIGNS – OVER 1.9–2.0 FEET

SHAWMUT AVENUE:
1) SIGN – OVER 0.7 FEET
2) SECURITY CAMERA – OVER 0.2 FEET
3) FIRE ALARM – OVER 0.5 FEET
4) 4 ANTENNAS – OVER 1.2 FEET

REFERENCES

SUFFOLK COUNTY REGISTRY OF DEEDS
BOOK 20304 PAGE 346
BOOK 8013 PAGE 252

PLAN BOOK 1494 PAGE 640
PLAN BOOK 8050 PAGE 521

MASSACHUSETTS LAND COURT
LCC 5597A
CERTIFICATE OF TITLE 110377

CITY OF BOSTON ENGINEERING DEPARTMENT
FIELD BOOK 1286 PAGES 78–81

UPDATED TITLE COMMITMENT: NOVEMBER 17, 2015
UPDATED VISUAL INSPECTION: NOVEMBER 12, 2015

ALTA/ACSM LAND TITLE SURVEY
100–112 SHAWMUT AVENUE
BOSTON, MASS.

FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE
BOSTON, MASS. 02118

MAY 18, 2015
PHONE: (617)357–9740
www.feldmansurveyors.com

FELDMAN LAND SURVEYORS

20 0 10 20 40 80
SCALE: 1"=20'

RESEARCH	FIELD CHIEF CS	PROJ MGR PRF	APPROVED: PRF	SHEET NO. 1 OF 1
CALC	CADD DCH	FIELD CHECKED	CRD FILE 14658PL	JOB NO. 14658

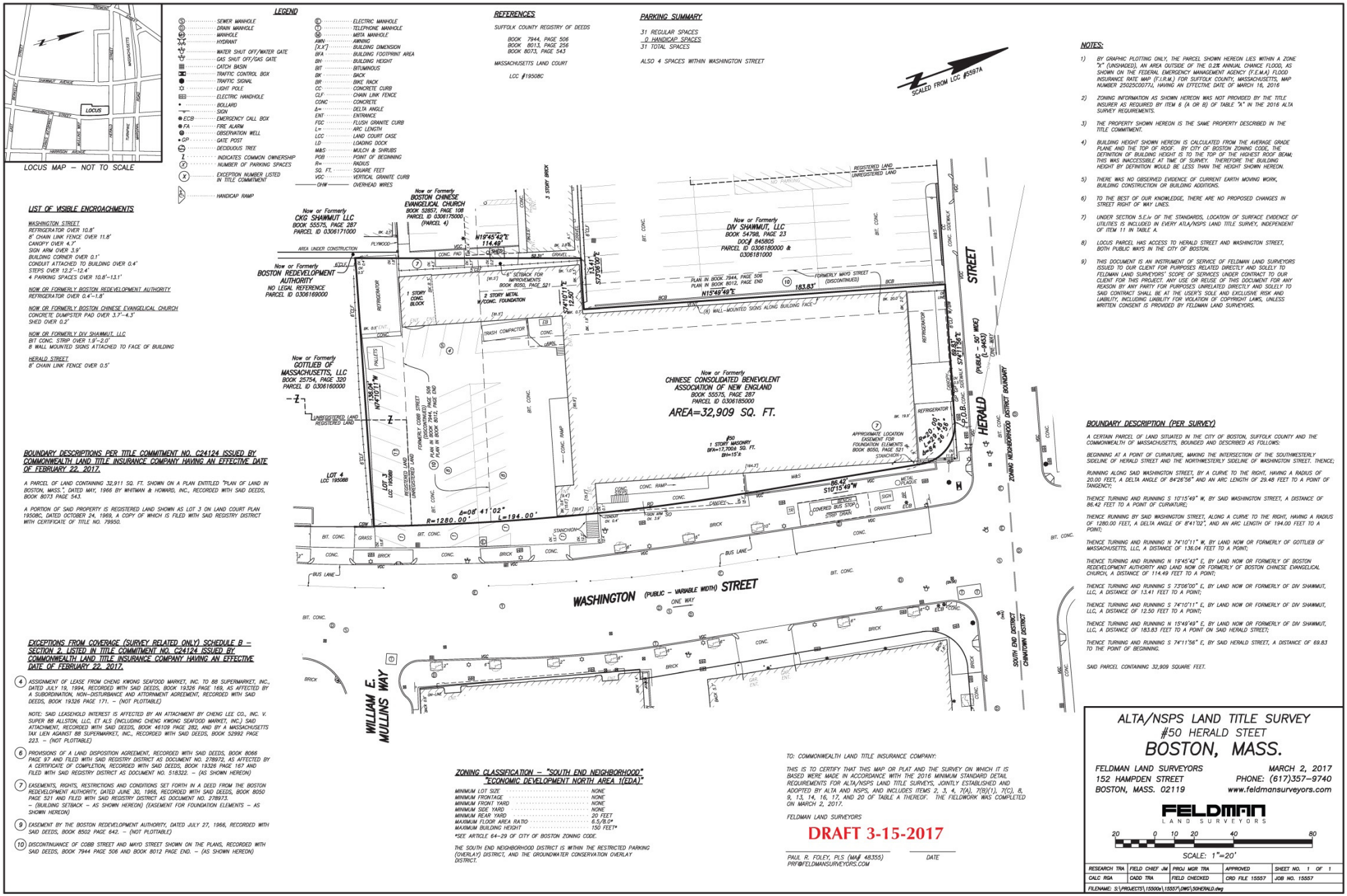
FILENAME: S:\PROJECTS\14600s\14658\DWG\14658–ALTA.dwg

Shawmut Avenue/Washington Street Block Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-2

Survey of 112 Shawmut Avenue Property

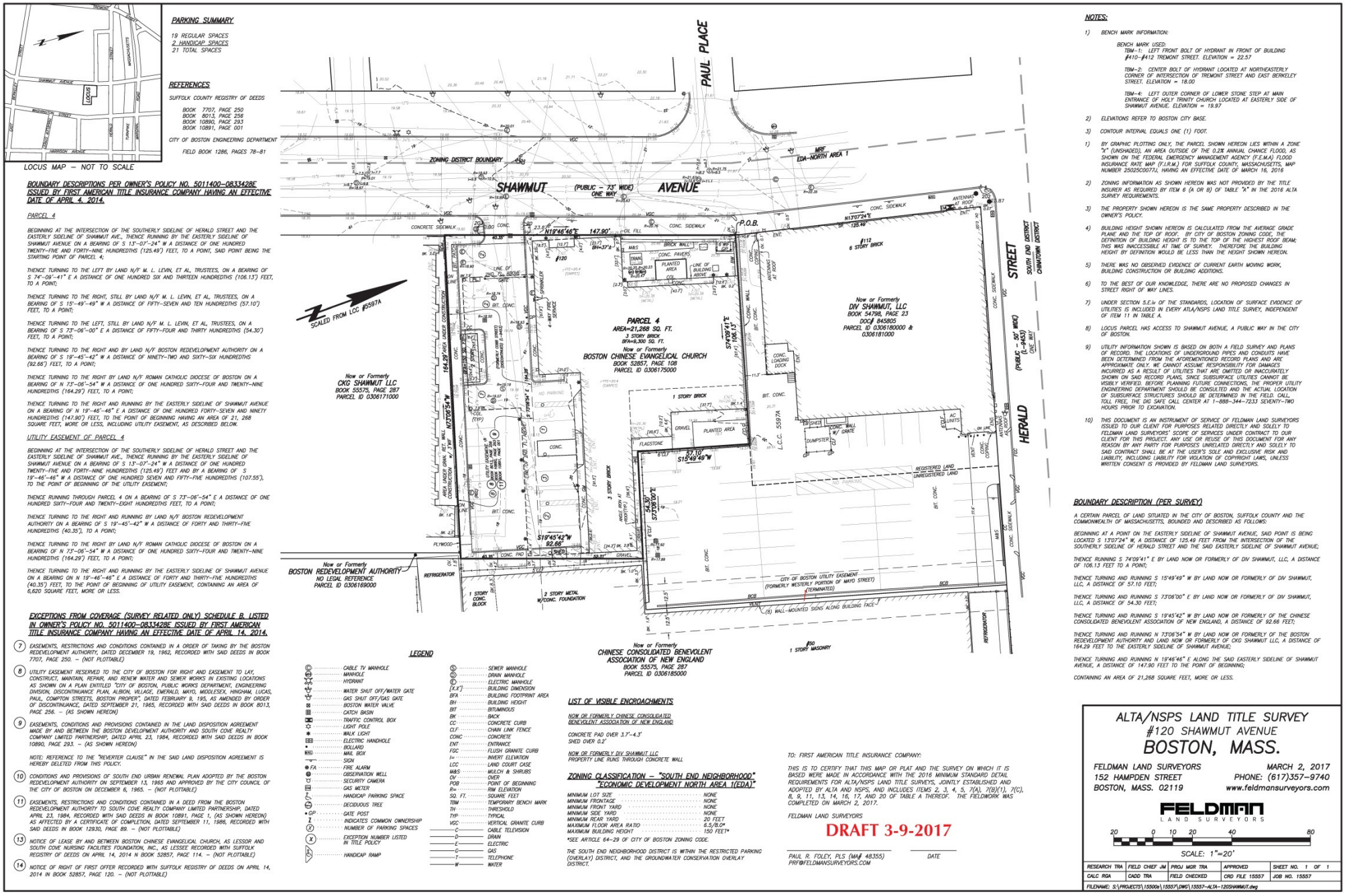


Shawmut Avenue/Washington Street Block Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-3

Survey of CCBA Property

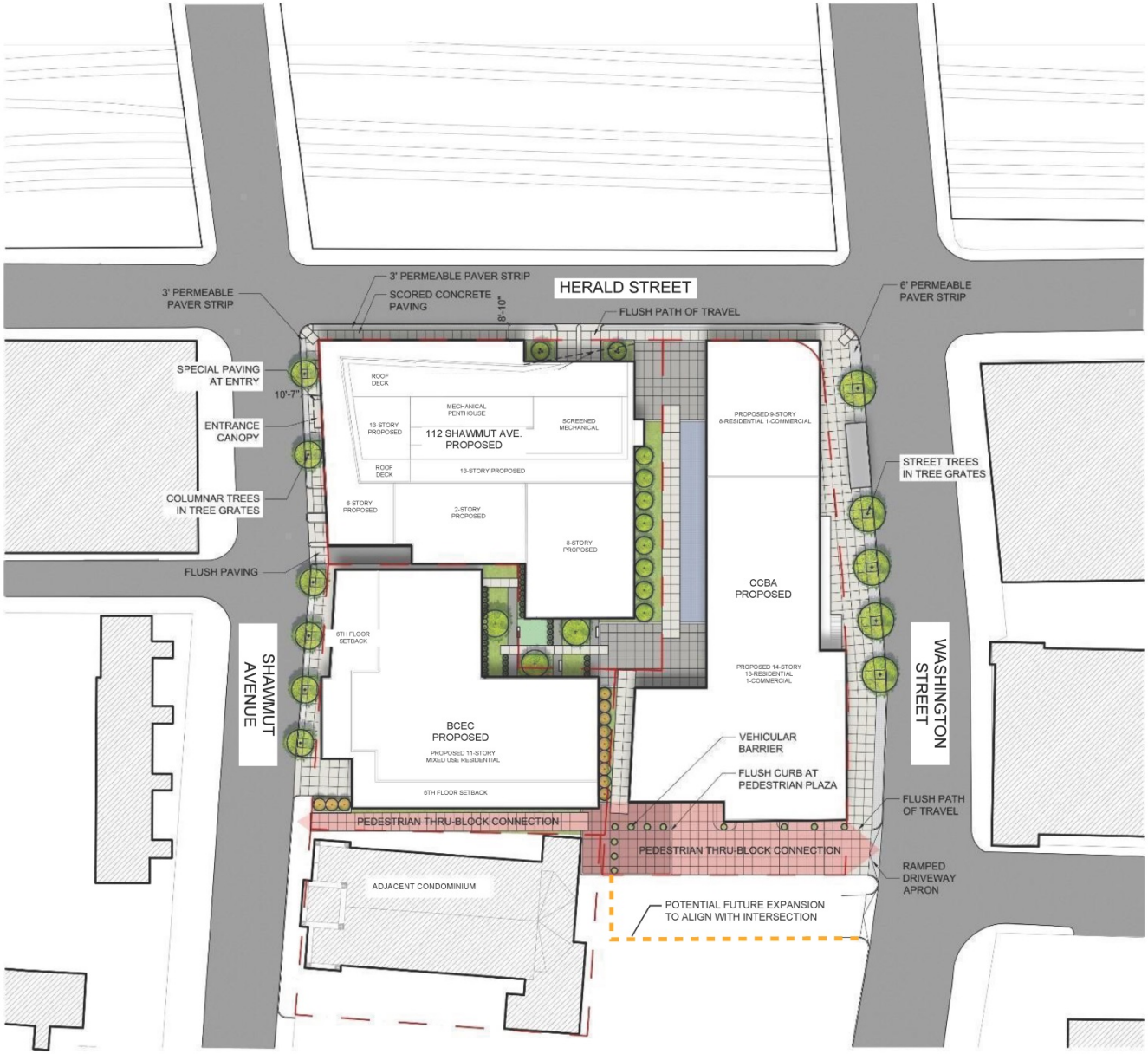


Shawmut Avenue/Washington Street Block Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-4

Survey of BCEC Property



Shawmut Avenue/Washington Street Block Boston, Massachusetts

tat

Figure 1-5

Project Site Plan

Chapter 2

Project Descriptions

2.0 PROJECT DESCRIPTION

2.1 Project Site/PDA Plan Area

The Project Site/PDA Plan Area is made up of three Lots as described below.

DIV Shawmut, LLC Property

The 112 Shawmut Avenue Property is located on the southeast corner of the intersection of Herald Street and Shawmut Avenue. The existing building on the property is a six story concrete frame/brick façade former warehouse building formerly used as offices and ground floor day care space, with approximately 44 surface parking spaces, and minimal open space.

BCEC Property

The BCEC Property is located on Shawmut Avenue, south of the 112 Shawmut Avenue Property. The existing building was formerly operated as a nursing home, and now houses space in which BCEC operates educational and social services programs for its approximately 1,200-member congregation and other members of the community.

CCBA Property

The CCBA Property is located on the southwest corner of the intersection of Herald Street and Washington Street, and currently houses a single-story supermarket and an associated surface parking lot.

2.2 Project Building Descriptions

Table 2-1 and Figure 2-1 provide an overview of each of the three buildings of the Project. Figures 2-2 and 2-3 include massing diagrams of the Project.

Overall, the proposed lot coverage ratio for the PDA will be approximately 74%, consistent with the requirements of Section 64-29(3) of the Zoning Code. In addition, at least 20% of the residential units created within the PDA will be affordable units, consistent with the City's Inclusionary Development Policy ("IDP") requirements. The remainder of this section includes information on the Project buildings.

Table 2-1 Planned Development Area Project Buildings

	Height	Uses	Stories	Gross SF	Residential Units	Parking
112 Shawmut Avenue (The Davis Companies)	150'±	Residential; retail/café; accessory parking	13	192,568± sf	143±	124± spaces
50 Herald Street (CCBA)	150'±	Residential; retail, community and/or commercial; accessory underground parking	9-14±	261,275± sf	300±	120± spaces
120 Shawmut Avenue (BCEC) (assumes development of new building)	150'±	Religious; community center uses (which may include religious educational and social services meeting rooms, a gymnasium and offices); multi-family dwellings; small (2,000± sf) ground floor commercial space; accessory underground parking	11±	145,468± sf	72±	30± spaces

112 Shawmut Avenue Building

The 112 Shawmut Avenue building, as described in the PNF, includes the construction of an approximately 192,568 sf, 13-story building consisting of approximately 143 residential units and residential amenity space, and approximately 980 sf of ground floor retail/café space. The building will include three levels of parking, one of which will be below-grade, to accommodate approximately 124 vehicles. The 112 Shawmut Avenue building will have a maximum Building Height (as defined in the Zoning Code) of approximately 150 feet. The roof of the building will include a rooftop deck and amenity space for residents' use, as well as enclosed mechanical space.

The existing building on the 112 Shawmut Avenue Property will be partially demolished, with the exception of the street-facing facades which will be incorporated into the building design. The new construction component of the 112 Shawmut Avenue Property will expand to the east and above the existing building. The ground floor will contain residential amenity spaces along Herald Street that will activate the street front, as well as a residential entry located along Shawmut Avenue. The garage will be accessed by an entrance/exit ramp on Herald Street and an entrance/exit ramp on Shawmut Avenue; because of the site geometry, the two parking areas in the garage will be independent of each other and not connected; this is designed to optimize the amount of open space at the

112 Shawmut Avenue Property. The loading bay at the 112 Shawmut Avenue Property will also be accessed from Shawmut Avenue. Bicycle racks for residents and visitors will be located near the entrances to the building, and there will also be bicycle racks for residents within the parking garage.

Public realm improvements, including new paving, street trees and new plant materials will be provided along Shawmut Avenue and Herald Street to create a more pedestrian-friendly experience in accordance with the City of Boston Complete Streets guidelines. A south and west-facing roof terrace on the 13th floor and a rooftop terrace at the 9th level will offer views of the Boston skyline, while also providing access to outdoor space for residents. Private balconies and rooftop terraces on the 7th floor will also provide outdoor space for specific units within the building.

BCEC Building

The improvements which may be constructed at the BCEC Property will consist of either the demolition of a portion of the existing facility and the construction of a vertical addition thereto, or the new construction of a 11-story structure of approximately 150 feet in Building Height to house two religious sanctuaries with combined seating for approximately 1,130 people, a gymnasium, fitness rooms, office, classroom and meeting space for religious educational, recreational and social services uses, a small (2,000± sf) ground floor commercial space, and approximately 72 residential units on the upper 6 floors of the building. The new building would contain approximately 145,468 sf of Gross Floor Area, as well as a single level of underground parking for approximately 30 vehicles. The pedestrian and garage entrances to the BCEC Property will be off Shawmut Avenue. The new building setback along the northern property line will range along the length of the building starting at the property line and up to a 5 foot setback, and range from 5 feet to 20 feet on the eastern property line. The new construction BCEC building will include a pedestrian passageway on the southern boundary of the BCEC Property that will connect to a pedestrian passageway on the southern portion of the CCBA Property, and thereby provide cross-block pedestrian access from Shawmut Avenue to Washington Street and the residential and commercial community to the east. The lot coverage ratio for the BCEC Property would be approximately 75% if the new building is constructed. Alternatively, BCEC may renovate/augment the existing building with or without a vertical addition for some, but not necessarily all, of the uses enumerated above, in which case the existing sidewalk would remain and could be connected to a passageway to be constructed on the CCBA Property.

The construction of the BCEC building will enable BCEC to consolidate its existing religious services and community services at its new facility, and also provide a wider array of educational, recreational, and social services to its congregants as well as to members of the larger community. The residential component of the BCEC building would help offset costs associated with the BCEC building, as well as provide much-needed housing resources. The BCEC will comply with the City's IDP requirements, as determined by the BPDA.

Design plans for the BCEC building are included as Appendix A.

Public Benefits

The BCEC building is expected to provide the following public benefits:

- The expansion of BCEC's community ministries providing religious, social service, educational, recreational and support ministries in a language-sensitive and culturally-sensitive manner to the Greater Boston area Asian population;
- The creation of approximately 72 units of housing; and
- The creation of 5-20 permanent jobs and 140 construction jobs.

CCBA Building

The improvements to be constructed at the CCBA Property will consist of a building that is nine stories high at the corner of Herald and Washington Streets, rising to 14 stories further south along Washington Street. The building will be approximately 150 feet in Building Height and will contain approximately 300 residential units, together with approximately 14,200 sf of ground floor retail, commercial and/or community space along Washington Street. The building will be set back approximately 24 feet from the westerly property line, will contain approximately 261,275 sf of Gross Floor Area, and include an underground garage accommodating approximately 120 parking spaces. The entrances to the residential units and community/commercial space at the CCBA Property will be off Washington Street, and the loading, service and parking functions for the CCBA building will be accessed off a new or existing private alley/pedestrian passage located to the south of the new building. This pedestrian passageway will connect to a new pedestrian passageway on the BCEC Property and enhance pedestrian connectivity between Shawmut Avenue and Washington Street. The lot coverage ratio for the CCBA Property will be approximately 66%.

The CCBA Property currently contains a one-story structure housing a supermarket and an associated surface parking lot. The CCBA building is expected to proceed after the premises are vacated by the existing tenant. CCBA will comply with the City's IDP requirements on-site, and CCBA's goal is for at least 30% of the units within the CCBA building to be affordable to households earning 80% or less of the Area Median Income as determined by the U.S. Department of Housing and Urban Development.

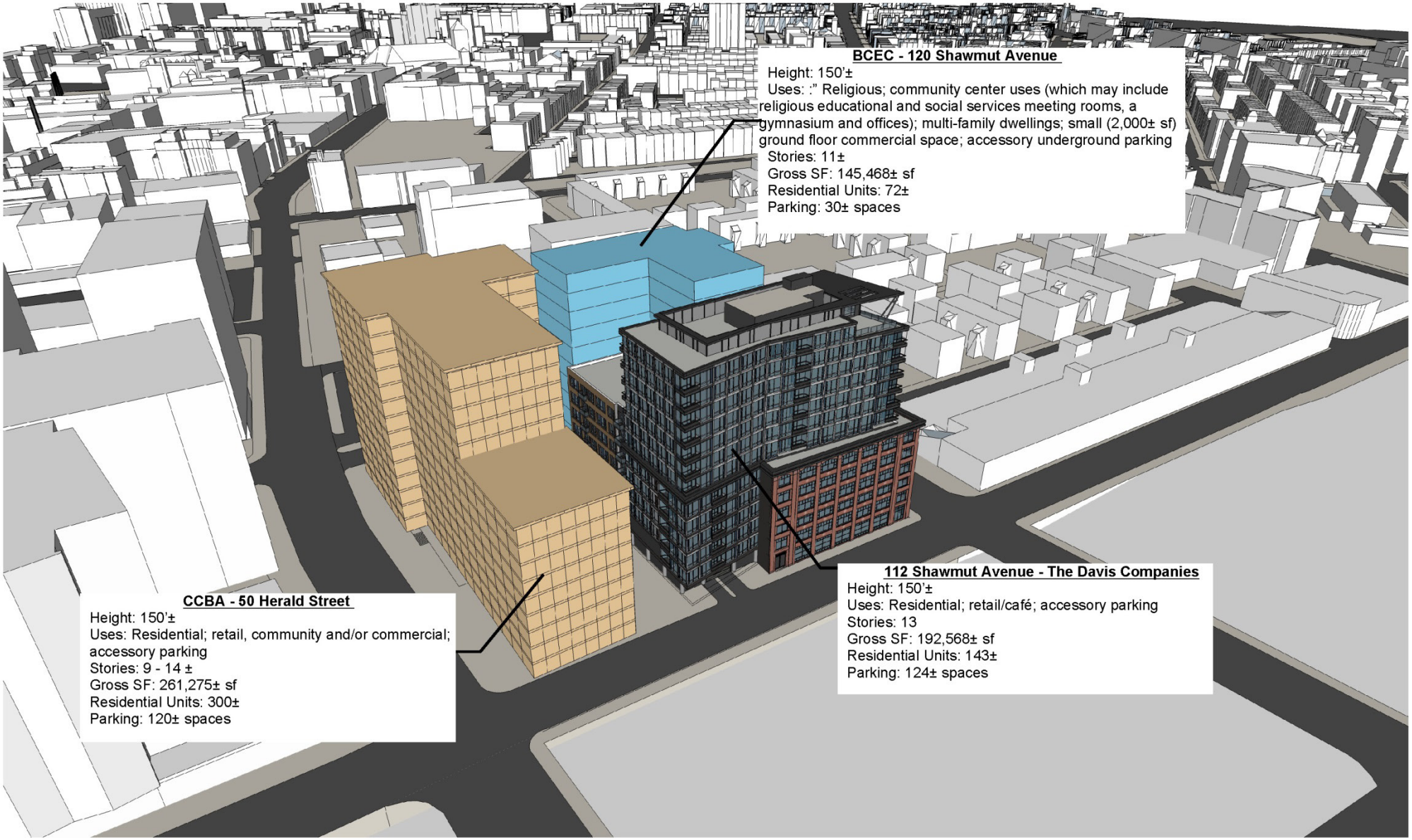
Conceptual design plans for the CCBA building are included as Appendix B.

Public Benefits

The CCBA building is expected to provide the following public benefits:

- The CCBA building will create approximately 300 units of new housing, at least 30% of which will be affordable housing units;
- The CCBA building will include approximately 14,200 sf of ground floor retail, commercial and/or community space that will enliven this part of Washington Street;
- The CCBA building will result in the conversion of an underutilized commercial site into a prominent mixed-use urban development that will be an important building along this portion of the Washington Street corridor;
- The CCBA building will generate significant property tax revenues and expand the City's tax base;
- Approximately 300 construction jobs and approximately 8-50 permanent jobs will be generated by the CCBA building, depending upon the ground floor non-residential use; and
- Streetscape improvements will be installed as part of the CCBA building along Washington Street to enhance its attractiveness as a key urban corridor.

	Height	Uses	Stories	Gross SF	Residential Units	Parking
112 Shawmut Avenue (The Davis Companies)	150'±	Residential; retail/café; accessory parking	13	192,568± sf	143±	124± spaces
50 Herald Street (CCBA)	150'±	Residential; retail, community and/or commercial; accessory underground parking	9-14±	261,275± sf	300±	120± spaces
120 Shawmut Avenue (BCEC) (assumes development of new building)	150'±	Religious; community center uses (which may include religious educational and social services meeting rooms, a gymnasium and offices); multi-family dwellings; small (2,000± sf) ground floor commercial space; accessory underground parking	11±	145,468± sf	72±	30± spaces



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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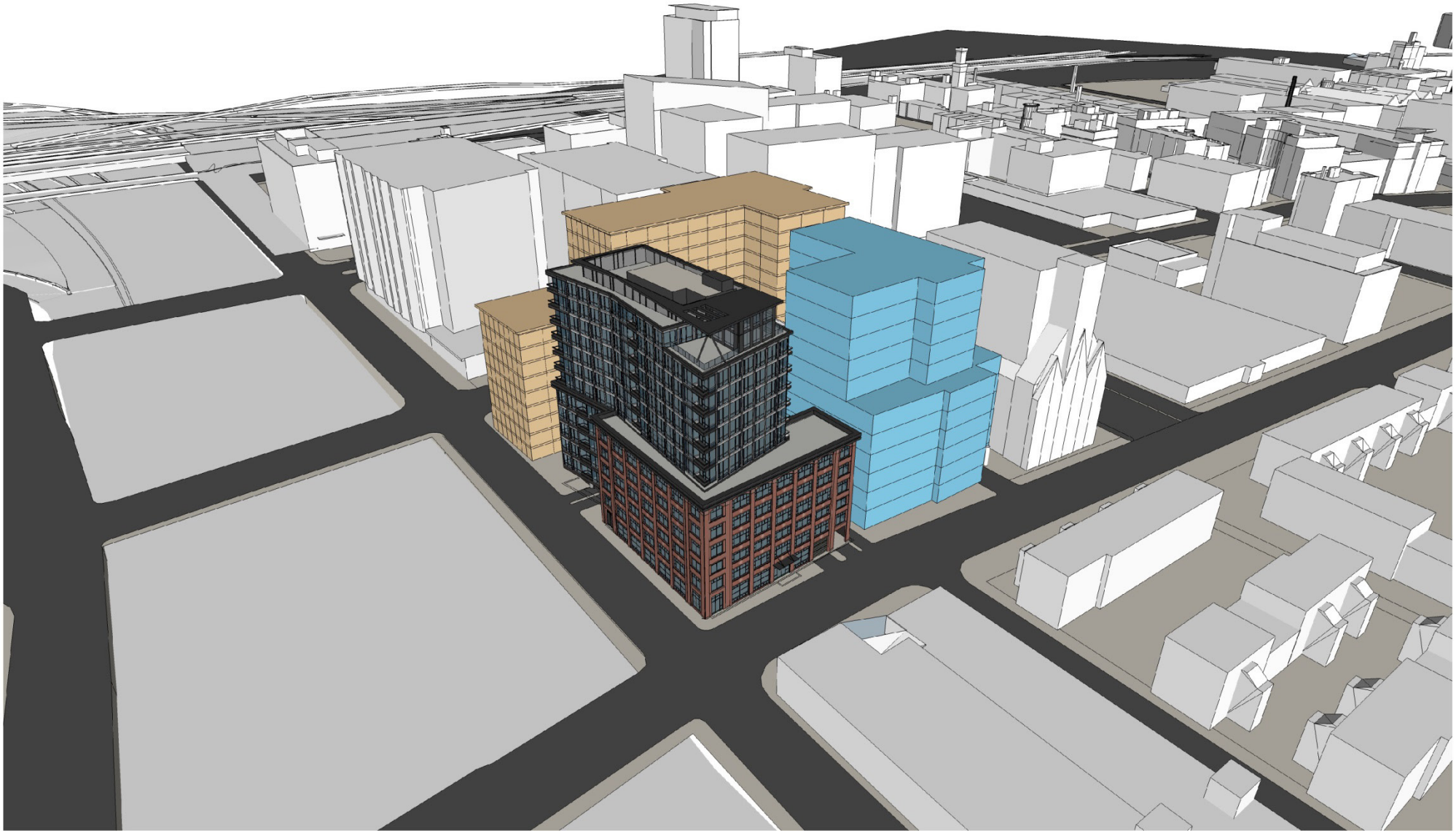
Figure 2-2

Aerial View Looking South



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 2-3

Aerial View Looking Southeast

Chapter 3

Transportation

3.0 TRANSPORTATION

3.1 Introduction

As discussed in Chapter 2, the three properties are proposed to be part of an assembled PDA. This Supplemental Submission includes the following two conditions:

- **No-Build (2024) Condition**: This future scenario assumes none of the Project buildings are built-out; and
- **Build (2024) Condition**: This future scenario assumes the entire Project is fully built-out.

It should be noted that the Existing Condition from the PNF has not changed. Additionally, the PNF traffic study Build Condition and the Build Condition in this Supplemental Submission both determined the cumulative impact of all three sites since the BCEC and CCBA were previously in the No-Build Condition as presented in the PNF and are now in the Build Condition, as presented in this Supplemental Submission.

3.2 No-Build (2024) Condition

The No-Build (2024) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area.

For the purpose of this Supplemental Submission, the No-Build (2024) Condition does not include the Project-related impacts from the 112 Shawmut Avenue building, BCEC building or CCBA building. Therefore, the traffic volumes of the No-Build (2024) Condition in this filing are lower than the No-Build volumes in the PNF filing.

3.2.1 Background Traffic Growth

Based on a review of recent traffic studies conducted for nearby projects and historic traffic data, to account for any additional unforeseen traffic growth, a one-half percent per year annual traffic growth rate was used.

3.2.2 Specific Development Traffic Growth

Traffic volumes associated with known, larger or adjacent development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Nearby

development projects were identified in the vicinity of the Project and are shown in Figure 3-1. Traffic volumes associated with the following projects were directly incorporated into the future conditions traffic volumes:

- **370-380 Harrison Avenue** – This project, located to the southeast of the Project Site, calls for the construction of a mixed-use building with approximately 314 residential units, 8,500 sf of commercial space, and 180 off-street parking spaces. This project has been approved by the BPDA Board.

- **80 East Berkeley Street** – This project, located to the south of the Project Site, consists of the construction of a 308,000 sf, 11-story building with ground floor retail and 200 parking spaces. This project has been approved by the BPDA Board.

- **321 Harrison Avenue** – This project, located to the east of the Project Site, calls for the construction of 230,000 gross square feet of office space, a new lobby, and pedestrian realm improvements. This project is currently under construction.

- **345 Harrison Avenue** – This project, located to the southeast of the Project Site, calls for the construction of two residential buildings with approximately 585 rental units and 40,000 sf of ground floor retail. This project is currently under construction.

Traffic volumes for other nearby development projects including Quincy Tower, Parcel P-7A (a/k/a 240 Tremont Street), 136 Shawmut Avenue, Ink Block – Phase III, and Parcel 24, will have minimal impact on the study area intersections and are therefore included in the general background traffic growth.

3.2.3 Infrastructure Improvements

The No-Build (2024) Condition incorporates the planned roadway and circulation modifications to Washington Street, Harrison Avenue, and Traveler Street being completed by the Boston Transportation Department ("BTD"). Information related to the future roadway conditions, including expected traffic patterns, traffic signal timings, and changes in lane usage were provided by the BPDA and BTD.

3.2.4 No-Build (2024) Condition Traffic Volumes and Operations Analysis

The No-Build (2024) Condition weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown on Figure 3-2 and Figure 3-3, respectively. Table 3-1 and Table 3-2 present the No-Build (2024) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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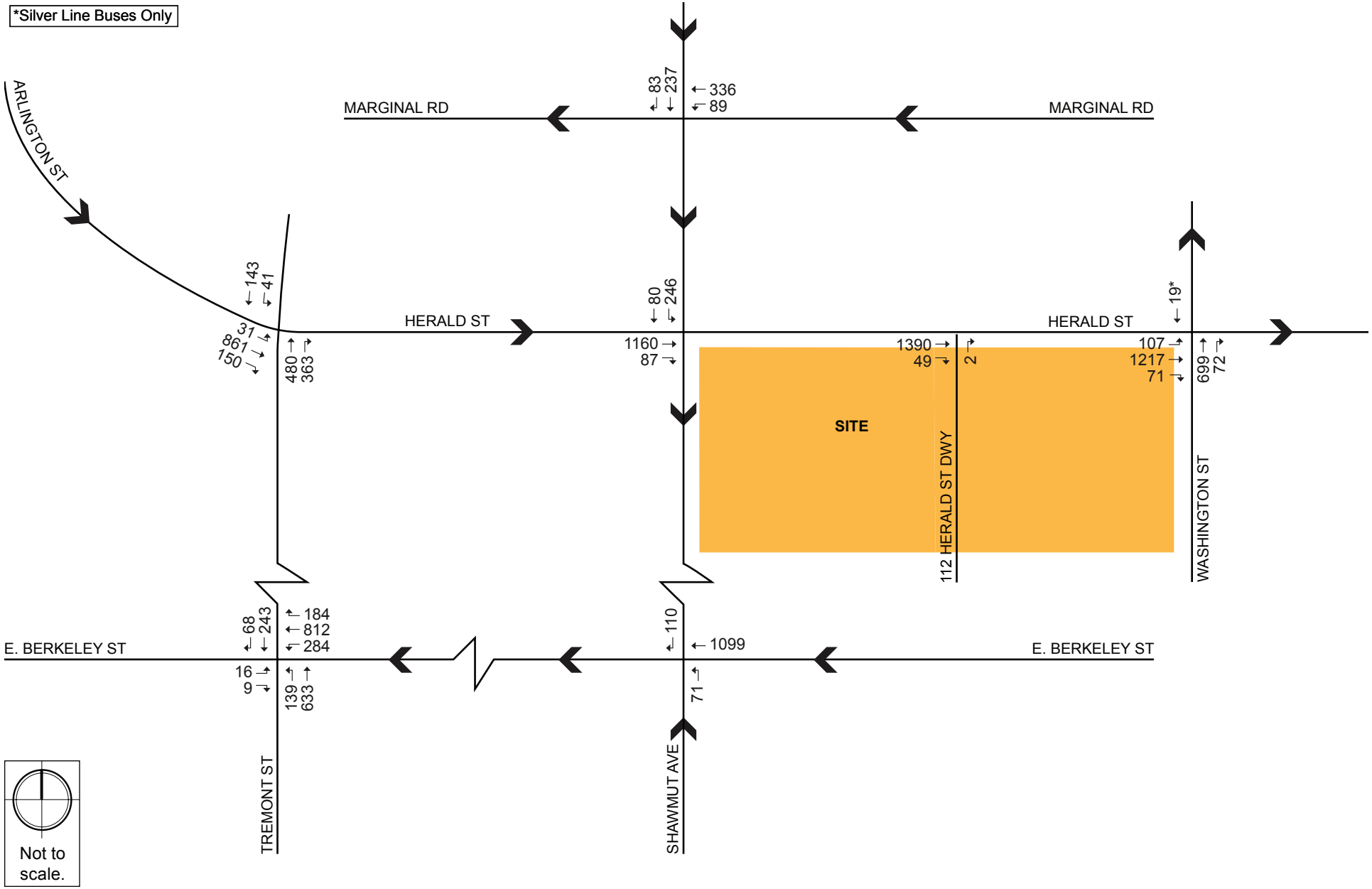
Figure 3-1
Area Development Projects



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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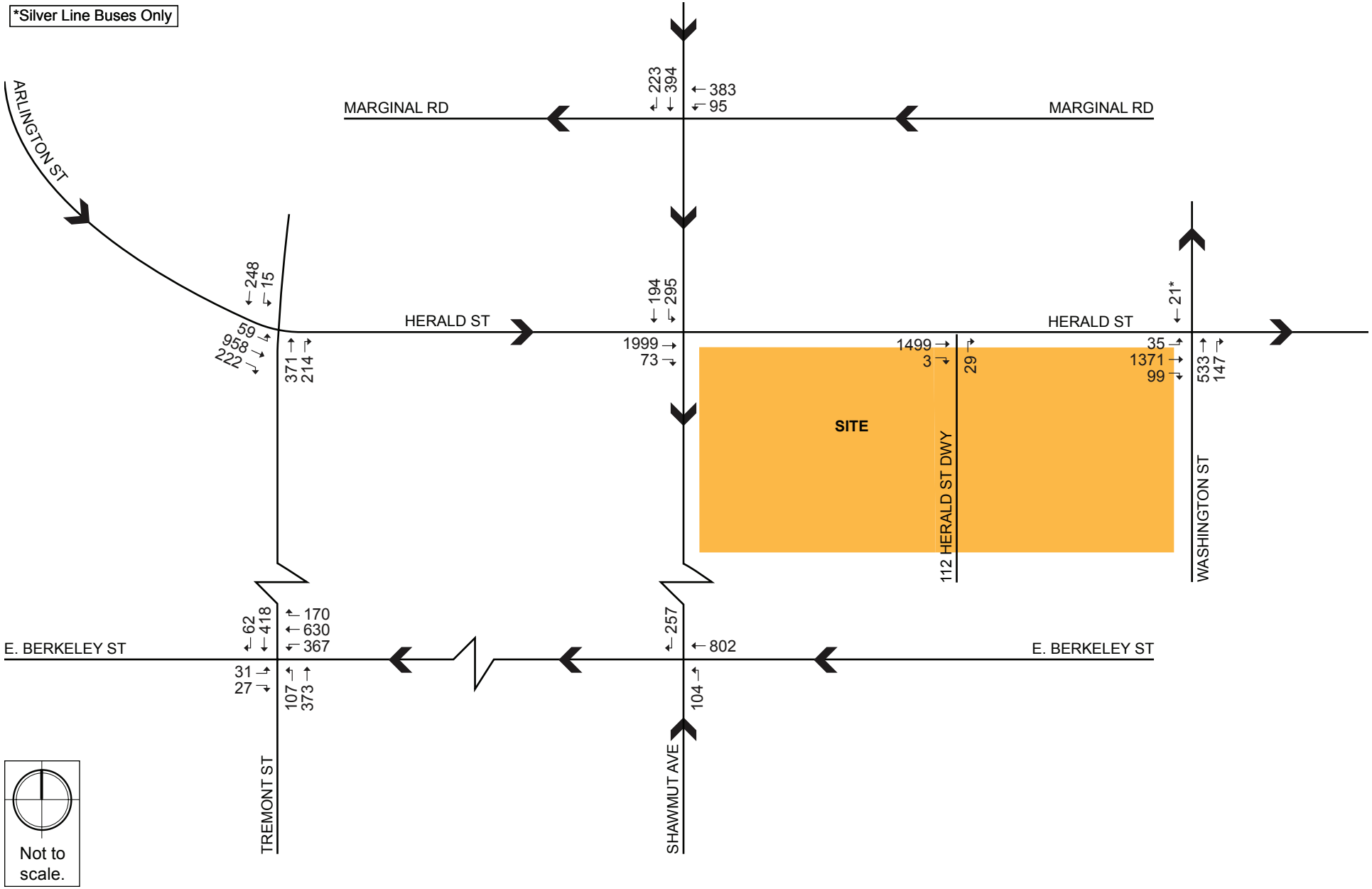
Figure 3-2

No-Build (2024) Condition Traffic Volumes without Project, a.m. Peak hour



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 3-3

No-Build (2024) Condition Traffic Volumes without Project, p.m. Peak hour

Table 3-1 No-Build (2024) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized					
Arlington Street/Herald Street/Tremont Street	**C**	**23.7**	-	-	-
Arlington Street EB left/thru | thru | thru| thru/right	C	24.9	0.51	152	185
Tremont Street NB thru | thru/right	C	21.6	0.76	165	m121
Tremont Street SB left/thru | thru	C	25.9	0.32	56	77
Herald Street/Shawmut Avenue	**A**	**8.9**	-	-	-
Herald Street EB thru | thru | thru/right	A	8.7	0.57	116	111
Shawmut Avenue SB left | left	A	6.5	0.26	0	11
Shawmut Avenue SB thru | thru	B	18.0	0.09	23	38
Herald Street/Washington Street	**D**	**49.7**	-	-	-
Herald Street left/thru | thru | thru/right	B	15.3	0.77	333	396
Washington Street NB thru	F	>80.0	>1.00	~619	#790
Washington Street NB right	B	12.8	0.18	21	48
Washington Street SB thru (Silver Line buses only)	B	15.6	0.06	9	20
East Berkeley Street/Shawmut Avenue	**B**	**11.2**	-	-	-
E Berkeley Street WB thru | thru | thru	B	12.0	0.48	149	180
Shawmut Avenue NB left	A	1.2	0.21	0	0
Shawmut Avenue SB right	B	10.1	0.41	0	0
Tremont Street/East Berkeley Street/Berkeley Street	**F**	**>80.0**	-	-	-
Berkeley Street EB left	D	39.0	0.28	9	29
Berkeley Street EB right	A	0.1	0.02	0	0
E Berkeley Street WB left	C	28.1	0.64	168	262
E Berkeley Street WB thru | thru/right	F	>80.0	>1.00	~417	#551
Tremont Street NB left/thru | thru	F	>80.0	>1.00	~293	#448
Tremont Street SB thru | thru/right	C	30.6	0.54	113	149
Shawmut Avenue/Marginal Road	**C**	**20.1**	-	-	-
Marginal Road WB left/thru | thru	C	20.6	0.36	104	139
Shawmut Avenue SB thru | thru | thru/right	B	19.2	0.23	42	65
Unsignalized					
Herald Street/112 Shawmut Avenue Driveway	-	-	-	-	-
Herald Street EB thru | thru | thru/right	A	0.0	0.34	-	0
112 Shawmut Avenue Driveway NB right	A	9.5	0.01	-	0

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

Table 3-2 No-Build (2024) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized					
Arlington Street/Herald Street/Tremont Street	**C**	**24.8**	-	-	-
Arlington Street EB left/thru | thru | thru| thru/right	C	23.3	0.54	176	211
Tremont Street NB thru | thru/right	C	26.6	0.61	151	211
Tremont Street SB left/thru | thru	C	27.4	0.31	76	110
Herald Street/Shawmut Avenue	**A**	**8.5**	-	-	-
Herald Street EB thru | thru | thru/right	A	8.4	0.58	85	96
Shawmut Avenue SB left | left	A	1.4	0.33	2	3
Shawmut Avenue SB thru | thru	B	19.5	0.27	31	39
Herald Street/Washington Street	**D**	**36.9**	-	-	-
Herald Street left/thru | thru | thru/right	D	44.4	>1.00	~420	#519
Washington Street NB thru	C	23.4	0.71	262	399
Washington Street NB right	B	11.6	0.54	43	82
Washington Street SB thru (Silver Line buses only)	B	11.4	0.54	8	18
East Berkeley Street/Shawmut Avenue	**A**	**9.3**	-	-	-
E Berkeley Street WB thru | thru | thru	A	9.2	0.31	98	133
Shawmut Avenue NB left	A	2.1	0.33	0	0
Shawmut Avenue SB right	B	13.1	0.69	0	52
Tremont Street/East Berkeley Street/Berkeley Street	**D**	**43.0**	-	-	-
Berkeley Street EB left	F	>80.0	0.69	27	#70
Berkeley Street EB right	A	0.3	0.07	0	0
E Berkeley Street WB left	D	47.0	0.81	301	426
E Berkeley Street WB thru | thru/right	D	47.4	0.91	352	#445
Tremont Street NB left/thru | thru	C	34.9	0.71	164	206
Tremont Street SB thru | thru/right	D	40.1	0.64	203	241
Shawmut Avenue/Marginal Road	**C**	**22.1**	-	-	-
Marginal Road WB left/thru | thru	C	22.8	0.40	122	166
Shawmut Avenue SB thru | thru | thru/right	C	21.7	0.45	106	127
Unsignalized					
Herald Street/112 Shawmut Avenue Driveway	-	-	-	-	-
Herald Street EB thru | thru | thru/right	A	0.0	0.39	-	0
112 Shawmut Avenue Driveway NB right	A	9.3	0.04	-	3

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

The signalized intersection of **Herald Street/Washington Street** operates at an acceptable LOS during both the weekday peak hours under the No-Build (2024) Condition. During the a.m. peak hour, the Washington Street northbound through lane operates at LOS F. All other movements at the intersection operate at LOS D or better.

The signalized intersection of **Tremont Street/East Berkeley Street/Berkeley Street** operates at LOS F during the a.m. peak hour, and at LOS D during the p.m. peak hour under the No-Build (2024) Condition. During the a.m. peak hour, the East Berkeley Street westbound through and shared through/right lanes as well as the Tremont Street northbound left lane operate at LOS F. During the p.m. peak hour, the Berkeley Street eastbound left-turn lane operates at LOS F. All other movements at the intersection continue to operate at LOS D or better.

3.3 Build (2024) Condition

The Build (2024) Condition assumes all three buildings described in Chapter 2 will be developed. Both this Build (2024) Condition and the Build Condition in the PNF determined the cumulative impact of all three properties.

3.3.1 Trip Generation Methodology

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

To estimate the trip generation for the Project, the following ITE land use code (LUCs) were used:

Land Use Code 220 – Apartment. This land use code refers to dwelling units located within the same building with at least three other dwelling units. Trip generation estimates are based on ITE's average rate per dwelling unit.

Land Use Code 820 – Shopping Center. This land use code refers to an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Trip generation estimates are based on ITE's average rate per 1,000 sf.

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

3.3.2 Mode Share

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located within designated Area 3 – South Core, Park Plaza. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The person trips were then distributed to different modes according to the mode shares shown in Table 3-3.

Table 3-3 Travel Mode Shares

Time Period		Land Use	Vehicle Occupancy Rate[1]	Walk/Bike Share[2]	Transit Share[2]	Vehicle Share[2]
Daily	In	Residential	1.13	48%	17%	35%
	Out		1.13	48%	17%	35%
	In	Retail	1.78	43%	17%	40%
	Out		1.78	43%	17%	40%
a.m. Peak Hour	In	Residential	1.13	38%	17%	45%
	Out		1.13	65%	13%	22%
	In	Retail	1.78	33%	16%	51%
	Out		1.78	79%	7%	14%
p.m. Peak Hour	In	Residential	1.13	65%	13%	22%
	Out		1.13	38%	17%	45%
	In	Retail	1.78	79%	7%	14%
	Out		1.78	33%	16%	51%

1. 2009 National Household Travel Survey.
2. Based on rates published by the Boston Transportation Department for Area 3.

3.3.3 Trip Generation

3.3.3.3 Net Trip Generation

The net peak-hour vehicle trip generation for the Project was determined by adjusting the 112 Shawmut Avenue project-generated vehicle trips to account for the removal of the trips associated with the existing office use on-site. The net vehicle trip generation for the Project during the weekday a.m. peak hour results is zero additional trips in and 51 additional trips out. During the p.m. peak hour, the net vehicle trip generation results in 55 additional trips in and 40 additional trips out.

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

It should be noted that net trip generation was not applied to the BCEC or CCBA properties as it was with 112 Shawmut Avenue Property. Therefore, it is likely that the increase in the Build traffic volumes is overstated. In addition, according to ITE, during the a.m. Peak Hour, the BCEC church will generate 22 vehicle trips (compared to just 11 vehicle trips associated with the new residential units). It is unlikely that the church will be generating this many vehicle trips during a typical morning peak hour, much less this many new trips that are not already occurring on-site.

3.3.4 Trip Distribution

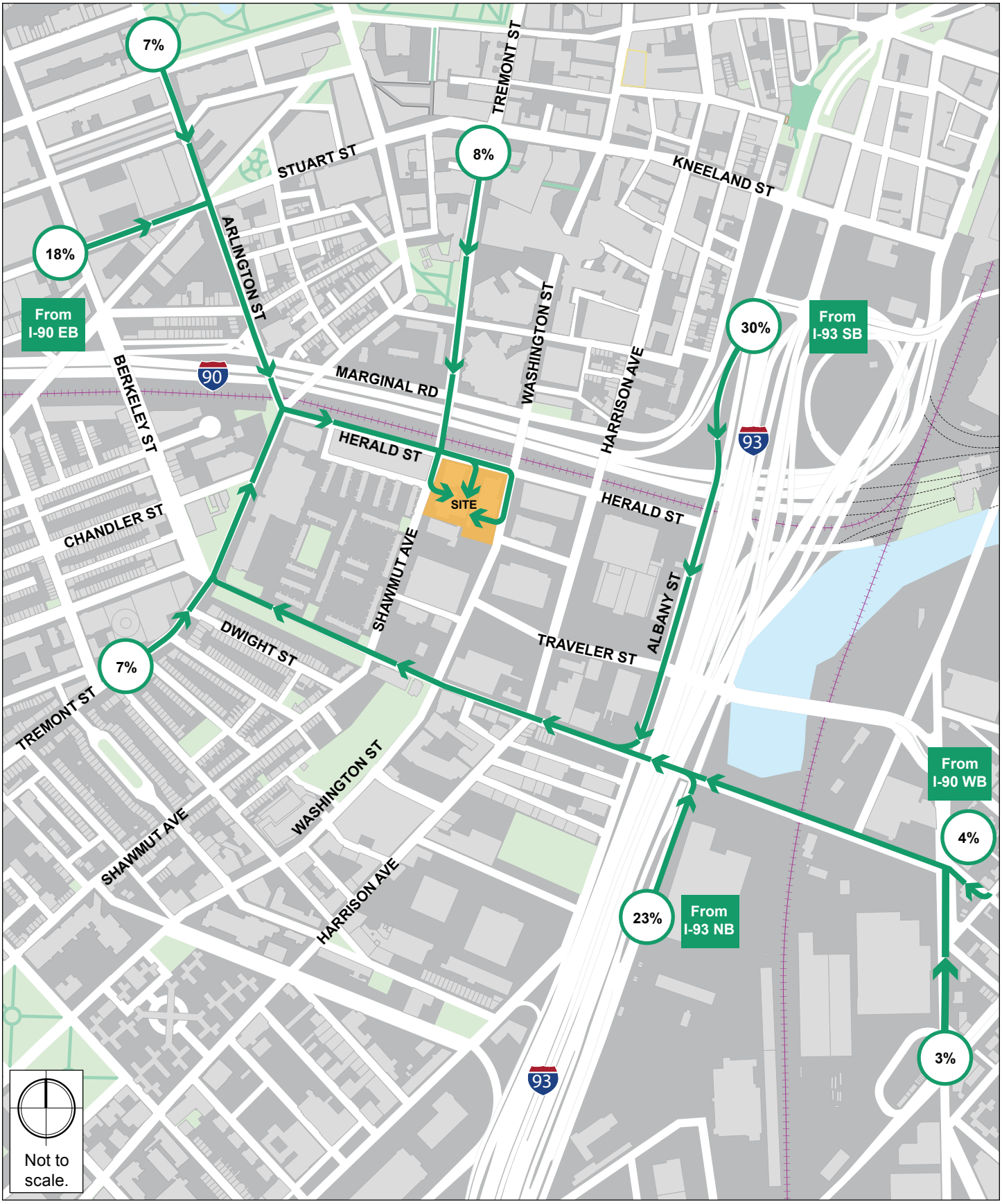
The vehicle trips associated with the Project were assigned to the proposed parking garages on-site. The trip distribution patterns for the Project are illustrated in Figures 3-4 and 3-5.

3.3.5 Build (2024) Condition Traffic Volumes

The Project-generated trips for the weekday a.m. peak hour and weekday p.m. peak hour are shown in Figure 3-6 and Figure 3-7, respectively. The net trip assignments were added to the No-Build (2024) Condition vehicular traffic volumes to develop the Build (2024) Condition vehicular traffic volumes. The Build (2024) Condition weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown on Figure 3-8 and Figure 3-9, respectively.

3.3.5 Build (2024) Condition Traffic Operations Analysis

Table 3-4 and Table 3-5 present the Build (2024) Condition capacity analysis for the weekday a.m. peak hour and weekday p.m. peak hour, respectively. The detailed analysis sheets are provided in Appendix C.



Shawmut Avenue/Washington Street Block **Boston, Massachusetts**

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Figure 3-4
Vehicle Trip Distribution - Entering

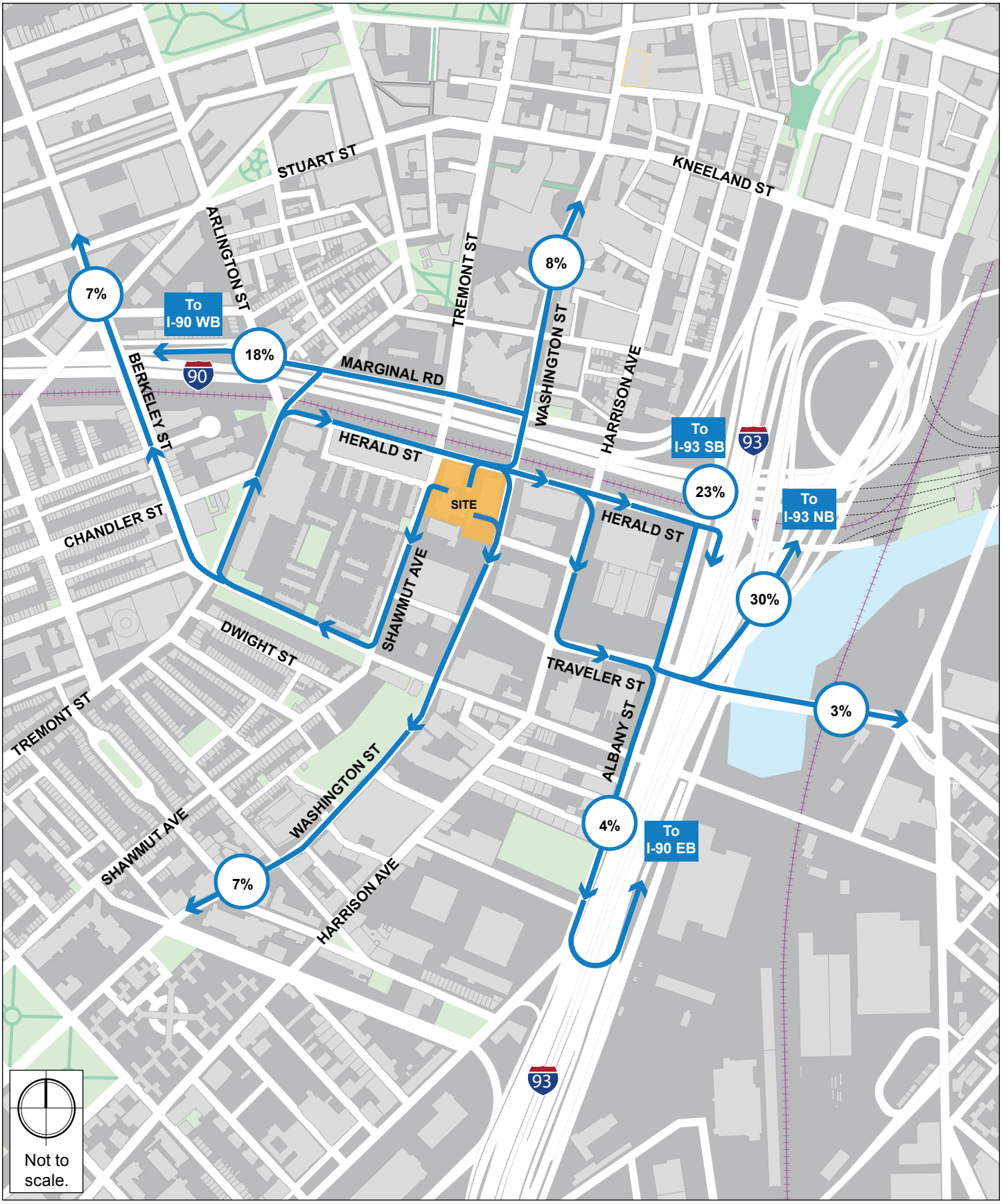

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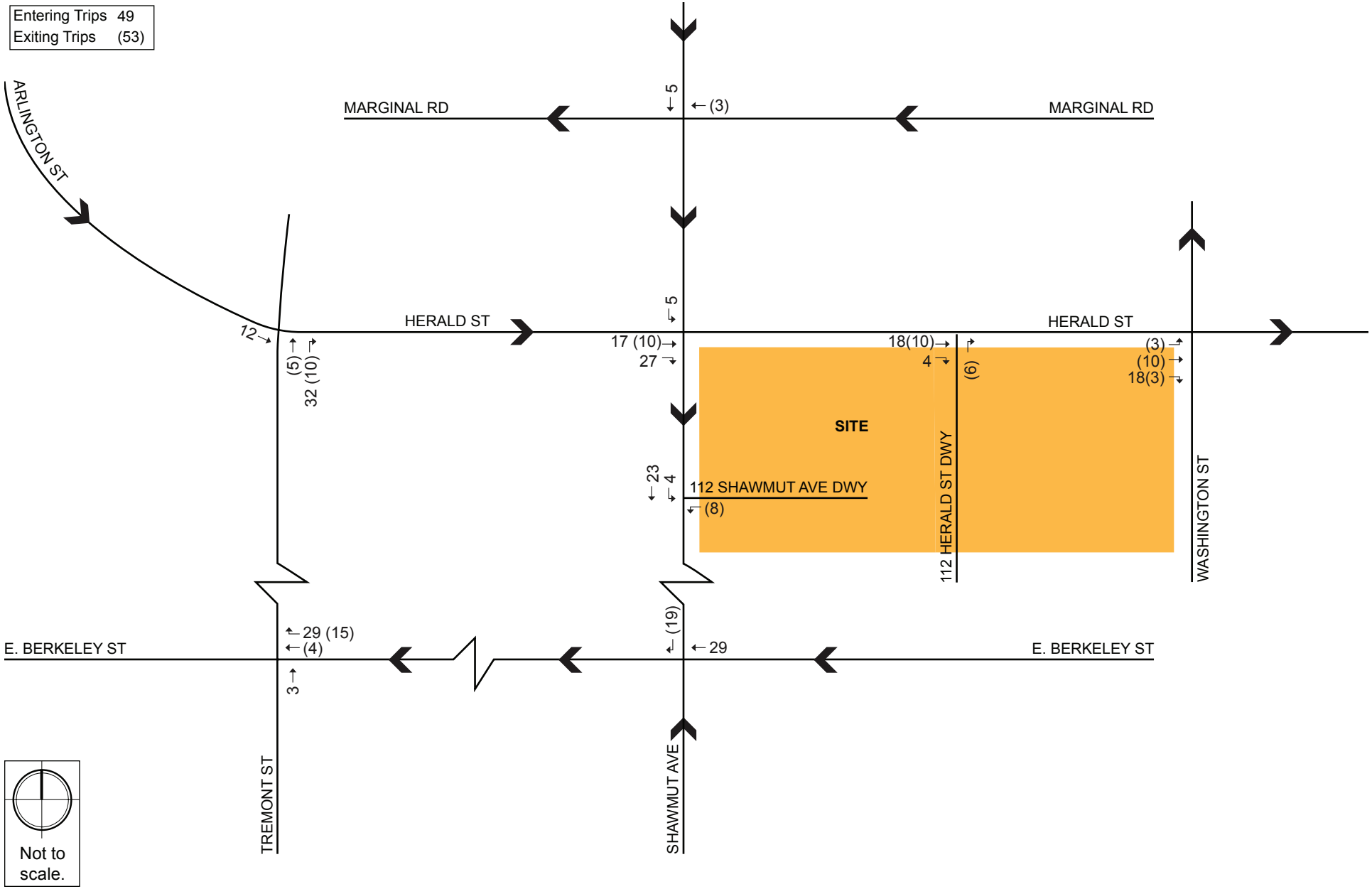
Figure 3-5
Vehicle Trip Distribution - Exiting



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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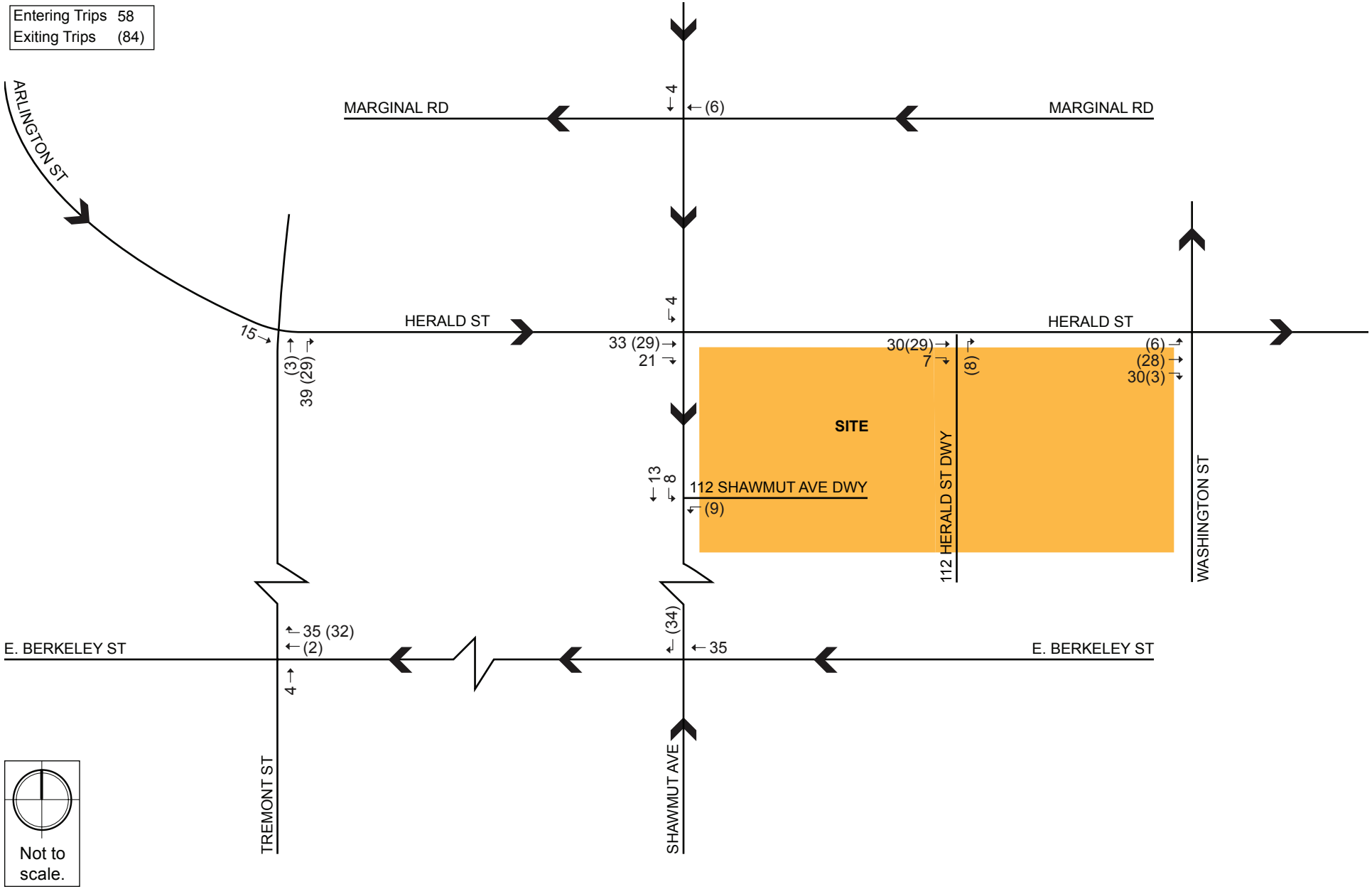
Figure 3-6

Project-Generated Vehicle Trip Assignment, a.m. Peak Hour



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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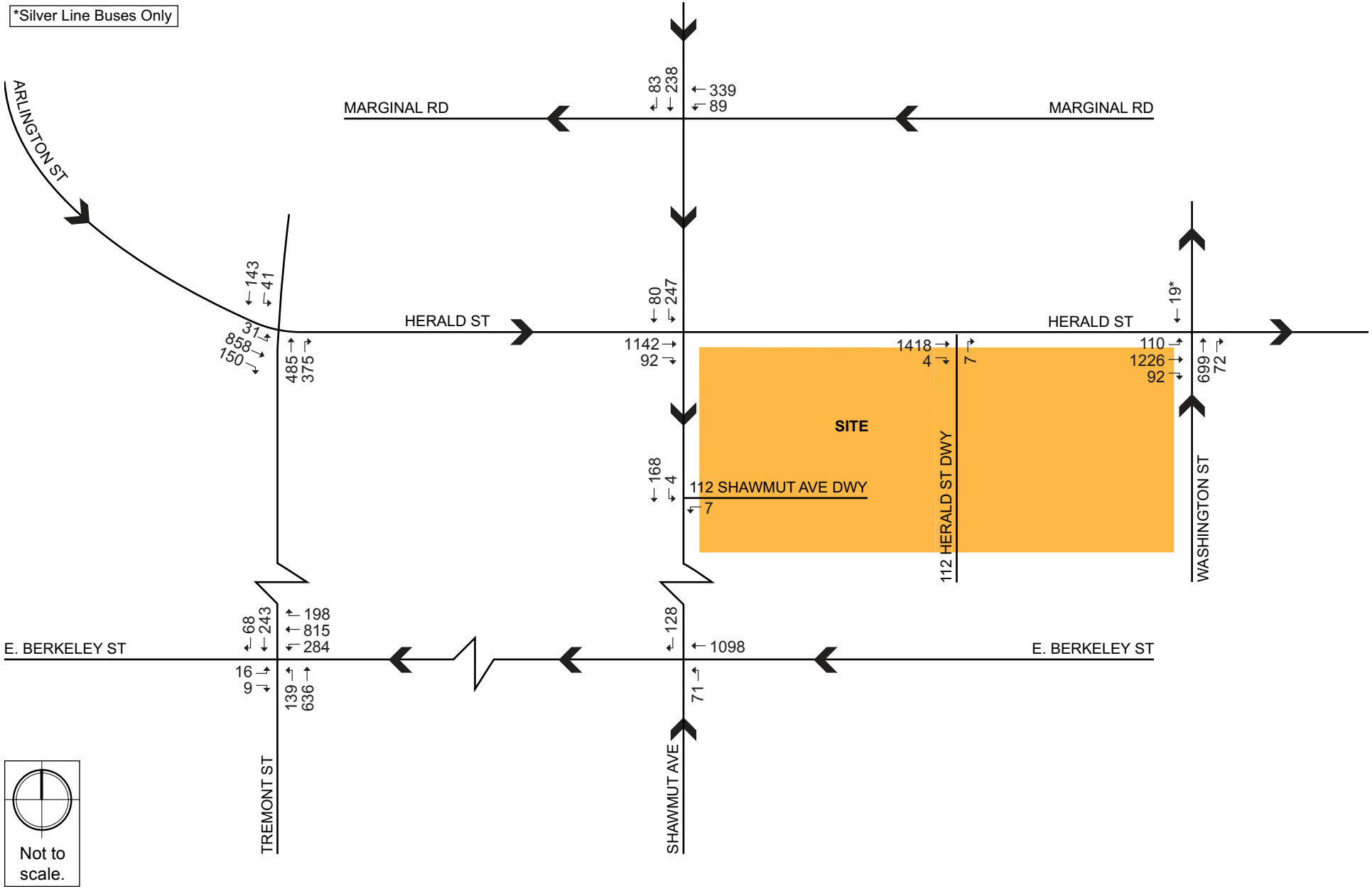
Figure 3-7

Project-Generated Vehicle Trip Assignment, p.m. Peak Hour



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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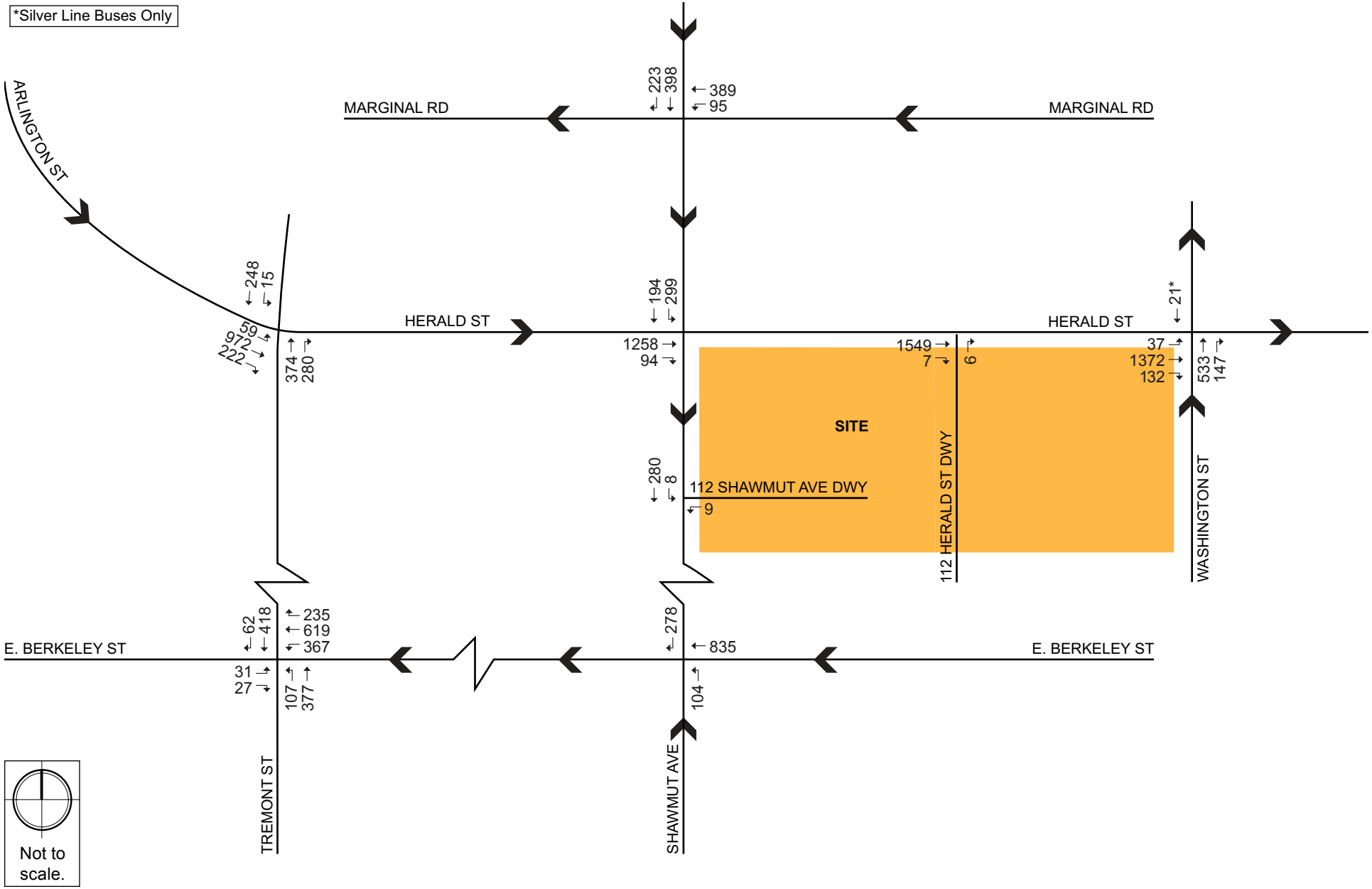
Figure 3-8

Build (2024) Condition Traffic Volumes, a.m. Peak Hour



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 3-9

Build (2024) Condition Traffic Volumes, p.m. Peak Hour

Table 3-4 Build (2024) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized					
Arlington Street/Herald Street/Tremont Street	**C**	**23.9**	-	-	-
Arlington Street EB left/thru | thru | thru| thru/right	C	24.8	0.51	151	184
Tremont Street NB thru | thru/right	C	22.2	0.77	178	m128
Tremont Street SB left/thru | thru	C	26.0	0.32	56	78
Herald Street/Shawmut Avenue	**A**	**8.9**	-	-	-
Herald Street EB thru | thru | thru/right	A	8.8	0.58	117	112
Shawmut Avenue SB left | left	A	6.6	0.26	0	11
Shawmut Avenue SB thru | thru	B	18.0	0.09	23	38
Herald Street/Washington Street	**D**	**49.9**	-	-	-
Herald Street left/thru | thru | thru/right	B	16.4	0.79	343	407
Washington Street NB thru	F	>80.0	>1.00	~619	#790
Washington Street NB right	B	13.0	0.18	22	49
Washington Street SB thru (Silver Line buses only)	B	15.6	0.06	9	20
East Berkeley Street/Shawmut Avenue	**B**	**11.2**	-	-	-
E Berkeley Street WB thru | thru | thru	B	12.0	0.48	149	180
Shawmut Avenue NB left	A	1.2	0.21	0	0
Shawmut Avenue SB right	B	10.5	0.48	3	3
Tremont Street/East Berkeley Street/Berkeley Street	**F**	**>80.0**	-	-	-
Berkeley Street EB left	D	39.0	0.28	9	29
Berkeley Street EB right	A	0.1	0.02	0	0
E Berkeley Street WB left	C	28.3	0.64	169	263
E Berkeley Street WB thru | thru/right	F	>80.0	>1.00	~429	#563
Tremont Street NB left/thru | thru	F	>80.0	>1.00	~296	#450
Tremont Street SB thru | thru/right	C	30.6	0.54	113	149
Shawmut Avenue/Marginal Road	**C**	**20.1**	-	-	-
Marginal Road WB left/thru | thru	C	20.8	0.36	105	141
Shawmut Avenue SB thru | thru | thru/right	B	19.2	0.23	42	66
Unsignalized					
Herald Street/112 Shawmut Avenue Driveway	-	-	-	-	-
Herald Street EB thru | thru | thru/right	A	0.0	0.35	-	0
112 Shawmut Avenue Driveway NB right	A	9.6	0.02	-	2
Shawmut Avenue/112 Shawmut Avenue Driveway	-	-	-	-	-
112 Shawmut Avenue Driveway WB left	A	9.5	0.01	-	1
Shawmut Avenue SB left/thru	A	0.2	0.00	-	0

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

Table 3-5 Build (2024) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized					
Arlington Street/Herald Street/Tremont Street	**C**	**24.4**	-	-	-
Arlington Street EB left/thru | thru | thru| thru/right	C	23.5	0.55	179	214
Tremont Street NB thru | thru/right	C	25.0	0.67	154	220
Tremont Street SB left/thru | thru	C	27.5	0.31	76	110
Herald Street/Shawmut Avenue	**A**	**8.5**	-	-	-
Herald Street EB thru | thru | thru/right	A	8.6	0.58	87	100
Shawmut Avenue SB left | left	A	1.4	0.33	2	3
Shawmut Avenue SB thru | thru	B	19.2	0.27	31	38
Herald Street/Washington Street	**D**	**42.3**	-	-	-
Herald Street left/thru | thru | thru/right	D	52.0	>1.00	~440	#538
Washington Street NB thru	C	23.4	0.71	262	399
Washington Street NB right	B	11.6	0.24	43	82
Washington Street SB thru (Silver Line buses only)	B	11.4	0.05	8	18
East Berkeley Street/Shawmut Avenue	**B**	**10.8**	-	-	-
E Berkeley Street WB thru | thru | thru	B	9.9	0.32	103	152
Shawmut Avenue NB left	A	2.1	0.32	0	0
Shawmut Avenue SB right	B	17.5	0.74	0	79
Tremont Street/East Berkeley Street/Berkeley Street	**D**	**45.1**	-	-	-
Berkeley Street EB left	F	>80.0	0.73	28	#73
Berkeley Street EB right	A	0.2	0.07	0	0
E Berkeley Street WB left	D	45.4	0.80	302	#428
E Berkeley Street WB thru | thru/right	D	52.1	0.95	381	#494
Tremont Street NB left/thru | thru	D	36.0	0.73	165	207
Tremont Street SB thru | thru/right	D	40.8	0.65	203	241
Shawmut Avenue/Marginal Road	**C**	**22.3**	-	-	-
Marginal Road WB left/thru | thru	C	22.9	0.41	124	168
Shawmut Avenue SB thru | thru | thru/right	C	21.8	0.46	108	128
Unsignalized					
Herald Street/112 Shawmut Avenue Driveway	-	-	-	-	-
Herald Street EB thru | thru | thru/right	A	0.0	0.40	-	0
112 Shawmut Avenue Driveway NB right	A	9.2	0.01	-	1
Shawmut Avenue/112 Shawmut Avenue Driveway	-	-	-	-	-
112 Shawmut Avenue Driveway WB left	B	10.2	0.01	-	1
Shawmut Avenue SB left/thru	A	0.3	0.01	-	0

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

Based on Tables 3-4 and Table 3-5, all of the study area intersections and movements continue to operate at similar LOS as the No-Build (2024) Condition. The East Berkeley Street/Shawmut Avenue intersection changes from an LOS A to B in the Build (2024) Condition, both of which are acceptable LOS. The Project is expected to generate minimal new trips throughout the study area when compared to the existing uses, and will not have a material impact on traffic operations at the study area intersections.

Chapter 4

Environmental Impacts

4.0 ENVIRONMENTAL IMPACTS

4.1 Introduction

This section provides discussions, and where appropriate, technical studies, for the environmental impacts related to wind, shadow, daylight and noise, as requested by the BPDA. These studies are based upon current designs for each of the Project buildings.

4.2 Wind

4.2.1 Introduction

Rowan Williams Davies & Irwin Inc. (RWDI) was retained to assess the pedestrian level wind impact of the Project. The qualitative assessment is based on the following:

- a review of the regional long-term meteorological data from Boston Logan International Airport;
- design drawings and documents received from the Project team on June 6, 8 and September 14, 2017;
- wind-tunnel studies undertaken by RWDI for similar projects in the Boston area, including projects on adjacent blocks;
- RWDI's engineering judgment, experience and expert knowledge of wind flows around buildings[3,4,5]; and
- use of software developed by RWDI (Windestimator[2]) for estimating the potential wind conditions around generalized building forms.

This qualitative approach provides a screening-level estimation of potential wind conditions.

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[3] 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.

[4] 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.

[5] 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.

4.2.2 Site and Building Information

The 112 Shawmut Avenue Property is currently occupied by a low building up to six stories in height. The CCBA Property is currently occupied by a single-story supermarket and an associated surface parking lot. The BCEC Property is currently occupied by a three-story building. These three Lots are surrounded by parking lots, multi-lane roadways and buildings ranging from five to 20 stories in height in the immediate vicinity. The downtown core of Boston, with high-rise developments is to the northeast. The terrain to the north through west to southwest comprises dense arrays of three to five-story residential and commercial buildings. To the south through east, the surroundings are slightly less dense, consisting of residential and industrial development, with Dorchester Bay and Dorchester Bay about two miles to the east.

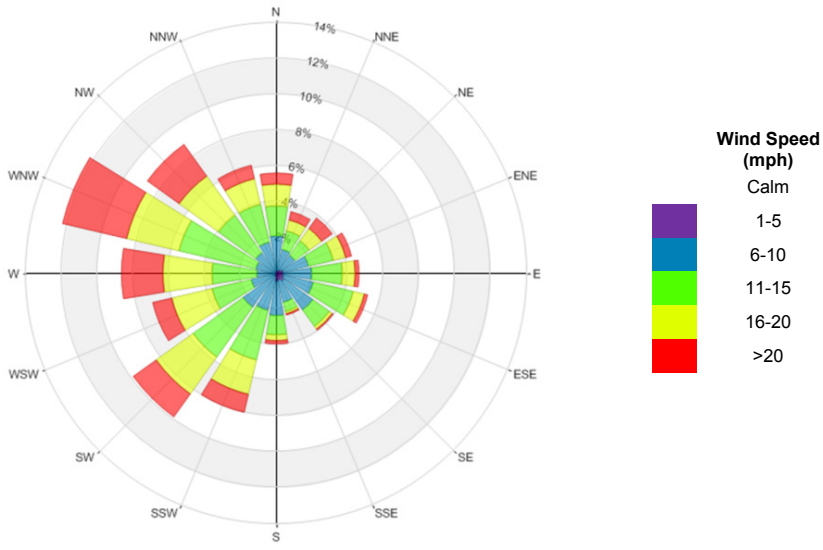
Several new buildings are under construction or approved in the adjacent lots. Most of these projects are proposed to be 10 stories in height or taller, and are likely to be complete before the proposed Project buildings. The proposed Project includes three mixed-use buildings, as described in Chapter 2. The proposed Project buildings will be similar in height to other mid-rise buildings in the surrounding area, including proposed buildings currently under construction in the vicinity.

Major pedestrian areas on and around the Project Site include main entrances to the 112 Shawmut Avenue building and BCEC building on Shawmut Avenue, a main entrance to the CCBA building on Washington Street, sidewalks on all neighboring streets, and terraces on Levels 7, 9 and 13 of the 112 Shawmut Avenue building.

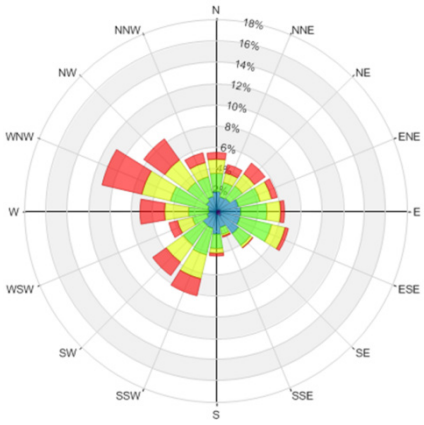
4.2.3 Meteorological Data

Wind statistics at Boston Logan International Airport between 1990 and 2015 were analyzed and Figure 4-1 graphically depicts the distributions of wind frequency and directionality for the four seasons and for the annual period. When all winds are considered (regardless of speed), winds from the northwest and southwest quadrants are predominant. Northeasterly winds are also relatively frequent in the spring.

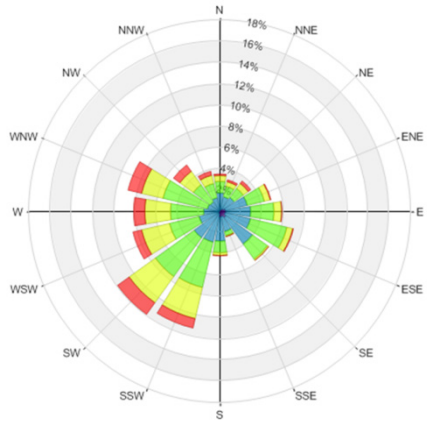
Strong winds with mean speeds greater than 20 miles per hour (mph)--red bands in the wind roses (see Figure 4-1)--are prevalent from the west-northwest direction throughout the year, while the strong winds from the southwest and northeast are also common. These are critical wind directions focused on in the following discussions.



Annual Winds

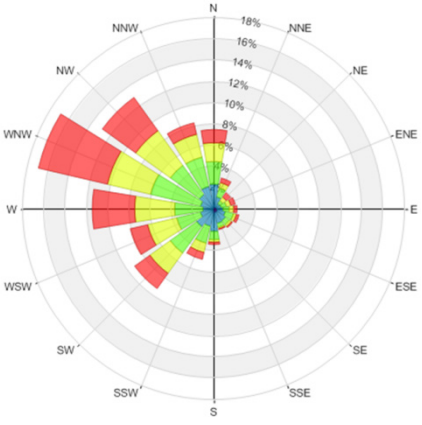


Spring (March to May)



Summer (June to August)

Fall (September to November)



Winter (December to February)

4.2.4 Pedestrian Wind Criteria

The BPDA has adopted two standards for assessing the relative wind comfort of pedestrians.

First, the BPDA wind design guidance criterion states that an effective gust velocity (hourly-mean wind speed + 1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent (1%) of the time. This criterion is hereby referred to as the gust criterion.

The second set of criteria used by the BPDA to determine the acceptability of specific locations is based on the work of Melbourne[6]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing and walking. The criteria are expressed in terms of benchmarks for the one-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed), as provided in Table 4-1.

Table 4-1 BPDA Mean Wind Criteria*

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

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

Pedestrians on sidewalks will be active and wind speeds comfortable for walking are appropriate at these locations. Lower wind speeds comfortable for standing are desired for building entrances where people are apt to linger. For any outdoor amenity at and above grade, low wind speeds comfortable for sitting or standing are desired in the summer months when such amenity spaces are typically in use. Wind speeds rated "Uncomfortable for Walking" and/or "Dangerous" are higher than desirable for any pedestrian activity.

The following discussions on pedestrian wind conditions is based on the annual wind climate. Typically, the summer and fall winds tend to be more comfortable than the annual winds, while the winter and spring winds are less comfortable than the annual winds.

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

4.2.5 Pedestrian Wind Conditions

4.2.5.1 Background

Predicting wind speeds and frequencies of occurrence is complicated. It involves the assessment of building geometry, orientation, position and height of surrounding buildings, upwind terrain and the local wind climate. Over the years, RWDI has conducted thousands of wind tunnel model studies on pedestrian wind conditions around buildings, yielding a broad knowledge base. This knowledge has been incorporated into RWDI's proprietary software that allows, in many situations, for a screening-level qualitative estimation of pedestrian wind conditions without wind tunnel testing.

Wind generally tends to flow over dense arrays of buildings of even height (Figure 4-2, Image 1). Buildings taller than their surroundings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. Such a Downwashing Flow (Figure 4-2, Image 2) is the main cause for increased wind activity around buildings at the pedestrian level. These Downwashed winds subsequently channel along street canyons make those areas windy (Figure 4-2, Image 3). If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity and uncomfortable conditions.

Stepping the windward façade (Figure 4-2, Image 4) is a positive design strategy that is often used for wind control. However, increased wind activity will be created on the lower windward roofs or terraces where low wind speeds are typically desired for amenity use.

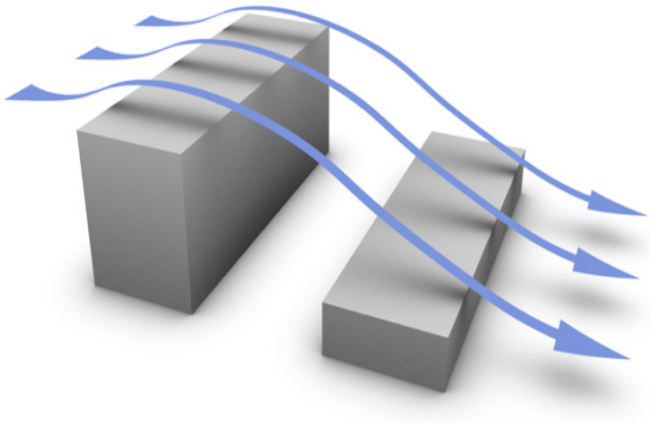
4.2.5.2 No Build: Effective Gust

Wind conditions on the Project Site are expected to be in compliance with the effective gust criterion, due to the low heights of the on-site buildings.

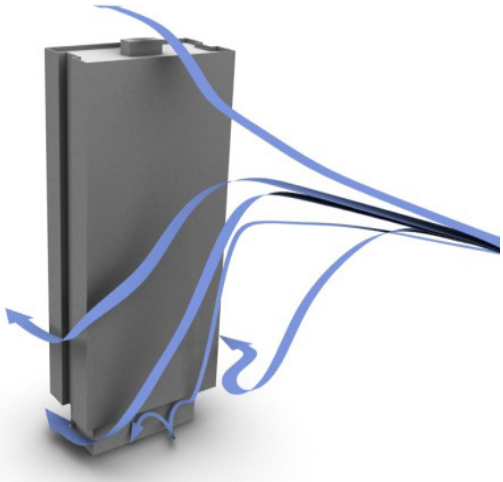
Off-site, existing tall buildings and approved and under construction buildings that are likely to be completed before the Project are expected to result in wind speeds that exceed the gust criterion on the sidewalks close to them, particularly near their western corners on Washington Street. These high wind conditions can be attributed to building-wind interactions as discussed in Section 4.2.5.1.

4.2.5.3 No-Build: Mean Speed

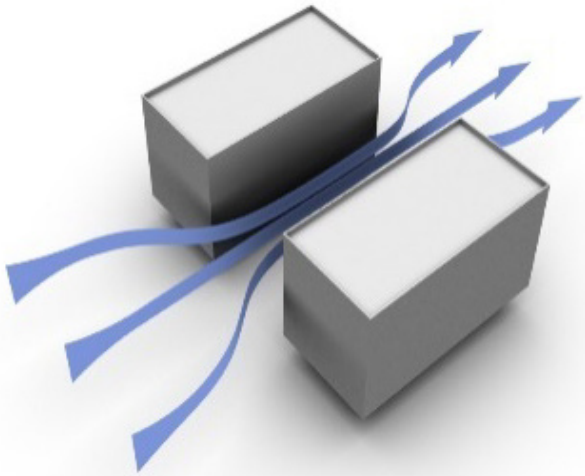
On an annual basis, wind conditions at most areas around the Project Site are currently predicted to be rated comfortable for sitting, standing or walking and therefore, suitable for pedestrian activities. This is largely due to the uniform height of surrounding buildings in the westerly and northeast directions that prevent the redirection of winds to street level (Figure 4-2, Image 1).



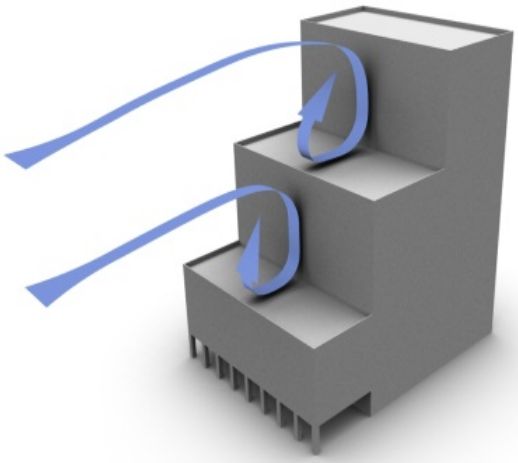
a) Wind Flow over Low-rise Buildings



b) Downwashing Flow



c) Channeling Effect



d) Stepped Facade

Wind conditions north of Herald Street on Shawmut Avenue and Washington Street are expected to be around the upper threshold for the walking category, and could potentially be uncomfortable for walking from time to time due to exposure to the prevailing winds.

Wind conditions at the intersections of these streets at Herald Street are also expected to be potentially uncomfortable due to wind acceleration around existing buildings at these intersections. Similar conditions are expected along Washington Street, south of Herald Street, close to the existing taller buildings due to the building-wind interactions discussed in Section 4.2.5.1.

4.2.5.4 Build: Project Features and Wind Flow

The three proposed buildings will be similar in height to mid-rise buildings that exist in the vicinity, and those that are under construction or approved in the neighboring area. The proposed buildings will be taller than the majority of the area to the west and southwest, predominantly consisting of low-rise buildings and roads, and therefore, exposed to winds from those directions. Although strong winds from the northeast are frequent, especially in the spring, the downtown core and taller buildings in that direction aid in lowering the impact of these winds on the Project.

The Project design includes large terraces formed by stepping the massing back at upper levels of the buildings. These massing setbacks are positive in that they capture downwashing flow and reduce wind impacts at grade level. The exposure of the buildings on their west and north side, however, subjects the proposed buildings to wind accelerations at the exposed northwest and southwest corners, which could potentially result in high and even severe wind conditions on the sidewalks near the corners of the buildings. Canopies and other potential measures are anticipated to be evaluated to mitigate these conditions for each Project component, as necessary. The northwesterly winds may also channel through the gap between the proposed 112 Shawmut Avenue building and the proposed BCEC building, creating high wind activity.

4.2.5.5 Build – Grade Level: Effective Gust

With the addition of the three buildings to the existing surroundings, wind conditions at most areas around the Project Site are expected to meet the effective gust criterion. The potential exception to this is at the northwest and southwest corners of the Project Site due to exposure and corner acceleration as discussed in Section 4.2.5.4. Apart from localized impacts close to the buildings, the proposed buildings are expected to have no significant impact on wind conditions in the extended surroundings.

The three buildings will afford shelter to the portion of Washington Street between Herald Street and William E. Mullins Way from the prevailing westerly winds. Therefore, it is anticipated that high wind activity expected in this street section under the No-Build

scenario will be reduced, and wind conditions near the existing building in that section will meet the gust criterion.

Conditions in the surrounding area away from the Project Site are anticipated to be the same as the No-Build condition.

4.2.5.6 Build – Grade Level: Mean Speed

Sidewalks

Wind speeds around the Project Site are anticipated to be comfortable for walking or better at most areas. Winds near the western building corners are anticipated to be rated uncomfortable for walking. The sheltering effect of the proposed buildings is expected to reduce wind speeds on Washington Street and south of Herald Street. Conditions at other areas are generally expected to remain similar to those noted for the No-Build scenario in Section 4.2.5.3.

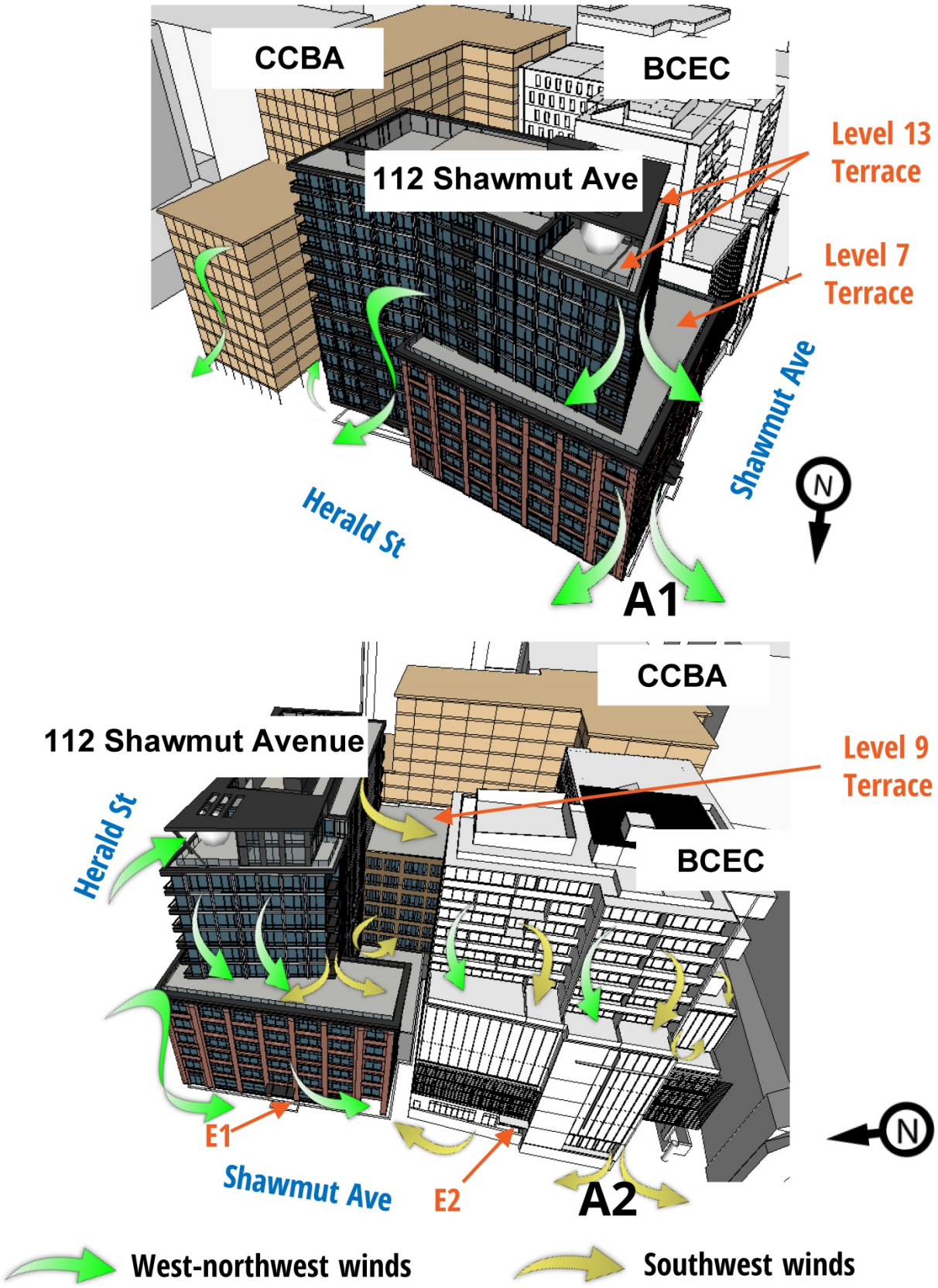
Main Entrance

The main entrances to the proposed 112 Shawmut Avenue building and proposed BCEC building are identified as E1 and E2 in Figure 4-3. The specific entrance location of the CCBA building is unknown at this stage of design. Anticipated large canopies above both identified entrances will protect these entrances from winds downwashing off the west façades. In addition, the entrance to the BCEC building is anticipated to be recessed from the main façade which is a positive design feature. However, entrance E1 to the 112 Shawmut Avenue building will be exposed to the winds that will accelerate at the northwest and southwest corners of the development and flow along the 112 Shawmut Avenue building and BCEC building on Shawmut Avenue. The Proponents will evaluate measures to mitigate the wind conditions along Shawmut Avenue, if necessary.

The closed vestibule at E1 would serve as a protected waiting area for pedestrians and is anticipated to be retained in the final design.

4.2.5.7 Build – Terraces

The proposed 112 Shawmut Avenue building includes large terraces. These terraces are planned on Level 7 (north and west sides), Level 9 (southeast) and Level 13 (Penthouse, northwest and southwest). Current designs for the BCEC and CCBA buildings do not proposed outdoor activities on the podiums of their respective buildings.



Shawmut Avenue/Washington Street Block Boston, Massachusetts

Figure 4-3

Expected Flow Patterns for Predominant Winds on the Projects

Wind speed increases with elevation; the large terraces are more exposed to winds due to the presence of very few tall buildings in the immediate vicinity in the windward directions. Wind speeds on the southeast terrace on Level 9 and the terrace on Level 13 would be relatively lower than on the terrace at Level 7 due to their location farthest from the windward (west) side (Level 9) and recessed location at a re-entrant corner under a large canopy (Level 13). However, conditions are expected to be windy from time to time. In addition, the terrace at Level 9 is sheltered from the predominant southwesterly winds by the proposed BCEC building. Thus, wind conditions on the terrace at Level 9 are expected to be comfortable for the intended use for most of the time.

4.2.6 Summary

Based on the height of the proposed buildings and their surroundings, local wind data, and RWDI's experience with similar projects, it is predicted that wind speeds at most areas around the Project Site will be suitable for pedestrian activity, and similar to conditions that exist currently. However, the exposure of the three buildings to the west-northwest and southwest winds, and the interaction of winds with the proposed buildings and the new surrounding buildings anticipated to be completed before the proposed buildings, will result in higher than desired wind conditions around the western corners. The main entrance to the 112 Shawmut Avenue building and terraces at Levels 7 and 13 are expected to be windy for the intended use due to their exposure to the prevailing winds. The Project team will continue to evaluate measures to mitigate wind impacts at the corners, main entrance and terraces as the designs progress.

Wind speeds that exceed the effective gust criterion are expected in the existing surroundings prior to the addition of the three buildings, and would remain after the buildings are constructed. The addition of the three buildings is expected to result in similar high gust conditions near the western corners. Mean wind speeds at the aforementioned areas are expected to be rated uncomfortable for walking. Wind conditions at most other areas are expected to remain largely unchanged compared to the existing conditions and be in the range comfortable for walking or standing.

The proposed buildings are expected to have little to no impact on wind conditions in the extended surroundings.

4.3 Shadow

4.3.1 Introduction and Methodology

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

The shadow analysis presents the existing shadow and new shadow that would be created by the Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project Site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 4-4 to 4-17.

The results of the analysis show that new shadow from the Project will generally be limited to nearby streets and sidewalks. During one time period (December 21 at 3:00 p.m.), new shadow will be cast onto the temporary Quincy Upper School basketball court, the closest open space to the Project Site. New shadow will be cast onto the bus stop on Washington Street south of Herald Street in the afternoons by the CCBA building. No other bus stops will be impacted by new shadow from the Project.

4.3.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the three buildings will be cast to the northwest. New shadow from the BCEC building will be cast onto Paul Place and its sidewalks, and minimal new shadow from the CCBA building and 112 Shawmut Avenue building will be cast onto small portions of Herald Street. Minimal new shadow from the 112 Shawmut Avenue building will be cast onto a minor portion of Paul Place and its northern sidewalk. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 12:00 p.m., new shadow from the three buildings will be cast to the north. New shadow from the BCEC building and the 112 Shawmut Avenue building will be cast onto portions of Shawmut Avenue and its sidewalks. New shadow from the CCBA building and the 112 Shawmut Avenue building will be cast onto Herald Street and its sidewalks, as well as onto the commuter rail tracks and Massachusetts Turnpike to the north. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 3:00 p.m., new shadow from the three buildings will be cast to the northeast. New shadow from the 112 Shawmut Avenue building and CCBA building will be cast across a portion of Herald Street and its sidewalks, as well as portions of the train tracks to the north and the Massachusetts Turnpike. New shadow from the CCBA building will also be cast onto Washington Street and its sidewalks, including the adjacent bus stop. New shadow from the BCEC building will be cast within the Project Site. No new shadow will be cast onto other nearby bus stops or any existing public open spaces.

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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

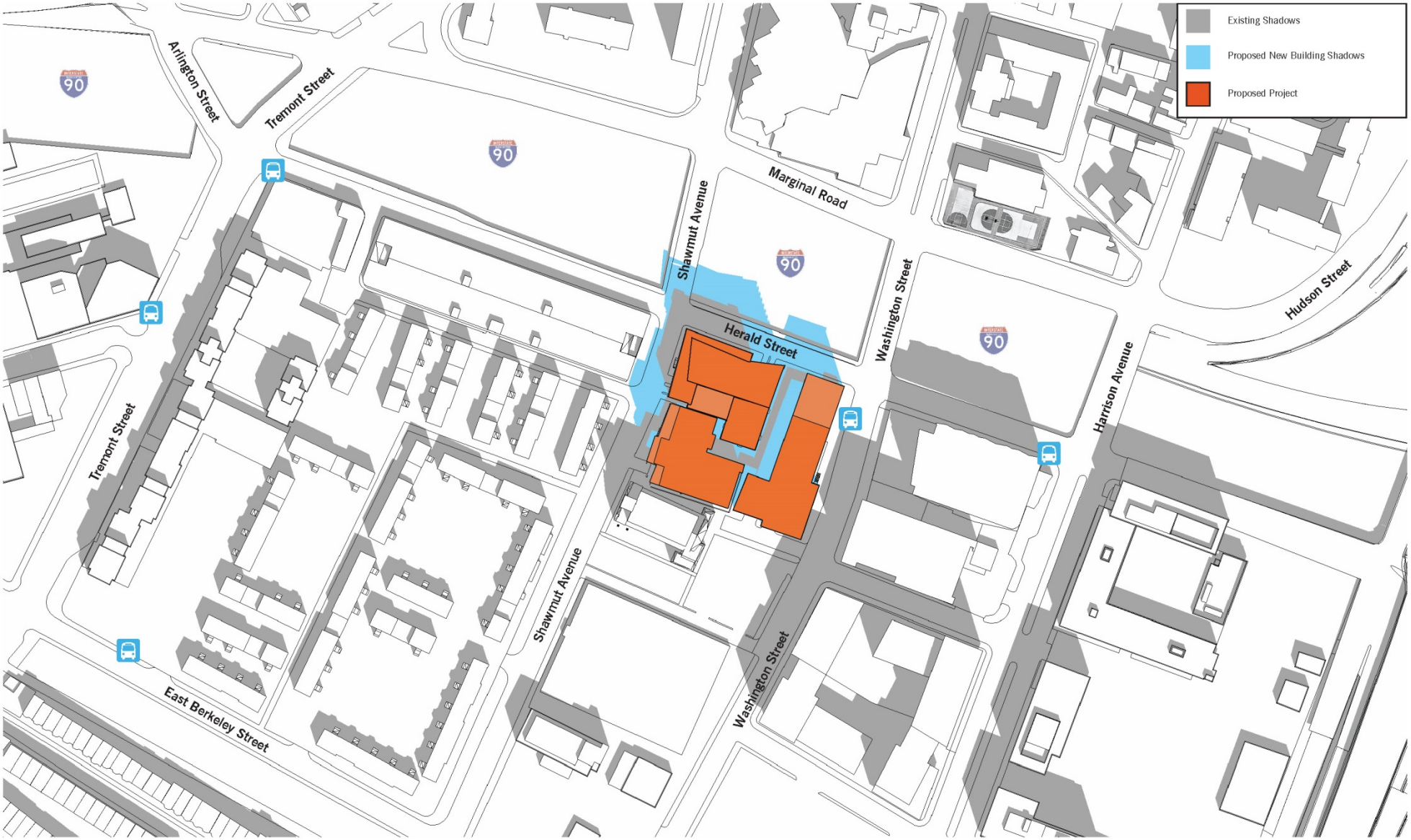

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Figure 4-5

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

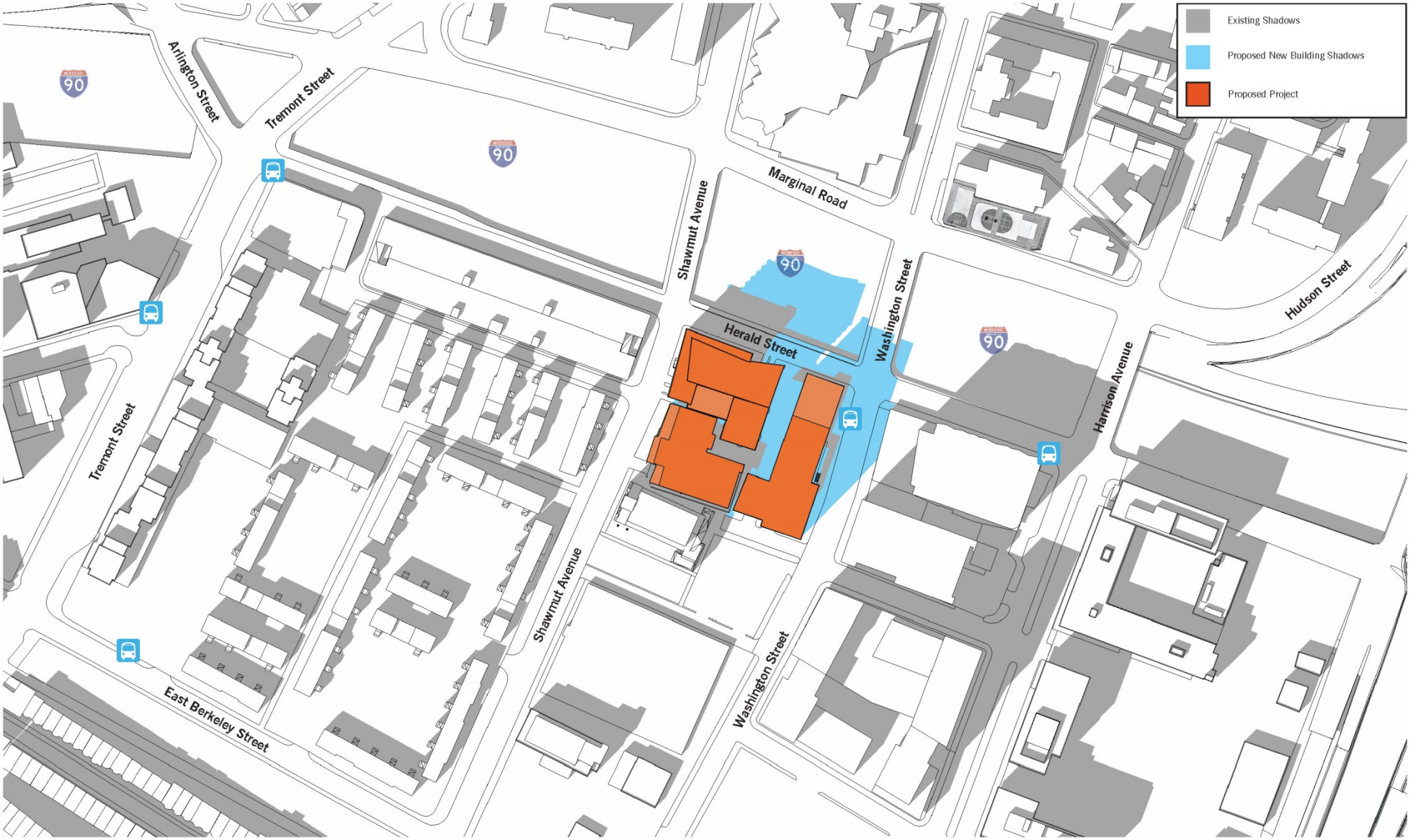

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Figure 4-6
Shadow Study, March 21 3:00 p.m.

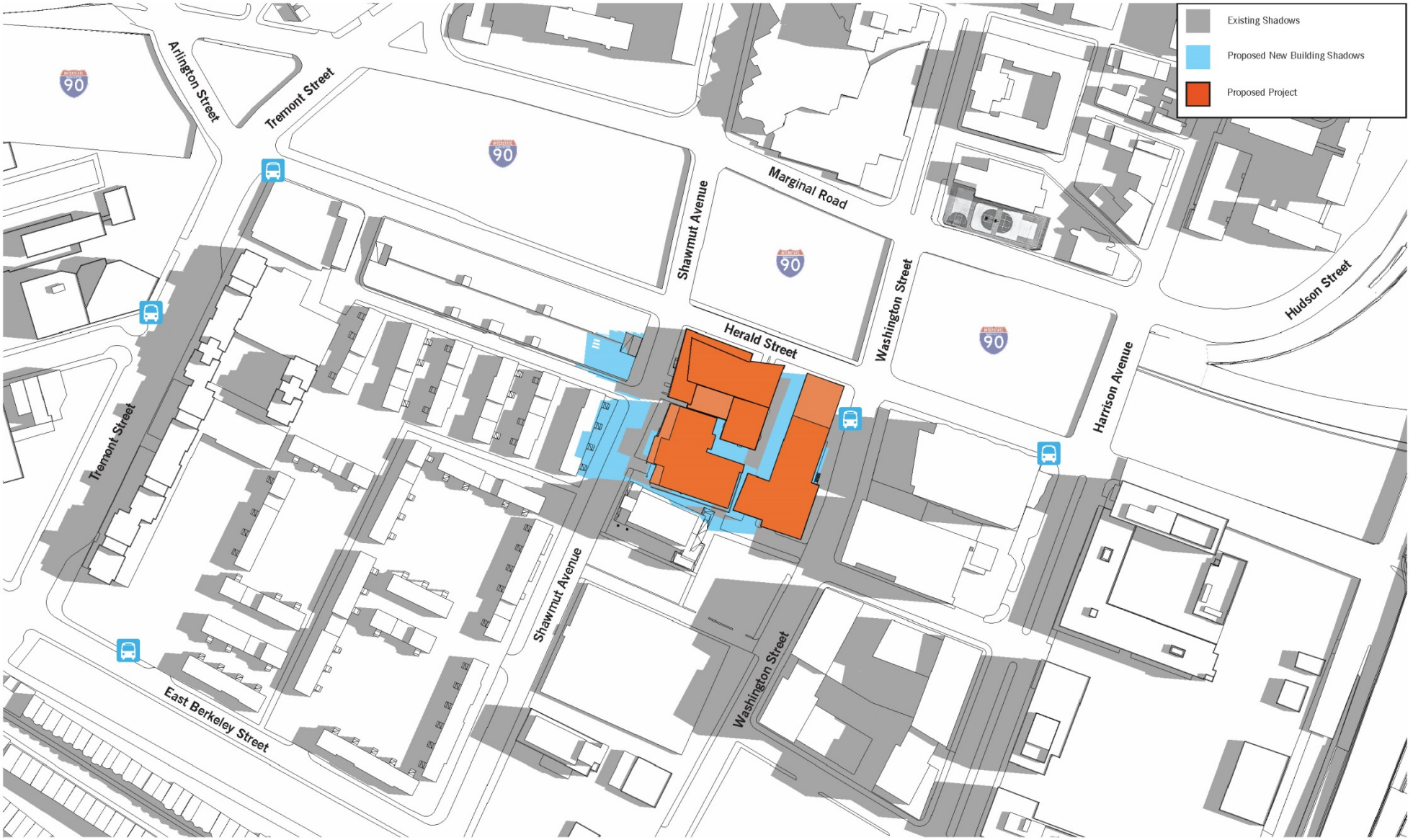

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Figure 4-7

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

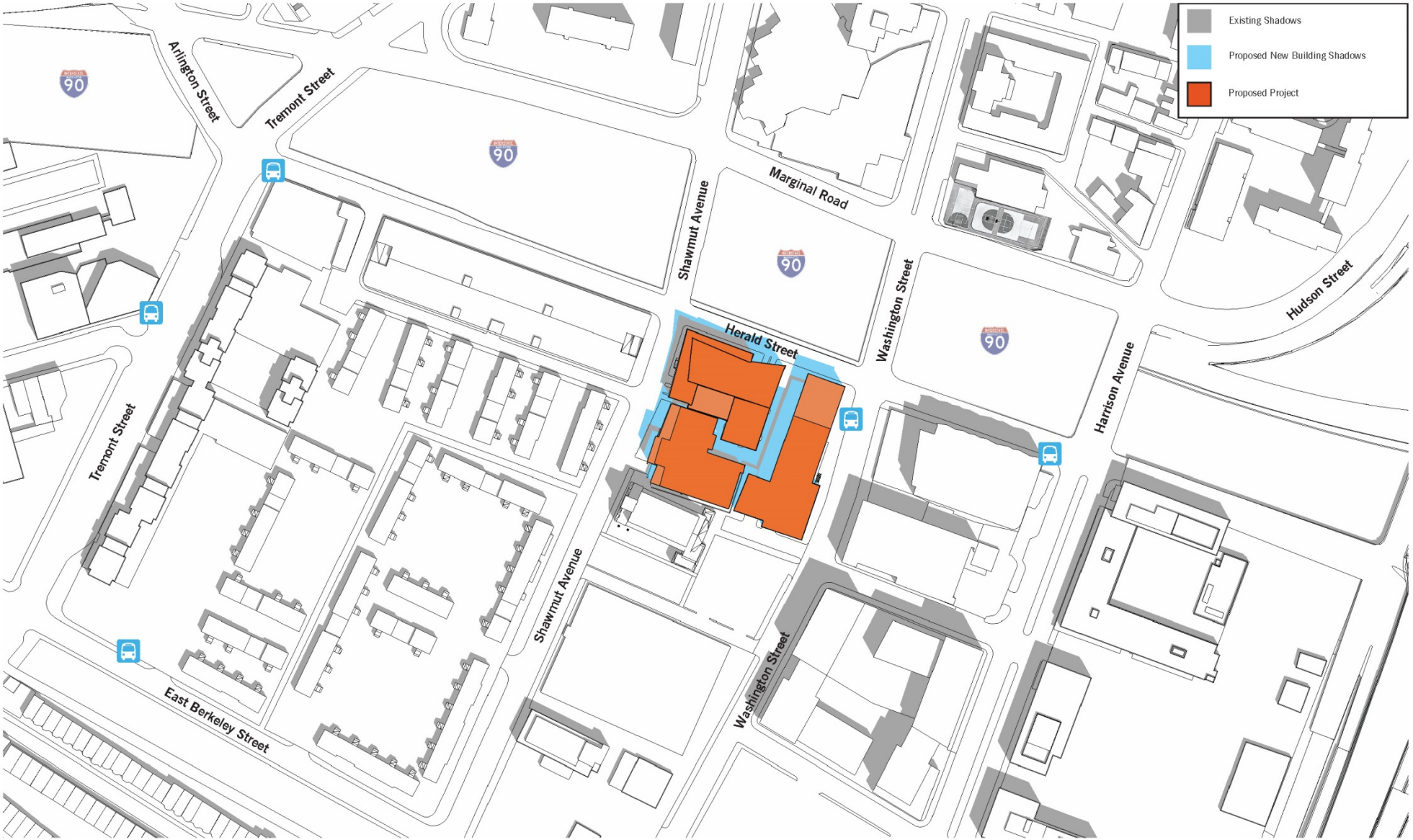

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Figure 4-8

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

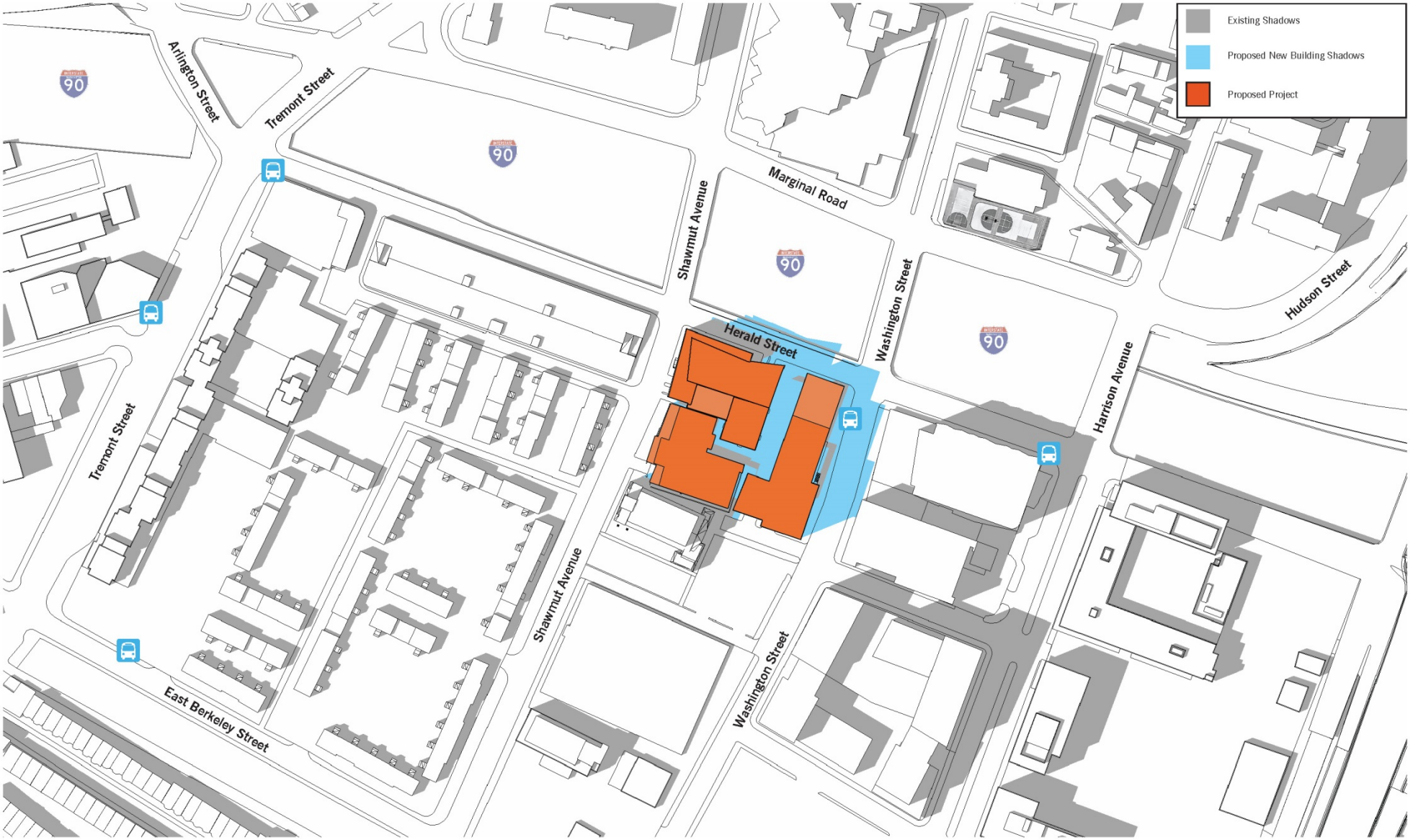

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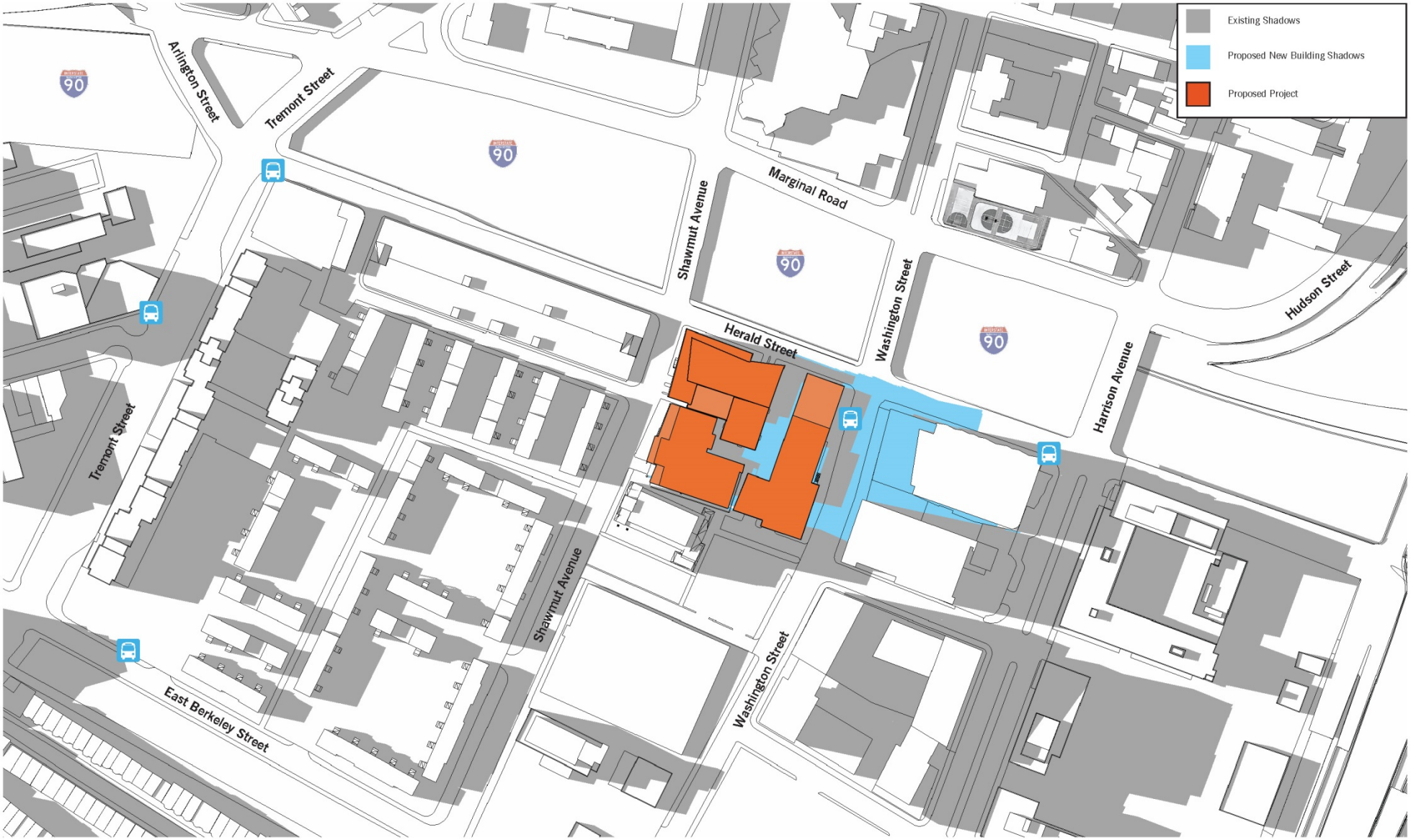
Figure 4-9

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



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 4-10

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

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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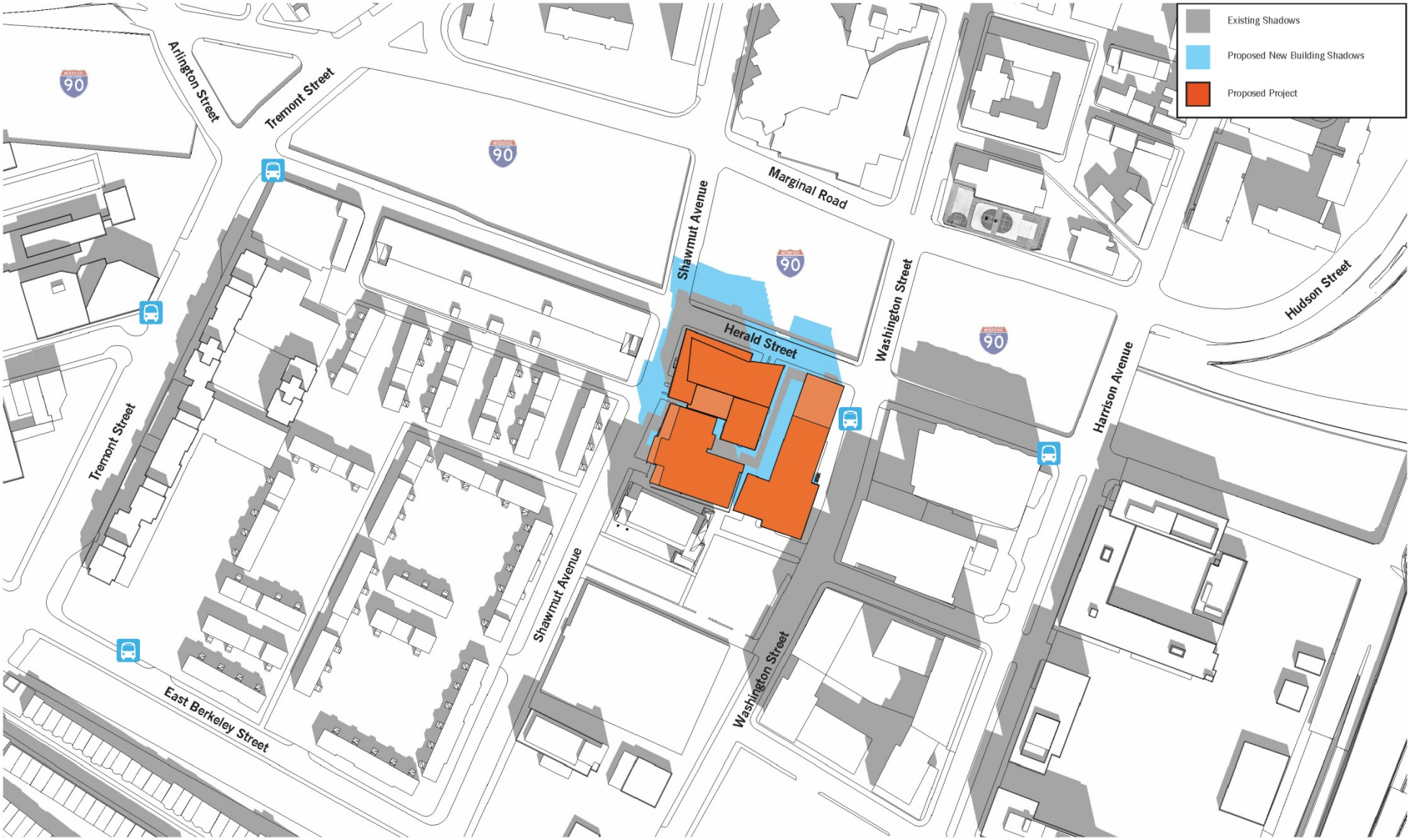
Figure 4-11

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



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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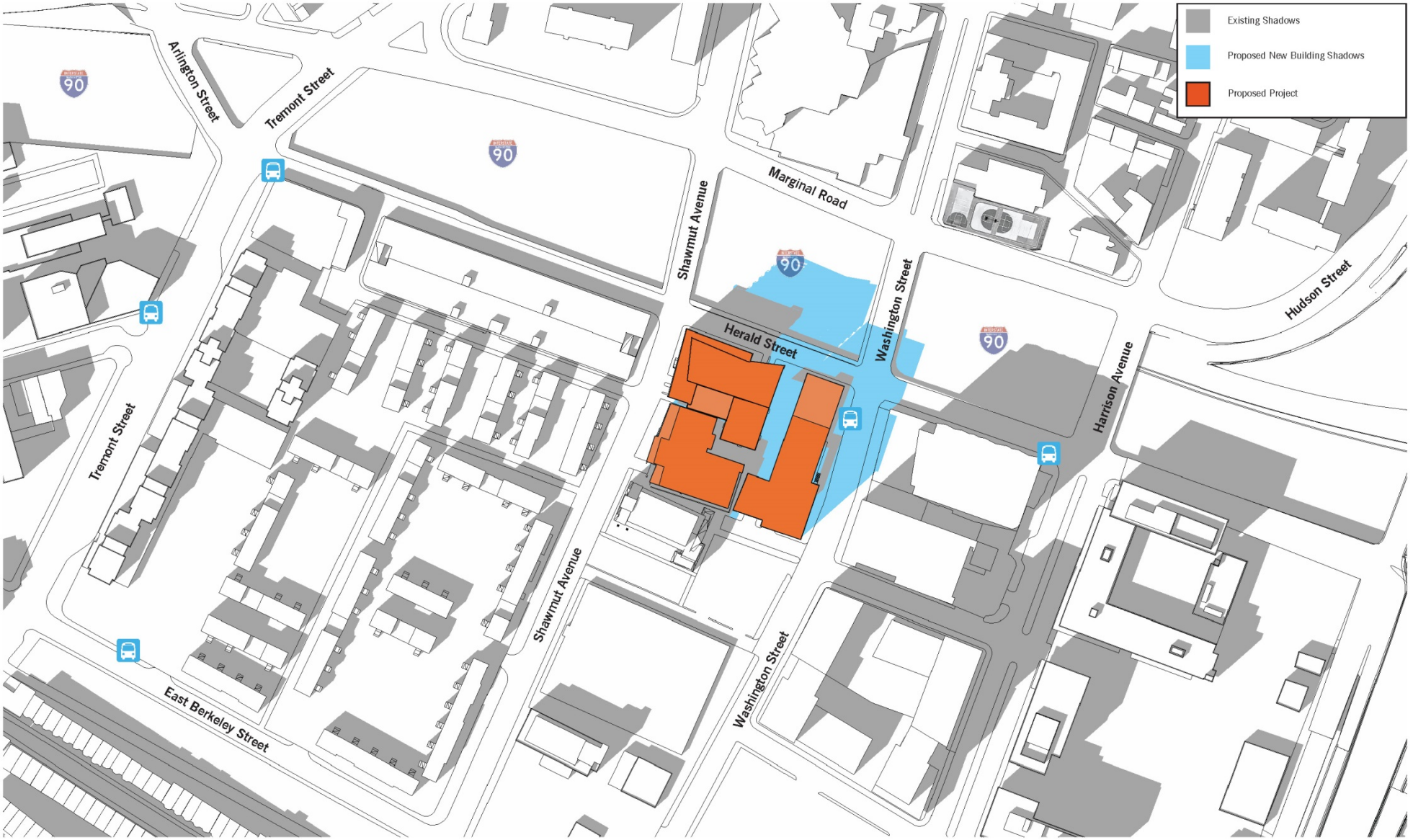
Figure 4-12

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



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 4-13

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

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 4-14

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

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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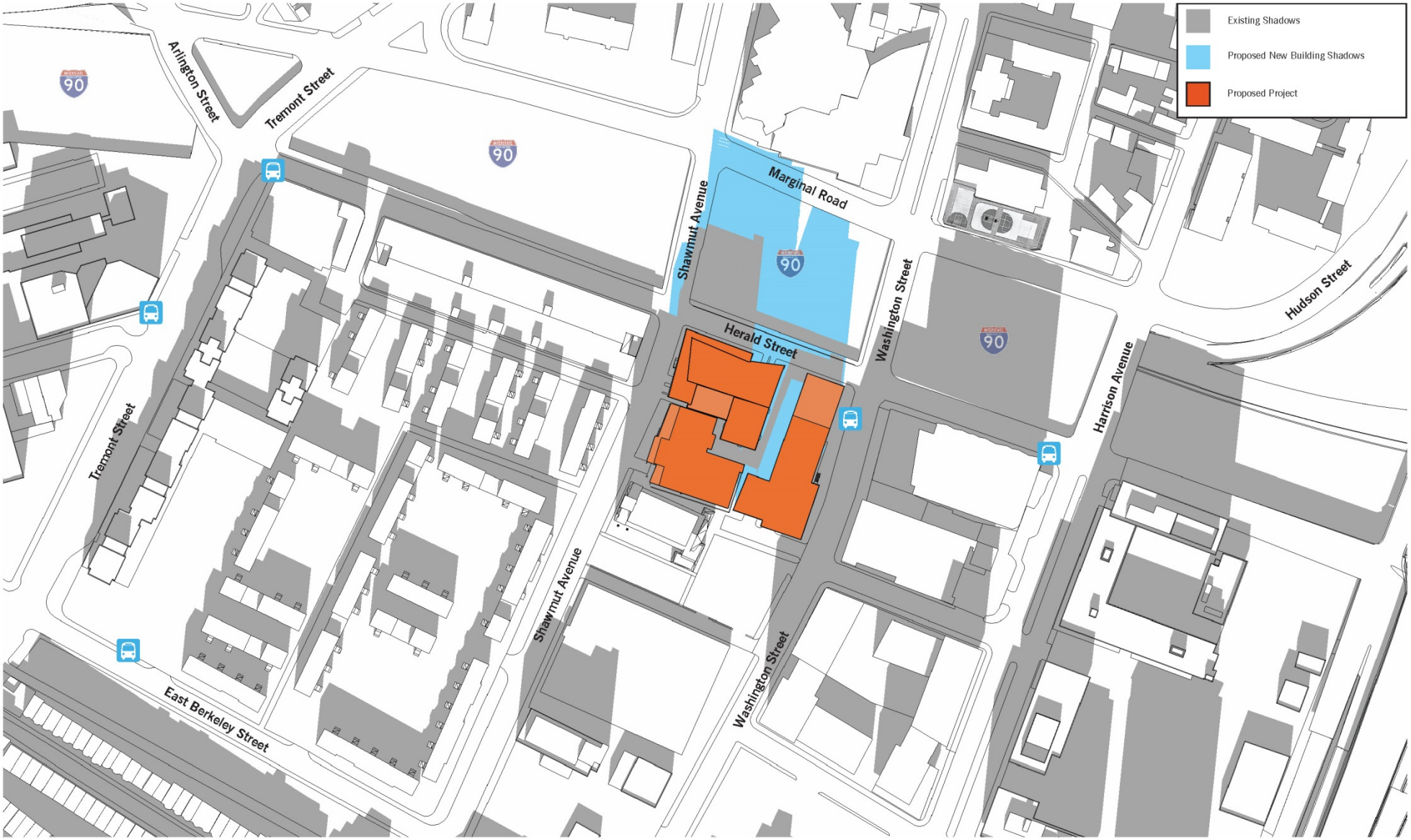
Figure 4-15

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



Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 4-16

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

Shawmut Avenue/Washington Street Block Boston, Massachusetts

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Figure 4-17

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

4.3.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the three buildings will be cast to the west. New shadow from the 112 Shawmut Avenue building will be cast onto a minor portion of the Paul Place northern sidewalk. New shadow from the BCEC building will be cast onto Shawmut Avenue and its sidewalks. New shadow from the CCBA building will be limited to the Project Site. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 12:00 p.m., new shadow will be cast to the northwest. New shadow from the CCBA building and the 112 Shawmut Avenue building will be cast onto small portions of Herald Street and its southern sidewalk. New shadow from the BCEC building will be cast onto small portions of Shawmut Avenue and its eastern sidewalk. The 112 Shawmut Avenue building will also cast new shadow onto a small portion of Shawmut Avenue. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast. New shadow from the 112 Shawmut Avenue building will be cast over a portion of Herald Street and its sidewalks. New shadow from the CCBA building will be cast onto Herald Street, Washington Street and their sidewalks, including the adjacent bus stop. New shadow from the BCEC building will be limited to the Project Site. No new shadow will be cast onto other nearby bus stops or any existing public open spaces.

At 6:00 p.m., new shadow will be cast to the east. New shadow from the 112 Shawmut Avenue building will be cast onto a portion of Herald Street and its southern sidewalk. New shadow from the CCBA building will be cast onto Washington Street and its sidewalk, as well as Herald Street and its southern sidewalk. New shadow from the BCEC building will be limited to the Project Site. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

4.3.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox, new shadow from the three buildings will be cast to the northwest. New shadow from the BCEC building will be cast onto Paul Place and its sidewalks, and minimal new shadow from the CCBA building and the 112 Shawmut Avenue building will be cast onto small portions of Herald Street. Minimal new shadow from the 112 Shawmut Avenue building will be cast onto a minor portion of Paul Place and its northern sidewalk. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 12:00 p.m., new shadow from the three buildings will be cast to the north. New shadow from the BCEC building and the 112 Shawmut Avenue building will be cast onto portions of Shawmut Avenue and its sidewalks. New shadow from the CCBA building and the 112 Shawmut Avenue building will be cast onto Herald Street and its sidewalks, as well as onto

the commuter rail tracks to the north. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 3:00 p.m., new shadow from the three buildings will be cast to the northeast. New shadow from the 112 Shawmut Avenue building and CCBA building will be cast across a portion of Herald Street and its sidewalks, as well as portions of the train tracks to the north and the Massachusetts Turnpike. New shadow from the CCBA building will also be cast onto Washington Street and its sidewalks, including the adjacent bus stop. New shadow from the BCEC building will be cast within the Project Site. No new shadow will be cast onto other nearby bus stops or any existing public open spaces.

At 6:00 p.m., new shadow will be cast to the east. New shadow from the 112 Shawmut Avenue building will be cast onto a portion of Harrison Avenue and its sidewalks, Marginal Road and its sidewalks, and Hudson Street and its sidewalks. New shadow from the CCBA building will be cast onto Harrison Avenue and its sidewalks, as well as the Massachusetts Turnpike and its westbound ramp. The BCEC building will not cast new shadow. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

4.3.5 Winter Solstice (December 21)

At 9:00 a.m. during the winter solstice, new shadow from the three buildings will be cast to the northwest. New shadow from the 112 Shawmut Avenue building and CCBA building will be cast across a minor portion of Shawmut Avenue and its sidewalks, Marginal Road and its sidewalks, and the commuter rail tracks and Massachusetts Turnpike to the north. New shadow from the BCEC building will be cast onto the Massachusetts Turnpike. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 12:00 p.m., new shadow will be cast to the north. New shadow from the BCEC building will be cast onto a small portion of Shawmut Avenue. New shadow from the 112 Shawmut Avenue building will be across a minor portion of Herald Street and its sidewalks, a small portion of Marginal Road and its sidewalks, a minor portion of Shawmut Avenue and its eastern sidewalk, as well as the commuter rail tracks and Massachusetts Turnpike to the north. New shadow from the CCBA building will be cast across a minor portion of Herald Street and its sidewalks, as well as the commuter rail tracks and Massachusetts Turnpike to the north. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

At 3:00 p.m., new shadow will be cast to the northwest. New shadow from the 112 Shawmut Avenue building will be cast across small portions of Washington Street and its eastern sidewalk, Pine Street and its sidewalks, the commuter rail tracks and Massachusetts Turnpike to the north, and a minor portion of the temporary Quincy Upper School basketball court. New shadow from the CCBA building will be cast onto Marginal Road and its sidewalks, Pine Street and its sidewalks, the Massachusetts Turnpike and commuter rail tracks, and a minor portion of the Quincy Upper School playground. The BCEC

building will not cast new shadow. No new shadow will be cast onto nearby bus stops or any existing public open spaces.

4.3.6 Conclusions

The shadow analysis examines the impact of new shadow from the Project on the surrounding area during 14 time periods. New shadow will mainly be cast onto nearby streets and sidewalks. During one time period (December 21 at 3:00 p.m.), new shadow will be cast onto the temporary Quincy Upper School basketball court. No new shadow will be cast onto nearby existing public open spaces during any of the other time periods studied. New shadow will be cast onto the bus stop on Washington Street south of Herald Street by the CCBA building during the afternoon hours. No new shadow will be cast onto other nearby bus stops during the 14 time periods studied.

4.4 Daylight

As described in the PNF, a daylight analysis was performed for the Project using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program.[7] This program measures the percentage of sky dome that is obstructed by a project, and is considered a useful tool for evaluating the net change in obstruction from existing to build conditions at a specific site.

In addition to the daylight impacts studied for the proposed 112 Shawmut Avenue Property in the PNF, this filing includes additional daylight analyses for the proposed developments on the BCEC and CCBA properties. One viewpoint has been analyzed along Shawmut Avenue facing west toward the BCEC Property. Two viewpoints have been analyzed for the CCBA Property; one viewpoint was taken from Washington Street facing east toward the CCBA Property, and one viewpoint was taken from Herald Street facing south toward the CCBA Property. The results of these analyses have been compared to the Area Context viewpoints included within the PNF. Figure 4-18 shows the viewpoints studied as part of the daylight analysis. Figures 4-19 through 4-25 illustrate the BRADA results for each viewpoint.

Due to the low-rise buildings and surface parking lots that currently occupy the BCEC and CCBA properties, the development of the proposed buildings will increase daylight obstruction over the existing conditions. As shown in Table 4-2, daylight impacts for the proposed buildings on the BCEC and CCBA properties will be similar to the daylight obstruction values for the 112 Shawmut Avenue building, as well as the Area Context viewpoints.

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

Table 4-2 Daylight Analysis Results

Viewpoint Locations		Daylight Obstruction (Percent)	
		Existing	Proposed
Viewpoint 1	View from the center of Herald Street facing south toward the 112 Shawmut Avenue Property	58.5%	77.8%
Viewpoint 2	View from Shawmut Avenue facing east toward the 112 Shawmut Avenue Property	73.9%	75.9%
Viewpoint 3	View from the center of Shawmut Avenue facing east toward the BCEC Property	42.9%	68.2%
Viewpoint 4	View from Herald Street facing south toward the CCBA Property	32.1%	46.5%
Viewpoint 5	View from Washington Street facing west toward the CCBA Property	20.8%	77.5%
Area Context Points			
AC1	View from the center of Herald Street facing the proposed building approved at 1000 Washington Street[1]	80.8%	N/A
AC2	View from the center of Washington Street facing the proposed building approved at 345 Harrison Avenue[1]	70.8%	N/A

[1] "Approved" means approved by the BPDA pursuant to Article 80 of the Zoning Code.

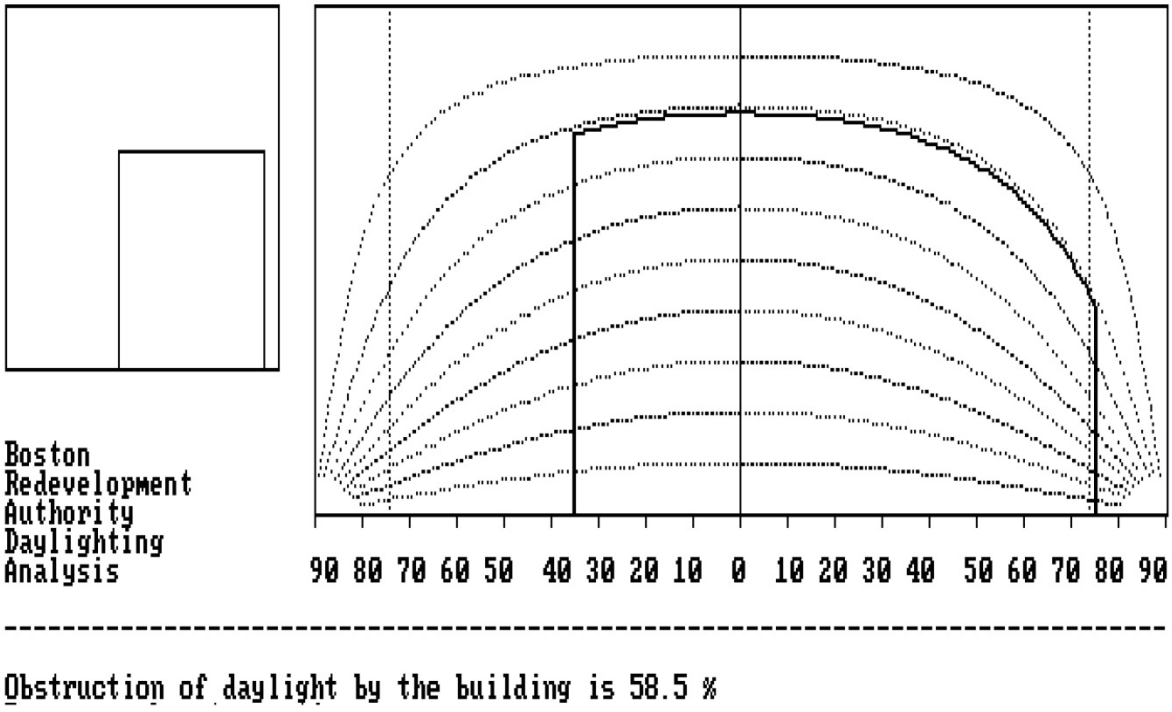
Shawmut Avenue/Washington Street Block Boston, Massachusetts

Epsilon ASSOCIATES INC.

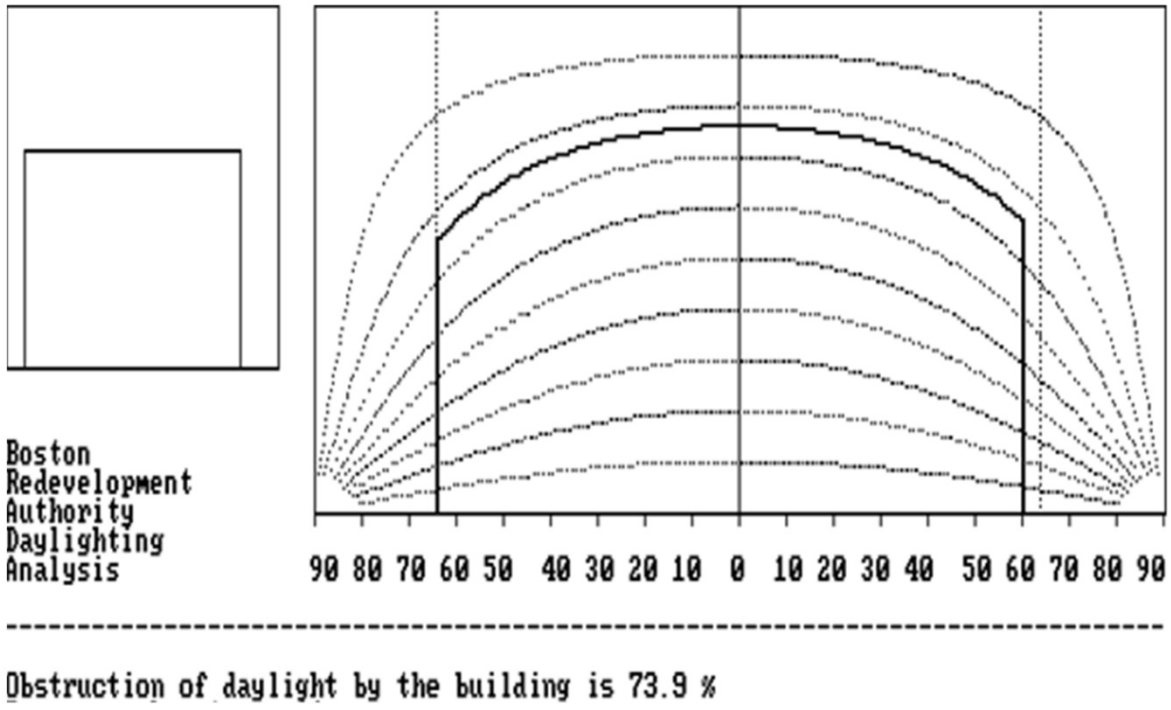
Figure 4-18

Viewpoint and Area Context Locations

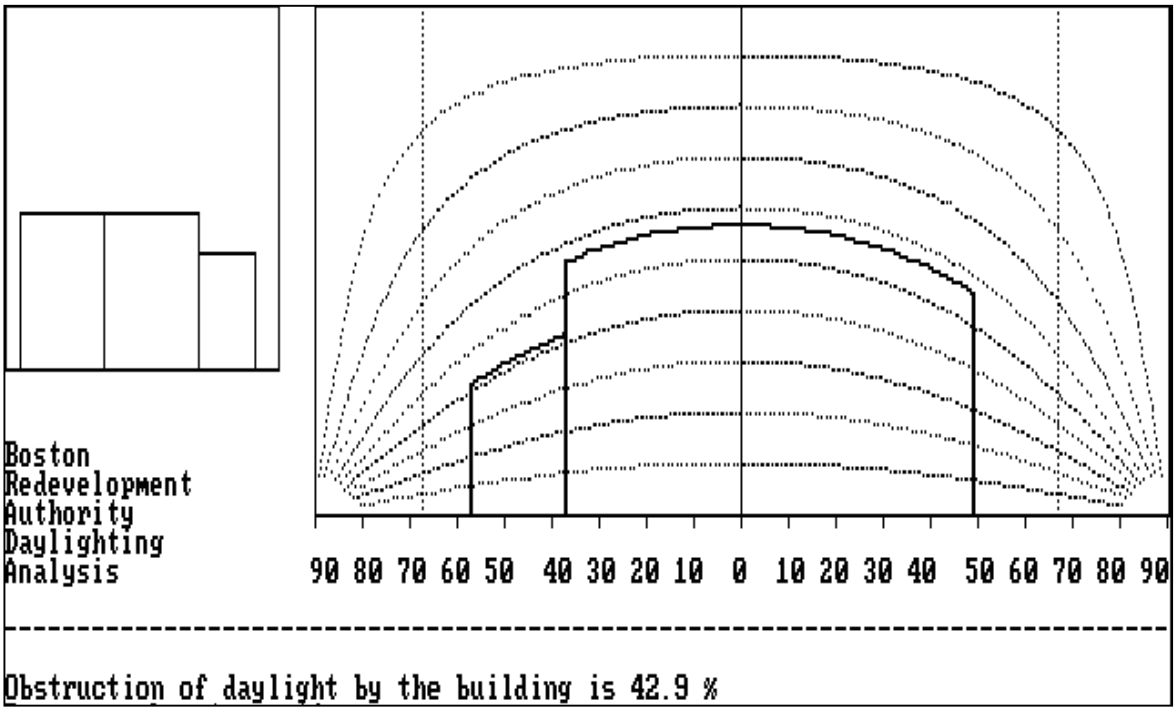
Viewpoint 1: View from Herald Street facing south toward the Project Site



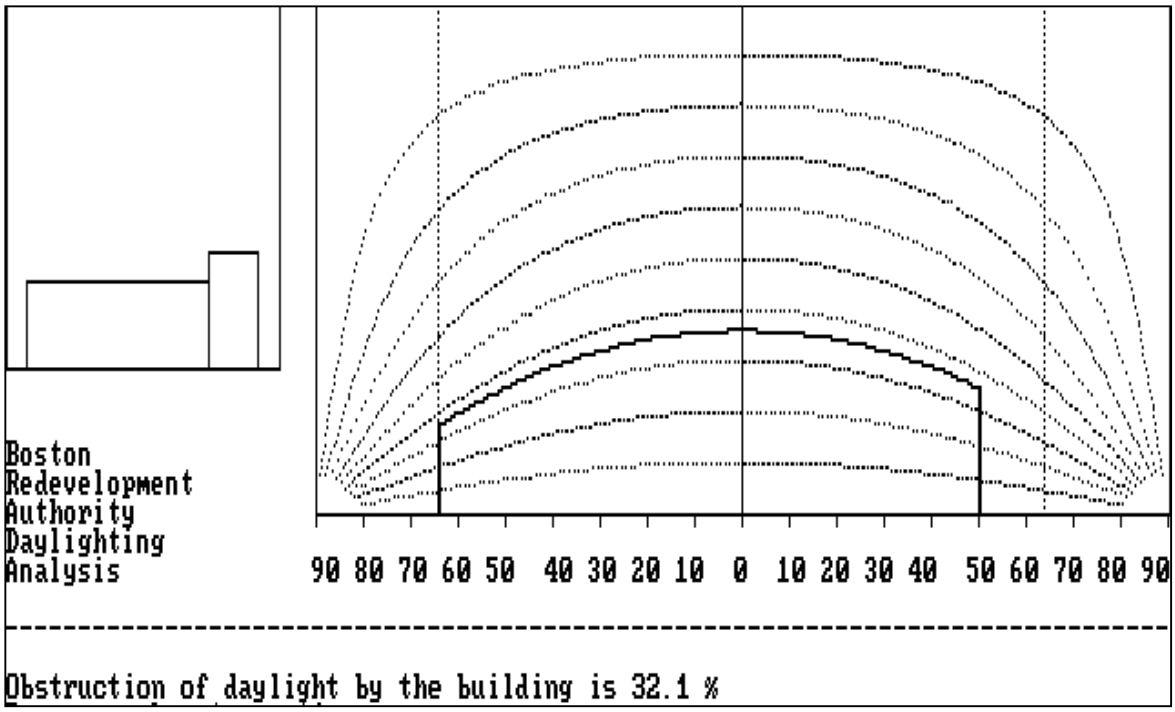
Viewpoint 2: View from Shawmut Avenue facing east toward the Project Site:



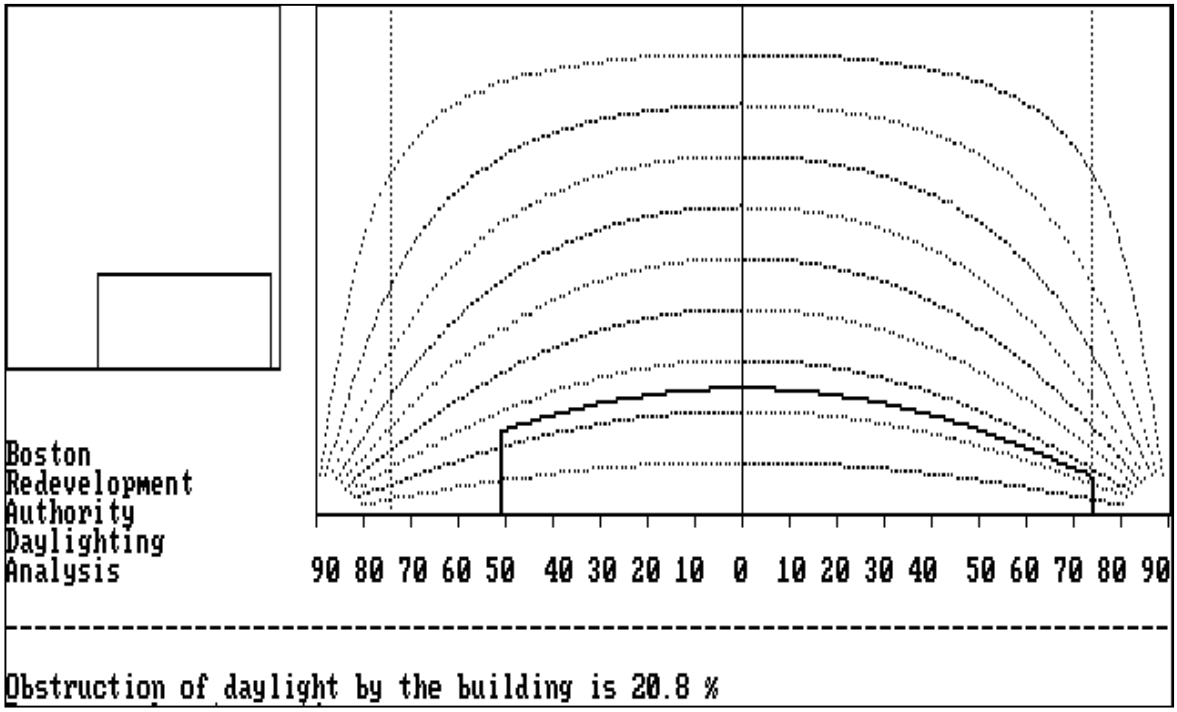
Viewpoint 3: View from Herald Street facing south toward the Project Site



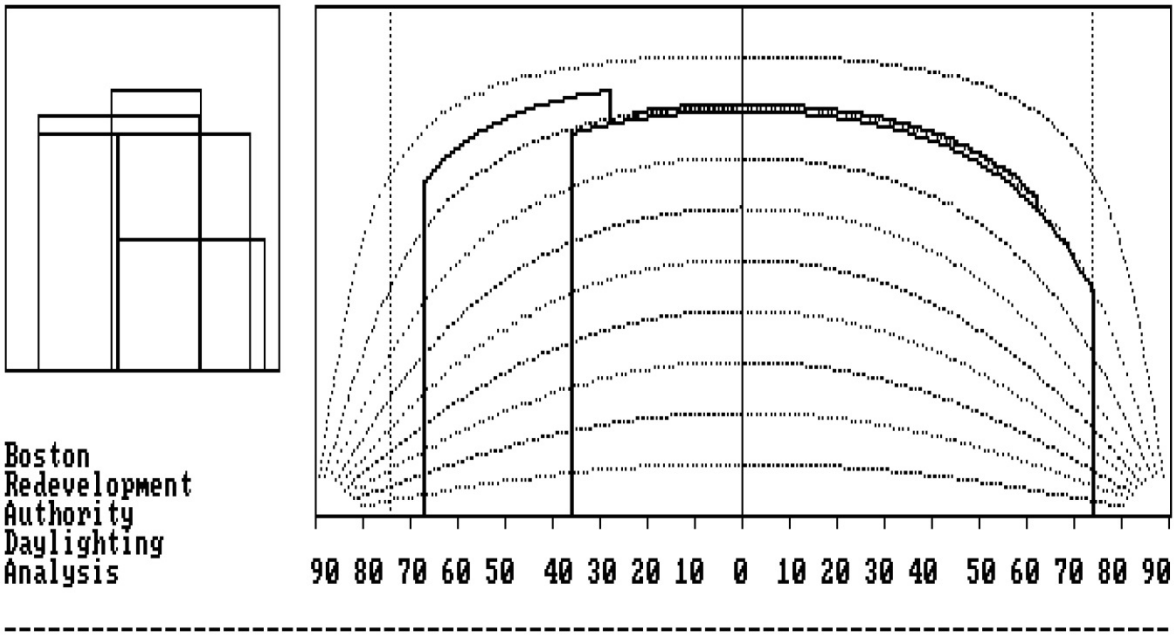
Viewpoint 4: View from Shawmut Avenue facing east toward the Project Site:



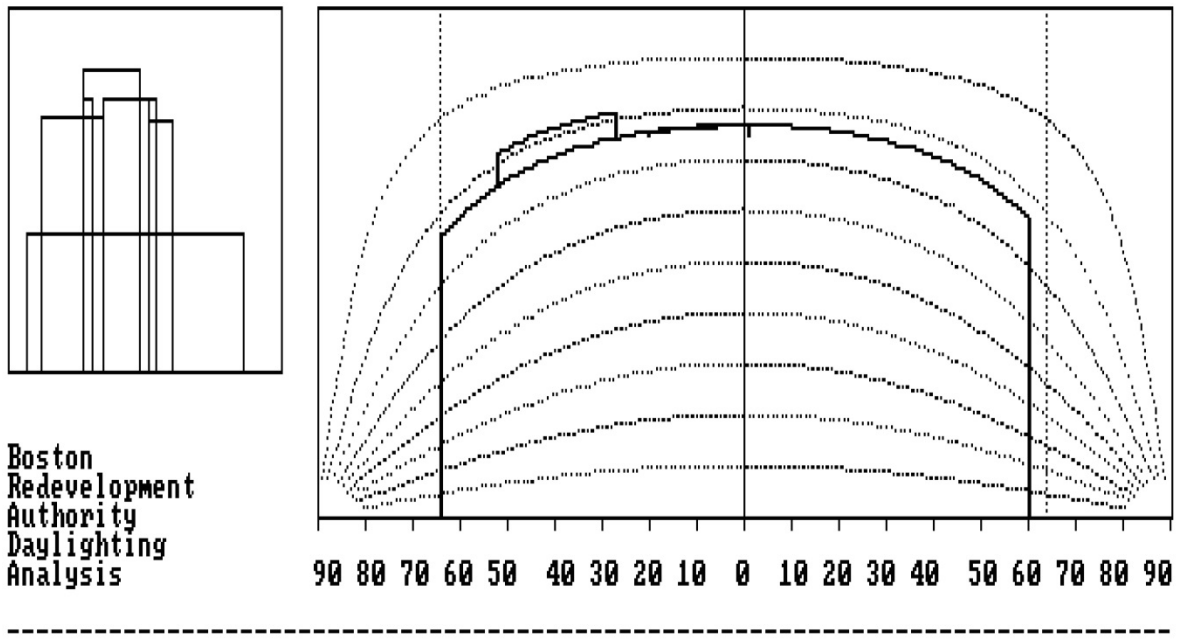
Viewpoint 5: View from Washington Street facing west toward the CCBA Property



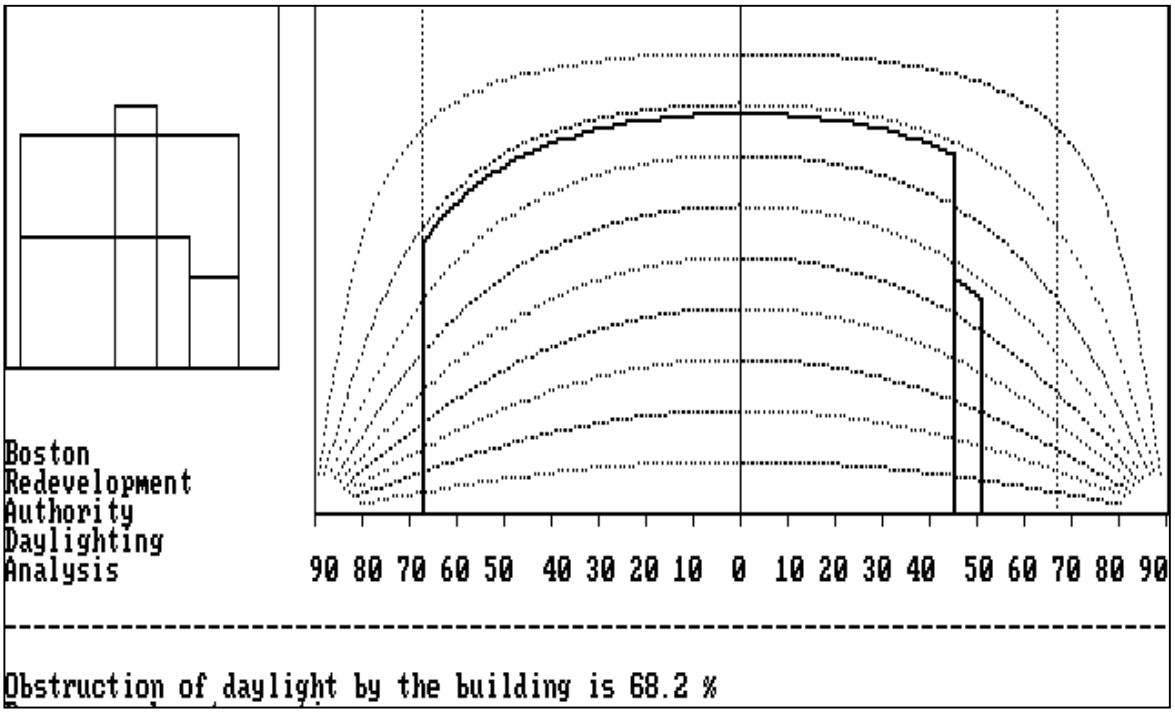
Viewpoint 1: View from Shawmut Avenue facing east toward the Project Site:



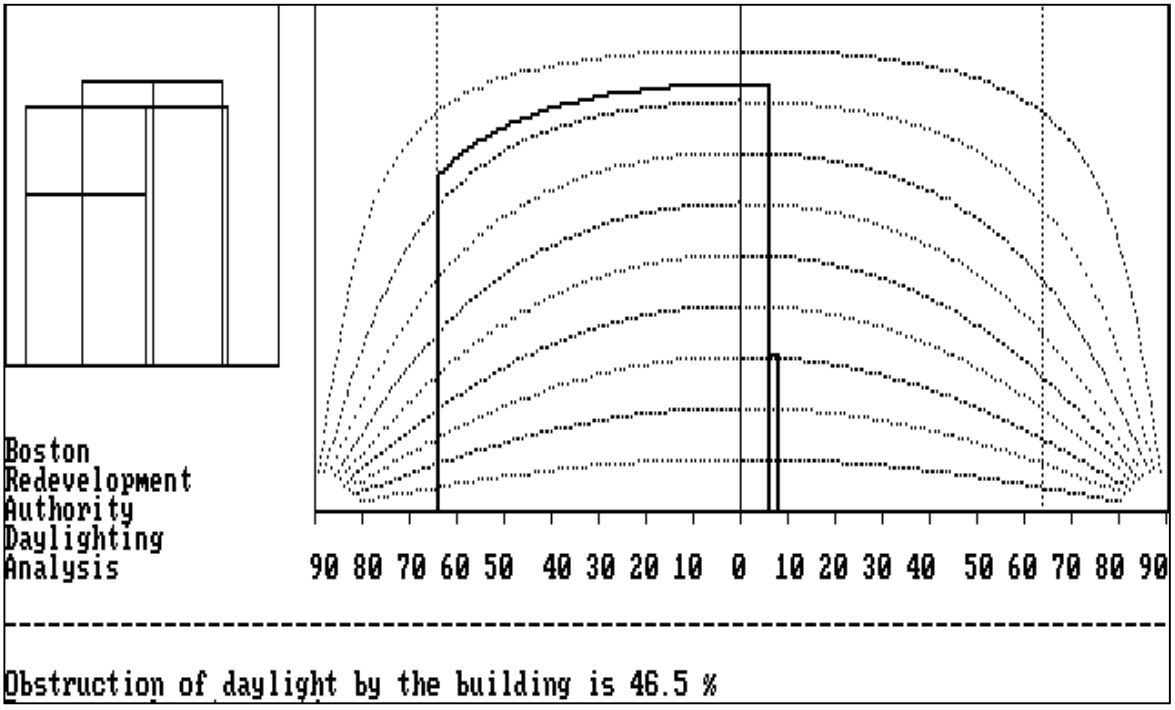
Viewpoint 2: View from Washington Street facing west toward the Project Site:



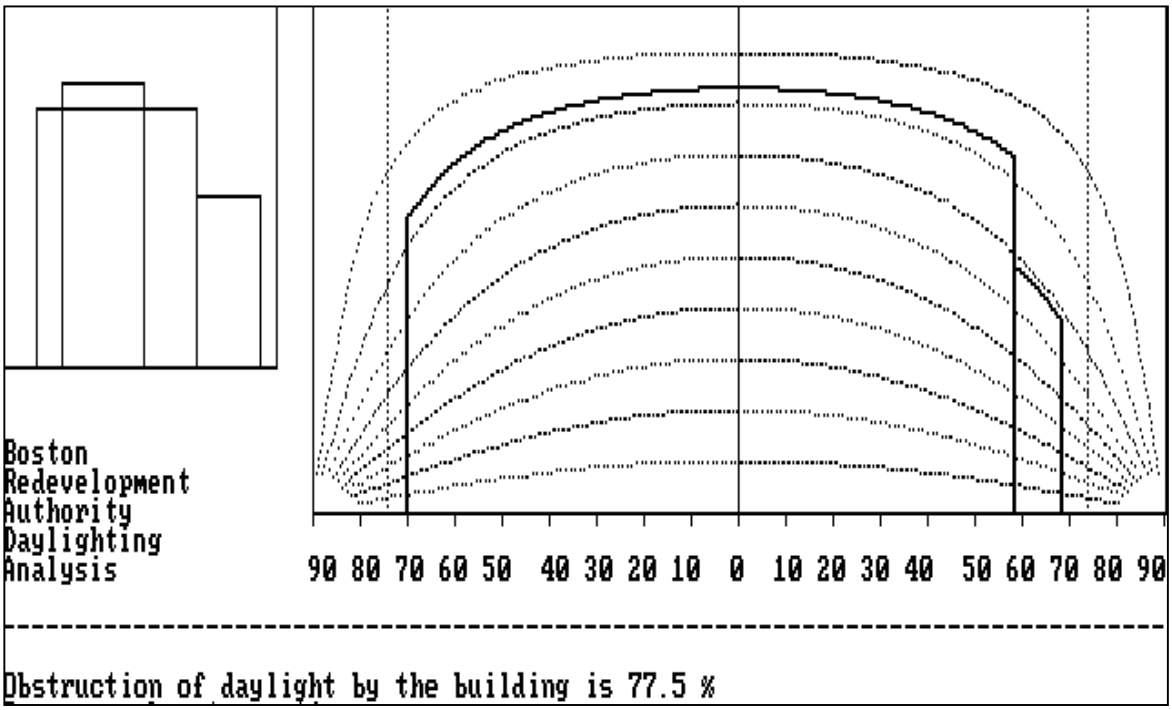
Viewpoint 3: View from Shawmut Avenue facing east toward the Project Site:



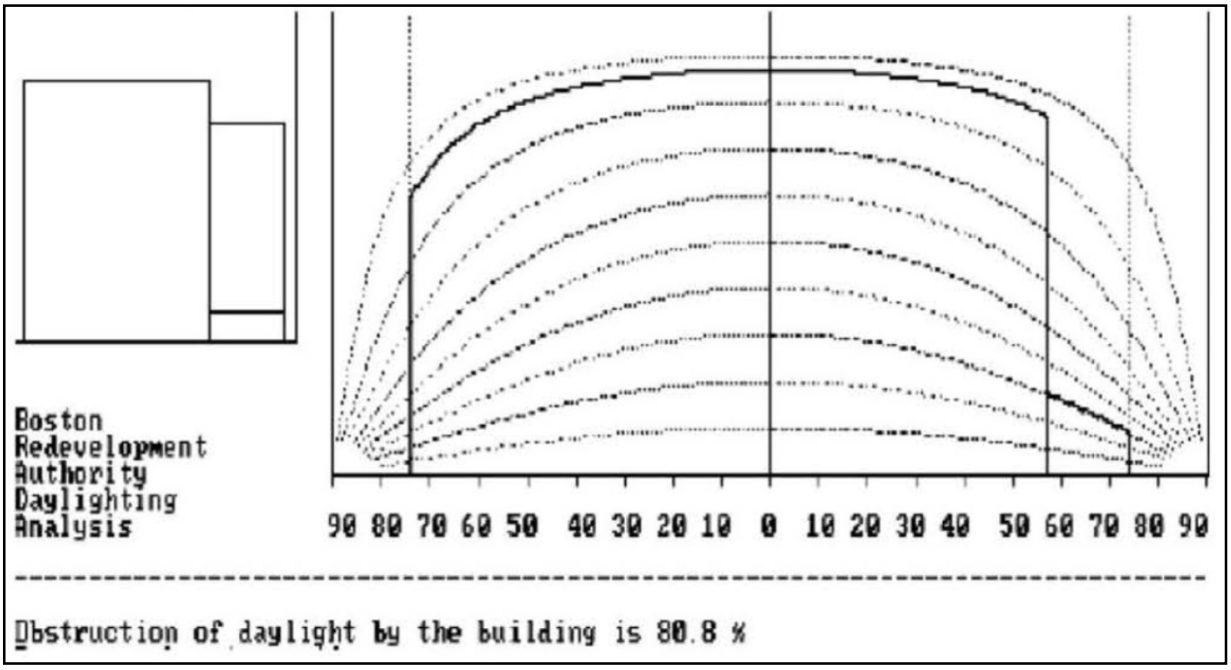
Viewpoint 4: View from Washington Street facing west toward the Project Site:



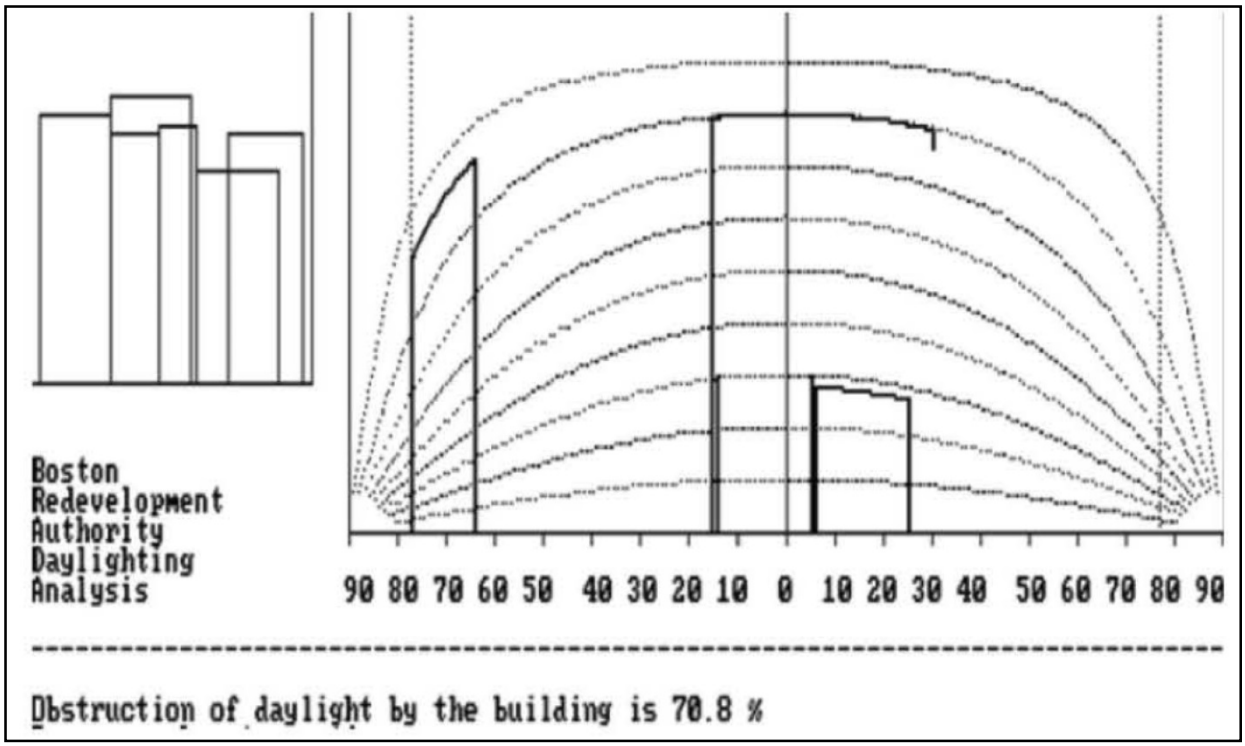
Viewpoint 5: View from Washington Street facing west toward the CCBA Property



AC1: View from Herald Street facing the proposed building approved at 1000 Washington Street



AC2:: View from Washington Street facing east toward the proposed building approved at 345 Harrison Avenue



4.5 Noise

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

Table 4-3 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property.

Table 4-3 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center Frequency (Hz)	Residential Zoning District		Residential-Industrial Zoning District		Business Zoning District Anytime (dB)	Industrial Zoning District Anytime (dB)
	Daytime (dB)	All Other Times (dB)	Daytime (dB)	All Other Times (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 sound pressure of 20 micropascals.

'Daytime' refers to the period between 7:00 a.m. and 6:00 p.m. daily, excluding Sunday.

Additionally, the Massachusetts Department of Environmental Protection ("MassDEP") has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. According to MassDEP, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The MassDEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10 dBA increase above the L_{90} ambient sound level measured at the Project property line and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is 3 dB or more than the sound levels in each of two adjacent bands.

A noise analysis for the 112 Shawmut Avenue building was included in the PNF. While the details of the mechanical equipment associated with the BCEC and CCBA buildings have not yet been determined, steady operational noise from stationary sources will primarily involve heating, cooling, and ventilation equipment typical for modern mixed-use buildings such as the BCEC building, and in the case of the CCBA building, a primarily residential project.

During the final design phase of the Project, mechanical equipment and noise mitigation will be specified to meet the applicable City of Boston and MassDEP noise limits. Reasonable efforts will be made, as appropriate, to minimize noise impacts from the Project using routinely employed methods of noise control, including:

- Selection of "low-noise" equipment models;
- Fitting of inlet and discharge vents with duct silencers;
- Installation of screening barriers to provide shielding where appropriate;
- Use of sound-attenuating enclosures, acoustical blankets, or both on continuously operating equipment with outdoor exposure; and
- Siting of noisy equipment at locations that protect sensitive receptors by shielding or with increased distance.

Chapter 5

Historic Resources

5.0 HISTORIC RESOURCES

The PNF described the historic resources in the area surrounding the Project Site. The 112 Shawmut Avenue, BCEC and CCBA properties are located within the Harrison/Albany Protection Area of the South End Landmark District. This Protection Area acts as a visual buffer to the more architecturally significant portion of the South End that comprises the Landmark District proper. All three properties are also located within the South End Industrial Area, as surveyed by the Boston Landmarks Commission and included in the Massachusetts Historical Commission's ("MHC") Inventory of Historic and Archaeological Assets of the Commonwealth (the "Inventory"). Neither the South End Industrial Area nor the South End Landmark District's Harrison/Albany Protection Area is included in the State or National Registers.

Now occupied by the Boston Chinese Evangelical Church, 120 Shawmut Avenue was completed in 1982 as a nursing home and designed by the Boston-based architectural firm Jung Brannen. It is a three-story masonry building veneered in brick. The undistinguished single-story building at 50 Herald Street is operated as the C-Mart Supermarket. It was completed in 1966 and enlarged in 1993. The original permit to build indicates only the contractor, the Sydney Construction Company of Boston, rather than the involvement of an architect. The buildings on the BCEC and CCBA properties are not individually listed in the State or National Registers, or listed in the MHC Inventory.

Chapter 6

Sustainable Design

6.0 SUSTAINABLE DESIGN

The PNF included a description of the approach to sustainable design and compliance with Article 37 for the 112 Shawmut Avenue building. DIV Shawmut, LLC has a goal of achieving the Silver level under the Leadership in Energy and Environmental Design (LEED) v4 Building Design and Construction rating system for the 112 Shawmut Avenue building.

The CCBA and BCEC buildings will comply with Article 37 of the Zoning Code by being certifiable using the LEED v4 rating system, and the CCBA has a goal of achieving the Silver level under the LEED v4 rating system for the CCBA building. It is anticipated that the buildings will each achieve at least 12 points for being located in a dense urban area with access to numerous services located at the Ink Block mixed-use development nearby and in the surrounding South End and Chinatown neighborhoods, and near public transportation, including the Silver Line which runs on Washington Street, the Orange Line Tufts Medical Center Station, the Green Line Boylston Street Station, and the Red Line Broadway Station, each of which is within walking distance. Additional points are anticipated for parking strategies to reduce vehicle use, water conservation, energy efficiency beyond what is required by LEED due to the stricter Stretch Energy Code provision of the Massachusetts State Building Code, as well as energy efficiency from thermal and lighting controls, and the use of products that minimize impacts to the environment and indoor air quality.

The proponents of the CCBA and BCEC buildings will submit a LEED checklist at the appropriate time for their developments.

Chapter 7

Urban Design

7.0 URBAN DESIGN

The coordinated approach to future development DIV Shawmut, LLC, BCEC and CCBA have discussed for their respective properties will also yield an improved streetscape and urban character of the area that will comprise the proposed PDA. Considerable thought has been given by those parties to elements of the existing and planned pedestrian experience within the PDA that are focused on enhancing that experience and making it closer to the lively and attractive character that is so characteristic of the South End neighborhood as a whole.

The South End is partially defined by its pedestrian scale and walkability, but this portion of the South End contains larger city blocks, a product of earlier urban renewal efforts. In order to achieve a more pedestrian-friendly character, an east-west pedestrian-accessible connection has been proposed that would lie on the BCEC and CCBA properties (see Figure 1-5). This connection could create a new zone of pedestrian convenience at a location that was previously a very large block on both Shawmut Avenue and Washington Street. The creation of a permeable large block interior is consistent with the intent of the underlying Article 64 zoning requirements aimed at pedestrian experience improvement and the activation of alley conditions for service and pedestrian accessibility throughout the South End neighborhood.

The coordinated development of the 112 Shawmut Avenue Property, BCEC Property and CCBA Property as envisioned in the proposed Development Plan for the PDA could facilitate creation of a new zone of architecturally harmonious buildings that are also compatible in size and scale, as well as the addition of street trees and furniture, sidewalk paving, improved quality of street lighting, and other features consistent with the neighborhood at large (subject to applicable public approvals). The extension of these urban design elements to this area, which has long been the domain of surface and structured parking and other non-residential buildings with limited ability to define the street edge, could add greatly to the character of the area and serve to extend the physical definition and characteristics of the South End neighborhood to this area of Shawmut Avenue, Herald Street and Washington Street.

Chapter 8

Infrastructure

8.0 INFRASTRUCTURE

8.1 Introduction

The following section describes the existing sewer, water, and drainage systems surrounding the site, and explains how these systems will service the Project. The analysis includes a description of anticipated impacts related to the proposed three buildings on area utilities. The three buildings are in the early design stages, and as a more definitive design evolves for each, the owners of each building will coordinate with the various utility companies to ensure full services for the new buildings.

A Boston Water and Sewer Commission (BWSC) Site Plan and General Service Application will be required for the proposed new water and sewer connections. In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be generated specifying best management practices (BMPs) for protecting the existing stormwater drainage system during construction of the buildings.

8.2 Sanitary Sewer System

8.2.1 Existing Sanitary Sewer System

BWSC record drawings indicate that the sanitary sewer system in the Project area (see Figure 8-1 at the end of this chapter) is owned and maintained by BWSC. BWSC record drawings indicate an existing 12-inch sanitary sewer line that runs southwest along Shawmut Avenue to the west of the Project Site, and an existing 12-inch sanitary sewer line that runs east along Herald Street, and turns to run southwesterly in Washington Street.

The 112 Shawmut Avenue Property includes an existing six-story building accommodating a mix of commercial uses. The BCEC Property contains a three-story brick building that had housed the South Cove Manor nursing home, which provided patient rooms and office space. The building now contains ministry uses and related educational and social service uses. The CCBA Property contains a one-story supermarket.

The estimated sewer flow from all existing facilities within the Project Site is summarized in Table 8-1, based on the existing building uses and design sewer flows provided in 310 CMR 15.000-The State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage ("Title V").

Table 8-1 Existing Wastewater Generation

Use	Number	Sewage Generation Rate	Total gpd
DIV Shawmut, LLC (112 Shawmut Ave)	68,382 sf	75 gpd/1,000 sf	5,130
BCEC (120 Shawmut Ave)	34,000 sf	75 gpd/1,000 sf	2,550*
CCBA (50 Herald Street)	19,525 sf	97 gpd/ 1,000 sf	1,895
Total Estimated PDA Existing Sewage Generation			**9,575**

*Current use breakdown unknown. Unit flow rate for office building was applied to the gross square footage of the building.

8.2.2 Proposed Wastewater Service

The proposed wastewater services for the 112 Shawmut Avenue building and the BCEC building are expected to tie into the 12-inch sanitary sewer in Shawmut Avenue. The wastewater service for the CCBA building is expected to tie into the 12-inch sewer in Washington Street. Floor drains from enclosed parking areas will connect to an oil-water separator prior to connecting to the municipal sanitary sewer.

8.2.3 Estimated Project Wastewater Generation

The 112 Shawmut Avenue building, as described in the PNF, will generate an estimated 24,250 gallons per day (gpd) based on design sewer flows provided in Title V, and the proposed building program as summarized in Table 8-2. This is a net increase of 19,120 gpd over the estimated flows of the existing building.

The BCEC Project, as described in Section 2.2, would generate an estimated 20,796 gpd of new wastewater (see Table 8-2).

The CCBA Project, as described in Section 2.2, would generate an estimated 48,985 gpd of new wastewater (see Table 8-2).

The three proposed buildings will generate an estimated total flow of 98,476 gpd, or approximately 88,901 gpd of new wastewater flow. Based on the proposed estimated sanitary flow, which is greater than 15,000 gpd, BWSC will require the removal of infiltration/inflow (I/I) at a minimum 4:1 ratio of I/I removed to wastewater generated. All sewer connections will be reviewed as part of the BWSC Site Plan Review process for each building.

Table 8-2 Proposed Wastewater Generation

Location	Use	Number	Sewage Generation Rate	Total gpd
112 Shawmut Avenue	Family Dwelling	220 beds	110 gpd/bedroom	24,200
	Retail	980 sf	50 gpd/1,000 sf	50
			Project Site Subtotal	*24,250*
BCEC	Place of Worship	1,130 seats	3 gpd/seat	3,390
	Classrooms (Preschool-Elementary	195	8 gpd/person	1,560
	Classrooms (Middle school-Adult	366	15 gpd/person	5,490
	Gymnasium	25 75	25 gpd/participant 3 gpd/spectator	850
	Office	2,347 sf	75 gpd/1,000 sf	176
	Family Dwelling	108 beds[1]	110 gpd/bedroom	11,880
			BCEC Subtotal	*23,346*
CCBA	Family Dwelling	453 beds[1]	110 gpd/bedroom	49,830
	Retail, Commercial, Community Space	14,000 sf	75 gpd/1,000 sf[2]	1,050
			CCBA Subtotal	*50,880*
Total Estimated PDA Proposed Sewage Generation				**98,476**

1. Assumed an average of 1½ bedrooms per unit
2. Unit flow for office space used for estimating

8.3 Water Supply System

8.3.1 Existing Water Service

The water distribution system near the Project area is owned and maintained by BWSC (see Figure 8-2 at the end of this chapter). BWSC record drawings indicate there is an existing 12-inch pit cast iron (PCI) water main installed in Shawmut Avenue, an existing 12-inch ductile iron cement-lined (DICL) water main installed in Herald Street, and an existing 16-inch PCI installed in Washington Street. These mains are part of BWSC's Southern Low distribution system. BWSC also maintains an 8-inch DICL in Washington Street, which is part of its Southern High distribution system, and is capped adjacent to the CCBA Property.

Fire hydrants are located in Shawmut Avenue and Herald Street to the northwest, southwest, and east of the Project area. It appears that these hydrants will provide sufficient coverage for the Project. Each building proponent will design appropriate domestic and fire

protection lines, and confirm the fire hydrant coverage for their respective building with the consultation of BWSC and the Boston Fire Department (BFD) during the detailed design phase.

8.3.2 Proposed Water Service

Each building will have its own domestic water service and fire protection service. The domestic water and fire protection services will have dedicated connections to a water main. The 112 Shawmut Avenue building and the BCEC building are expected to have their water services tie into the 12-inch main in Shawmut Avenue. The CCBA building will tie into the 16-inch main in Washington Street, unless BWSC requires connection of the fire protection service into the 8-inch main in Washington Street.

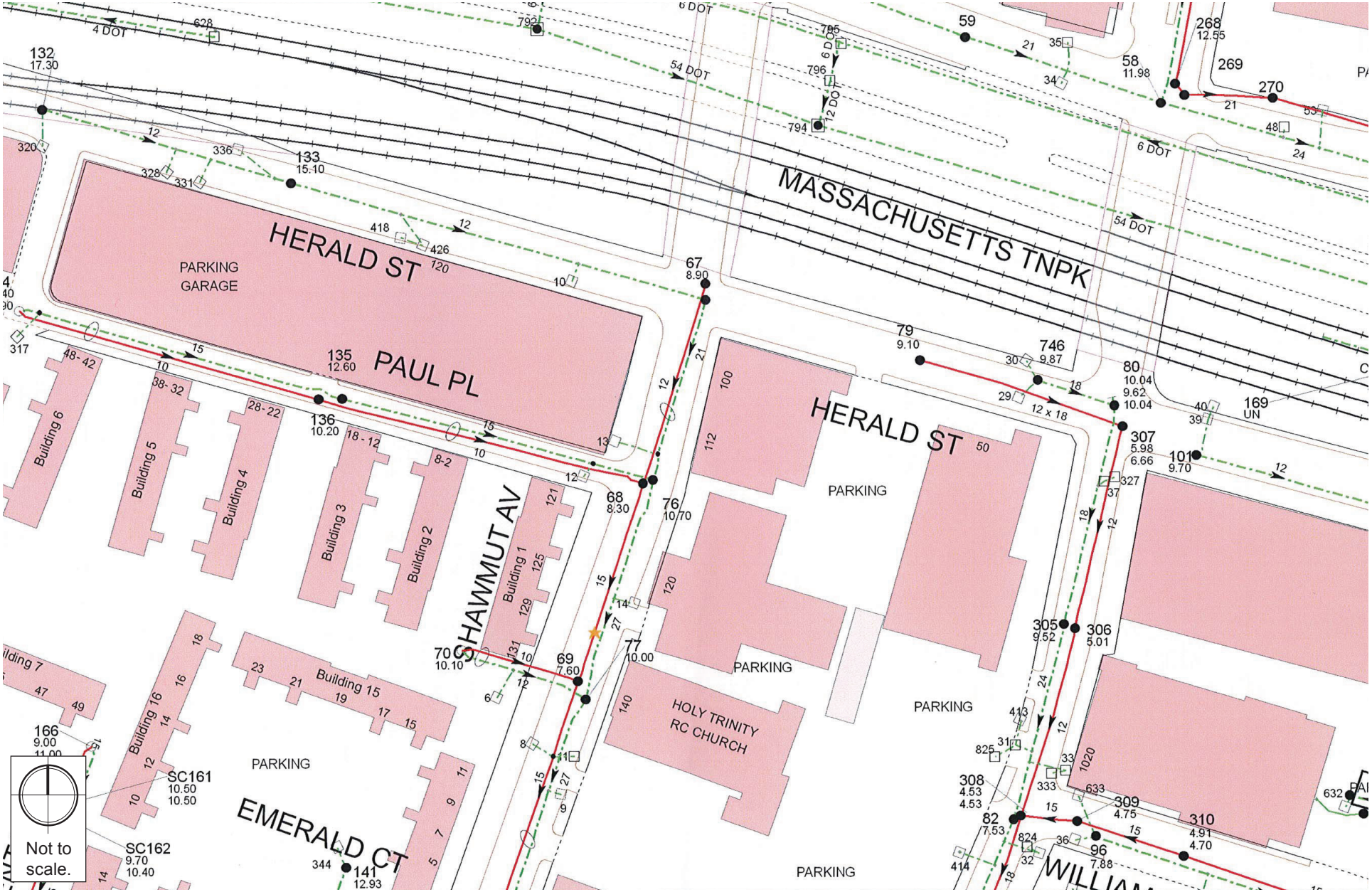
The location of hydrants and siamese connections will be reviewed by BWSC and BFD during the design development phase of each building. Water meters will be of a type approved by BWSC and tied into the BWSC's Automatic Meter Reading (AMR) System. Fixture counts and water meter sizing information will be provided, and services will be designed and coordinated with the BWSC as part of the Site Plan Review process and General Service Application for each building.

8.3.3 Anticipated Water Consumption

Each building's estimated water consumption is based on the building's estimated sewage generation, plus a factor to account for consumption, system losses, and other usages to estimate an average water demand. The estimated water demand for the full build-out of the Project is estimated at 108,324 gpd. More detailed water use and meter sizing calculations will be submitted to BWSC as part of the Site Plan Review process for each building.

8.4.4 City of Boston Groundwater Overlay District

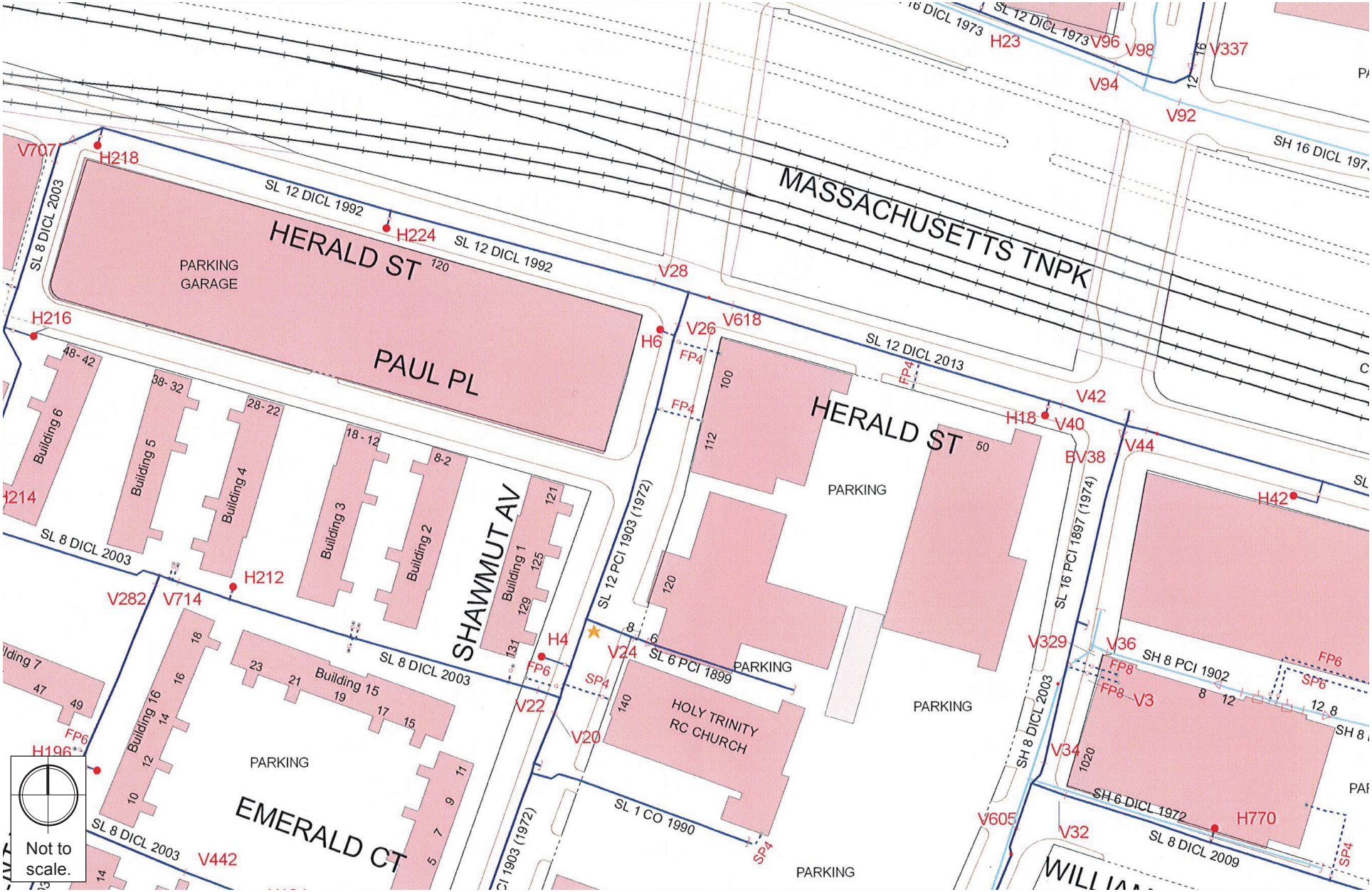
The Project Site is located within the City of Boston Groundwater Conservation Overlay District (GCOD). Per the GCOD regulations, stormwater infiltration is required and must capture a minimum rainfall volume of one inch across the impervious area of the site. In order to meet this regulation, stormwater infiltration systems will be designed that best fits the needs of each of the three projects and their respective site constraints.



Shawmut Avenue/Washington Street Block Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 8-1
Existing Sewer System



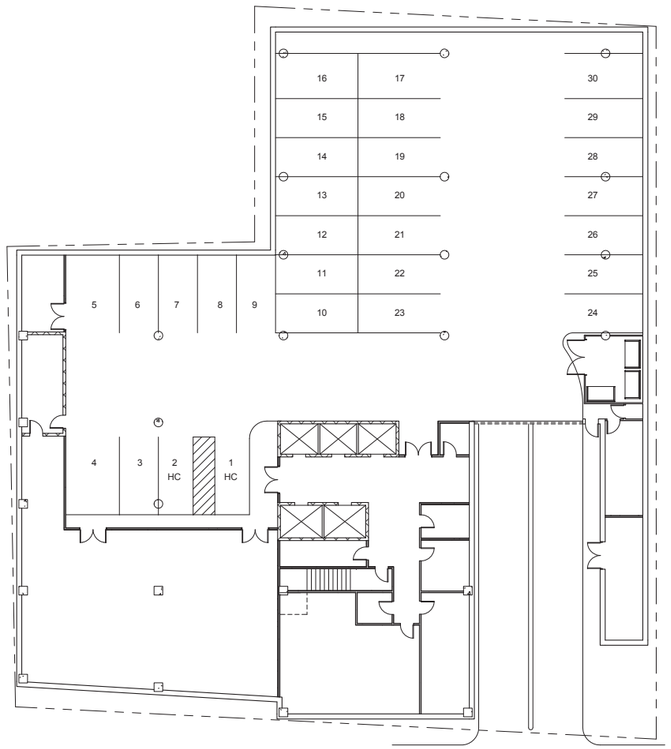
Shawmut Avenue/Washington Street Block **Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

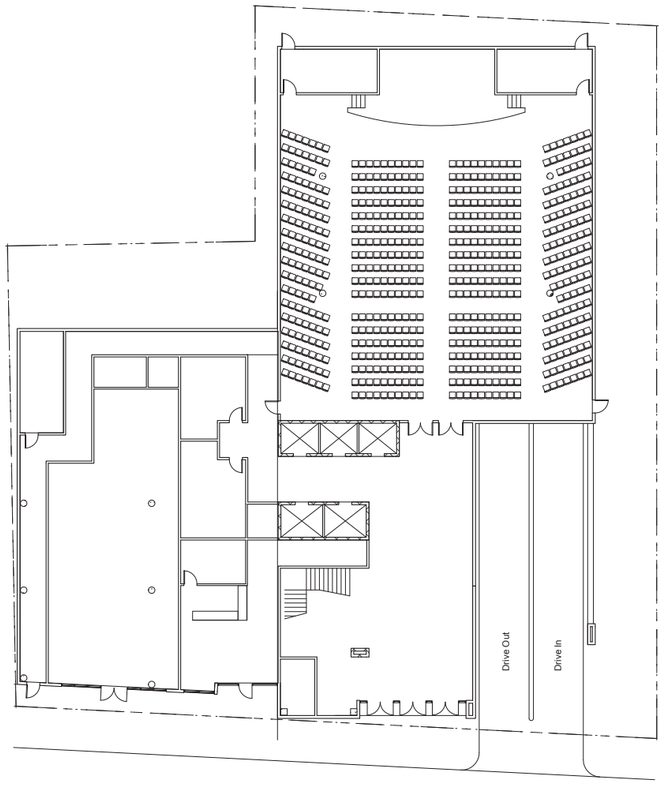
Figure 8-2
Existing Water System

Appendix A

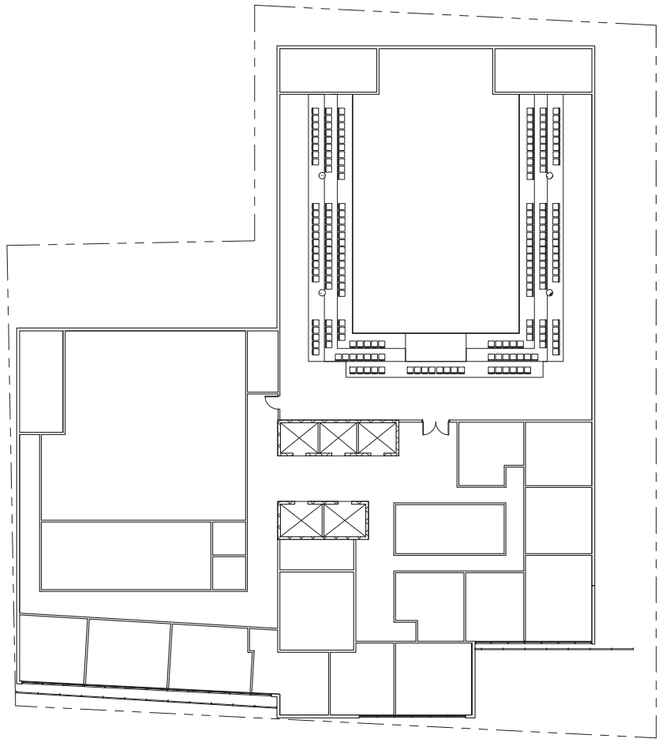
BCEC Project Conceptual Design Plans



1 Basement/Garage (Church & Residential)
1/16" = 1'-0"



2 Level 1 (Church, Residential, & Commercial)
1/16" = 1'-0"



3 Level 2 (Church)
1/16" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

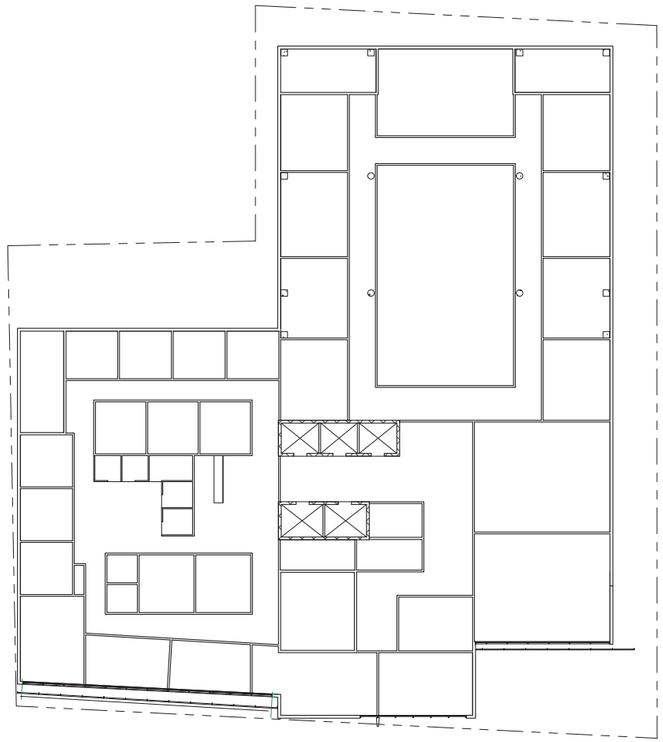
Basement, First Floor, Second Floor

drawing scale
1/16" = 1'-0"

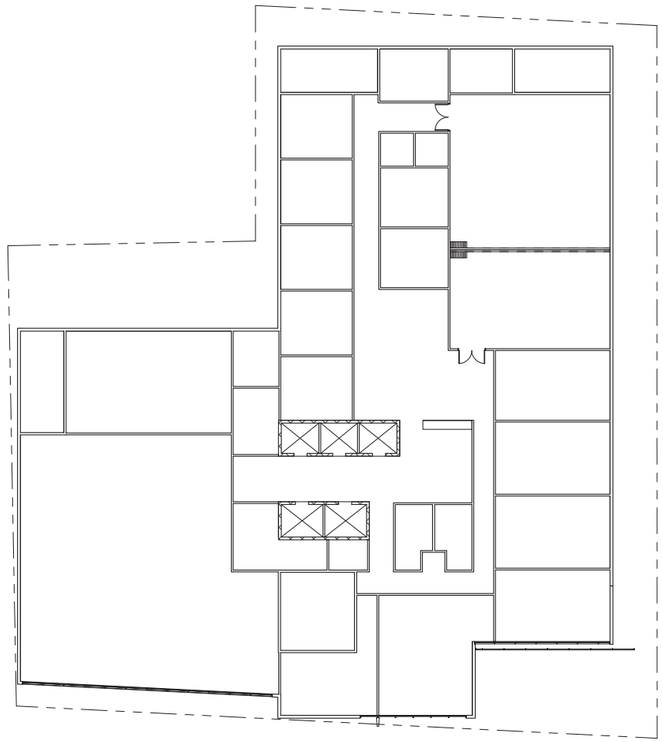
project number
Project Number

date issued
03/23/17

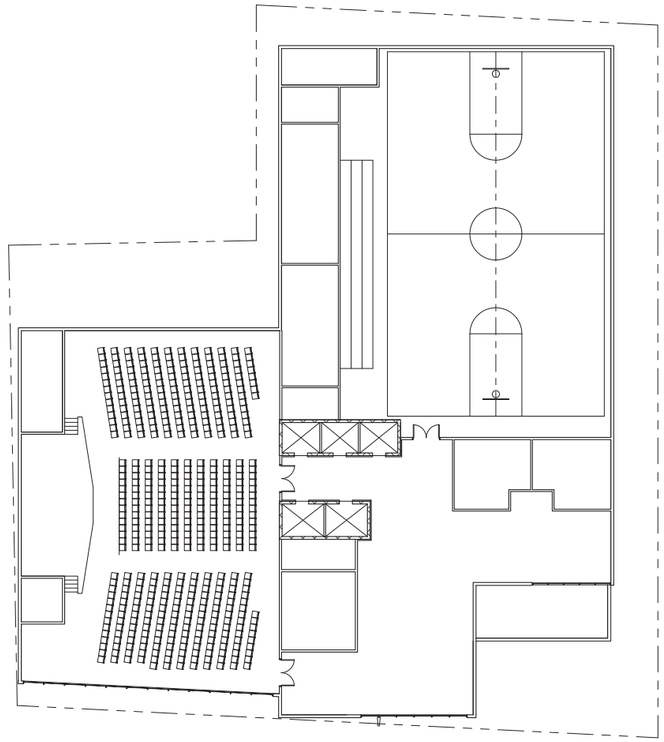
A101



1 Level 3 (Church)
1/16" = 1'-0"



2 Level 4 (Church)
1/16" = 1'-0"



3 Level 5 (Church)
1/16" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

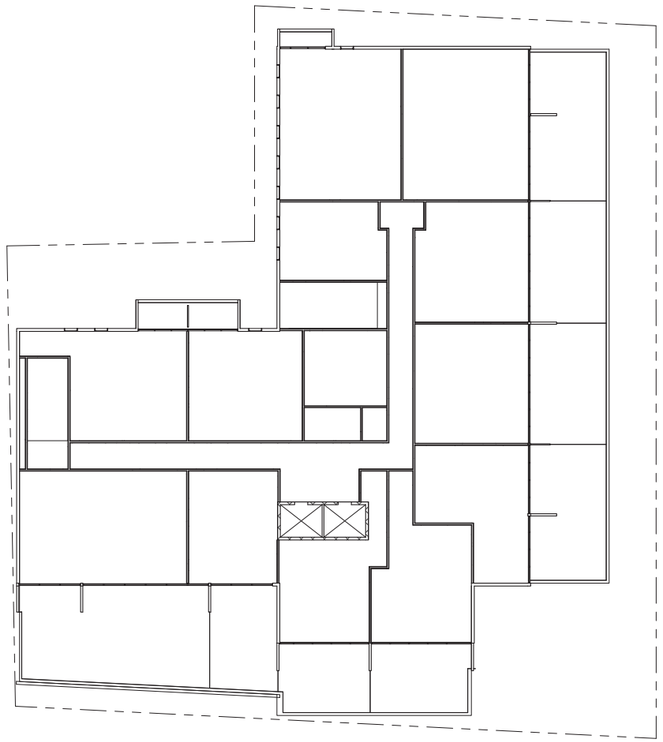
Third, Fourth, and Fifth Floors

drawing scale
1/16" = 1'-0"

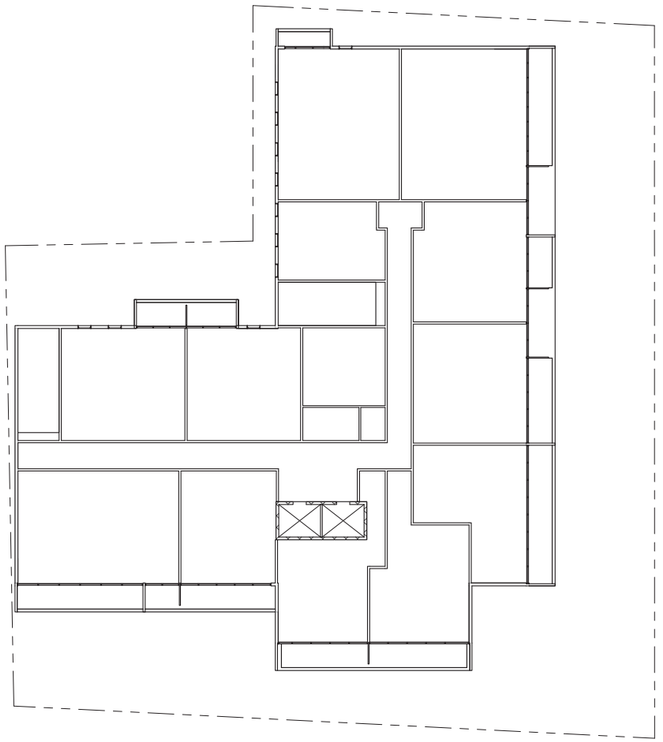
project number
Project Number

date issued
03/23/17

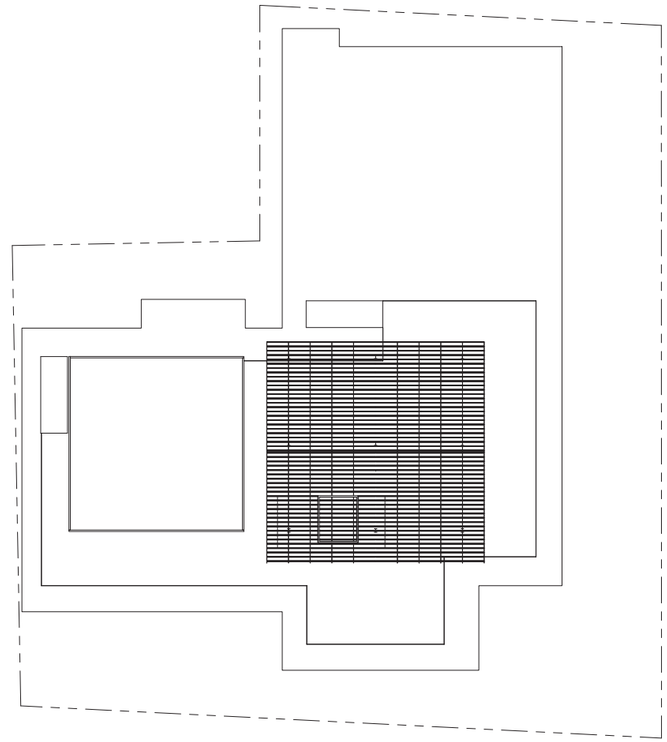
A102



1 Level 6 (Residential)
1/16" = 1'-0"



2 Level 7 - 11 (Residential)
1/16" = 1'-0"



3 Roof
1/16" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

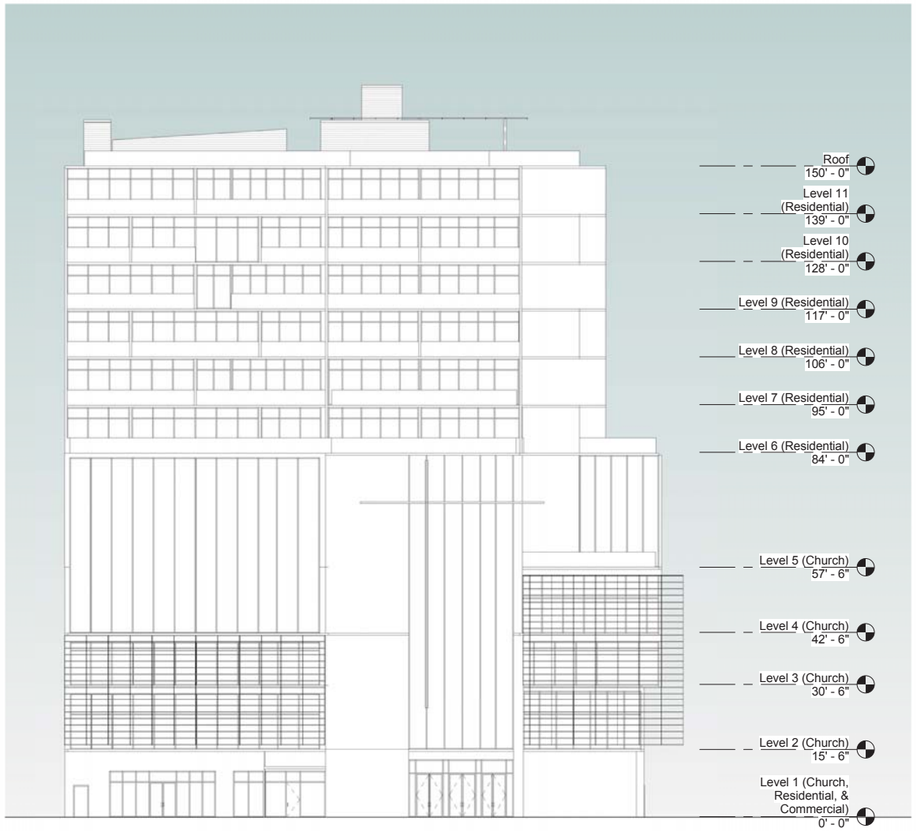
Sixth Floor, Seventh - Eleventh Floors, Roof

drawing scale
1/16" = 1'-0"

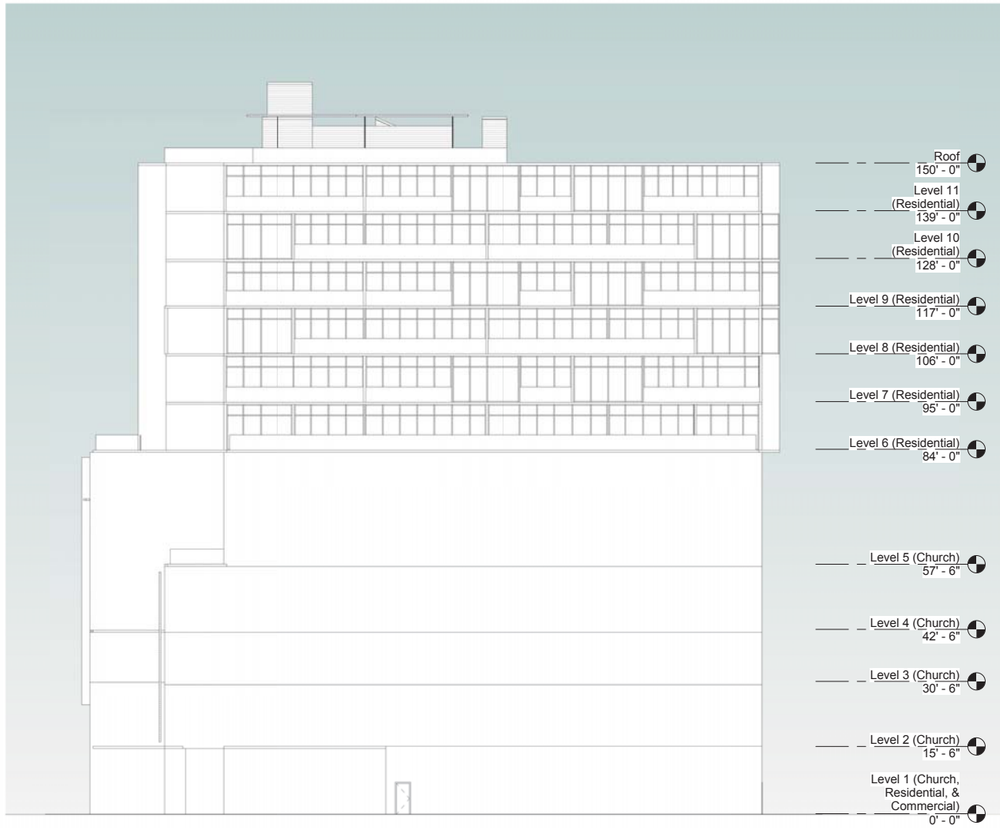
project number
Project Number

date issued
03/23/17

A103



1 West - Shawmut Ave
1/16" = 1'-0"



2 South toward 136 Shawmut
1/16" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

South and East Elevations

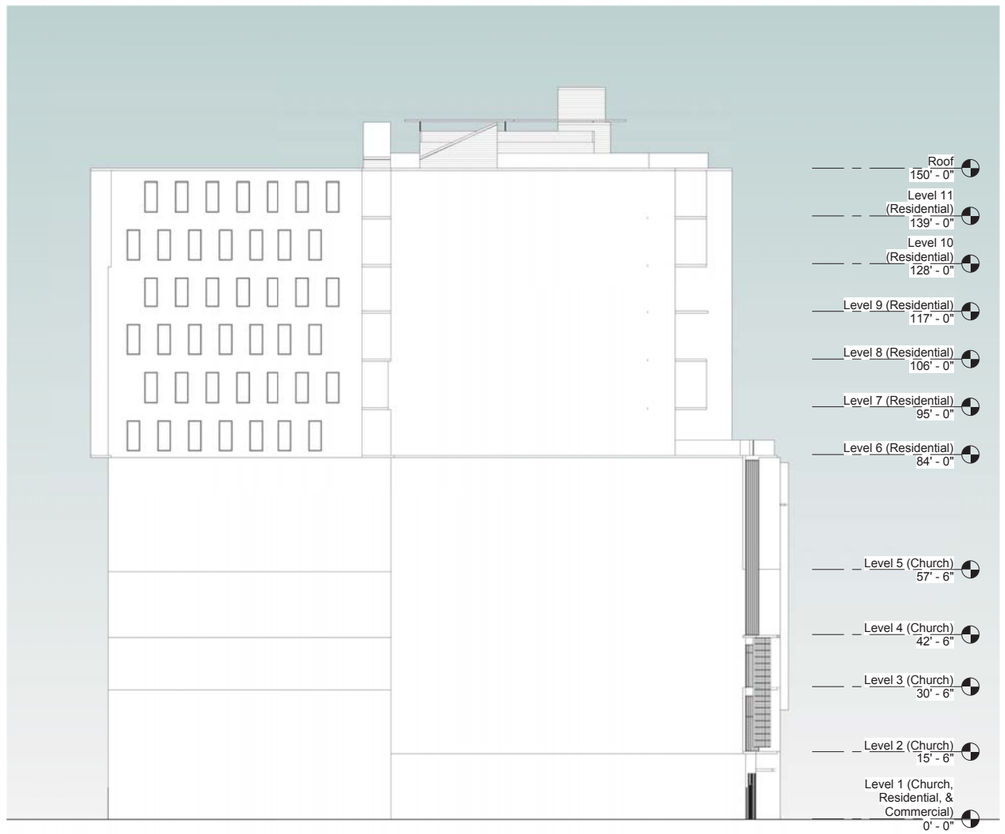
drawing scale
1/16" = 1'-0"

project number
Project Number

date issued
04/06/17

A104

1 East toward Washington St
1/16" = 1'-0"



2 North toward Herald St
1/16" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

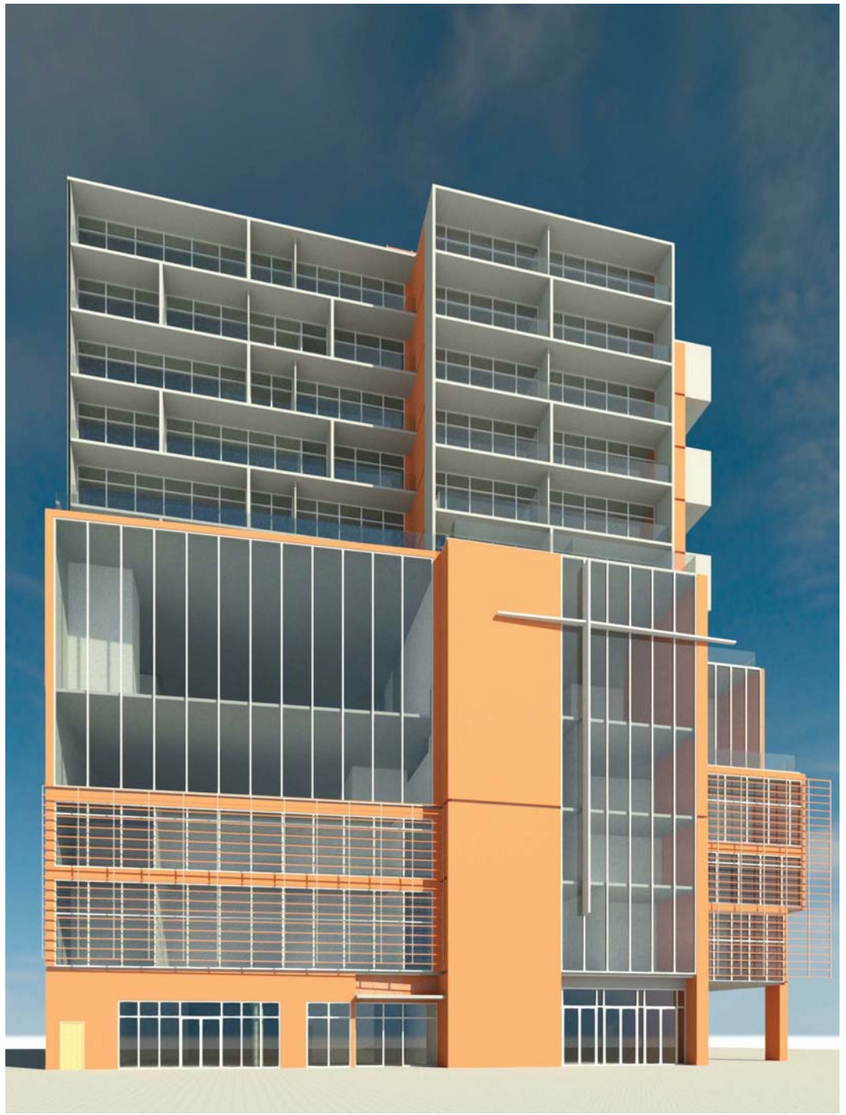
North and West Elevations

drawing scale
1/16" = 1'-0"

project number
Project Number

date issued
04/06/17

A105



1 View from North West
12" = 1'-0"

2 View from South West
12" = 1'-0"

Boston Chinese Evangelical Church

120 Shawmut Ave., Boston, MA 02119

Perspective Views

drawing scale
12" = 1'-0"

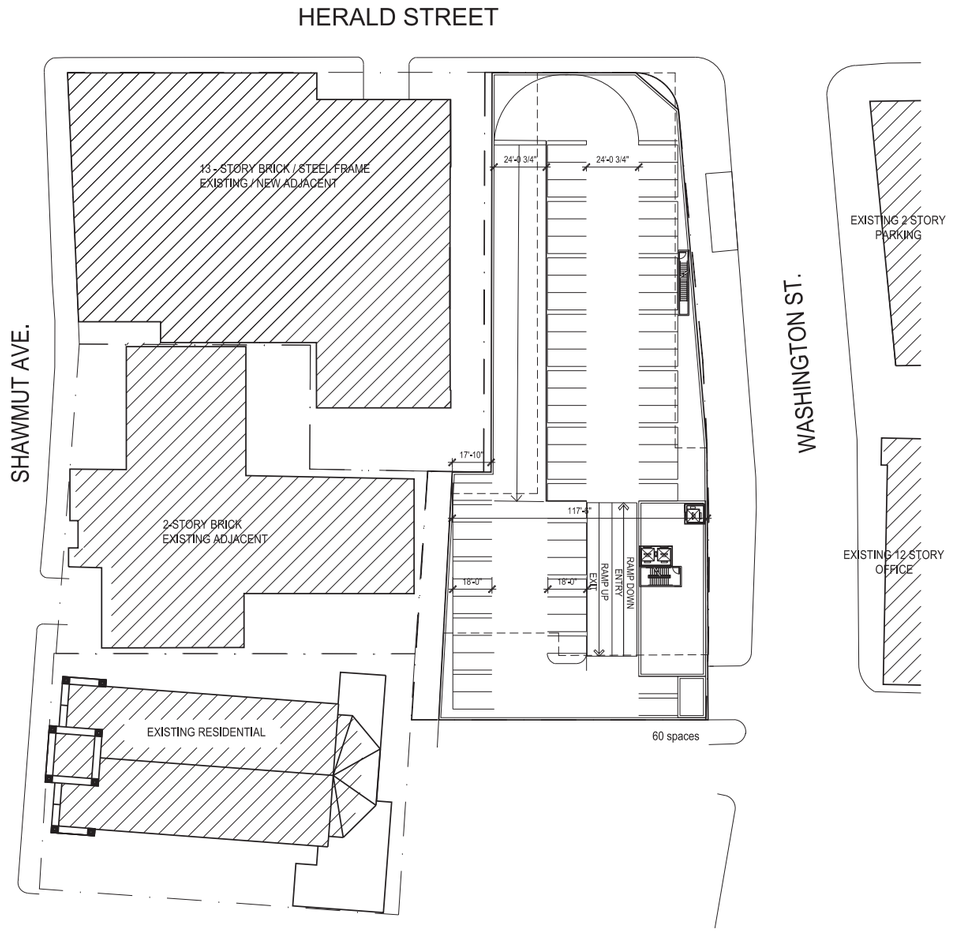
project number
Project Number

date issued
04/13/17

A106

Appendix B

CCBA Project Conceptual Design Plans

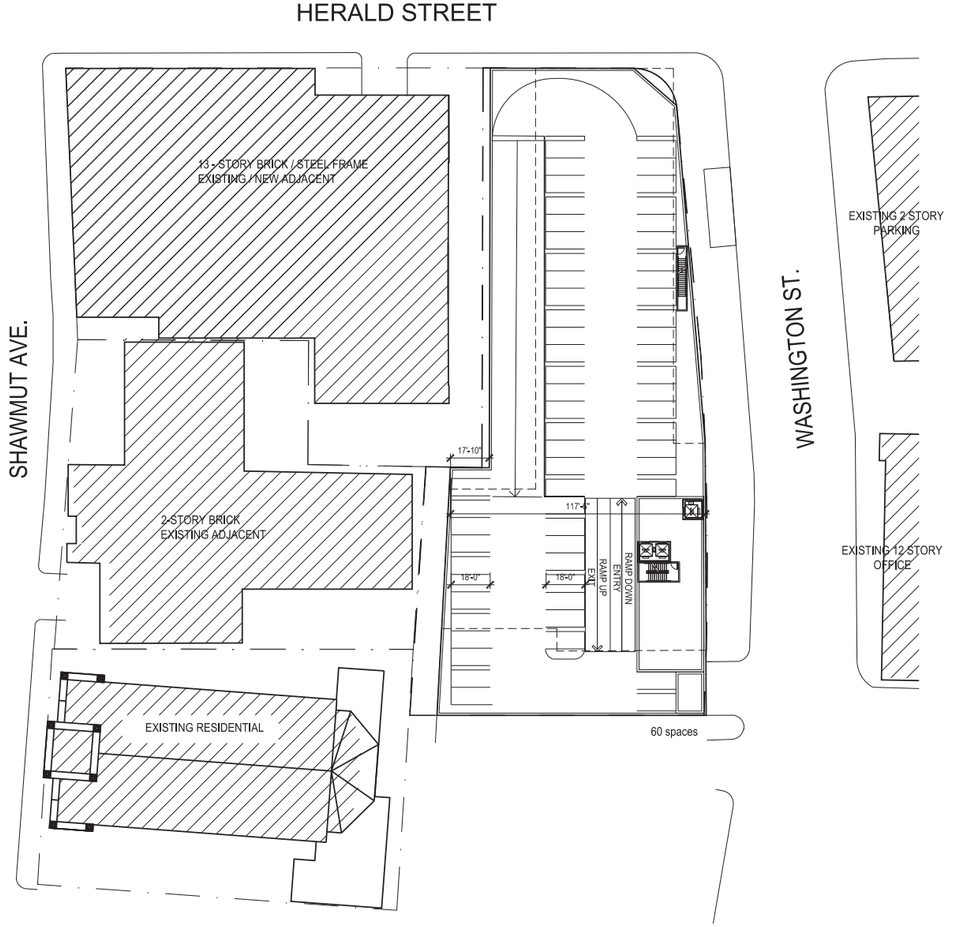


12 Basement 1 - Parking Level

SCALE : 1/32" = 1'-0"

N

10 50 100

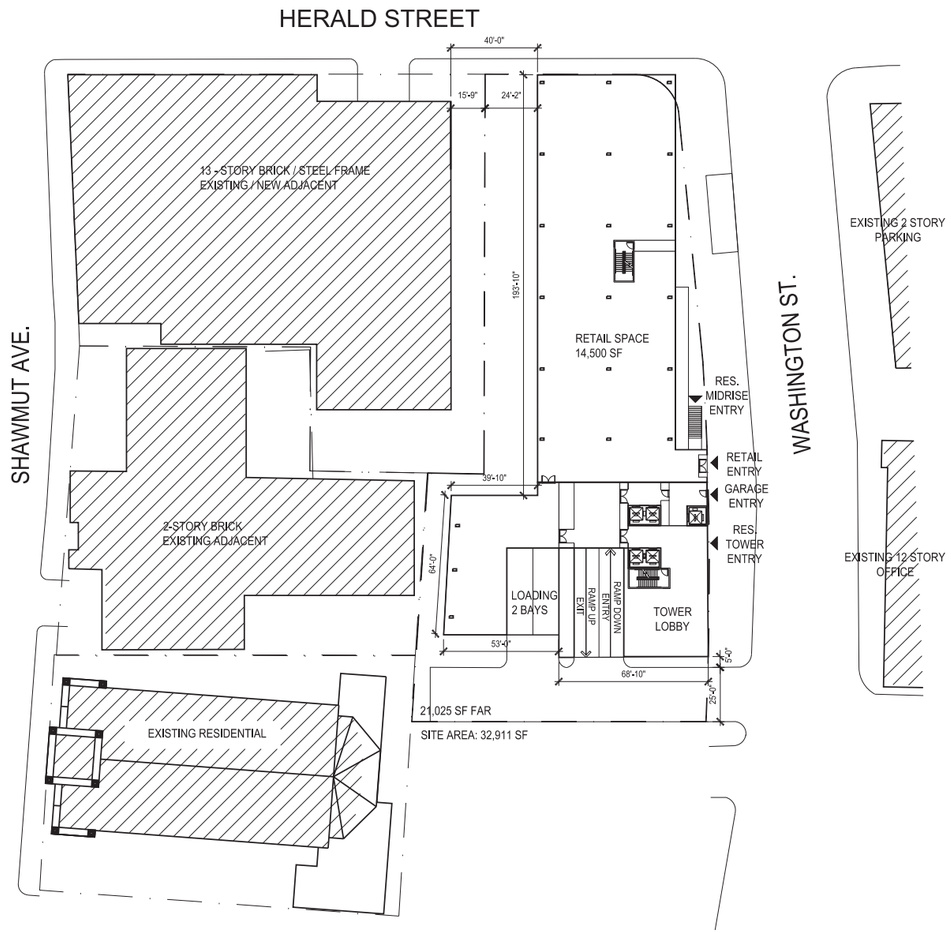


12 Basement 2 - Parking Level B2 /B3

SCALE : 1/32" = 1'-0"

N

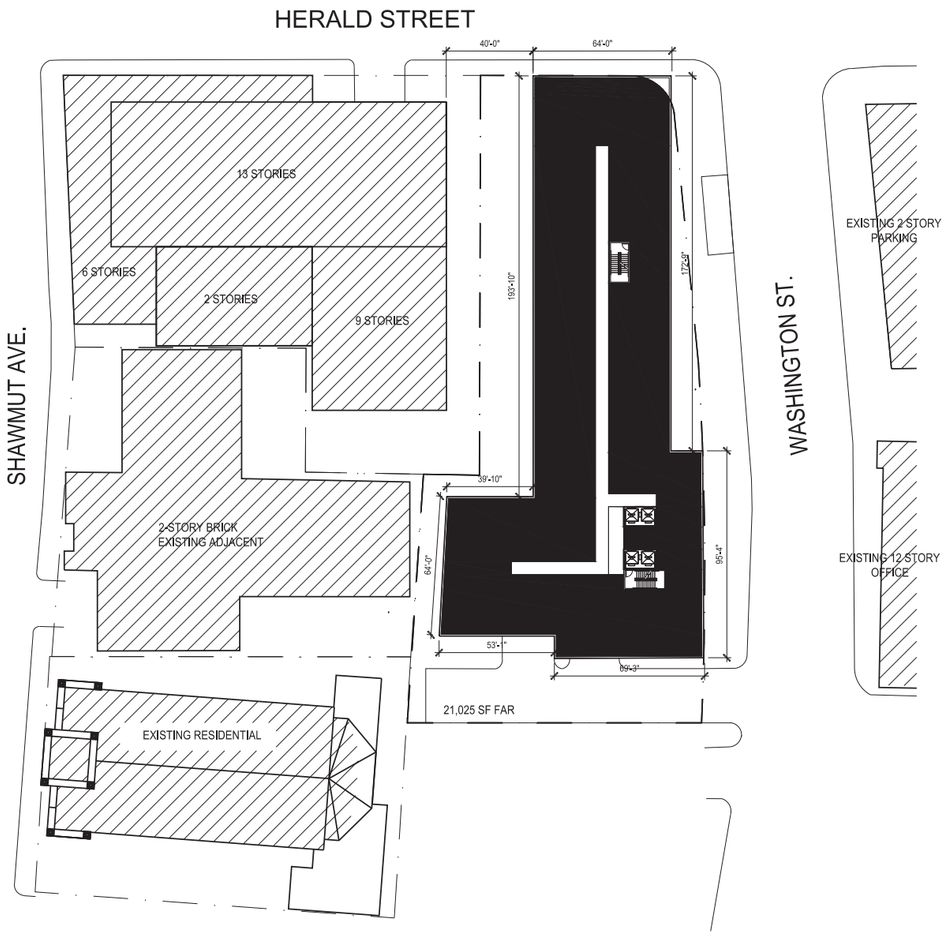
10 50 100



12 1st Level - Ground Floor Retail

SCALE : 1/32" = 1'-0"

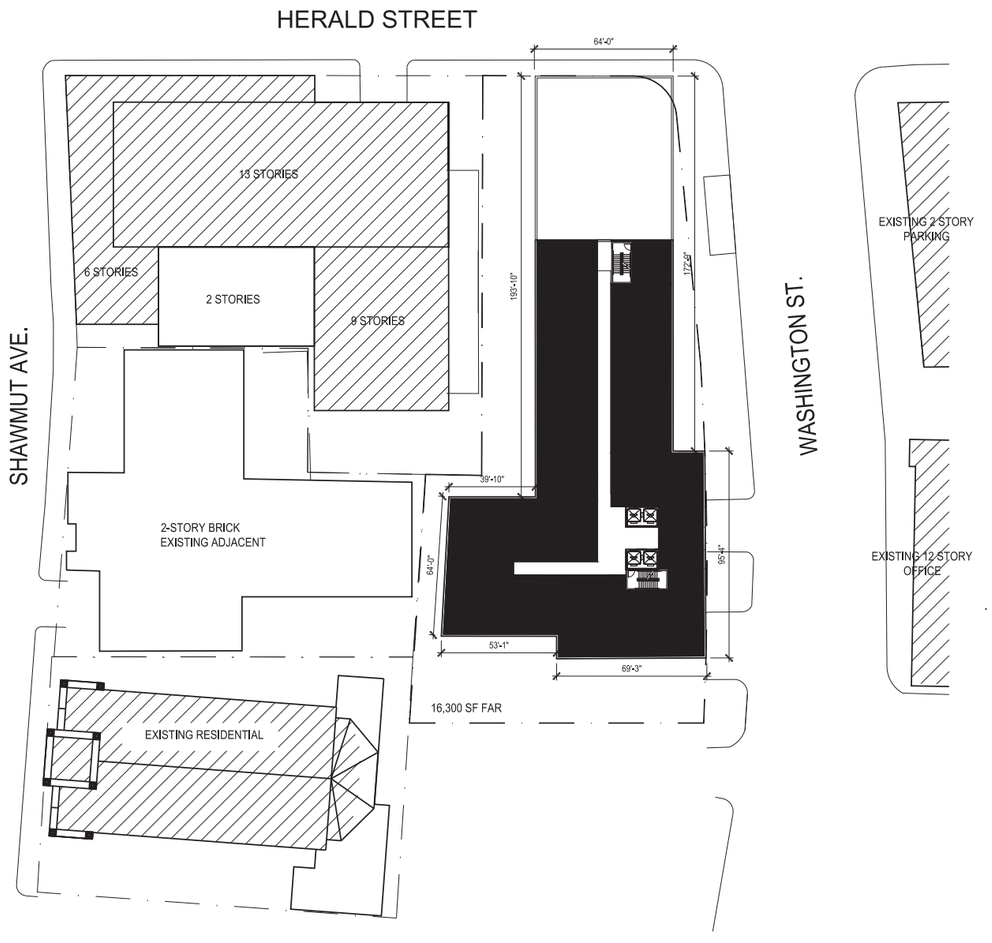
10 50 100



11 2nd to 9th Levels

SCALE : 1/32" = 1'-0"

10 50 100



12 10th to 14th Levels

SCALE : 1/32" = 1'-0"

Appendix C

Transportation

Appendix – Transportation

Synchro Intersection Level of Service Reports

- No-Build (2024) Condition
- Interim Build (2024) Condition
- Full Build (2024) Condition

- No-Build (2024) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	861	150	0	0	0	0	480	363	41	143	0	
Future Volume (vph)	31	861	150	0	0	0	0	480	363	41	143	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.99						0.95			1.00		
Frt		0.978						0.935					
Flt Protected		0.999									0.989		
Satd. Flow (prot)	0	5991	0	0	0	0	0	3079	0	0	3340	0	
Flt Permitted		0.999									0.633		
Satd. Flow (perm)	0	5982	0	0	0	0	0	3079	0	0	2128	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		48						206					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		207			774			883			176		
Travel Time (s)		4.7			17.6			20.1			4.0		
Confl. Peds. (#/hr)	59		91						117	117			
Confl. Bikes (#/hr)			1										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	
Heavy Vehicles (%)	4%	5%	7%	2%	2%	2%	0%	6%	2%	3%	8%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	33	916	160	0	0	0	0	511	386	51	177	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1109	0	0	0	0	0	897	0	0	228	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (%)	41.0%	41.0%						38.0%		38.0%	38.0%		21%
Maximum Green (s)	36.0	36.0						34.0		34.0	34.0		14.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		4.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	27.0	27.0						25.0		25.0	25.0		5.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		357
Act Effct Green (s)		36.0						34.0			34.0		
Actuated g/C Ratio		0.36						0.34			0.34		
v/c Ratio		0.51						0.76			0.32		
Control Delay		24.9						21.6			25.9		
Queue Delay		0.0						0.0			0.0		
Total Delay		24.9						21.6			25.9		
LOS		C						C			C		
Approach Delay		24.9						21.6			25.9		
Approach LOS		C						C			C		
Queue Length 50th (ft)		152						165			56		
Queue Length 95th (ft)		185						m121			77		
Internal Link Dist (ft)		127			694			803			96		
Turn Bay Length (ft)													
Base Capacity (vph)		2187						1182			723		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.51						0.76			0.32		

Intersection Summary

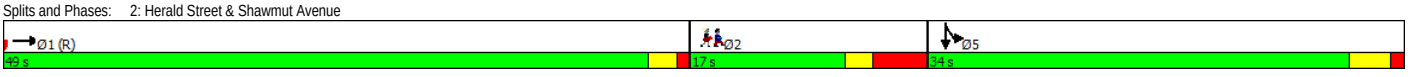
Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 5 (5%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 23.7 Intersection LOS: C
Intersection Capacity Utilization 71.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1160	65	0	0	0	0	0	0	246	80	0	
Future Volume (vph)	0	1160	65	0	0	0	0	0	0	246	80	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.87			
Frt		0.992											
Flt Protected										0.950			
Satd. Flow (prot)	0	4928	0	0	0	0	0	0	0	3213	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4928	0	0	0	0	0	0	0	2801	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		11								300			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		774			148			1006			279		
Travel Time (s)		17.6			3.4			22.9			6.3		
Confl. Peds. (#/hr)			86							128			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.82	0.82	0.82	
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	2%	2%	9%	1%	0%	
Adj. Flow (vph)	0	1234	69	0	0	0	0	0	0	300	98	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1303	0	0	0	0	0	0	0	300	98	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		49.0								34.0	34.0		17.0
Total Split (s)		49.0								34.0	34.0		17.0
Total Split (%)		49.0%								34.0%	34.0%		17%
Maximum Green (s)		46.0								30.0	30.0		11.0
Yellow Time (s)		2.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		3.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		35.0								21.0	21.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		373
Act Effct Green (s)		46.0								30.0	30.0		
Actuated g/C Ratio		0.46								0.30	0.30		
v/c Ratio		0.57								0.26	0.09		
Control Delay		8.5								6.1	18.0		
Queue Delay		0.2								0.4	0.0		
Total Delay		8.7								6.5	18.0		
LOS		A								A	B		
Approach Delay		8.7									9.3		
Approach LOS		A									A		
Queue Length 50th (ft)		116								0	23		
Queue Length 95th (ft)		111								11	38		
Internal Link Dist (ft)		694			68			926			199		
Turn Bay Length (ft)													
Base Capacity (vph)		2272								1173	1072		
Starvation Cap Reductn		0								454	0		
Spillback Cap Reductn		329								19	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.67								0.42	0.09		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 6 (6%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

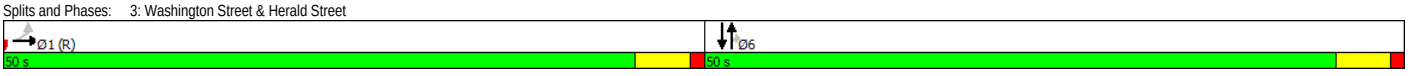


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	1217	71	0	0	0	0	699	72	0	19	0
Future Volume (vph)	107	1217	71	0	0	0	0	699	72	0	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.79			
Frt		0.992							0.850			
Flt Protected		0.996										
Satd. Flow (prot)	0	4168	0	0	0	0	0	1517	1243	0	919	0
Flt Permitted		0.996										
Satd. Flow (perm)	0	4165	0	0	0	0	0	1517	977	0	919	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11							24			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			204			253			221	
Travel Time (s)		4.5			4.6			5.8			5.0	
Confl. Peds. (#/hr)	12								165			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.86	0.86	0.86	0.75	0.75	0.75
Heavy Vehicles (%)	6%	6%	0%	0%	0%	0%	0%	9%	13%	0%	86%	0%
Bus Blockages (#/hr)	0	9	9	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	114	1295	76	0	0	0	0	813	84	0	25	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1485	0	0	0	0	0	813	84	0	25	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	50.0	50.0						29.0	29.0		29.0	
Total Split (s)	50.0	50.0						50.0	50.0		50.0	
Total Split (%)	50.0%	50.0%						50.0%	50.0%		50.0%	
Maximum Green (s)	45.0	45.0						45.0	45.0		45.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						None	None		None	
Walk Time (s)	36.0	36.0						15.0	15.0		15.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		46.0						46.0	46.0		46.0	
Actuated g/C Ratio		0.46						0.46	0.46		0.46	
v/c Ratio		0.77						1.17	0.18		0.06	
Control Delay		14.3						117.5	12.8		15.6	
Queue Delay		1.0						0.0	0.0		0.0	
Total Delay		15.3						117.5	12.8		15.6	
LOS		B						F	B		B	
Approach Delay		15.3						107.7			15.6	
Approach LOS		B						F			B	
Queue Length 50th (ft)		333						~619	21		9	
Queue Length 95th (ft)		396						#790	48		20	
Internal Link Dist (ft)		120			124			173			141	
Turn Bay Length (ft)												
Base Capacity (vph)		1921						697	462		422	
Starvation Cap Reductn		203						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.86						1.17	0.18		0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 49.7 Intersection LOS: D
Intersection Capacity Utilization 77.8% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Washington Street & Herald Street

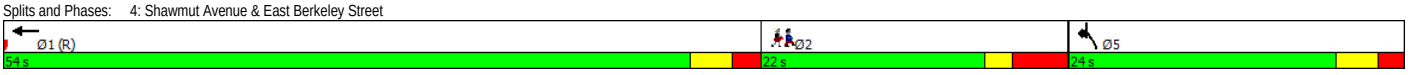


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	1099	0	71	0	0	0	0	110	
Future Volume (vph)	0	0	0	0	1099	0	71	0	0	0	0	110	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.88						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4322	0	1593	0	0	0	0	1450	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4322	0	1395	0	0	0	0	1450	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							296					296	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			264			598			1006		
Travel Time (s)		18.8			6.0			13.6			22.9		
Confl. Peds. (#/hr)							62					62	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86	0.69	0.69	0.69	
Heavy Vehicles (%)	0%	0%	0%	0%	8%	0%	2%	0%	0%	0%	0%	2%	
Adj. Flow (vph)	0	0	0	0	1235	0	83	0	0	0	0	159	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	1235	0	83	0	0	0	0	159	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					54.0		20.0					20.0	22.0
Total Split (s)					54.0		24.0					24.0	22.0
Total Split (%)					54.0%		24.0%					24.0%	22%
Maximum Green (s)					49.0		19.0					19.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					39.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	298
Act Effct Green (s)					60.0		8.0					8.0	
Actuated g/C Ratio					0.60		0.08					0.08	
v/c Ratio					0.48		0.21					0.41	
Control Delay					12.0		1.2					10.1	
Queue Delay					0.0		0.0					0.0	
Total Delay					12.0		1.2					10.1	
LOS					B		A					B	
Approach Delay					12.0			1.2			10.1		
Approach LOS					B			A			B		
Queue Length 50th (ft)					149		0					0	
Queue Length 95th (ft)					180		0					0	
Internal Link Dist (ft)		749			184			518			926		
Turn Bay Length (ft)													
Base Capacity (vph)					2593		542					515	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.48		0.15					0.31	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:WBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street

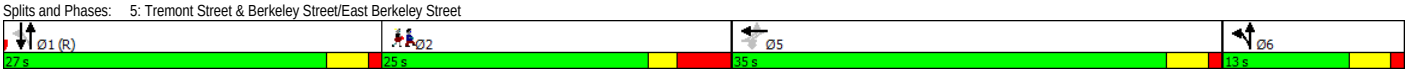


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	16	0	9	284	812	184	139	633	0	0	243	68	
Future Volume (vph)	16	0	9	284	812	184	139	633	0	0	243	68	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor											0.99		
Frt			0.850		0.972						0.967		
Flt Protected	0.950			0.950				0.991					
Satd. Flow (prot)	1624	0	1163	1547	2957	0	0	3091	0	0	2859	0	
Flt Permitted	0.129			0.950				0.705					
Satd. Flow (perm)	221	0	1163	1547	2957	0	0	2199	0	0	2859	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			120		28						33		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			883		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)												40	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.83	0.83	0.83	0.93	0.93	0.93	0.89	0.89	0.89	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	0%	25%	5%	7%	6%	5%	4%	0%	0%	7%	13%	
Adj. Flow (vph)	19	0	11	305	873	198	156	711	0	0	289	81	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	19	0	11	305	1071	0	0	867	0	0	370	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				27.0		25.0
Total Split (s)	35.0		35.0	35.0	35.0		13.0				27.0		25.0
Total Split (%)	35.0%		35.0%	35.0%	35.0%		13.0%				27.0%		25%
Maximum Green (s)	31.0		31.0	31.0	31.0		9.0				23.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											17.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		301
Act Effct Green (s)	31.0		31.0	31.0	31.0			32.0			23.0		
Actuated g/C Ratio	0.31		0.31	0.31	0.31			0.32			0.23		
v/c Ratio	0.28		0.02	0.64	1.15			1.11			0.54		
Control Delay	39.0		0.1	28.1	103.5			97.0			30.6		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	39.0		0.1	28.1	103.5			97.0			30.6		
LOS	D		A	C	F			F			C		
Approach Delay		24.7			86.8			97.0			30.6		
Approach LOS		C			F			F			C		
Queue Length 50th (ft)	9		0	168	~417			~293			113		
Queue Length 95th (ft)	29		0	262	#551			#448			149		
Internal Link Dist (ft)		567			749			329			803		
Turn Bay Length (ft)													
Base Capacity (vph)	68		443	479	935			783			682		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.28		0.02	0.64	1.15			1.11			0.54		

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 38 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.15
Intersection Signal Delay: 81.6 Intersection LOS: F
Intersection Capacity Utilization 84.6% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	89	336	0	0	0	0	0	237	83	
Future Volume (vph)	0	0	0	89	336	0	0	0	0	0	237	83	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					1.00						0.98		
Frt											0.961		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3456	0	0	0	0	0	4589	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3451	0	0	0	0	0	4589	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					39						87		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		266			231			279			323		
Travel Time (s)		6.0			5.3			6.3			7.3		
Confl. Peds. (#/hr)				9								59	
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95	
Heavy Vehicles (%)	2%	2%	2%	5%	3%	2%	2%	2%	2%	0%	8%	3%	
Adj. Flow (vph)	0	0	0	102	386	0	0	0	0	0	249	87	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	488	0	0	0	0	0	336	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				43.0	43.0						35.0		22.0
Total Split (s)				43.0	43.0						35.0		22.0
Total Split (%)				43.0%	43.0%						35.0%		22%
Maximum Green (s)				39.0	39.0						31.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				28.0	28.0						23.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		315
Act Effct Green (s)					39.0						31.0		
Actuated g/C Ratio					0.39						0.31		
v/c Ratio					0.36						0.23		
Control Delay					20.6						19.2		
Queue Delay					0.0						0.0		
Total Delay					20.6						19.2		
LOS					C						B		
Approach Delay					20.6						19.2		
Approach LOS					C						B		
Queue Length 50th (ft)					104						42		
Queue Length 95th (ft)					139						65		
Internal Link Dist (ft)		186			151			199			243		
Turn Bay Length (ft)													
Base Capacity (vph)					1371						1482		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.36						0.23		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 81 (81%), Referenced to phase 1:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Shawmut Avenue & Marginal Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1390	49	0	0	0	2
Future Volume (Veh/h)	1390	49	0	0	0	2
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.38
Hourly flow rate (vph)	1448	51	0	0	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	148			200		
pX, platoon unblocked			0.81		0.81	0.81
vC, conflicting volume			1499		1474	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			803		772	0
tC, single (s)			4.1		6.8	7.6
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.6
p0 queue free %			100		100	99
cM capacity (veh/h)			663		276	805

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	579	579	341	5
Volume Left	0	0	0	0
Volume Right	0	0	51	5
cSH	1700	1700	1700	805
Volume to Capacity	0.34	0.34	0.20	0.01
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	9.5
Lane LOS				A
Approach Delay (s)	0.0			9.5
Approach LOS				A

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			37.9%	ICU Level of Service
Analysis Period (min)			15	

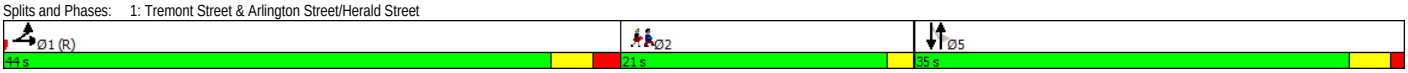
A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	59	958	222	0	0	0	0	371	214	15	248	0	
Future Volume (vph)	59	958	222	0	0	0	0	371	214	15	248	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.98						0.95			1.00		
Frt		0.973						0.945					
Flt Protected		0.998									0.997		
Satd. Flow (prot)	0	6131	0	0	0	0	0	3148	0	0	3437	0	
Flt Permitted		0.998									0.906		
Satd. Flow (perm)	0	6123	0	0	0	0	0	3148	0	0	3116	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		64						119					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		230			765			886			173		
Travel Time (s)		5.2			17.4			20.1			3.9		
Confl. Peds. (#/hr)	37		97						130	130			
Confl. Bikes (#/hr)			3										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.90	0.90	0.90	0.88	0.88	0.88	
Heavy Vehicles (%)	4%	2%	1%	2%	2%	2%	0%	3%	3%	0%	5%	0%	
Adj. Flow (vph)	63	1019	236	0	0	0	0	412	238	17	282	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1318	0	0	0	0	0	650	0	0	299	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (%)	44.0%	44.0%						35.0%		35.0%	35.0%		21%
Maximum Green (s)	39.0	39.0						31.0		31.0	31.0		19.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	30.0	30.0						22.0		22.0	22.0		10.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		370
Act Effct Green (s)		39.0						31.0			31.0		
Actuated g/C Ratio		0.39						0.31			0.31		
v/c Ratio		0.54						0.61			0.31		
Control Delay		23.3						26.6			27.4		
Queue Delay		0.0						0.0			0.0		
Total Delay		23.3						26.6			27.4		
LOS		C						C			C		
Approach Delay		23.3						26.6			27.4		
Approach LOS		C						C			C		
Queue Length 50th (ft)		176						151			76		
Queue Length 95th (ft)		211						211			110		
Internal Link Dist (ft)		150			685			806			93		
Turn Bay Length (ft)													
Base Capacity (vph)		2430						1057			965		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.54						0.61			0.31		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 89 (89%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 24.8 Intersection LOS: C
Intersection Capacity Utilization 65.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1199	73	0	0	0	0	0	0	295	194	0	
Future Volume (vph)	0	1199	73	0	0	0	0	0	0	295	194	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.90			
Frt		0.991											
Flt Protected										0.950			
Satd. Flow (prot)	0	4965	0	0	0	0	0	0	0	3367	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4965	0	0	0	0	0	0	0	3036	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		13								364			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		765			139			1015			271		
Travel Time (s)		17.4			3.2			23.1			6.2		
Confl. Peds. (#/hr)			100							82			
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	3%	0%	2%	2%	2%	2%	2%	2%	4%	1%	0%	
Adj. Flow (vph)	0	1363	83	0	0	0	0	0	0	364	240	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1446	0	0	0	0	0	0	0	364	240	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		54.0								29.0	29.0		17.0
Total Split (s)		54.0								29.0	29.0		17.0
Total Split (%)		54.0%								29.0%	29.0%		17%
Maximum Green (s)		50.0								25.0	25.0		11.0
Yellow Time (s)		3.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		4.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		39.0								16.0	16.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		399
Act Effct Green (s)		50.0								25.0	25.0		
Actuated g/C Ratio		0.50								0.25	0.25		
v/c Ratio		0.58								0.33	0.27		
Control Delay		7.2								1.2	19.5		
Queue Delay		1.2								0.2	0.0		
Total Delay		8.4								1.4	19.5		
LOS		A								A	B		
Approach Delay		8.4									8.6		
Approach LOS		A									A		
Queue Length 50th (ft)		85								2	31		
Queue Length 95th (ft)		96								3	39		
Internal Link Dist (ft)		685			59			935			191		
Turn Bay Length (ft)													
Base Capacity (vph)		2489								1114	893		
Starvation Cap Reductn		0								254	0		
Spillback Cap Reductn		750								54	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.83								0.42	0.27		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1371	99	0	0	0	0	533	147	0	21	0
Future Volume (vph)	35	1371	99	0	0	0	0	533	147	0	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.88			
Frt		0.990							0.850			
Flt Protected		0.999										
Satd. Flow (prot)	0	4289	0	0	0	0	0	1503	1364	0	934	0
Flt Permitted		0.999										
Satd. Flow (perm)	0	4288	0	0	0	0	0	1503	1205	0	934	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13							22			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		203			204			266			224	
Travel Time (s)		4.6			4.6			6.0			5.1	
Confl. Peds. (#/hr)	8								188			
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	10%	3%	0%	83%	0%
Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	39	1523	110	0	0	0	0	579	160	0	27	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1672	0	0	0	0	0	579	160	0	27	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (%)	42.0%	42.0%						58.0%	58.0%		58.0%	
Maximum Green (s)	37.0	37.0						53.0	53.0		53.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						Max	Max		Max	
Walk Time (s)	28.0	28.0						44.0	44.0		44.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		38.0						54.0	54.0		54.0	
Actuated g/C Ratio		0.38						0.54	0.54		0.54	
v/c Ratio		1.02						0.71	0.24		0.05	
Control Delay		44.4						23.4	11.6		11.4	
Queue Delay		0.0						0.0	0.0		0.0	
Total Delay		44.4						23.4	11.6		11.4	
LOS		D						C	B		B	
Approach Delay		44.4						20.8			11.4	
Approach LOS		D						C			B	
Queue Length 50th (ft)		~420						262	43		8	
Queue Length 95th (ft)		#519						399	82		18	
Internal Link Dist (ft)		123			124			186			144	
Turn Bay Length (ft)												
Base Capacity (vph)		1637						811	660		504	
Starvation Cap Reductn		0						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		1.02						0.71	0.24		0.05	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 14 (14%), Referenced to phase 1:EBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 36.9		Intersection LOS: D	
Intersection Capacity Utilization 83.5%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

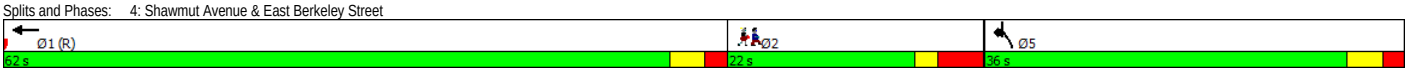
Splits and Phases: 3: Washington Street & Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	802	0	104	0	0	0	0	257	
Future Volume (vph)	0	0	0	0	802	0	104	0	0	0	0	257	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.89						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4532	0	1577	0	0	0	0	1465	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4532	0	1403	0	0	0	0	1465	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							306					306	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			256			598			1015		
Travel Time (s)		18.8			5.8			13.6			23.1		
Confl. Peds. (#/hr)							46					46	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.80	0.80	0.80	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%	
Adj. Flow (vph)	0	0	0	0	911	0	130	0	0	0	0	271	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	911	0	130	0	0	0	0	271	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					62.0		20.0					20.0	22.0
Total Split (s)					62.0		36.0					36.0	22.0
Total Split (%)					51.7%		30.0%					30.0%	18%
Maximum Green (s)					57.0		31.0					31.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					47.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	240
Act Effct Green (s)					79.0		9.0					9.0	
Actuated g/C Ratio					0.66		0.08					0.08	
v/c Ratio					0.31		0.33					0.69	
Control Delay					9.2		2.1					13.1	
Queue Delay					0.0		0.0					0.0	
Total Delay					9.2		2.1					13.1	
LOS					A		A					B	
Approach Delay					9.2			2.1			13.1		
Approach LOS					A			A			B		
Queue Length 50th (ft)					98		0					0	
Queue Length 95th (ft)					133		0					52	
Internal Link Dist (ft)		749			176			518			935		
Turn Bay Length (ft)													
Base Capacity (vph)					2985		634					605	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.31		0.21					0.45	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 98 (82%), Referenced to phase 1:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 9.3 Intersection LOS: A
Intersection Capacity Utilization 56.7% ICU Level of Service B
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	0	27	367	630	170	107	373	0	0	418	62	
Future Volume (vph)	31	0	27	367	630	170	107	373	0	0	418	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor					1.00			0.99			0.99		
Frt			0.850		0.968						0.981		
Flt Protected	0.950			0.950				0.989					
Satd. Flow (prot)	1624	0	1454	1593	3039	0	0	3126	0	0	3053	0	
Flt Permitted	0.108			0.950				0.591					
Satd. Flow (perm)	185	0	1454	1593	3039	0	0	1856	0	0	3053	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			100		30						14		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			886		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)							77					77	
Confl. Bikes (#/hr)						2						4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.87	0.87	0.87	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	0%	0%	2%	3%	4%	2%	3%	0%	0%	3%	4%	
Adj. Flow (vph)	41	0	36	417	716	193	123	429	0	0	504	75	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	41	0	36	417	909	0	0	552	0	0	579	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				38.0		25.0
Total Split (s)	44.0		44.0	44.0	44.0		13.0				38.0		25.0
Total Split (%)	36.7%		36.7%	36.7%	36.7%		10.8%				31.7%		21%
Maximum Green (s)	40.0		40.0	40.0	40.0		9.0				34.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											28.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		322
Act Effct Green (s)	38.7		38.7	38.7	38.7			44.3			35.3		
Actuated g/C Ratio	0.32		0.32	0.32	0.32			0.37			0.29		
v/c Ratio	0.69		0.07	0.81	0.91			0.71			0.64		
Control Delay	90.7		0.3	47.0	47.4			34.9			40.1		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	90.7		0.3	47.0	47.4			34.9			40.1		
LOS	F		A	D	D			C			D		
Approach Delay		48.4			47.3			34.9			40.1		
Approach LOS		D			D			C			D		
Queue Length 50th (ft)	27		0	301	352			164			203		
Queue Length 95th (ft)	#70		0	426	#445			206			241		
Internal Link Dist (ft)		567			749			329			806		
Turn Bay Length (ft)													
Base Capacity (vph)	61		551	531	1033			779			907		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.67		0.07	0.79	0.88			0.71			0.64		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 75 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 43.0 Intersection LOS: D
Intersection Capacity Utilization 82.5% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	95	383	0	0	0	0	0	394	223	
Future Volume (vph)	0	0	0	95	383	0	0	0	0	0	394	223	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					0.99						0.97		
Frt											0.946		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	4660	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3513	0	0	0	0	0	4660	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					35						152		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		310			237			271			312		
Travel Time (s)		7.0			5.4			6.2			7.1		
Confl. Peds. (#/hr)				44								73	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92	0.83	0.83	0.83	
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	0%	2%	3%	
Adj. Flow (vph)	0	0	0	107	430	0	0	0	0	0	475	269	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	537	0	0	0	0	0	744	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				41.0	41.0						37.0		22.0
Total Split (s)				41.0	41.0						37.0		22.0
Total Split (%)				41.0%	41.0%						37.0%		22%
Maximum Green (s)				37.0	37.0						33.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				26.0	26.0						25.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		352
Act Effct Green (s)					37.0						33.0		
Actuated g/C Ratio					0.37						0.33		
v/c Ratio					0.40						0.45		
Control Delay					22.8						21.7		
Queue Delay					0.0						0.0		
Total Delay					22.8						21.7		
LOS					C						C		
Approach Delay					22.8						21.7		
Approach LOS					C						C		
Queue Length 50th (ft)					122						106		
Queue Length 95th (ft)					166						127		
Internal Link Dist (ft)		230			157			191			232		
Turn Bay Length (ft)													
Base Capacity (vph)					1331						1639		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.40						0.45		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 1 (1%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 56.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Shawmut Avenue & Marginal Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1490	3	0	0	0	29
Future Volume (Veh/h)	1490	3	0	0	0	29
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.75	0.75
Hourly flow rate (vph)	1637	3	0	0	0	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	139			203		
pX, platoon unblocked			0.80		0.80	0.80
vC, conflicting volume			1640		1638	547
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			929		927	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	96
cM capacity (veh/h)			586		217	874

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	655	655	330	39
Volume Left	0	0	0	0
Volume Right	0	0	3	39
cSH	1700	1700	1700	874
Volume to Capacity	0.39	0.39	0.19	0.04
Queue Length 95th (ft)	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	9.3
Lane LOS				A
Approach Delay (s)	0.0			9.3
Approach LOS				A

Intersection Summary				
Average Delay			0.2	
Intersection Capacity Utilization			38.9%	ICU Level of Service
Analysis Period (min)			15	

A

- Interim Build (2024) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	848	150	0	0	0	0	482	343	41	143	0	
Future Volume (vph)	31	848	150	0	0	0	0	482	343	41	143	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.99						0.95			1.00		
Frt		0.978						0.938					
Flt Protected		0.998									0.989		
Satd. Flow (prot)	0	5984	0	0	0	0	0	3093	0	0	3340	0	
Flt Permitted		0.998									0.638		
Satd. Flow (perm)	0	5975	0	0	0	0	0	3093	0	0	2144	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		48						195					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		207			774			883			176		
Travel Time (s)		4.7			17.6			20.1			4.0		
Confl. Peds. (#/hr)	59		91						117	117			
Confl. Bikes (#/hr)			1										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	
Heavy Vehicles (%)	4%	5%	7%	2%	2%	2%	0%	6%	2%	3%	8%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	33	902	160	0	0	0	0	513	365	51	177	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1095	0	0	0	0	0	878	0	0	228	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (%)	41.0%	41.0%						38.0%		38.0%	38.0%		21%
Maximum Green (s)	36.0	36.0						34.0		34.0	34.0		14.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		4.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	27.0	27.0						25.0		25.0	25.0		5.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		357
Act Effct Green (s)		36.0						34.0			34.0		
Actuated g/C Ratio		0.36						0.34			0.34		
v/c Ratio		0.50						0.74			0.31		
Control Delay		24.8						20.9			25.9		
Queue Delay		0.0						0.0			0.0		
Total Delay		24.8						20.9			25.9		
LOS		C						C			C		
Approach Delay		24.8						20.9			25.9		
Approach LOS		C						C			C		
Queue Length 50th (ft)		149						150			55		
Queue Length 95th (ft)		182						m112			77		
Internal Link Dist (ft)		127			694			803			96		
Turn Bay Length (ft)													
Base Capacity (vph)		2184						1180			728		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.50						0.74			0.31		

Intersection Summary

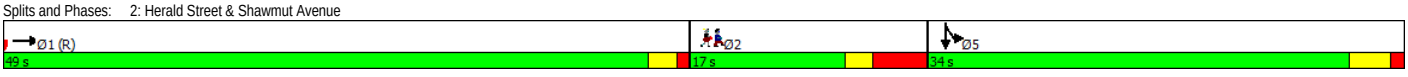
Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 5 (5%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 23.3 Intersection LOS: C
Intersection Capacity Utilization 71.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1123	69	0	0	0	0	0	0	243	80	0	
Future Volume (vph)	0	1123	69	0	0	0	0	0	0	243	80	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.87			
Frt		0.991											
Flt Protected										0.950			
Satd. Flow (prot)	0	4922	0	0	0	0	0	0	0	3213	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4922	0	0	0	0	0	0	0	2801	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		12								296			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		774			148			155			279		
Travel Time (s)		17.6			3.4			3.5			6.3		
Confl. Peds. (#/hr)			86							128			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.82	0.82	0.82	
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	2%	2%	9%	1%	0%	
Adj. Flow (vph)	0	1195	73	0	0	0	0	0	0	296	98	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1268	0	0	0	0	0	0	0	296	98	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		49.0								34.0	34.0		17.0
Total Split (s)		49.0								34.0	34.0		17.0
Total Split (%)		49.0%								34.0%	34.0%		17%
Maximum Green (s)		46.0								30.0	30.0		11.0
Yellow Time (s)		2.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		3.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		35.0								21.0	21.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		373
Act Effct Green (s)		46.0								30.0	30.0		
Actuated g/C Ratio		0.46								0.30	0.30		
v/c Ratio		0.56								0.25	0.09		
Control Delay		8.3								6.2	17.9		
Queue Delay		0.2								0.0	0.0		
Total Delay		8.6								6.2	17.9		
LOS		A								A	B		
Approach Delay		8.6									9.1		
Approach LOS		A									A		
Queue Length 50th (ft)		112								0	23		
Queue Length 95th (ft)		107								10	38		
Internal Link Dist (ft)		694			68			75			199		
Turn Bay Length (ft)													
Base Capacity (vph)		2270								1171	1072		
Starvation Cap Reductn		0								0	0		
Spillback Cap Reductn		340								20	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.66								0.26	0.09		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 6 (6%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 51.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

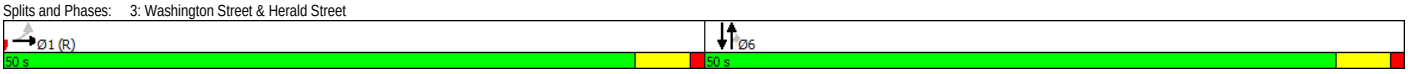


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	1224	72	0	0	0	0	699	72	0	19	0
Future Volume (vph)	109	1224	72	0	0	0	0	699	72	0	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.79			
Frt		0.992							0.850			
Flt Protected		0.996										
Satd. Flow (prot)	0	4168	0	0	0	0	0	1517	1243	0	919	0
Flt Permitted		0.996										
Satd. Flow (perm)	0	4165	0	0	0	0	0	1517	977	0	919	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11							23			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			204			253			221	
Travel Time (s)		4.5			4.6			5.8			5.0	
Confl. Peds. (#/hr)	12								165			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.86	0.86	0.86	0.75	0.75	0.75
Heavy Vehicles (%)	6%	6%	0%	0%	0%	0%	0%	9%	13%	0%	86%	0%
Bus Blockages (#/hr)	0	9	9	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	116	1302	77	0	0	0	0	813	84	0	25	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1495	0	0	0	0	0	813	84	0	25	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	50.0	50.0						29.0	29.0		29.0	
Total Split (s)	50.0	50.0						50.0	50.0		50.0	
Total Split (%)	50.0%	50.0%						50.0%	50.0%		50.0%	
Maximum Green (s)	45.0	45.0						45.0	45.0		45.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						None	None		None	
Walk Time (s)	36.0	36.0						15.0	15.0		15.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		46.0						46.0	46.0		46.0	
Actuated g/C Ratio		0.46						0.46	0.46		0.46	
v/c Ratio		0.78						1.17	0.18		0.06	
Control Delay		14.7						117.5	13.0		15.6	
Queue Delay		1.1						0.0	0.0		0.0	
Total Delay		15.8						117.5	13.0		15.6	
LOS		B						F	B		B	
Approach Delay		15.8						107.7			15.6	
Approach LOS		B						F			B	
Queue Length 50th (ft)		336						~619	22		9	
Queue Length 95th (ft)		398						#790	49		20	
Internal Link Dist (ft)		120			124			173			141	
Turn Bay Length (ft)												
Base Capacity (vph)		1921						697	461		422	
Starvation Cap Reductn		203						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.87						1.17	0.18		0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 49.9 Intersection LOS: D
Intersection Capacity Utilization 78.1% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Washington Street & Herald Street

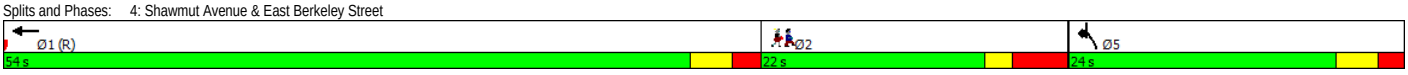


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	1073	0	71	0	0	0	0	117	
Future Volume (vph)	0	0	0	0	1073	0	71	0	0	0	0	117	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.88						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4322	0	1593	0	0	0	0	1450	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4322	0	1395	0	0	0	0	1450	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							298					298	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			264			598			851		
Travel Time (s)		18.8			6.0			13.6			19.3		
Confl. Peds. (#/hr)							62					62	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86	0.69	0.69	0.69	
Heavy Vehicles (%)	0%	0%	0%	0%	8%	0%	2%	0%	0%	0%	0%	2%	
Adj. Flow (vph)	0	0	0	0	1206	0	83	0	0	0	0	170	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	1206	0	83	0	0	0	0	170	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					54.0		20.0					20.0	22.0
Total Split (s)					54.0		24.0					24.0	22.0
Total Split (%)					54.0%		24.0%					24.0%	22%
Maximum Green (s)					49.0		19.0					19.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					39.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	298
Act Effct Green (s)					60.0		8.0					8.0	
Actuated g/C Ratio					0.60		0.08					0.08	
v/c Ratio					0.47		0.21					0.44	
Control Delay					11.8		1.2					9.9	
Queue Delay					0.0		0.0					0.0	
Total Delay					11.8		1.2					9.9	
LOS					B		A					A	
Approach Delay					11.8			1.2			9.9		
Approach LOS					B			A			A		
Queue Length 50th (ft)					144		0					0	
Queue Length 95th (ft)					175		0					0	
Internal Link Dist (ft)		749			184			518			771		
Turn Bay Length (ft)													
Base Capacity (vph)					2593		544					516	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.47		0.15					0.33	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:WBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 51.7%		ICU Level of Service A	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street

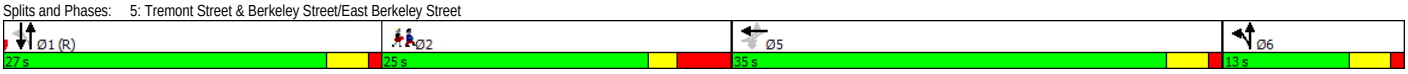


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	16	0	9	284	812	165	139	634	0	0	243	68	
Future Volume (vph)	16	0	9	284	812	165	139	634	0	0	243	68	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor											0.99		
Frt			0.850		0.975						0.967		
Flt Protected	0.950			0.950				0.991					
Satd. Flow (prot)	1624	0	1163	1547	2965	0	0	3091	0	0	2859	0	
Flt Permitted	0.129			0.950				0.706					
Satd. Flow (perm)	221	0	1163	1547	2965	0	0	2202	0	0	2859	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			120		25						33		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			883		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)												40	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.83	0.83	0.83	0.93	0.93	0.93	0.89	0.89	0.89	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	0%	25%	5%	7%	6%	5%	4%	0%	0%	7%	13%	
Adj. Flow (vph)	19	0	11	305	873	177	156	712	0	0	289	81	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	19	0	11	305	1050	0	0	868	0	0	370	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				27.0		25.0
Total Split (s)	35.0		35.0	35.0	35.0		13.0				27.0		25.0
Total Split (%)	35.0%		35.0%	35.0%	35.0%		13.0%				27.0%		25%
Maximum Green (s)	31.0		31.0	31.0	31.0		9.0				23.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											17.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		301
Act Effct Green (s)	31.0		31.0	31.0	31.0			32.0			23.0		
Actuated g/C Ratio	0.31		0.31	0.31	0.31			0.32			0.23		
v/c Ratio	0.28		0.02	0.64	1.12			1.11			0.54		
Control Delay	39.0		0.1	28.2	94.5			96.9			30.7		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	39.0		0.1	28.2	94.5			96.9			30.7		
LOS	D		A	C	F			F			C		
Approach Delay		24.7			79.6			96.9			30.7		
Approach LOS		C			E			F			C		
Queue Length 50th (ft)	9		0	168	~403			~294			113		
Queue Length 95th (ft)	29		0	262	#536			#448			149		
Internal Link Dist (ft)		567			749			329			803		
Turn Bay Length (ft)													
Base Capacity (vph)	68		443	479	936			784			682		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.28		0.02	0.64	1.12			1.11			0.54		

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 38 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 77.8 Intersection LOS: E
Intersection Capacity Utilization 83.9% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

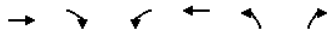
Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	89	337	0	0	0	0	0	236	83	
Future Volume (vph)	0	0	0	89	337	0	0	0	0	0	236	83	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					1.00						0.98		
Frt											0.961		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3456	0	0	0	0	0	4589	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3451	0	0	0	0	0	4589	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					39						87		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		266			231			279			323		
Travel Time (s)		6.0			5.3			6.3			7.3		
Confl. Peds. (#/hr)				9								59	
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95	
Heavy Vehicles (%)	2%	2%	2%	5%	3%	2%	2%	2%	2%	0%	8%	3%	
Adj. Flow (vph)	0	0	0	102	387	0	0	0	0	0	248	87	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	489	0	0	0	0	0	335	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				43.0	43.0						35.0		22.0
Total Split (s)				43.0	43.0						35.0		22.0
Total Split (%)				43.0%	43.0%						35.0%		22%
Maximum Green (s)				39.0	39.0						31.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				28.0	28.0						23.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		315
Act Effct Green (s)					39.0						31.0		
Actuated g/C Ratio					0.39						0.31		
v/c Ratio					0.36						0.23		
Control Delay					20.7						19.2		
Queue Delay					0.0						0.0		
Total Delay					20.7						19.2		
LOS					C						B		
Approach Delay					20.7						19.2		
Approach LOS					C						B		
Queue Length 50th (ft)					104						42		
Queue Length 95th (ft)					140						65		
Internal Link Dist (ft)		186			151			199			243		
Turn Bay Length (ft)													
Base Capacity (vph)					1371						1482		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.36						0.23		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 81 (81%), Referenced to phase 1:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 51.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Shawmut Avenue & Marginal Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1395	4	0	0	0	7
Future Volume (Veh/h)	1395	4	0	0	0	7
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.38
Hourly flow rate (vph)	1453	4	0	0	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	148			200		
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			1457		1455	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			784		782	0
tC, single (s)			4.1		6.8	7.6
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.6
p0 queue free %			100		100	98
cM capacity (veh/h)			680		275	812

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	581	581	295	18
Volume Left	0	0	0	0
Volume Right	0	0	4	18
cSH	1700	1700	1700	812
Volume to Capacity	0.34	0.34	0.17	0.02
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	9.5
Lane LOS				A
Approach Delay (s)	0.0			9.5
Approach LOS				A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	0	0	0	4	145
Future Volume (Veh/h)	7	0	0	0	4	145
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	0	0	4	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			851			155
pX, platoon unblocked	0.97					
vC, conflicting volume	166	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	126	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	841	1085			1623	

Direction, Lane #	WB 1	SB 1
Volume Total	8	162
Volume Left	8	4
Volume Right	0	0
cSH	841	1623
Volume to Capacity	0.01	0.00
Queue Length 95th (ft)	1	0
Control Delay (s)	9.3	0.2
Lane LOS	A	A
Approach Delay (s)	9.3	0.2
Approach LOS	A	

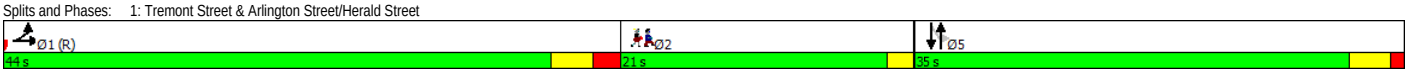
Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	17.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	59	961	222	0	0	0	0	373	228	15	248	0	
Future Volume (vph)	59	961	222	0	0	0	0	373	228	15	248	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.98						0.95			1.00		
Frt		0.973						0.943					
Flt Protected		0.998									0.997		
Satd. Flow (prot)	0	6131	0	0	0	0	0	3135	0	0	3437	0	
Flt Permitted		0.998									0.905		
Satd. Flow (perm)	0	6123	0	0	0	0	0	3135	0	0	3113	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		64						135					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		230			765			886			173		
Travel Time (s)		5.2			17.4			20.1			3.9		
Confl. Peds. (#/hr)	37		97						130	130			
Confl. Bikes (#/hr)			3										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.90	0.90	0.90	0.88	0.88	0.88	
Heavy Vehicles (%)	4%	2%	1%	2%	2%	2%	0%	3%	3%	0%	5%	0%	
Adj. Flow (vph)	63	1022	236	0	0	0	0	414	253	17	282	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1321	0	0	0	0	0	667	0	0	299	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (%)	44.0%	44.0%						35.0%		35.0%	35.0%		21%
Maximum Green (s)	39.0	39.0						31.0		31.0	31.0		19.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	30.0	30.0						22.0		22.0	22.0		10.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		370
Act Effct Green (s)		39.0						31.0			31.0		
Actuated g/C Ratio		0.39						0.31			0.31		
v/c Ratio		0.54						0.63			0.31		
Control Delay		23.4						26.3			27.4		
Queue Delay		0.0						0.0			0.0		
Total Delay		23.4						26.3			27.4		
LOS		C						C			C		
Approach Delay		23.4						26.3			27.4		
Approach LOS		C						C			C		
Queue Length 50th (ft)		177						152			76		
Queue Length 95th (ft)		212						214			110		
Internal Link Dist (ft)		150			685			806			93		
Turn Bay Length (ft)													
Base Capacity (vph)		2430						1065			965		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.54						0.63			0.31		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 89 (89%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 65.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1208	81	0	0	0	0	0	0	296	194	0	
Future Volume (vph)	0	1208	81	0	0	0	0	0	0	296	194	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.90			
Frt		0.991											
Flt Protected										0.950			
Satd. Flow (prot)	0	4963	0	0	0	0	0	0	0	3367	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4963	0	0	0	0	0	0	0	3036	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		15								365			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		765			139			152			271		
Travel Time (s)		17.4			3.2			3.5			6.2		
Confl. Peds. (#/hr)			100							82			
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	3%	0%	2%	2%	2%	2%	2%	2%	4%	1%	0%	
Adj. Flow (vph)	0	1373	92	0	0	0	0	0	0	365	240	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1465	0	0	0	0	0	0	0	365	240	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		54.0								29.0	29.0		17.0
Total Split (s)		54.0								29.0	29.0		17.0
Total Split (%)		54.0%								29.0%	29.0%		17%
Maximum Green (s)		50.0								25.0	25.0		11.0
Yellow Time (s)		3.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		4.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		39.0								16.0	16.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		399
Act Effct Green (s)		50.0								25.0	25.0		
Actuated g/C Ratio		0.50								0.25	0.25		
v/c Ratio		0.59								0.33	0.27		
Control Delay		7.5								1.2	19.5		
Queue Delay		1.2								0.2	0.0		
Total Delay		8.6								1.4	19.5		
LOS		A								A	B		
Approach Delay		8.6									8.6		
Approach LOS		A									A		
Queue Length 50th (ft)		88								2	31		
Queue Length 95th (ft)		100								3	39		
Internal Link Dist (ft)		685			59			72			191		
Turn Bay Length (ft)													
Base Capacity (vph)		2489								1115	893		
Starvation Cap Reductn		0								254	0		
Spillback Cap Reductn		725								53	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.83								0.42	0.27		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	1354	100	0	0	0	0	533	147	0	21	0
Future Volume (vph)	34	1354	100	0	0	0	0	533	147	0	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.88			
Frt		0.990							0.850			
Flt Protected		0.999										
Satd. Flow (prot)	0	4289	0	0	0	0	0	1503	1364	0	934	0
Flt Permitted		0.999										
Satd. Flow (perm)	0	4288	0	0	0	0	0	1503	1205	0	934	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13							22			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		203			204			266			224	
Travel Time (s)		4.6			4.6			6.0			5.1	
Confl. Peds. (#/hr)	8								188			
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	10%	3%	0%	83%	0%
Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	38	1504	111	0	0	0	0	579	160	0	27	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1653	0	0	0	0	0	579	160	0	27	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (%)	42.0%	42.0%						58.0%	58.0%		58.0%	
Maximum Green (s)	37.0	37.0						53.0	53.0		53.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						Max	Max		Max	
Walk Time (s)	28.0	28.0						44.0	44.0		44.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		38.0						54.0	54.0		54.0	
Actuated g/C Ratio		0.38						0.54	0.54		0.54	
v/c Ratio		1.01						0.71	0.24		0.05	
Control Delay		40.6						23.4	11.6		11.4	
Queue Delay		0.0						0.0	0.0		0.0	
Total Delay		40.6						23.4	11.6		11.4	
LOS		D						C	B		B	
Approach Delay		40.6						20.8			11.4	
Approach LOS		D						C			B	
Queue Length 50th (ft)		~399						262	43		8	
Queue Length 95th (ft)		#508						399	82		18	
Internal Link Dist (ft)		123			124			186			144	
Turn Bay Length (ft)												
Base Capacity (vph)		1637						811	660		504	
Starvation Cap Reductn		0						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		1.01						0.71	0.24		0.05	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 14 (14%), Referenced to phase 1:EBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 83.1%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

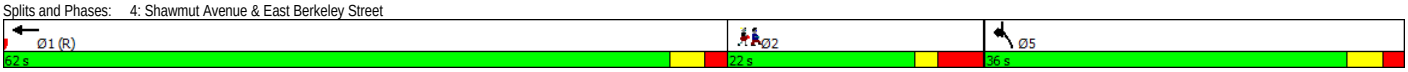
Splits and Phases: 3: Washington Street & Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	809	0	104	0	0	0	0	253	
Future Volume (vph)	0	0	0	0	809	0	104	0	0	0	0	253	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.89						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4532	0	1577	0	0	0	0	1465	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4532	0	1403	0	0	0	0	1465	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							304					304	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			256			598			862		
Travel Time (s)		18.8			5.8			13.6			19.6		
Confl. Peds. (#/hr)							46					46	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.80	0.80	0.80	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%	
Adj. Flow (vph)	0	0	0	0	919	0	130	0	0	0	0	266	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	919	0	130	0	0	0	0	266	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					62.0		20.0					20.0	22.0
Total Split (s)					62.0		36.0					36.0	22.0
Total Split (%)					51.7%		30.0%					30.0%	18%
Maximum Green (s)					57.0		31.0					31.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					47.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	240
Act Effct Green (s)					79.1		8.9					8.9	
Actuated g/C Ratio					0.66		0.07					0.07	
v/c Ratio					0.31		0.33					0.68	
Control Delay					9.2		2.2					12.7	
Queue Delay					0.0		0.0					0.0	
Total Delay					9.2		2.2					12.7	
LOS					A		A					B	
Approach Delay					9.2			2.2			12.7		
Approach LOS					A			A			B		
Queue Length 50th (ft)					99		0					0	
Queue Length 95th (ft)					133		0					50	
Internal Link Dist (ft)		749			176			518			782		
Turn Bay Length (ft)													
Base Capacity (vph)					2988		632					603	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.31		0.21					0.44	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 98 (82%), Referenced to phase 1:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 56.6% ICU Level of Service B
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	0	27	367	618	185	107	374	0	0	418	62	
Future Volume (vph)	31	0	27	367	618	185	107	374	0	0	418	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor					1.00			0.99			0.99		
Frt			0.850		0.965						0.981		
Flt Protected	0.950			0.950				0.989					
Satd. Flow (prot)	1624	0	1454	1593	3028	0	0	3126	0	0	3053	0	
Flt Permitted	0.107			0.950				0.590					
Satd. Flow (perm)	183	0	1454	1593	3028	0	0	1853	0	0	3053	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			100		35						14		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			886		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)							77					77	
Confl. Bikes (#/hr)						2						4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.87	0.87	0.87	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	0%	0%	2%	3%	4%	2%	3%	0%	0%	3%	4%	
Adj. Flow (vph)	41	0	36	417	702	210	123	430	0	0	504	75	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	41	0	36	417	912	0	0	553	0	0	579	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				38.0		25.0
Total Split (s)	44.0		44.0	44.0	44.0		13.0				38.0		25.0
Total Split (%)	36.7%		36.7%	36.7%	36.7%		10.8%				31.7%		21%
Maximum Green (s)	40.0		40.0	40.0	40.0		9.0				34.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											28.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		322
Act Effct Green (s)	38.8		38.8	38.8	38.8			44.2			35.2		
Actuated g/C Ratio	0.32		0.32	0.32	0.32			0.37			0.29		
v/c Ratio	0.69		0.07	0.81	0.91			0.71			0.64		
Control Delay	90.8		0.2	46.9	47.5			35.0			40.1		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	90.8		0.2	46.9	47.5			35.0			40.1		
LOS	F		A	D	D			C			D		
Approach Delay		48.5			47.3			35.0			40.1		
Approach LOS		D			D			C			D		
Queue Length 50th (ft)	27		0	301	352			164			203		
Queue Length 95th (ft)	#70		0	427	#448			207			241		
Internal Link Dist (ft)		567			749			329			806		
Turn Bay Length (ft)													
Base Capacity (vph)	61		551	531	1032			778			906		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.67		0.07	0.79	0.88			0.71			0.64		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 75 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 43.0 Intersection LOS: D
Intersection Capacity Utilization 82.5% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	95	384	0	0	0	0	0	395	223	
Future Volume (vph)	0	0	0	95	384	0	0	0	0	0	395	223	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					0.99						0.97		
Frt											0.946		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	4660	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3513	0	0	0	0	0	4660	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					35						152		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		310			237			271			312		
Travel Time (s)		7.0			5.4			6.2			7.1		
Confl. Peds. (#/hr)				44								73	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92	0.83	0.83	0.83	
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	0%	2%	3%	
Adj. Flow (vph)	0	0	0	107	431	0	0	0	0	0	476	269	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	538	0	0	0	0	0	745	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				41.0	41.0						37.0		22.0
Total Split (s)				41.0	41.0						37.0		22.0
Total Split (%)				41.0%	41.0%						37.0%		22%
Maximum Green (s)				37.0	37.0						33.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				26.0	26.0						25.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		352
Act Effct Green (s)					37.0						33.0		
Actuated g/C Ratio					0.37						0.33		
v/c Ratio					0.40						0.45		
Control Delay					22.8						21.7		
Queue Delay					0.0						0.0		
Total Delay					22.8						21.7		
LOS					C						C		
Approach Delay					22.8						21.7		
Approach LOS					C						C		
Queue Length 50th (ft)					122						106		
Queue Length 95th (ft)					166						127		
Internal Link Dist (ft)		230			157			191			232		
Turn Bay Length (ft)													
Base Capacity (vph)					1331						1639		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.40						0.45		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 1 (1%), Referenced to phase 1:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 22.2		Intersection LOS: C	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Shawmut Avenue & Marginal Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1496	7	0	0	0	6
Future Volume (Veh/h)	1496	7	0	0	0	6
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.75	0.75
Hourly flow rate (vph)	1644	8	0	0	0	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	139			203		
pX, platoon unblocked			0.80		0.80	0.80
vC, conflicting volume			1652		1648	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			928		923	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			584		217	870

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	658	658	337	8
Volume Left	0	0	0	0
Volume Right	0	0	8	8
cSH	1700	1700	1700	870
Volume to Capacity	0.39	0.39	0.20	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	9.2
Lane LOS				A
Approach Delay (s)	0.0			9.2
Approach LOS				A

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			39.1%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	0	0	0	8	267
Future Volume (Veh/h)	11	0	0	0	8	267
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	9	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			862			152
pX, platoon unblocked	0.93					
vC, conflicting volume	308	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			99	
cM capacity (veh/h)	711	1085			1623	

Direction, Lane #	WB 1	SB 1
Volume Total	12	299
Volume Left	12	9
Volume Right	0	0
cSH	711	1623
Volume to Capacity	0.02	0.01
Queue Length 95th (ft)	1	0
Control Delay (s)	10.2	0.3
Lane LOS	B	A
Approach Delay (s)	10.2	0.3
Approach LOS	B	

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		24.5%	ICU Level of Service	A
Analysis Period (min)		15		

- Full Build (2024) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	857	150	0	0	0	0	482	368	41	143	0	
Future Volume (vph)	31	857	150	0	0	0	0	482	368	41	143	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.99						0.95			1.00		
Frt		0.978						0.935					
Flt Protected		0.999									0.989		
Satd. Flow (prot)	0	5990	0	0	0	0	0	3079	0	0	3340	0	
Flt Permitted		0.999									0.631		
Satd. Flow (perm)	0	5982	0	0	0	0	0	3079	0	0	2121	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		48						209					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		207			774			883			176		
Travel Time (s)		4.7			17.6			20.1			4.0		
Confl. Peds. (#/hr)	59		91						117	117			
Confl. Bikes (#/hr)			1										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	
Heavy Vehicles (%)	4%	5%	7%	2%	2%	2%	0%	6%	2%	3%	8%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	33	912	160	0	0	0	0	513	391	51	177	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1105	0	0	0	0	0	904	0	0	228	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (s)	41.0	41.0						38.0		38.0	38.0		21.0
Total Split (%)	41.0%	41.0%						38.0%		38.0%	38.0%		21%
Maximum Green (s)	36.0	36.0						34.0		34.0	34.0		14.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		3.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		4.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	27.0	27.0						25.0		25.0	25.0		5.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		357
Act Effct Green (s)		36.0						34.0			34.0		
Actuated g/C Ratio		0.36						0.34			0.34		
v/c Ratio		0.51						0.76			0.32		
Control Delay		24.8						21.7			25.9		
Queue Delay		0.0						0.0			0.0		
Total Delay		24.8						21.7			25.9		
LOS		C						C			C		
Approach Delay		24.8						21.7			25.9		
Approach LOS		C						C			C		
Queue Length 50th (ft)		151						168			56		
Queue Length 95th (ft)		184						m120			77		
Internal Link Dist (ft)		127			694			803			96		
Turn Bay Length (ft)													
Base Capacity (vph)		2187						1184			721		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.51						0.76			0.32		

Intersection Summary

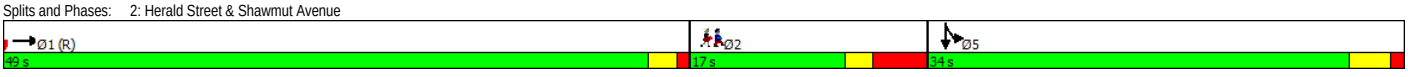
Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 5 (5%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 23.7 Intersection LOS: C
Intersection Capacity Utilization 71.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1135	91	0	0	0	0	0	0	244	81	0	
Future Volume (vph)	0	1135	91	0	0	0	0	0	0	244	81	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.87			
Frt		0.989											
Flt Protected										0.950			
Satd. Flow (prot)	0	4906	0	0	0	0	0	0	0	3213	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4906	0	0	0	0	0	0	0	2801	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		17								298			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		774			148			155			279		
Travel Time (s)		17.6			3.4			3.5			6.3		
Confl. Peds. (#/hr)			86							128			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.82	0.82	0.82	
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	2%	2%	9%	1%	0%	
Adj. Flow (vph)	0	1207	97	0	0	0	0	0	0	298	99	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1304	0	0	0	0	0	0	0	298	99	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		49.0								34.0	34.0		17.0
Total Split (s)		49.0								34.0	34.0		17.0
Total Split (%)		49.0%								34.0%	34.0%		17%
Maximum Green (s)		46.0								30.0	30.0		11.0
Yellow Time (s)		2.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		3.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		35.0								21.0	21.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		373
Act Effct Green (s)		46.0								30.0	30.0		
Actuated g/C Ratio		0.46								0.30	0.30		
v/c Ratio		0.58								0.25	0.09		
Control Delay		8.4								6.1	18.0		
Queue Delay		0.3								0.0	0.0		
Total Delay		8.7								6.1	18.0		
LOS		A								A	B		
Approach Delay		8.7									9.1		
Approach LOS		A									A		
Queue Length 50th (ft)		116								0	23		
Queue Length 95th (ft)		111								10	39		
Internal Link Dist (ft)		694			68			75			199		
Turn Bay Length (ft)													
Base Capacity (vph)		2265								1172	1072		
Starvation Cap Reductn		0								0	0		
Spillback Cap Reductn		353								21	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.68								0.26	0.09		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 6 (6%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

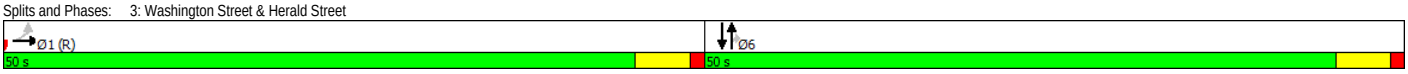


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1230	78	0	0	0	0	700	93	0	19	0
Future Volume (vph)	110	1230	78	0	0	0	0	700	93	0	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.79			
Frt		0.992							0.850			
Flt Protected		0.996										
Satd. Flow (prot)	0	4169	0	0	0	0	0	1517	1243	0	919	0
Flt Permitted		0.996										
Satd. Flow (perm)	0	4166	0	0	0	0	0	1517	977	0	919	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12							23			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			204			253			221	
Travel Time (s)		4.5			4.6			5.8			5.0	
Confl. Peds. (#/hr)	12								165			
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.86	0.86	0.86	0.75	0.75	0.75
Heavy Vehicles (%)	6%	6%	0%	0%	0%	0%	0%	9%	13%	0%	86%	0%
Bus Blockages (#/hr)	0	9	9	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	117	1309	83	0	0	0	0	814	108	0	25	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1509	0	0	0	0	0	814	108	0	25	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	50.0	50.0						29.0	29.0		29.0	
Total Split (s)	50.0	50.0						50.0	50.0		50.0	
Total Split (%)	50.0%	50.0%						50.0%	50.0%		50.0%	
Maximum Green (s)	45.0	45.0						45.0	45.0		45.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						None	None		None	
Walk Time (s)	36.0	36.0						15.0	15.0		15.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		46.0						46.0	46.0		46.0	
Actuated g/C Ratio		0.46						0.46	0.46		0.46	
v/c Ratio		0.79						1.17	0.23		0.06	
Control Delay		14.9						118.0	14.3		15.6	
Queue Delay		1.1						0.0	0.0		0.0	
Total Delay		16.1						118.0	14.3		15.6	
LOS		B						F	B		B	
Approach Delay		16.1						105.9			15.6	
Approach LOS		B						F			B	
Queue Length 50th (ft)		339						~620	31		9	
Queue Length 95th (ft)		403						#793	64		20	
Internal Link Dist (ft)		120			124			173			141	
Turn Bay Length (ft)												
Base Capacity (vph)		1922						697	461		422	
Starvation Cap Reductn		202						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		0.88						1.17	0.23		0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 49.8 Intersection LOS: D
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Washington Street & Herald Street

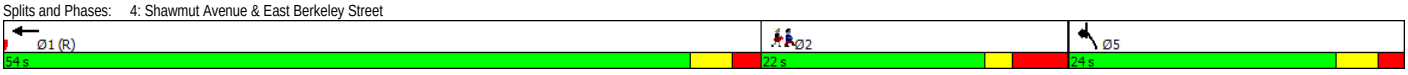


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	1090	0	72	0	0	0	0	128	
Future Volume (vph)	0	0	0	0	1090	0	72	0	0	0	0	128	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.88						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4322	0	1593	0	0	0	0	1450	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4322	0	1395	0	0	0	0	1450	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							297					297	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			264			598			851		
Travel Time (s)		18.8			6.0			13.6			19.3		
Confl. Peds. (#/hr)							62					62	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86	0.69	0.69	0.69	
Heavy Vehicles (%)	0%	0%	0%	0%	8%	0%	2%	0%	0%	0%	0%	2%	
Adj. Flow (vph)	0	0	0	0	1225	0	84	0	0	0	0	186	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	1225	0	84	0	0	0	0	186	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					54.0		20.0					20.0	22.0
Total Split (s)					54.0		24.0					24.0	22.0
Total Split (%)					54.0%		24.0%					24.0%	22%
Maximum Green (s)					49.0		19.0					19.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					39.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	298
Act Effct Green (s)					60.0		8.0					8.0	
Actuated g/C Ratio					0.60		0.08					0.08	
v/c Ratio					0.47		0.21					0.48	
Control Delay					11.9		1.2					10.2	
Queue Delay					0.0		0.0					0.0	
Total Delay					11.9		1.2					10.2	
LOS					B		A					B	
Approach Delay					11.9			1.2			10.2		
Approach LOS					B			A			B		
Queue Length 50th (ft)					147		0					2	
Queue Length 95th (ft)					178		0					2	
Internal Link Dist (ft)		749			184			518			771		
Turn Bay Length (ft)													
Base Capacity (vph)					2593		543					516	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.47		0.15					0.36	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:WBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 52.9%		ICU Level of Service A	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street

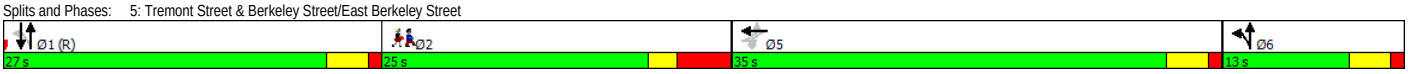


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	16	0	9	285	818	187	139	637	0	0	243	68	
Future Volume (vph)	16	0	9	285	818	187	139	637	0	0	243	68	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor											0.99		
Frt			0.850		0.972						0.967		
Flt Protected	0.950			0.950				0.991					
Satd. Flow (prot)	1624	0	1163	1547	2957	0	0	3091	0	0	2859	0	
Flt Permitted	0.129			0.950				0.706					
Satd. Flow (perm)	221	0	1163	1547	2957	0	0	2202	0	0	2859	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			120		28						33		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			883		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)												40	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.83	0.83	0.83	0.93	0.93	0.93	0.89	0.89	0.89	0.84	0.84	0.84	
Heavy Vehicles (%)	0%	0%	25%	5%	7%	6%	5%	4%	0%	0%	7%	13%	
Adj. Flow (vph)	19	0	11	306	880	201	156	716	0	0	289	81	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	19	0	11	306	1081	0	0	872	0	0	370	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				27.0		25.0
Total Split (s)	35.0		35.0	35.0	35.0		13.0				27.0		25.0
Total Split (%)	35.0%		35.0%	35.0%	35.0%		13.0%				27.0%		25%
Maximum Green (s)	31.0		31.0	31.0	31.0		9.0				23.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											17.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		301
Act Effct Green (s)	31.0		31.0	31.0	31.0			32.0			23.0		
Actuated g/C Ratio	0.31		0.31	0.31	0.31			0.32			0.23		
v/c Ratio	0.28		0.02	0.64	1.16			1.11			0.54		
Control Delay	39.0		0.1	28.4	107.9			98.8			30.6		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	39.0		0.1	28.4	107.9			98.8			30.6		
LOS	D		A	C	F			F			C		
Approach Delay		24.7			90.4			98.8			30.6		
Approach LOS		C			F			F			C		
Queue Length 50th (ft)	9		0	169	~425			~297			113		
Queue Length 95th (ft)	29		0	264	#558			#451			149		
Internal Link Dist (ft)		567			749			329			803		
Turn Bay Length (ft)													
Base Capacity (vph)	68		443	479	935			784			682		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.28		0.02	0.64	1.16			1.11			0.54		

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 38 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 84.1 Intersection LOS: F
Intersection Capacity Utilization 85.0% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

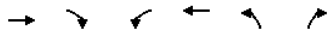
Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	89	337	0	0	0	0	0	236	83	
Future Volume (vph)	0	0	0	89	337	0	0	0	0	0	236	83	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					1.00						0.98		
Frt											0.961		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3456	0	0	0	0	0	4589	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3451	0	0	0	0	0	4589	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					39						87		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		266			231			279			323		
Travel Time (s)		6.0			5.3			6.3			7.3		
Confl. Peds. (#/hr)				9								59	
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95	
Heavy Vehicles (%)	2%	2%	2%	5%	3%	2%	2%	2%	2%	0%	8%	3%	
Adj. Flow (vph)	0	0	0	102	387	0	0	0	0	0	248	87	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	489	0	0	0	0	0	335	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				43.0	43.0						35.0		22.0
Total Split (s)				43.0	43.0						35.0		22.0
Total Split (%)				43.0%	43.0%						35.0%		22%
Maximum Green (s)				39.0	39.0						31.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				28.0	28.0						23.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		315
Act Effct Green (s)					39.0						31.0		
Actuated g/C Ratio					0.39						0.31		
v/c Ratio					0.36						0.23		
Control Delay					20.7						19.2		
Queue Delay					0.0						0.0		
Total Delay					20.7						19.2		
LOS					C						B		
Approach Delay					20.7						19.2		
Approach LOS					C						B		
Queue Length 50th (ft)					104						42		
Queue Length 95th (ft)					140						65		
Internal Link Dist (ft)		186			151			199			243		
Turn Bay Length (ft)													
Base Capacity (vph)					1371						1482		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.36						0.23		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 81 (81%), Referenced to phase 1:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Shawmut Avenue & Marginal Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1408	4	0	0	0	7
Future Volume (Veh/h)	1408	4	0	0	0	7
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.38
Hourly flow rate (vph)	1467	4	0	0	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	148			200		
pX, platoon unblocked			0.81		0.81	0.81
vC, conflicting volume			1471		1469	491
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			768		766	0
tC, single (s)			4.1		6.8	7.6
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.6
p0 queue free %			100		100	98
cM capacity (veh/h)			683		279	805

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	587	587	297	18
Volume Left	0	0	0	0
Volume Right	0	0	4	18
cSH	1700	1700	1700	805
Volume to Capacity	0.35	0.35	0.17	0.02
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	9.6
Lane LOS				A
Approach Delay (s)	0.0			9.6
Approach LOS				A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	0	0	0	4	168
Future Volume (Veh/h)	7	0	0	0	4	168
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	0	0	4	183
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			851			155
pX, platoon unblocked	0.97					
vC, conflicting volume	191	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	814	1085			1623	

Direction, Lane #	WB 1	SB 1
Volume Total	8	187
Volume Left	8	4
Volume Right	0	0
cSH	814	1623
Volume to Capacity	0.01	0.00
Queue Length 95th (ft)	1	0
Control Delay (s)	9.5	0.2
Lane LOS	A	A
Approach Delay (s)	9.5	0.2
Approach LOS	A	

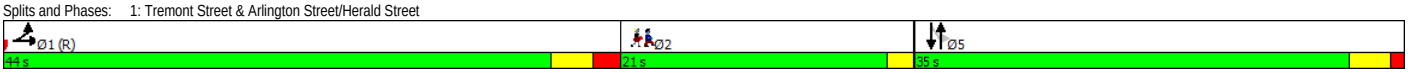
Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		19.1%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	59	968	222	0	0	0	0	373	258	15	248	0	
Future Volume (vph)	59	968	222	0	0	0	0	373	258	15	248	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor		0.98						0.94			1.00		
Frt		0.973						0.939					
Flt Protected		0.998									0.997		
Satd. Flow (prot)	0	6132	0	0	0	0	0	3109	0	0	3437	0	
Flt Permitted		0.998									0.903		
Satd. Flow (perm)	0	6123	0	0	0	0	0	3109	0	0	3106	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		64						183					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		230			765			886			173		
Travel Time (s)		5.2			17.4			20.1			3.9		
Confl. Peds. (#/hr)	37		97						130	130			
Confl. Bikes (#/hr)			3										
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.90	0.90	0.90	0.88	0.88	0.88	
Heavy Vehicles (%)	4%	2%	1%	2%	2%	2%	0%	3%	3%	0%	5%	0%	
Adj. Flow (vph)	63	1030	236	0	0	0	0	414	287	17	282	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1329	0	0	0	0	0	701	0	0	299	0	
Turn Type	Split	NA						NA		Perm	NA		
Protected Phases	1	1						5			5		2
Permitted Phases										5			
Detector Phase	1	1						5		5	5		
Switch Phase													
Minimum Initial (s)	10.0	10.0						10.0		10.0	10.0		8.0
Minimum Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (s)	44.0	44.0						35.0		35.0	35.0		21.0
Total Split (%)	44.0%	44.0%						35.0%		35.0%	35.0%		21%
Maximum Green (s)	39.0	39.0						31.0		31.0	31.0		19.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	2.0	2.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)		0.0						0.0			0.0		
Total Lost Time (s)		5.0						4.0			4.0		
Lead/Lag	Lead	Lead											Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0		0.2
Recall Mode	C-Max	C-Max						Max		Max	Max		None
Walk Time (s)	30.0	30.0						22.0		22.0	22.0		10.0
Flash Dont Walk (s)	9.0	9.0						9.0		9.0	9.0		9.0
Pedestrian Calls (#/hr)	0	0						0		0	0		370
Act Effct Green (s)		39.0						31.0			31.0		
Actuated g/C Ratio		0.39						0.31			0.31		
v/c Ratio		0.55						0.64			0.31		
Control Delay		23.4						24.7			27.5		
Queue Delay		0.0						0.0			0.0		
Total Delay		23.4						24.7			27.5		
LOS		C						C			C		
Approach Delay		23.4						24.7			27.5		
Approach LOS		C						C			C		
Queue Length 50th (ft)		178						148			76		
Queue Length 95th (ft)		213						212			110		
Internal Link Dist (ft)		150			685			806			93		
Turn Bay Length (ft)													
Base Capacity (vph)		2430						1090			962		
Starvation Cap Reductn		0						0			0		
Spillback Cap Reductn		0						0			0		
Storage Cap Reductn		0						0			0		
Reduced v/c Ratio		0.55						0.64			0.31		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 89 (89%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 24.3 Intersection LOS: C
Intersection Capacity Utilization 65.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Tremont Street & Arlington Street/Herald Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	1232	93	0	0	0	0	0	0	298	195	0	
Future Volume (vph)	0	1232	93	0	0	0	0	0	0	298	195	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	
Ped Bike Factor		0.99								0.90			
Frt		0.989											
Flt Protected										0.950			
Satd. Flow (prot)	0	4949	0	0	0	0	0	0	0	3367	3574	0	
Flt Permitted										0.950			
Satd. Flow (perm)	0	4949	0	0	0	0	0	0	0	3036	3574	0	
Right Turn on Red			Yes			Yes			Yes	Yes		Yes	
Satd. Flow (RTOR)		17								368			
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		765			139			152			271		
Travel Time (s)		17.4			3.2			3.5			6.2		
Confl. Peds. (#/hr)			100							82			
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	3%	0%	2%	2%	2%	2%	2%	2%	4%	1%	0%	
Adj. Flow (vph)	0	1400	106	0	0	0	0	0	0	368	241	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1506	0	0	0	0	0	0	0	368	241	0	
Turn Type		NA								Split	NA		
Protected Phases		1								5	5		2
Permitted Phases													
Detector Phase		1								5	5		
Switch Phase													
Minimum Initial (s)		8.0								2.0	2.0		1.0
Minimum Split (s)		54.0								29.0	29.0		17.0
Total Split (s)		54.0								29.0	29.0		17.0
Total Split (%)		54.0%								29.0%	29.0%		17%
Maximum Green (s)		50.0								25.0	25.0		11.0
Yellow Time (s)		3.0								3.0	3.0		2.0
All-Red Time (s)		1.0								1.0	1.0		4.0
Lost Time Adjust (s)		0.0								0.0	0.0		
Total Lost Time (s)		4.0								4.0	4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)		2.0								2.0	2.0		0.2
Recall Mode		C-Max								Max	Max		None
Walk Time (s)		39.0								16.0	16.0		5.0
Flash Dont Walk (s)		11.0								9.0	9.0		6.0
Pedestrian Calls (#/hr)		0								0	0		399
Act Effct Green (s)		50.0								25.0	25.0		
Actuated g/C Ratio		0.50								0.25	0.25		
v/c Ratio		0.61								0.33	0.27		
Control Delay		8.1								1.2	19.3		
Queue Delay		1.4								0.2	0.0		
Total Delay		9.5								1.4	19.3		
LOS		A								A	B		
Approach Delay		9.5									8.5		
Approach LOS		A									A		
Queue Length 50th (ft)		94								2	31		
Queue Length 95th (ft)		106								3	39		
Internal Link Dist (ft)		685			59			72			191		
Turn Bay Length (ft)													
Base Capacity (vph)		2483								1117	893		
Starvation Cap Reductn		0								253	0		
Spillback Cap Reductn		718								53	0		
Storage Cap Reductn		0								0	0		
Reduced v/c Ratio		0.85								0.43	0.27		

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 1:EBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Herald Street & Shawmut Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1369	110	0	0	0	0	535	179	0	21	0
Future Volume (vph)	35	1369	110	0	0	0	0	535	179	0	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	11	11	12	12	12
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00							0.88			
Frt		0.989							0.850			
Flt Protected		0.999										
Satd. Flow (prot)	0	4285	0	0	0	0	0	1503	1364	0	934	0
Flt Permitted		0.999										
Satd. Flow (perm)	0	4284	0	0	0	0	0	1503	1205	0	934	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14							22			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		203			204			266			224	
Travel Time (s)		4.6			4.6			6.0			5.1	
Confl. Peds. (#/hr)	8								188			
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	0%	10%	3%	0%	83%	0%
Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	39	1521	122	0	0	0	0	582	195	0	27	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1682	0	0	0	0	0	582	195	0	27	0
Turn Type	Perm	NA						NA	Perm		NA	
Protected Phases		1						6			6	
Permitted Phases	1								6			
Detector Phase	1	1						6	6		6	
Switch Phase												
Minimum Initial (s)	12.0	12.0						12.0	12.0		12.0	
Minimum Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (s)	42.0	42.0						58.0	58.0		58.0	
Total Split (%)	42.0%	42.0%						58.0%	58.0%		58.0%	
Maximum Green (s)	37.0	37.0						53.0	53.0		53.0	
Yellow Time (s)	4.0	4.0						4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0						1.0	1.0		1.0	
Lost Time Adjust (s)		-1.0						-1.0	-1.0		-1.0	
Total Lost Time (s)		4.0						4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0						3.0	3.0		3.0	
Recall Mode	C-Max	C-Max						Max	Max		Max	
Walk Time (s)	28.0	28.0						44.0	44.0		44.0	
Flash Dont Walk (s)	9.0	9.0						9.0	9.0		9.0	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)		38.0						54.0	54.0		54.0	
Actuated g/C Ratio		0.38						0.54	0.54		0.54	
v/c Ratio		1.03						0.72	0.30		0.05	
Control Delay		45.6						23.5	12.5		11.4	
Queue Delay		0.0						0.0	0.0		0.0	
Total Delay		45.6						23.5	12.5		11.4	
LOS		D						C	B		B	
Approach Delay		45.6						20.8			11.4	
Approach LOS		D						C			B	
Queue Length 50th (ft)		~424						264	56		8	
Queue Length 95th (ft)		#523						403	102		18	
Internal Link Dist (ft)		123			124			186			144	
Turn Bay Length (ft)												
Base Capacity (vph)		1636						811	660		504	
Starvation Cap Reductn		0						0	0		0	
Spillback Cap Reductn		0						0	0		0	
Storage Cap Reductn		0						0	0		0	
Reduced v/c Ratio		1.03						0.72	0.30		0.05	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 14 (14%), Referenced to phase 1:EBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 37.5		Intersection LOS: D	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

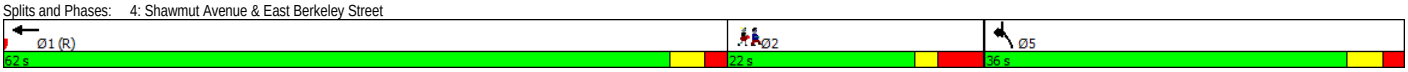
Splits and Phases: 3: Washington Street & Herald Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	0	821	0	105	0	0	0	0	278	
Future Volume (vph)	0	0	0	0	821	0	105	0	0	0	0	278	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							0.89						
Frt												0.865	
Flt Protected							0.950						
Satd. Flow (prot)	0	0	0	0	4532	0	1577	0	0	0	0	1465	
Flt Permitted							0.950						
Satd. Flow (perm)	0	0	0	0	4532	0	1403	0	0	0	0	1465	
Right Turn on Red			Yes			Yes	Yes		Yes			Yes	
Satd. Flow (RTOR)							301					301	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		829			256			598			862		
Travel Time (s)		18.8			5.8			13.6			19.6		
Confl. Peds. (#/hr)							46					46	
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.80	0.80	0.80	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%	
Adj. Flow (vph)	0	0	0	0	933	0	131	0	0	0	0	293	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	933	0	131	0	0	0	0	293	
Turn Type					NA		Prot					Prot	
Protected Phases					1		5!					5!	2
Permitted Phases													
Detector Phase					1		5					5	
Switch Phase													
Minimum Initial (s)					8.0		8.0					8.0	1.0
Minimum Split (s)					62.0		20.0					20.0	22.0
Total Split (s)					62.0		36.0					36.0	22.0
Total Split (%)					51.7%		30.0%					30.0%	18%
Maximum Green (s)					57.0		31.0					31.0	16.0
Yellow Time (s)					3.0		3.0					3.0	2.0
All-Red Time (s)					2.0		2.0					2.0	4.0
Lost Time Adjust (s)					0.0		0.0					0.0	
Total Lost Time (s)					5.0		5.0					5.0	
Lead/Lag					Lead								Lag
Lead-Lag Optimize?													
Vehicle Extension (s)					2.0		2.0					2.0	0.2
Recall Mode					C-Max		None					None	None
Walk Time (s)					47.0		8.0					8.0	7.0
Flash Dont Walk (s)					10.0		7.0					7.0	9.0
Pedestrian Calls (#/hr)					0		0					0	240
Act Effct Green (s)					78.3		9.7					9.7	
Actuated g/C Ratio					0.65		0.08					0.08	
v/c Ratio					0.32		0.32					0.74	
Control Delay					9.8		2.1					17.2	
Queue Delay					0.0		0.0					0.0	
Total Delay					9.8		2.1					17.2	
LOS					A		A					B	
Approach Delay					9.8			2.1			17.2		
Approach LOS					A			A			B		
Queue Length 50th (ft)					101		0					0	
Queue Length 95th (ft)					148		0					78	
Internal Link Dist (ft)		749			176			518			782		
Turn Bay Length (ft)													
Base Capacity (vph)					2956		630					601	
Starvation Cap Reductn					0		0					0	
Spillback Cap Reductn					0		0					0	
Storage Cap Reductn					0		0					0	
Reduced v/c Ratio					0.32		0.21					0.49	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 98 (82%), Referenced to phase 1:WBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 10.6 Intersection LOS: B
Intersection Capacity Utilization 58.6% ICU Level of Service B
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 4: Shawmut Avenue & East Berkeley Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	31	0	27	369	629	210	107	379	0	0	418	62	
Future Volume (vph)	31	0	27	369	629	210	107	379	0	0	418	62	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	
Ped Bike Factor					1.00			0.99			0.99		
Frt			0.850		0.962						0.981		
Flt Protected	0.950			0.950				0.989					
Satd. Flow (prot)	1624	0	1454	1593	3017	0	0	3126	0	0	3053	0	
Flt Permitted	0.102			0.950				0.589					
Satd. Flow (perm)	174	0	1454	1593	3017	0	0	1850	0	0	3053	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			100		41						14		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		647			829			409			886		
Travel Time (s)		14.7			18.8			9.3			20.1		
Confl. Peds. (#/hr)							77					77	
Confl. Bikes (#/hr)						2						4	
Peak Hour Factor	0.75	0.75	0.75	0.88	0.88	0.88	0.87	0.87	0.87	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	0%	0%	2%	3%	4%	2%	3%	0%	0%	3%	4%	
Adj. Flow (vph)	41	0	36	419	715	239	123	436	0	0	504	75	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	41	0	36	419	954	0	0	559	0	0	579	0	
Turn Type	D.Pm		Perm	Perm	NA		pm+pt	NA			NA		
Protected Phases					5		6	1 6			1		2
Permitted Phases	5		5	5			1 6						
Detector Phase	5		5	5	5		6	1 6			1		
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0		4.0				10.0		1.0
Minimum Split (s)	9.0		9.0	9.0	9.0		8.0				38.0		25.0
Total Split (s)	44.0		44.0	44.0	44.0		13.0				38.0		25.0
Total Split (%)	36.7%		36.7%	36.7%	36.7%		10.8%				31.7%		21%
Maximum Green (s)	40.0		40.0	40.0	40.0		9.0				34.0		19.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0				3.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0				1.0		4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0						0.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0						4.0		
Lead/Lag											Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0				2.0		0.2
Recall Mode	None		None	None	None		None				C-Max		None
Walk Time (s)											28.0		8.0
Flash Dont Walk (s)											6.0		11.0
Pedestrian Calls (#/hr)											0		322
Act Effct Green (s)	39.3		39.3	39.3	39.3			43.7			34.7		
Actuated g/C Ratio	0.33		0.33	0.33	0.33			0.36			0.29		
v/c Ratio	0.72		0.07	0.80	0.94			0.73			0.65		
Control Delay	96.8		0.2	46.0	50.8			35.9			40.6		
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0		
Total Delay	96.8		0.2	46.0	50.8			35.9			40.6		
LOS	F		A	D	D			D			D		
Approach Delay		51.7			49.3			35.9			40.6		
Approach LOS		D			D			D			D		
Queue Length 50th (ft)	28		0	304	374			166			203		
Queue Length 95th (ft)	#73		0	#428	#482			209			241		
Internal Link Dist (ft)		567			749			329			806		
Turn Bay Length (ft)													
Base Capacity (vph)	58		551	531	1033			768			892		
Starvation Cap Reductn	0		0	0	0			0			0		
Spillback Cap Reductn	0		0	0	0			0			0		
Storage Cap Reductn	0		0	0	0			0			0		
Reduced v/c Ratio	0.71		0.07	0.79	0.92			0.73			0.65		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 75 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 44.6 Intersection LOS: D
Intersection Capacity Utilization 82.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Tremont Street & Berkeley Street/East Berkeley Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	0	0	95	384	0	0	0	0	0	398	223	
Future Volume (vph)	0	0	0	95	384	0	0	0	0	0	398	223	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	
Ped Bike Factor					0.99						0.97		
Frt											0.946		
Flt Protected					0.990								
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	4661	0	
Flt Permitted					0.990								
Satd. Flow (perm)	0	0	0	0	3513	0	0	0	0	0	4661	0	
Right Turn on Red			Yes	Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)					35						151		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		310			237			271			312		
Travel Time (s)		7.0			5.4			6.2			7.1		
Confl. Peds. (#/hr)				44								73	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92	0.83	0.83	0.83	
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	0%	2%	3%	
Adj. Flow (vph)	0	0	0	107	431	0	0	0	0	0	480	269	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	0	0	0	538	0	0	0	0	0	749	0	
Turn Type				Split	NA						NA		
Protected Phases				1	1						5		2
Permitted Phases													
Detector Phase				1	1						5		
Switch Phase													
Minimum Initial (s)				10.0	10.0						10.0		1.0
Minimum Split (s)				41.0	41.0						37.0		22.0
Total Split (s)				41.0	41.0						37.0		22.0
Total Split (%)				41.0%	41.0%						37.0%		22%
Maximum Green (s)				37.0	37.0						33.0		20.0
Yellow Time (s)				3.0	3.0						3.0		2.0
All-Red Time (s)				1.0	1.0						1.0		0.0
Lost Time Adjust (s)					0.0						0.0		
Total Lost Time (s)					4.0						4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)				2.0	2.0						2.0		0.2
Recall Mode				C-Max	C-Max						Max		None
Walk Time (s)				26.0	26.0						25.0		13.0
Flash Dont Walk (s)				11.0	11.0						8.0		7.0
Pedestrian Calls (#/hr)				0	0						0		352
Act Effct Green (s)					37.0						33.0		
Actuated g/C Ratio					0.37						0.33		
v/c Ratio					0.40						0.46		
Control Delay					22.8						21.8		
Queue Delay					0.0						0.0		
Total Delay					22.8						21.8		
LOS					C						C		
Approach Delay					22.8						21.8		
Approach LOS					C						C		
Queue Length 50th (ft)					122						108		
Queue Length 95th (ft)					166						128		
Internal Link Dist (ft)		230			157			191			232		
Turn Bay Length (ft)													
Base Capacity (vph)					1331						1639		
Starvation Cap Reductn					0						0		
Spillback Cap Reductn					0						0		
Storage Cap Reductn					0						0		
Reduced v/c Ratio					0.40						0.46		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 1 (1%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 56.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Shawmut Avenue & Marginal Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1522	7	0	0	0	6
Future Volume (Veh/h)	1522	7	0	0	0	6
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.75	0.75
Hourly flow rate (vph)	1673	8	0	0	0	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	139			203		
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			1681		1677	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			924		919	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			579		216	860

Direction, Lane #	EB 1	EB 2	EB 3	NB 1
Volume Total	669	669	343	8
Volume Left	0	0	0	0
Volume Right	0	0	8	8
cSH	1700	1700	1700	860
Volume to Capacity	0.39	0.39	0.20	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	9.2
Lane LOS				A
Approach Delay (s)	0.0			9.2
Approach LOS				A

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			39.6%	ICU Level of Service
Analysis Period (min)			15	

A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	0	0	0	8	280
Future Volume (Veh/h)	11	0	0	0	8	280
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	9	304
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			862			152
pX, platoon unblocked	0.93					
vC, conflicting volume	322	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			99	
cM capacity (veh/h)	697	1085			1623	

Direction, Lane #	WB 1	SB 1
Volume Total	12	313
Volume Left	12	9
Volume Right	0	0
cSH	697	1623
Volume to Capacity	0.02	0.01
Queue Length 95th (ft)	1	0
Control Delay (s)	10.3	0.3
Lane LOS	B	A
Approach Delay (s)	10.3	0.3
Approach LOS	B	

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		25.2%	ICU Level of Service	A
Analysis Period (min)		15		