DRAFT PROJECT IMPACT REPORT

45 TOWNSEND STREET

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

Submitted by:
KIC Roxbury, LLC 347 Congress Street . Boston, MA 02210

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

In Association with:

Bevco	**Building Consultation Services**	**Callahan, Inc.**
CK Communications	**Cube3 Studios**	**Ground Inc.**
Haley & Aldrich	**Howard Stein Hudson**	**Janeyco**
Legacy Consultants	**Rubin and Rudman, LLP**	**Toney Jones**

January 15, 2019

Epsilon ASSOCIATES INC.

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Chapter 1.0

General Information

1.0 GENERAL INFORMATION

1.1 Introduction

KIC Roxbury, LLC (the Proponent) proposes the redevelopment of the former Radius Specialty Hospital parcels in the Washington Park South neighborhood of Roxbury. The site consists of three contiguous parcels of land located at 45-47 Townsend Street (collectively, the Project site), as shown on Figure 1-1.

This Draft Project Impact Report (DPIR) is being submitted to the Boston Redevelopment Authority doing business as the Boston Planning and Development Agency (herein, "BPDA") in response to the Scoping Determination issued on July 23, 2018, which is included in Attachment A of this DPIR.

The redevelopment will create approximately 400,000 square feet (sf) and up to approximately 300 rental units, mixed amenity spaces, a community space (the "Community Room"), and a publicly accessible outdoor plaza (the Project). The Project will provide approximately 232 parking spaces within two levels of podium parking with four and five levels of wood framed multifamily housing above. The Project also contains seven townhomes which will be accessed directly from the Townsend Street sidewalk.

The Project will provide substantial public realm improvements, including the publicly accessible outdoor plaza and new landscaping along Townsend Street and the abutting parcels. Public access to the Community Room from Townsend Street at the public plaza will also be improved.

1.2 Changes Since the Expanded Project Notification Form (EPNF)

Since the submission of the EPNF, the Proponent has addressed items identified in the Scoping Determination issued by the BPDA on July 23, 2018 as well as feedback received from the neighbors, by requesting that the design team implement the following modifications to the Project:

Massing

Since the EPNF submission, the overall massing design has been revised to improve its relationship with the context of the surrounding neighborhood.

The Project design and program have also evolved since the filing of the EPNF in response to community feedback and comments from the BPDA and the Boston Civic Design Commission, and community. These changes include:

- Reduced building height;
- Reduced residential unit count;

- Overall building footprint adjustments;
- Reduced massing and increased setbacks along most property lines;
- Separate service use access from resident, vehicular and pedestrian entries;
- Additional passive green roofs; and
- Mitigation benefits for the neighboring Higginson School.

Traffic

The Project has improved the traffic mitigation program with:

- Increased traffic mitigation measures;
- Improved site access drive functionality;
- Increased parking ratio; and
- Increased traffic signal infrastructure improvements.

Affordability

In the EPNF, the Proponent had proposed to comply with the City of Boston's Inclusionary Development Policy (IDP) requirement by providing 100 percent off-site home ownership units. In response to community feedback, the Proponent will now satisfy the IDP requirements by providing 50 percent of the required units on site as rental apartments and 50 percent off-site home ownership units within one half mile of the Project site.

1.3 Development Team

Name /Location:	45 Townsend Street, Roxbury
Proponent:	KIC Roxbury, LLC 347 Congress Street Boston, Massachusetts 02210 Charlotte Lewis Kurt Therrien Robb A. Van Marter
Owner Advisor	Building Consultation Services 933 East Second Street Unit 10 Boston, Massachusetts 02127 (617) 334-8188 Robb Van Marter

Architect:	Cube3 Studio 360 Merrimack Street Building 5, Floor 3 Lawrence, Massachusetts 0843 (978) Brian O'Connor, AIA Talia Cannistra
Landscape Architect:	Ground Inc. W/BE 6 Carlton Street Somerville, MA 02143 (617) 718-0889 Shauna Gillies-Smith Lena Smart
Legal Counsel:	Rubin and Rudman, LLP 53 State Street Boston, Massachusetts 02109 (617) 330-7000 James H. Green Esq.
Permitting Consultant:	Epsilon Associates, Inc. 3 Mill & Main, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Erik Rexford Fiona Vardy
Noise & Air Quality Analysis	Epsilon Associates, Inc. 3 Mill & Main, Suite 250 Maynard, MA 01754 (978) 897-7100 Richard Lampeter Clint Cyr Christopher Hoyt
Community and Public Outreach	Bevco WMBE 202 West Selden Street Boston, MA 02126 (617) 438-2767 Beverley Johnson

Media/Government Relations	CK Communications 12 Sunset Hill Road Boston, MA 02132 Connie Kastelnik
Community Liaison	Legacy Consultants WMBE 3 Curley Street Boston, MA 02131 (617) 290-3542 Alfreda Harris
Community Liaison	Toney Jones 6 Haley Street Boston, MA 02119
Civil Engineer:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 James Downing, PE
Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Brien J. Beisel, PTP Andrew Fabiszewski Nathaniel Cabral-Curits
Geotechnical Engineer:	Haley & Aldrich, Inc. 465 Medford Street Suite 2200 Boston, MA 02129 (617) 886-7400 Marya Gorczyca Denis Bell
Pre-Construction Services and Construction Management	Janeyco MBE 236 Huntington Avenue, Suite 417 Boston, MA 02115 (617) 267-6200 Greg Janey Bob White

Pre-Construction Advisor	Callahan, Inc. 80 First Street Bridgewater, MA 02324 (508) 279 0012 Patrick Callahan Jim Cole

1.4 Legal Information

1.4.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments or pending legal actions concerning the Project.

1.4.2 History of Tax Arrears on Property Owned in Boston by the Proponent

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

1.4.3 Site Control/ Public Easements

Title to the property is held by KIC Roxbury LLC, a Delaware limited liability company, having an address at 347 Congress Street, Boston, MA 02210 (KIC Roxbury LLC). KIC Roxbury LLC acquired the property from the Receiver of the Property of Radius Specialty Hospital LLC and Radius Hospital Realty LLC on September 22, 2015 by Deed recorded at Suffolk Registry of Deeds, Book 55099, Page 233. As noted above, the property consists of three parcels of land at 45 and 47 Townsend Street and Harrishof Street and according to the Title Survey, the site contains approximately 211,272 sf or 4.85 acres of land.

1.5 Anticipated Regulatory Controls and Permits

Agency Name	Permit / Approval
FEDERAL	
Environmental Protection Agency	National Pollution Discharge Elimination System General Permit
STATE	
Department of Environmental Protection	Plan Approval (if required); Fossil Fuel Utilization permit (as required); Notice of Demolition/Construction
Massachusetts Historical Commission	State Register Review, including Determination of No Adverse Effect or Memorandum of Agreement; Section 106 Review (if required)
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit (if required); Sewer Use Discharge Permit (if required)
LOCAL	
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code

Agency Name	Permit / Approval
LOCAL (cont.)	
Boston Fire Department	Fuel Storage Permit; Fire Alarm Permit; Blasting Permit (if required)
Boston Inspectional Service Department	Building Permit (Long Form); Demolition Permit; Certificate of Occupancy
Boston Public Improvement Commission/ Department of Public Works	Specific Repair Approvals; Discontinuances (if required); Permit for sign, awning, hood, canopy, or marquee, or other incursion over public right of way (as required); Street Layout (as required); Tieback/Earth Excavation Approvals (if required)
Boston Public Safety Commission, Committee on Licenses	Parking Garage Permit; License for Storage of Inflammables
Boston Public Works Department	Curb Cut Permits (if required); Street Opening Permits (if required)
Boston Planning and Development Agency	Review under Article 80, including Large Project Review, as required pursuant to Article 80B of the Zoning Code and PDA Plan Review, as required pursuant to Article 80C of the Zoning Code; Cooperation Agreement; Affordable Housing Agreement(s); Boston Residents Construction Employment Plan Agreement; Certifications of Consistency and Compliance
Boston Landmarks Commission	Article 85 Demolition Delay Review
Boston Transportation Department	Transportation Access Plan Agreement; Review and Approval of a Construction Management Plan
Boston Water and Sewer Commission	Sewer Extension/Connection Permit; Sewer Use Discharge Permit; Site Plan Approval; Temporary Construction Dewatering Permit (if required); Cross Connection/Backflow Prevention Approval
Boston Zoning Board of Appeal	Zoning and Building Code variance(s) (if required)

1.6 Zoning

The Project site is located within the Roxbury Neighborhood District, Article 50 of the Code (Article 50), and is shown on the City of Boston Zoning Map 6B/6C. As shown on the Title Survey, Parcels 1 and 3, which comprise the main portion (97 percent) of the Project site, are situated within the Community Facilities Subdistrict ("CF District"). The smaller parcel known as Parcel 2 is located within the Residential 3F-4000 Subdistrict. Parcel 2 is now used for parking and the proposed uses for this area will continue to be landscaping and/or parking.

No buildings are contemplated for this parcel. Therefore, the Project site (exclusive of Parcel 2 containing 5,208 sf.) will be subject to the Community Facilities ("CF") Subdistrict requirements. Zoning within proximity to the Project site is shown on Figure 1-2.

Use. Table A Use Regulations of the Code applies to the Community Facility Subdistrict and multi-family residential use is an allowed use together with accessory parking.

Dimensional – Table E of Article 50 sets forth the dimensional regulations applicable to the Townsend Street Community Facility (CF) District. Although a number of the dimensional requirements do not apply to the Project, as noted below in Table 1-1, the Project is not in compliance with the height limitation of 45 feet.

Parking - The Project is subject to Article 80 Large Project Review and the location and amount of parking is subject to BPDA approval.

Off-Street Loading - The Project is subject to Article 80 Large Project Review and the location and amount of off-street loading is subject to BPDA approval.

Zoning Relief - As noted above, the proposed building height does not comply with the dimensional requirements of the underlying zoning district, Community Facilities (CF) Subdistrict, and as a result the Project will require Zoning Relief. Additionally, in connection with the review of project plans by the City of Boston Inspection Services Department (ISD), ISD will review the need for Zoning Relief prior to any appeal to the Zoning Board of Appeal ("ZBA"). Prior to the grant of Zoning Relief by the ZBA, the BPDA will make recommendations to the ZBA as part of the Article 80B Large Project Review and Related Approvals Process. A report by the Project Architect of the Project's compliance with the dimensional provisions of Article 50 are set forth in Table 1-1.

Table 1-1 Zoning Dimensional Requirements

ZONING CODE CATEGORY	REQUIRED OR LIMITATION	PROJECT	ZONING COMPLIANCE
SITE AREA	N/A	211,307 SF (4.85 acres)	
FLOOR AREA RATIO	2.0	1.9	Y
GROSS FLOOR AREA	422,614 GSF	401,392 GSF	Y
MAXIMUM HEIGHT	45'-0"	~69'-0"	N
FRONT YARD SETBACK	0	24'-0"	Y
SIDE YARD SETBACK	0	35'-0"	Y
REAR YARD SETBACK	20'-0"	60'-0"	Y
MINIMUM USABLE OPEN SPACE	50 SF PER UNIT	225 SF PER UNIT	Y
PARKING SPACES	Subject to BPDA Review	232 SPACES	Y

1.7 Public Participation

The Proponent has met with several community organizations and stakeholders to discuss the Project, the changes described in the DPIR, and discuss its effects on and benefits to the neighborhood. Outreach efforts, since the EPNF was filed, include presentations to the following groups:

OUTREACH ACTIVITY	DATE
PROJECT BRIEFINGS WITH ELECTED OFFICIALS	
City Councilor Kim Janey	May 2nd
Senator Sonia Chang-Diaz	May 9th
City Councilor Andrea Campbell	May 16th
Rep. Liz Malia	July 11th
Rep. Chynah Tyler	July 26th
Updates to Senator Chang-Diaz & Rep. Liz Malia	September 14th
Update to Councilor Janey	October 15th
OUTREACH MEETINGS WITH DIRECT ABUTTERS & THOUGHT LEADERS	
Abutters at Haley & Harrishof Streets	August 21st
Abutters at Denison Street	August 22nd
Meeting with Indirect Abutters	August 27th
Direct Abutter Meeting with the Higginson School	August 29th
Meeting with Thought Leaders	September 4th
Abutters at Townsend Street	September 5th
IAG Working Session #1-Project Update	September 6th
Project Update with Garrison Trotter NA: Louis Elisa & Connie Forbes	October 15th
IAG Working Session #2-Project Design	October 17th
Second Direct Abutter Meeting with the Higginson School	October 29th
IAG Working Session #3-Transportation	December 5th

The BPDA and the Mayor's Office of Neighborhood Services identified the Impact Advisory Group (IAG) members for the Project, and an initial meeting was held on September 28, 2017 with a community-wide public meeting held on August 17, 2017. A subsequent IAG meeting was held on December 5, 2017 and, more recently, the IAG was briefed on the proposed changes described in the DPIR.

The IAG members appointed by the Mayor's Office of Neighborhood Services are:

- Nefertiti Lawrence
- Connie Forbes
- Thomika Bridwell
- Lauren Miller
- Jean McGuire
- Yaritza Pena
- Amira Abdal-Khallaq
- Jed Hresko
- Dorothea Jones
- Norman Stembridge
- Louis Elisa

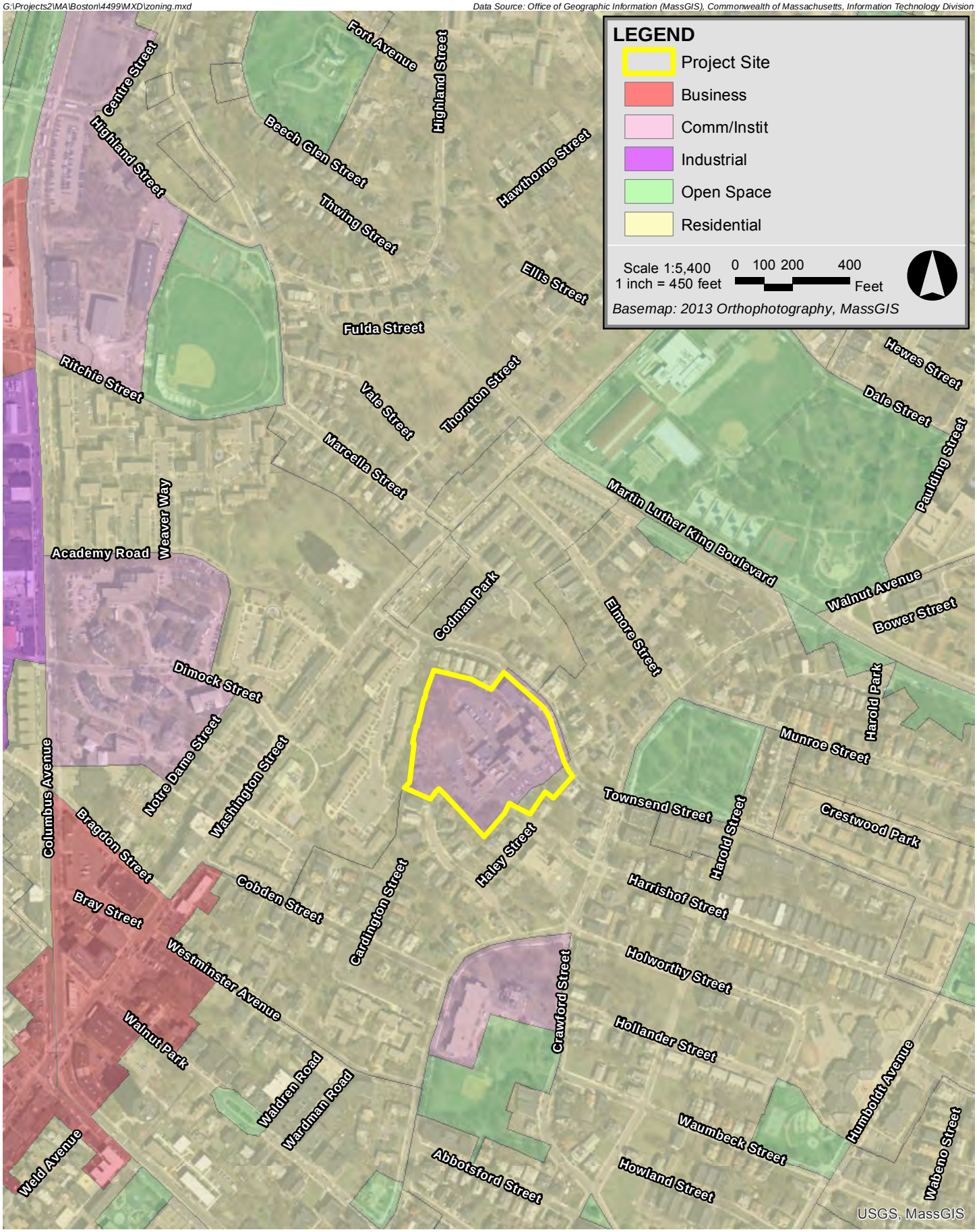
45 Townsend Street Boston, Massachusetts

Epsilon Associates Inc

Figure 1-1

Aerial Locus Map

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



45 Townsend Street Boston, Massachusetts

Epsilon Associates Inc

Figure 1-2
Zoning

Chapter 2.0

Project Description

2.0 PROJECT DESCRIPTION

2.1 Existing Site and Area Context

The approximately 4.85-acre (approximately 211,272 sf) site is comprised of three parcels of land located to the west of Townsend Street. The Project site is the former location of the Jewish Memorial Hospital and Rehabilitation Center, most recently operated by Radius Specialty Hospital until its closure in 2014. The former hospital buildings are currently vacant and will be demolished as part of the Project. The parcels front on Townsend Street, but also face the ends of Harrishof and Dennison streets at the rear of the site. The Project site is located between Washington and Walnut streets, two blocks south of Martin Luther King Boulevard.

The site features ledge and prominent rock outcroppings and an elevation change of approximately 50 feet from the Townsend Street sidewalk to the top of the site near Dennison Street. The rock outcroppings at some locations rise ten to twenty feet above the normative grade. A rock shoulder at the west side of the site rises steeply above the grade then drops approximately 30 feet to Codman Park, located at the rear of the adjacent Academy Homes II development. The Project has been designed to minimize disturbances to the ledge to the greatest extent feasible.

The Project site is in close proximity to a variety of neighborhood amenities, including Horatio Harris Park, located one half of a block to the east; Malcolm X Park, located two blocks to the northeast; Crawford Street and Ellis School Playgrounds, located three blocks to the south; and Marcella Playground is approximately one-half mile to the north. The Seaver Street side of Franklin Park is also located approximately one-half mile from the Project site. The Southwest Corridor Park and bike path are also accessible at Jackson Square, and serve to link Townsend Street to Back Bay and Forest Hills.

Local schools include the Higginson-Lewis K-8 School at 131 Walnut Avenue, the David A. Ellis School at 302 Walnut Avenue, the Trotter Elementary School at 135 Humboldt Avenue, and Boston Latin Academy at 205 Townsend Street.

Nearby cultural resources include the Museum of National Center of Afro-American Artists, the Melnea Cass Recreational Complex including Shelburne Community Center, and the Reggie Lewis Track Center. The Roxbury YMCA is also near the Project site. Nearby, Dudley Square offers a branch of the Boston Public Library, the Boston Public School headquarters, restaurants, diverse business opportunities, and cultural events.

2.2 Proposed Project

The Project proposes the redevelopment of the approximately 4.85-acre site bound by Townsend Street to the north, Academy Homes II to the west, and Haley Street to the south. The Project includes up to approximately 400,000 square feet which includes up to

approximately 300 rental units, mixed amenity spaces, a community space (the "Community Room") and publicly accessible outdoor plaza, and approximately 232 parking spaces. The development team will comply with the Inclusionary Development Policy (IDP) by providing 50 percent of the required units on site as rental apartments and 50 percent off-site home ownership units within one half mile of the Project site.

Table 2-1 Project Program

Project Element	Approximate Dimension[1]	Change from PNF
Residential	301,734 sf	-78,266
Rental units[2]	300	-22
Commercial / Retail	0 sf	-4,500 sf
Building Height	Up to 69'-11"	-16'9""
Parking	Approximately 232 spaces	-4 spaces

[1] sf calculations are consistent with gross floor area as defined by Section 2 of the Code
[2] Residential mix to be determined as the Project progresses through the approval process.

Proposed Building

The Project will provide approximately 232 parking spaces within two levels of podium parking with four and five levels of wood framed multifamily housing above. The Project also contains seven townhomes with direct access from the Townsend Street sidewalk. The Project will provide a Community Room and outdoor plaza available to the neighborhood. The proposed site layout is shown on Figure 2-1. The proposed ground floor plan for the Townsend Wing is shown on Figure 2-2, the ground floor plan for the courtyard level is shown on Figure 2-3, a typical floor plan is shown in Figure 2-4, and a building section is shown on Figure 2-5.

Parking and Access

Vehicular access to the Project will be provided from Townsend Street at two locations, as shown on Figure 2-6. All residential and leasing staff parking will be housed within the parking garage. Twelve surface parking spots will be available for the Community Room and visitors. Pedestrian access to the site will be provided along Townsend Street.

Public Realm

The Project includes substantial investments in public realm improvements, which are described in further detail in Section 3.5. Among other improvements, a publicly accessible Community Room and, along Townsend Street, vehicle entrances will be realigned and improved landscaping on the Project site will allow for a wider, more pedestrian friendly sidewalk, in addition to a Community Plaza, as shown on Figure 2-7. Landscaping will be

improved with new trees, a variety of shrubs and perennials will be featured in densely planted beds to add visual interest to the site and provide a privacy screen for the ground floor occupants along Townsend Street.

2.3 Changes Since the PNF

The Proponent has addressed items identified in the Scoping Determination issued by the BPDA on July 23, 2018 as well as feedback received from the neighbors, by requesting that the design team implement the following modifications to the Project.

Massing

Since the PNF submission, the overall massing design has been revised to improve its relationship with the context surrounding neighborhood.

The Project design and program have also evolved since the filing of the PNF in response to community feedback and comments from the BPDA and the Boston Civic Design Commission, and community. These changes include:

- Reduced building height;
- Reduced residential unit count;
- Overall building footprint adjustments;
- Reduced massing and increased setbacks along most property lines;
- Separate service use access from resident, vehicular and pedestrian entries;
- Additional passive green roofs; and
- Mitigation benefits for the neighboring Higginson School.

Design

Significant design changes have been incorporated to improve neighborhood cohesion with respect to the Project site.

- All required parking is located within the building footprint.
- The landscaped outdoor amenity space has been consolidated to leave more of the existing site in its natural condition.
- Breaks in the building have been curated to allow framed views through the site to reduce the impact of large expanses of building edges.

Program

The Project adopted the following programmatic changes in order to reduce vehicular and other impacts on the surrounding neighborhood:

- Reduced Project-related traffic by eliminating retail, co-working, innovation and gallery space uses; and
- Reduced residential unit count.

Traffic

The Project has improved the traffic mitigation program by:

- Increased traffic mitigation measures;
- Improved site access drive functionality;
- Increased parking ratio; and.
- Increased traffic signal infrastructure improvements.

2.4 Inclusionary Development Policy Compliance

In the PNF, the Project complied with the City of Boston's IDP requirement by providing 100 percent required units as off-site home ownership units. In response to community feedback, the Project will now satisfy the IDP requirements by providing 50 percent of the required units on site, as rental apartments, and 50 percent off-site home ownership units within one half mile of the Project site.

2.5 Economic Development and Opportunity

As described in Section 6.2.2 of the EPNF, the Proponent is committed to leveraging the Project to the maximum extent possible to achieve their goal of generating economic opportunity for local minority and women-owned business enterprises (M/WBE). This goal is consistent with the wealth-creation and economic development goals of the Roxbury Strategic Master Plan (RSMP).

2.6 Schedule

Construction of the Project is estimated to commence during the first quarter of 2020 with completion by the first quarter of 2022.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 2-1
Proposed Site Layout

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 2-2
Ground Floor Plan, Townsend Wing

45 Townsend Street **Boston, Massachusetts**

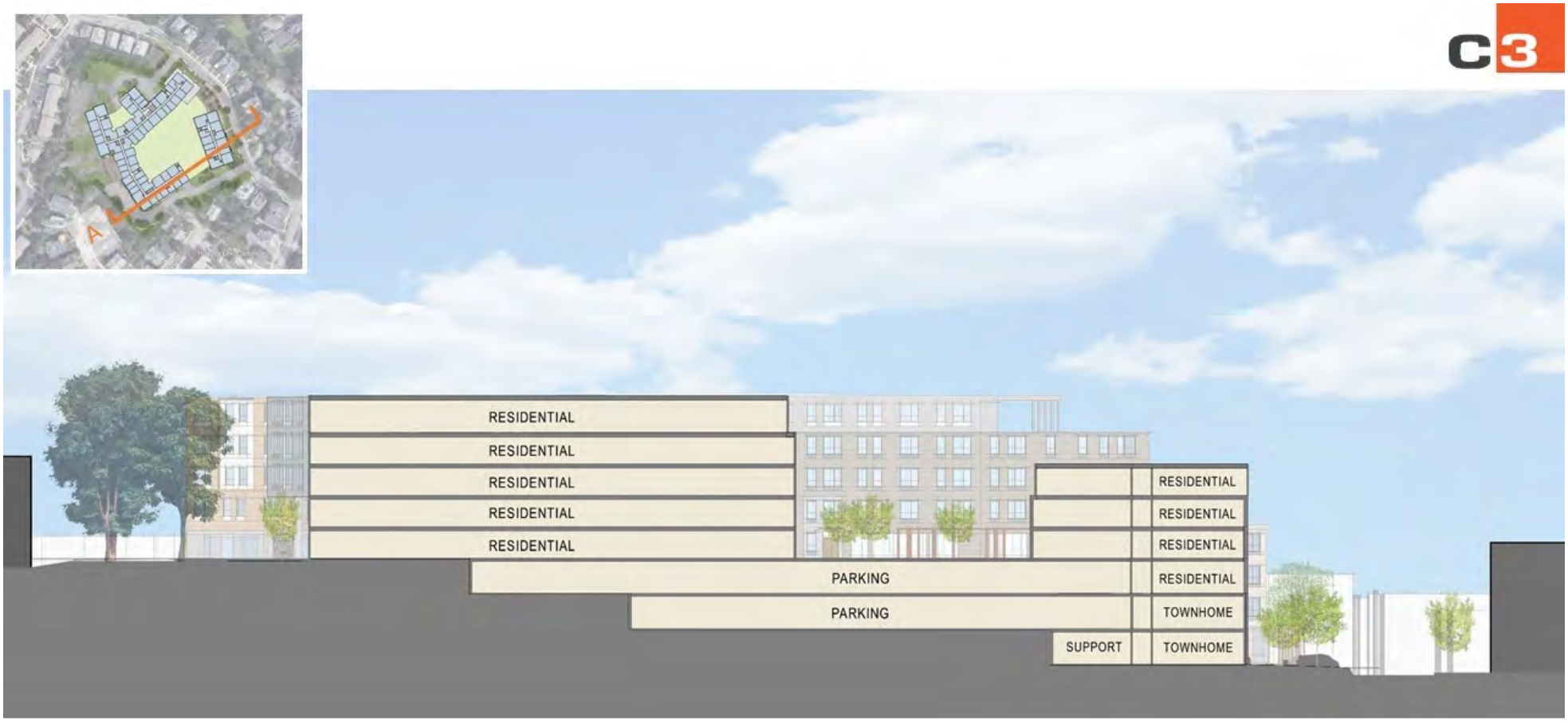
CUBE3

Figure 2-3
Ground Floor Plan , Courtyard

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 2-4
Typical Floor Plan



45 Townsend Street **Boston, Massachusetts**

Figure 2-5
Building Section

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 2-6
Vehicular Circulation

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 2-7
Community Plaza

Chapter 3.0

Urban Design

3.0 URBAN DESIGN

3.1 Project Context

The Project site is situated in a densely built residential area of the Garrison/Trotter neighborhood in Roxbury and is well-suited for new housing. The Project site is located within a five-minute walk to Washington Street and its multiple bus routes; a fifteen-minute walk to the Jackson Square MBTA Orange Line Station, a Stop and Shop Supermarket, and the Southwest Corridor Park and bike path connecting Forest Hills to Back Bay. Dudley Square, with the Bruce Bolling Building, Boston Public Schools headquarters, a variety of other businesses, restaurants and cafes, is also an approximately fifteen-minute walk.

There are ample opportunities to access public open space near the Project site, including Horatio Harris Park, half a block away on the corner of Walnut Avenue; Malcolm X Park, located two blocks to the north; and Crawford Street and Ellis School Playgrounds, located three blocks to the south. The Project site is also one-half mile from the Seaver Street entrance to Franklin Park.

3.2 Evolution of Design

3.2.1 Preliminary Design Concepts

Since filing the PNF in July of 2017, the Project design has evolved in response to stakeholder and neighborhood feedback. A number of conceptual designs were evaluated for best integrating the approximately 300 residential units on the site. Previous design concepts have included separate buildings along a new road connecting Townsend, Harrishof, and Dennison streets; an E-shaped apartment building creating a centralized interior courtyard; and a series of simple 'bars' stepping up the steeply sloped site. A single building was preferred, however, to ensure that all residents have indoor access to the shared amenity spaces. The interconnected wings are also seen as a means of enhancing a sense of community among residents.

Alternatives that evaluated connecting Townsend with both Harrishof and Dennison streets were determined infeasible because of the pronounced grade change between the streets and requires the excavation of substantial volumes of ledge which could result in significant disruptions to abutting property owners during construction. The Proponent also received feedback from the residents on both Harrishof and Dennison streets that creating such a connection was not desirable.

The previously proposed design, a series of residential bars set at different grades stepping up the hill, was determined impractical and ineffective due to the inefficiencies of constructing and operating separate garage levels and a lack of residential connectivity.

Adaptive reuse of the existing structures was also considered during the design process to maintain and repurpose certain existing structures. However, these structures are inadequate to meet the functional needs of the Project; namely, their proximity to abutting houses along Townsend Street, and their position relative to Townsend Street made designing a positive streetscape infeasible.

Additional previous design iterations explored three- and four-story townhouse wings at Townsend Street on either side of a five-story façade of the amenity spine. At the top of the hill, two residential wings were located on relatively flat areas of the site, again, to minimize ledge removal. Further site and structural investigations reshaped the Project and these iterations proved to be too sprawling and negatively imposing on the adjacent neighborhoods.

Valuable feedback on the design was gathered at a series of community meetings. Key concerns expressed at these meetings included minimizing vehicular traffic to and from the site, maximizing on-site parking, and minimizing building heights. Community members were enthusiastic about the efforts to create a pedestrian friendly streetscape along Townsend Street, and expressed interest in access to open space on the Project site.

3.2.2 Current Design

Although the Project goals have remained consistent, the design has evolved to best meet the program needs while also minimizing impacts on neighbors and promoting a healthy and sustainable residential development.

A centralized scheme, such as the proposed 'campus' building, was determined the best approach for the site. By connecting all interior spaces, the circulation is simplified and amenity spaces are easily shared and accessible. Although the building has a single entity on Townsend Street, the floor plates grow and change as each floor climbs up the steeply sloped site to disturb as little ledge as possible. As the building reaches the top of the hill near Dennison Street, the building mass pulls back from Townsend Street to reaffirm the stepping and shifting floor plates and to reduce the building's visual impact from the site's edges.

Townsend Wing

The six-story Townsend South wing replaces the existing six-story Kaplan Building and the four-story Townsend North wing replaces the adjacent five-story Nurses' Residence (Figure 3-1). Central to the façade is a double-height Community Room for neighborhood and resident access.

Flanking the Community Room to the south are two-level townhouses with direct access entries from Townsend Street (Figure 3-2), reinforcing the Project's neighborhood scale along the Townsend Street frontage (Figure 3-3). Massing has been eliminated above the Community Room to break the proposed building into two distinct sections, as shown on Figure 3-4.

Harrishof/Dennison Wings

The five-story Harrishof Wing includes additional direct access units, the "move-in" lobby, and a pedestrian connection through the Courtyard Bridge to the Townsend Wing. The western section of the proposed structure is sited at an existing parking lot (Figure 3-5). A five-story leg of the building, housing a secondary lobby on the ground floor, is aligned with the end of Dennison Street. Adjacent to the secondary lobby is a double height opening that connects the Harrishof Plaza to a raised central courtyard. The main entry drive from Townsend Street terminates at the top of the site at the Harrishof Plaza, near the secondary lobby. Landscaping, pedestrian paths, and open space within the Harrishof Plaza create a buffer between Dennison Street and the Project site (Figure 3-6).

The existing site access from Harrishof Street (Figure 3-7) will be reserved for emergency vehicle access (Figure 3-8). The ground floor of Harrishof South includes direct entry residential units and the Dennison wing accessed from the secondary lobby. The Harrishof Plaza serves as a connection between secondary lobby and the direct entry residential units in Harrishof South. The Harrishof Plaza also provides access for emergency vehicles and can serve as a flexible community function space for farmers markets and other seasonal neighborhood events.

Central Wing

The Central Wing connects Townsend and Harrishof/Dennison wings and features a roof-top viewing deck accessible from the Central Wing elevators and stairs. The viewing deck is screened from abutters and is oriented to the northwest, taking advantage of views of downtown Boston. Vegetated roof systems and solar PV installations are being evaluated and will be installed wherever feasible

3.3 Site Constraints

As noted above, the site's prominent rock outcroppings, shallow depth to bedrock, and an elevation change of approximately 43 feet from Townsend Street to the proposed Harrishof Plaza present several unique design challenges. Given these challenges, the proposed site layout and building forms are intended to make the most efficient use of the Project site while respecting the scale of the neighborhood.

Key design strategies for minimizing ledge removal include utilizing existing excavations and leveling completed by the prior site operators. The Project massing has been consolidated in order to maximize the reuse of these previously excavated and leveled areas. To the greatest degree practical, the building's floor plates are designed to avoid or minimize excavation for structural foundations.

3.3.1 Urban Design Considerations

The site provides views to downtown Boston and the Muddy River parklands from many of the residential units. The view shed extends north to downtown Boston, west to the Arnold Arboretum, the Muddy River and the Town of Brookline, and south to the Blue Hills. The proposed design maximizes these views from residential units. The sloped site also increases solar exposure and allows for passive solar design features that enhance the building's energy performance.

This large site on a rocky hillside has always been unique in its neighborhood. In the 1800's the site was a pastoral estate with a single house owned by Walter Dasham. The neighborhood in that era was more densely built than it is today, with Washington and other nearby streets were lined with row houses and closely built wood houses. With enormous rock outcroppings and ledge just below the surface, the site was difficult to break into the smaller parcels typical of the neighborhood and therefore it remained a single large property, developed for an institutional use over the ensuing decades. As a result, the site has little or no relationship with its abutters and the surrounding neighborhood.

The former hospital facilities gradually expanded from the center of the site, where the Dasham House had been located. As a result, the Nurses' Residence and the Kaplan Building were located with scant regard of their context in the neighborhood, particularly along Townsend Street. The Project, while remaining unique in the context of the neighborhood, has been designed to offer a more gracious relationship to its neighbors. The proposed Townsend wing parallels the street, which bends significantly at the site, and establishes a four- and five-story masonry datum that relates to the four-story brick apartment buildings along this side of Townsend Street.

A two-way drive linking Townsend to the top of the top of the site and Harrishof Plaza provides access to the parking garage and loading areas. A secondary drive will provide access to both levels of parking and the trash services, as well as double as emergency access to the north side of the Project. Vehicular circulation is shown on Figure 1-4.

Harrishof Street currently terminates at the site's property line and vehicular access will limited to emergency vehicles The Project, however, will extend the Harrishof sidewalk onto the Project site to create a continuous pedestrian connection between Harrishof Street and the Harrishof Plaza. The Harrishof Plaza, designed with pavers of different colors and textures, will greet residents and visitors to the secondary lobby and Courtyard Bridge. These features will bring residents of the Project together with their neighbors from Dennison,

Harrishof, Townsend, Haley and other nearby streets to enjoy a walk, an event or a chance to sit under the trees on a summer day.

The Project creates an improved and pedestrian friendly streetscape along Townsend Street. The lobby is enclosed by a wall of glass and wood that illuminate the spaces, invites people in, and provides a glow of activity. As noted above, the puddingstone retaining wall will be replaced and new walkways providing access to the lobby will be constructed. The area between the sidewalk and the building façade features large planted areas with trees and shrubs to screen the ground floor.

3.4 Building Design and Materials

The Project is designed with distinct variations within a cohesive material palette in response to the specific conditions of the site's different street faces. Each variation provides a different language for the wings of the building so each appears as a separate building within the cohesive campus. To meet sustainability goals, the Project will utilize cladding systems that efficiently manages moisture and energy transfer through the wall assembly.

The Harrishof and Central wings feature shallow projecting bays that create a rhythm across their façades, with corresponding shadow lines below the projection. The outward facades of the Townsend wing feature a sawtooth pattern that projects from the structure at each townhome bay, creating a varied façade and pedestrian scale street edge.

To minimize the appearance of upper level massing, the top floor of each wing is set back 12 to 18 inches from the façade of the level below. Cladding materials have been selected so that the upper floors appear to recede from view. In most locations the roof will have a parapet extending above the plane of the roof; this method is used to shield any roof-mounted mechanical systems from view. Upper level massing in certain locations has been eliminated to further reduce the Project's overall scale.

The primary Heating Ventilation and Air Conditioning (HVAC) equipment is located on the roof levels and within service areas of the various wings.

The Project's sustainability goals, described in Section 5.0, include designing for a long building life cycle by incorporating highly durable and easily maintained materials. Windows will be of standard size and shape, and any storefront and curtainwalls will be thermally broken aluminum.

3.5 Public Realm Improvements

As described above, vehicle entrances at Townsend Street will be realigned to provide a more welcoming entrance and make more efficient use of the site. Along Townsend Street, there will be multiple points of pedestrian and bicycle access. Two existing curb cuts on Townsend Street are being modified to provide access to the two-way drive entry drive and a service

drive. The Project proposes to remove the gates previously utilized by the hospital to close off the site and will provide neighborhood access to the new two-way drive.

Along Townsend Street, trees will be planted in front of the townhouse units as well as the lobby, thereby allowing for a wider, more pedestrian friendly sidewalk. In addition to the new trees, a variety of shrubs and perennials will be featured in densely planted beds to add visual interest to the site and screen the ground floor occupants along Townsend Street. The planting beds also allow for improved storm water retention and infiltration.

Near the top of the site, where Harrishof Street currently terminates at the property line, the Harrishof Street sidewalk will continue onto the site and extend along the south side of the site access drive. The access drive extends to the paved Harrishof Plaza which will include Zipcar spaces and barrier-free parking reserved for accessible vehicles. Dennison Street is currently closed off from the site by a rubble wall (Figure 3-9) and shall remain in this condition (Figure 3-10).

3.6 Landscape Design

Each edge of the site will feature new plantings and improved landscaping. Native plant species will be utilized to the greatest degree practical. Landscape lighting will be installed at appropriate locations to ensure public safety while not imposing on neighbors. The site's lighting has been selected to protect the night sky and minimize light pollution. The proposed landscape plan is shown on Figure 3-11.

The Project will create densely planted landscape buffers along the east and west boundaries to provide additional privacy for the abutting properties. A shared concrete stair at the west of the Project site on Townsend Street will be replaced with a new concrete stair for the exclusive use of the abutting property and a new entry ramp for the Project. The two structures will be separated by a landscape buffer.

Along the eastern site boundary, there will be a new pedestrian path and planting beds adjacent to the two-way driveway. A continuous planted buffer follows the driveway up the hill. Along the west, new landscaping and plantings will screen the abutting properties along Dennison Street.

Open spaces for use by residents are situated in more private locations on the site and a green roof gathering space includes a series of decks and patios accessible from the interior amenity spaces. The raised courtyard is located above the parking garage and wrapped on three sides by resident amenities spaces and residential units.

The courtyard also features a natural swimming pool surrounded by sunbathing decks. The pool will be filtered by hydraulic and biological processes through an adjacent biologically active living system which provides the conditions for an ideal mix of beneficial

microorganisms, aquatic flora, and fauna. The active green roof is set back a minimum of 15 feet from the parking garage edge with a screened buffer of shrubs and plants.

Accessed from the third floor of the podium parking/amenity space, the passive Meadow Courtyard will feature a small patio and views of the sunset beyond the high rock outcroppings at the westerly side of the Site.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-1
Townsend Street, North – Existing Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-2
Townsend Street, North – Proposed Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-3
Townsend Street, South – Existing Conditions

Figure 3-4
Townsend Street, South – Proposed Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-5
Parking Lot, Existing Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-6
Harrishof Plaza

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-7
Harrishof, Existing Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-8
Harrishof , Proposed Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-9
Dennison, Existing Conditions

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 3-10
Dennison, Proposed Conditions

45 Townsend Street **Boston, Massachusetts**

ground

Figure 3-11
Landscape Plan

Chapter 4.0

Transportation

4.0 TRANSPORTATION

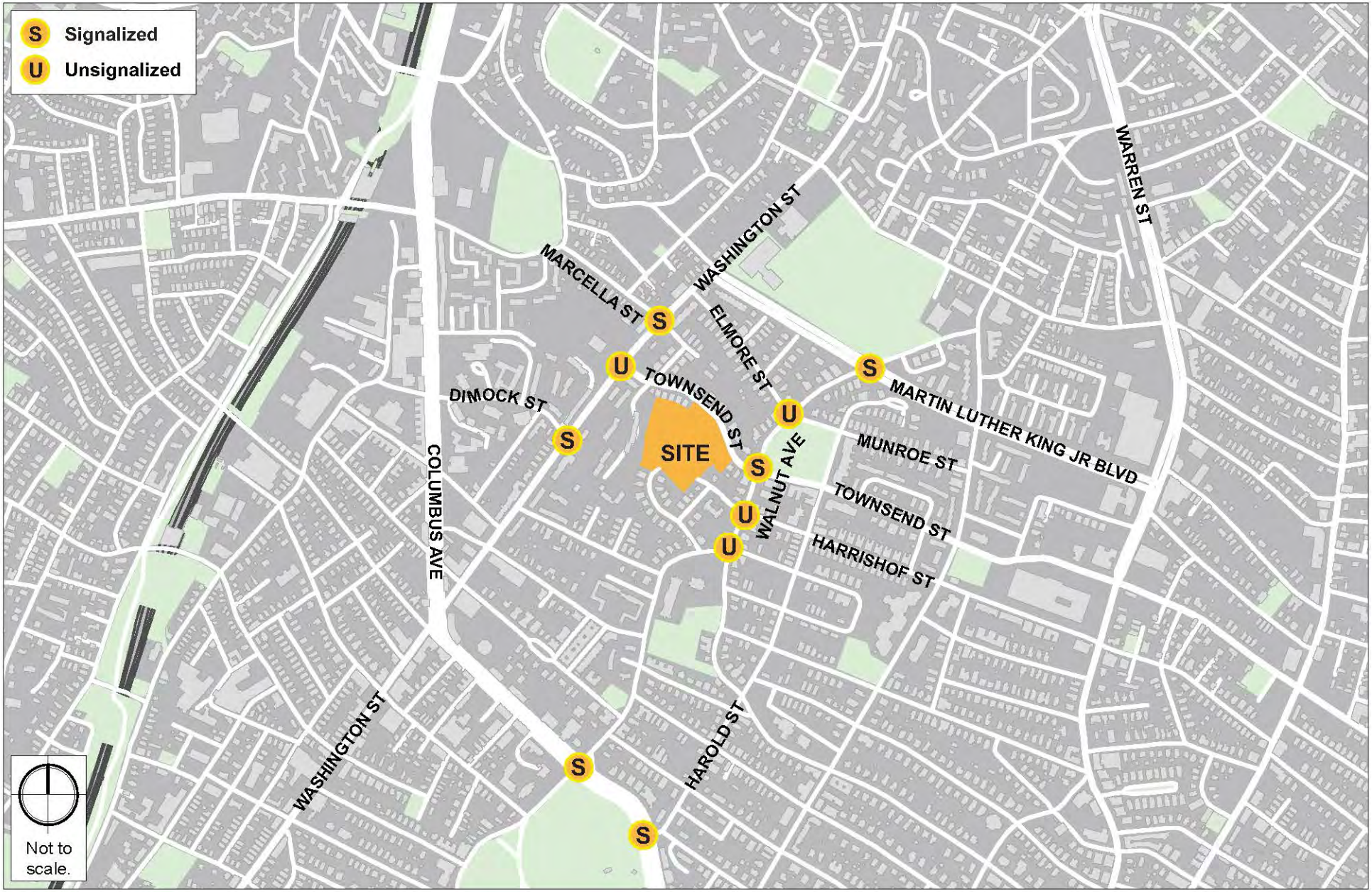
Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the Project in the Roxbury neighborhood of Boston. The transportation study contained in the Expanded Project Notification Form (EPNF) submitted in July 2017 adhered to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and BPDA Article 80 Large Project Review process. This study included a full review of existing multimodal transportation conditions within the study area and analysis of the future transportation conditions with and without the Project.

The transportation study prepared for the EPNF is still an accurate depiction of the impact of the Project. The DPIR transportation study includes further information and analysis based on comments that have been received during the permitting process, most notably analysis of additional intersections.

4.1 Existing (2018) Condition

The transportation study area was revised based on comments from BTD and the community and now is bounded by Martin Luther King Jr. Boulevard to the north, Seaver Street to the south, Harold Street to the east, and Washington Street to the west. The study area consists of the following nine intersections in the vicinity of the Project site, also shown on Figure 4-1:

- Washington Street/Marcella Street/Brinton Street (signalized);
- Washington Street/Townsend Street (unsignalized);
- Washington Street/Dimock Street (signalized);
- Walnut Avenue/Martin Luther King Jr. Boulevard (signalized);
- Walnut Avenue/Elmore Street/Munroe Street (unsignalized);
- Walnut Avenue/Townsend Street (signalized);
- Walnut Avenue/Harrishof Street (unsignalized);
- Walnut Avenue/Crawford Street/Holworthy Street (unsignalized);
- Columbus Avenue/Seaver Street/Walnut Avenue (signalized); and
- Seaver Street/Harold Street (signalized);



45 Townsend Street Boston, Massachusetts

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Figure 4-1
Study Area Intersections

4.1.1 Existing Roadway Conditions

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

Crawford Street is a two-way, two lane roadway from Walnut Avenue and Holworthy Street but becomes a one-way, one lane roadway at Waumbeck Street and terminates at Warren Street. Crawford Street is classified as a local roadway under BTD jurisdiction. On-street parking is not provided on either side of the roadway until the intersection with Waumbeck Street at which point it is provided on both sides. Sidewalks are provided along both sides of Crawford Street.

Holworthy Street is a one-way, on lane roadway that runs east from Walnut Avenue to Hollander Street. Holworthy Street is classified as a local roadway under BTD jurisdiction. On-street parking and sidewalks are provided on both sides of the roadway.

Columbus Avenue is a two-way, four lane roadway located to both the west of the Project site that runs in a predominantly north-south direction starting at Malcolm X Boulevard and Tremont Street to the northwest and ending at Seaver Street and Walnut Avenue to the South. Columbus Avenue is classified as an urban principal arterial under BTD jurisdiction. On-street parking and sidewalks are provided on both sides of the roadway.

Seaver Street is a two-way, four lane roadway for the majority of its length and is located to the south of the Project site. It runs in a predominantly east-west direction starting at Columbus Avenue and Walnut Avenue and terminating at Erie Street. Seaver Street is classified as an urban principal arterial under BTD jurisdiction. In the vicinity of the Project, on-street parking, a sidewalk, and a bike lane is provided on the northern side of the roadway while a shared-use path is provided on the southern side.

Harold Street is a two-way, two lane roadway located to the east of the Project site that runs in a predominantly north-south direction from a cul-de-sac just past Munroe Street to its termination at Seaver Street. Harold Street is classified as a local roadway under BTD jurisdiction. Parking and sidewalks and provided on both sides of the roadway.

4.1.2 Existing Intersection Conditions

Existing conditions at the new study area intersections are described below.

Walnut Avenue/Crawford Street/Holworthy Street is a four-leg, unsignalized intersection with three approaches. The Walnut Avenue eastbound approach consists of one shared left-turn/through/right-turn lane. The Crawford Street northbound approach consists of one shared left-turn/through/right-turn lane. The Walnut Avenue southbound approach consists of one

shared left-turn/through/right-turn lane. There are sidewalks, crosswalks, and pedestrian ramps at all approaches and on-street parking is permitted on the eastbound and southbound approaches.

Columbus Avenue/Seaver Street/Walnut Avenue is a four-leg, signalized intersection with four approaches. The Columbus Avenue eastbound approach consists of one shared left-turn/through lane, one shared through/right-turn lane, and a bus-stop. The Seaver Street westbound approach consists of one shared left-turn/through lane, one through lane, a bike lane, and a channelized right turn lane. The Walnut Avenue northbound approach consists of one shared left-turn/through/right-turn lane. The Walnut Street southbound approach consists of one shared left-turn/through/right-turn lane. There are sidewalks, crosswalks, and pedestrian ramps at all approaches and on-street parking is not permitted at any approach.

Seaver Street/Harold Street is a three leg, signalized intersection with three approaches. The Harold Street westbound approach consists of one shared left-turn/right-turn lane. The Seaver Street northbound approach consists of one through lane, one shared through/right-turn lane, and a bike lane. The Seaver Street southbound approach consists of one shared left-turn/through lane and one through lane. Sidewalks are provided along each approach, but crosswalks and pedestrian ramps are only provided across the westbound and southbound approaches. On-street parking is permitted along the westbound and northbound approaches.

4.1.3 Existing Traffic Data

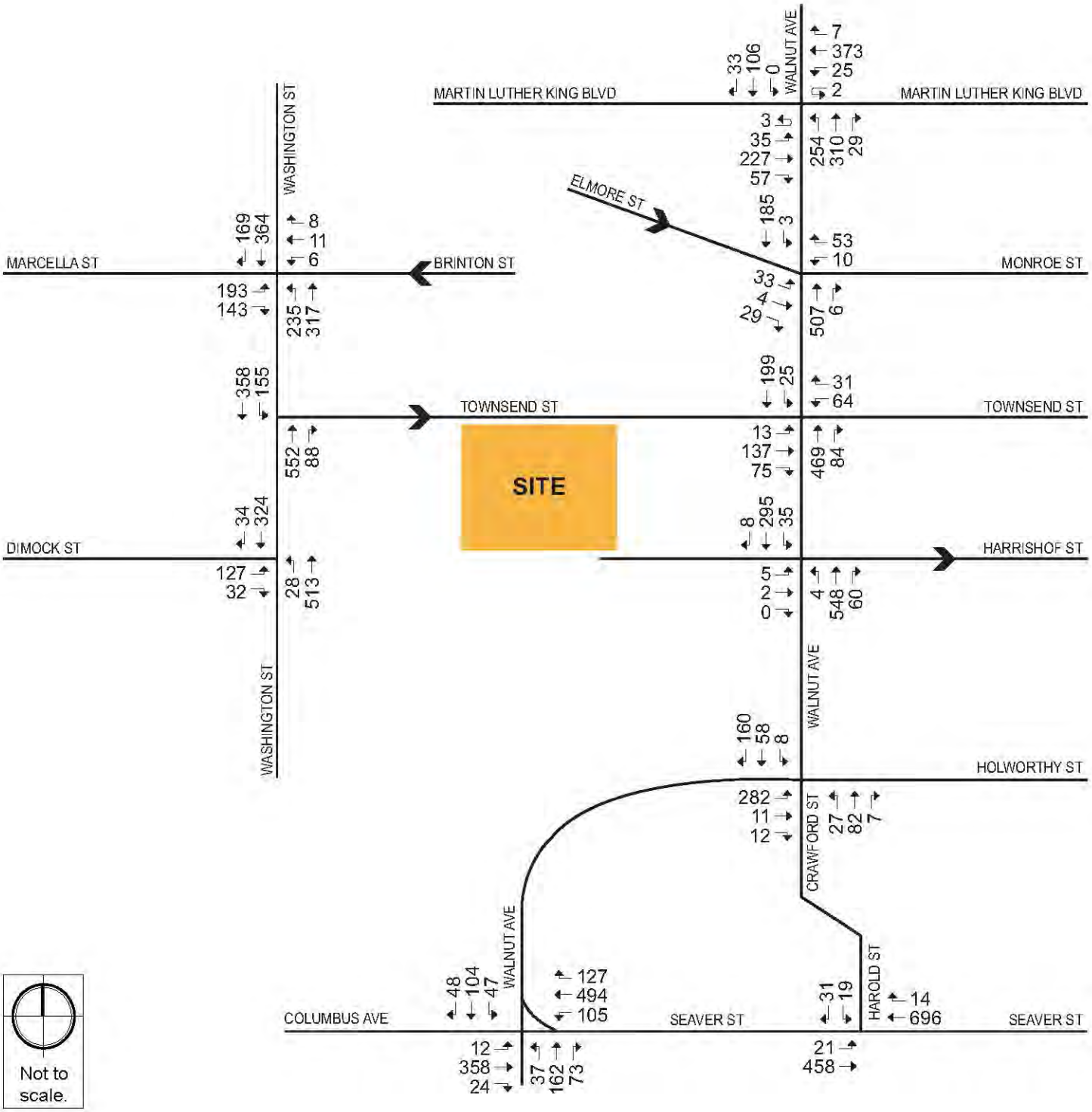
Traffic volume data was collected at seven of the study area intersections on October 6, 2016. Additional traffic volume data was collected at the three new intersections on August 7, 2018. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Attachment B.

4.1.4 Existing Vehicular Traffic Volumes

The existing traffic volumes collected in October 2016 and August 2018 were used to develop the Existing (2018) Condition traffic volumes. The Existing (2018) weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown in Figures 4-2 and Figure 4-3, respectively.

4.1.5 Existing Bicycle Volume

Bicycle counts were conducted concurrently with the vehicular TMCs and are presented in Figure 4-4. As shown in the Figure 4-4, bicycle volumes are heaviest along Washington Street and Walnut Avenue during the peak periods.



45 Townsend Street Roxbury, Massachusetts

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Figure 4-2
Existing (2018) Conditions Turning Movement Volumes, a.m. Peak Hour

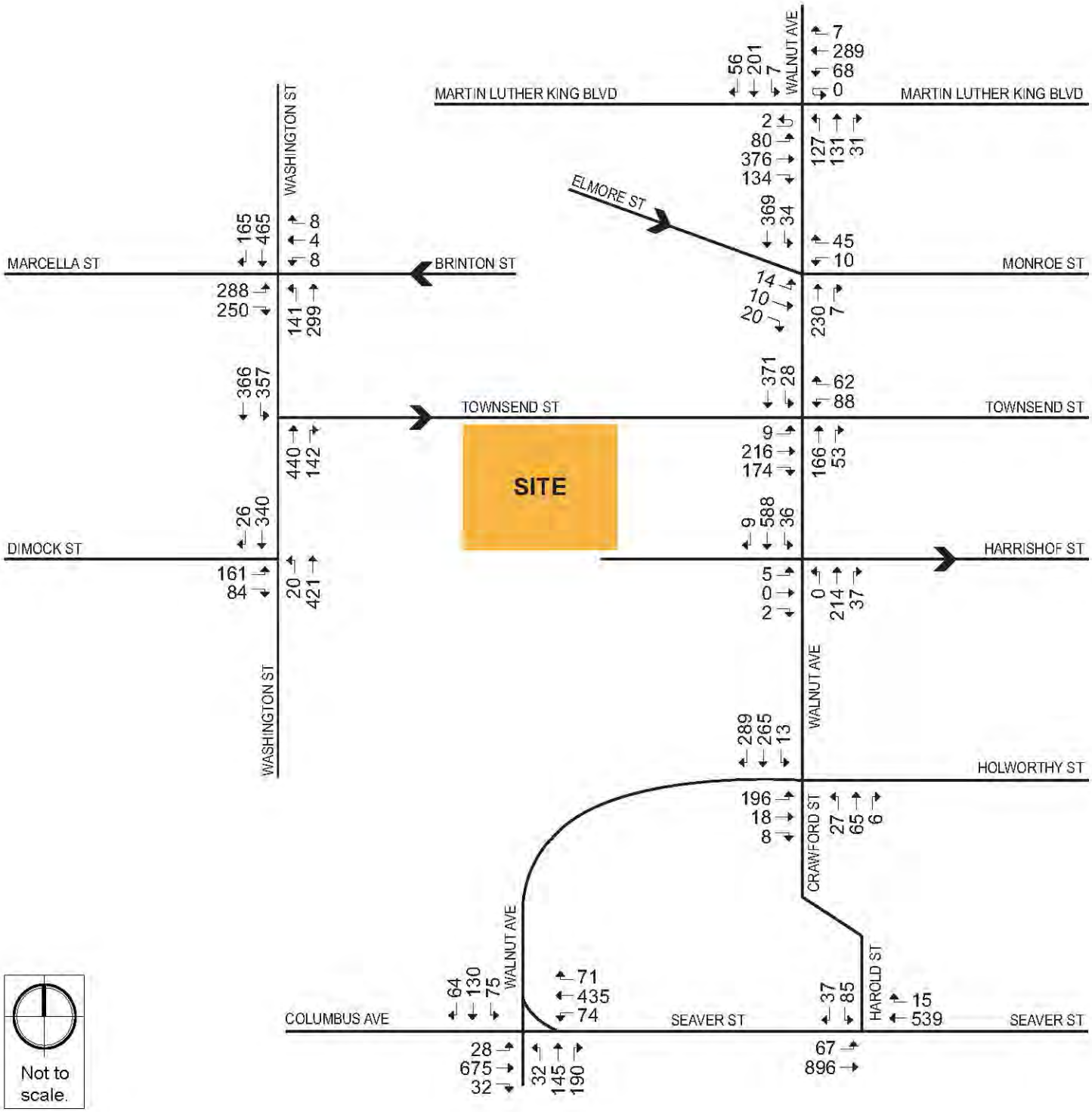

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Figure 4-3
Existing (2018) Conditions Turning Movement Volumes, p.m. Peak Hour

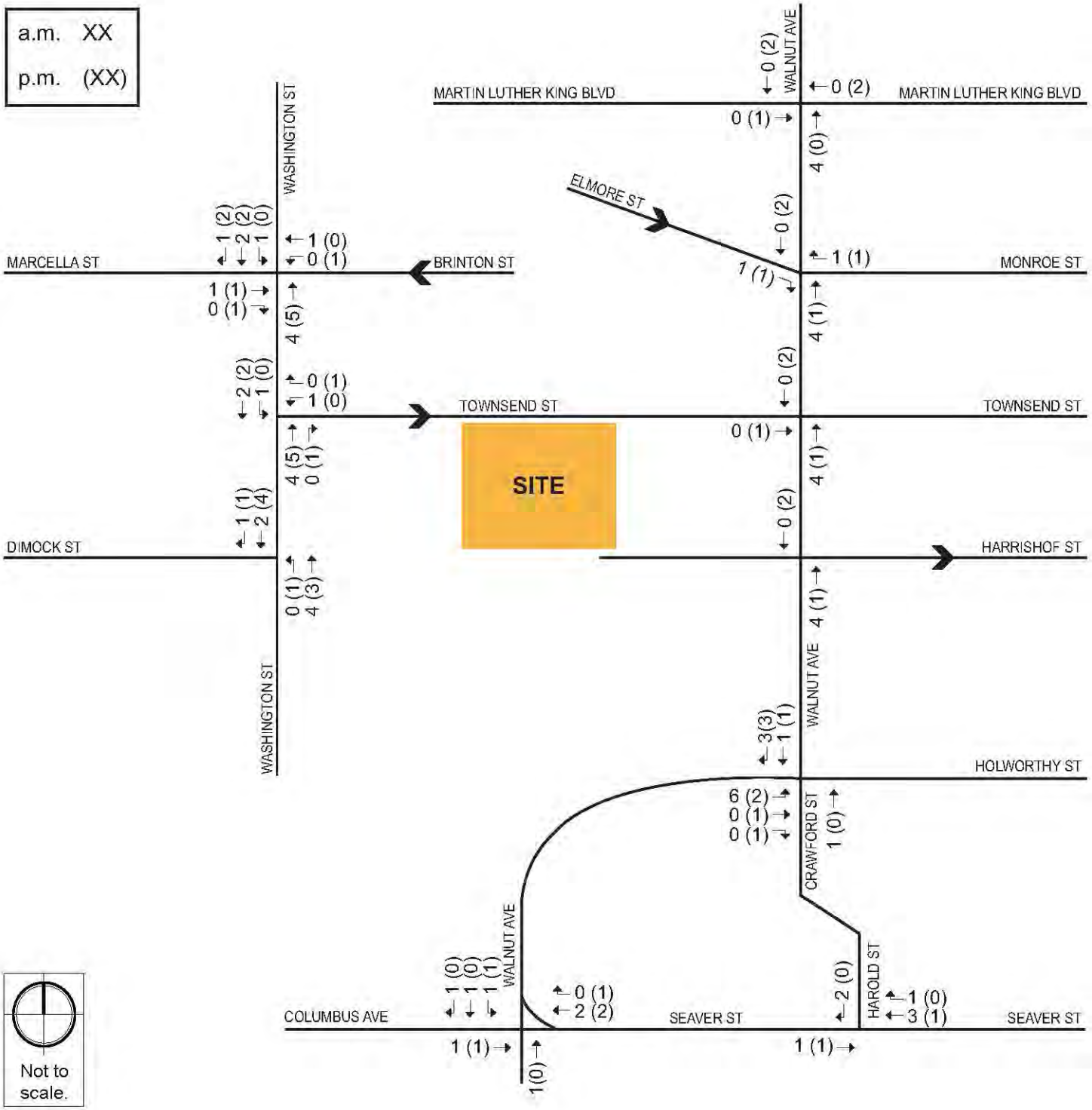

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Figure 4-4
Existing (2018) Conditions Bicycle Volumes, a.m. and p.m. Peak Hours

4.1.6 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along all roadways in proximity to the Project site and are in good condition. No excessive damage to sidewalks within the study area was observed. Crosswalks are provided at all study area intersections except Walnut Avenue/Elmore Street/Munroe Street. Pedestrian signal equipment is provided at each of the six signalized intersections within the study area.

To determine the level of pedestrian activity within the study area, pedestrian counts were conducted concurrently with the TMCs at the study area intersections. Those counts are presented in Figure 4-5. As shown in Figure 4-5, pedestrian activity is low throughout the study area. The intersection of Harold Street and Seaver Street had the highest pedestrian activity during the a.m. peak hour and the intersection of Washington Street and Dimock Street had the highest pedestrian activity during the p.m. peak hour.

4.2 No-Build (2025) Condition

The No-Build (2025) 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. These infrastructure improvements may include roadway, public transportation, pedestrian or bicycle improvements.

4.2.1 Background Traffic Growth

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

4.2.2 Specific Development Traffic Growth

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

Bartlett Place – This project consists of a multiple phase mixed-use development with approximately 20,000 sf of retail, 323 residential units, 22,000 sf of office space, and a 13,000 sf grocery store. Two of the phases are under construction and the third has been approved for development by the BPDA.

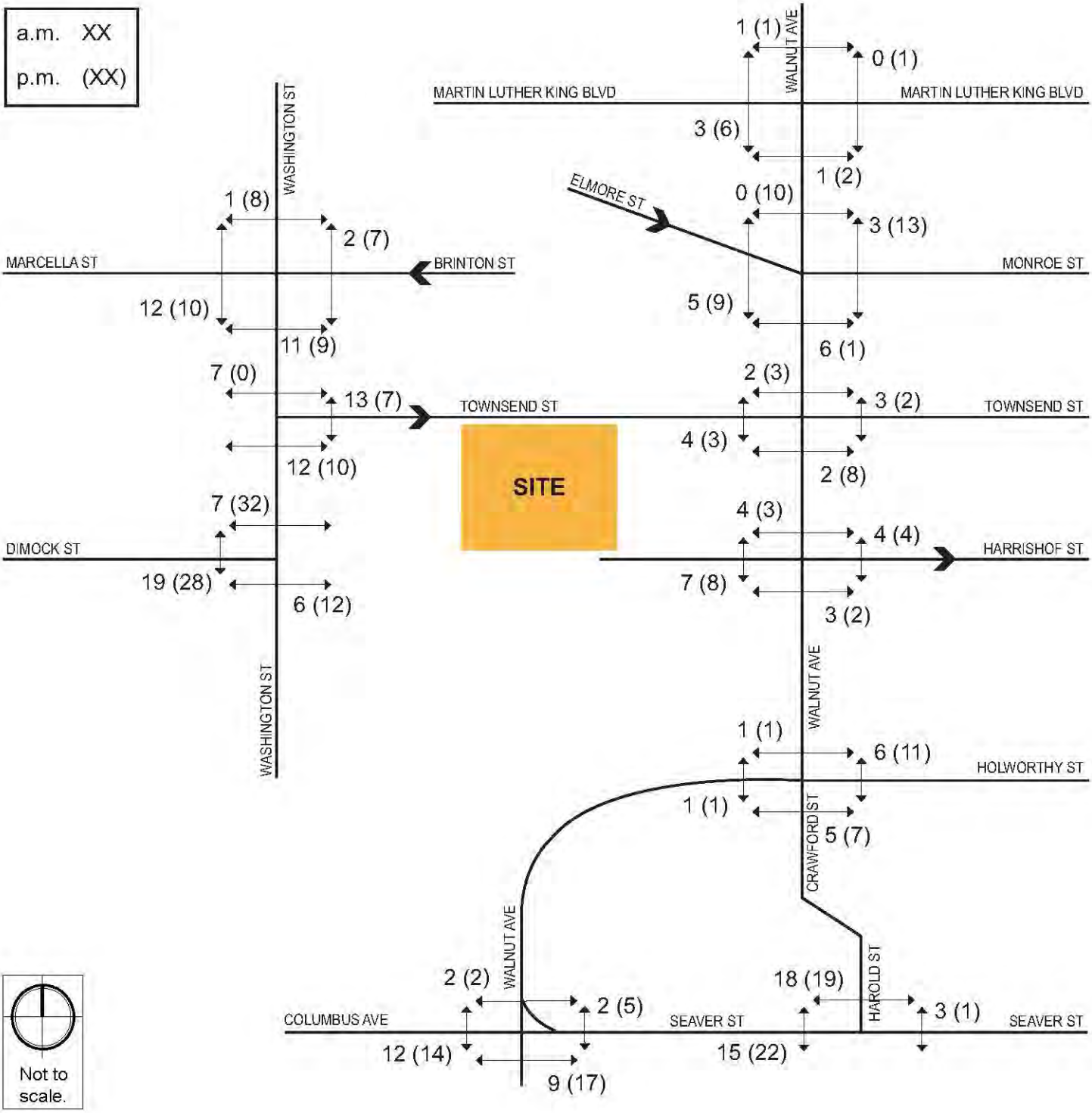

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Figure 4-5
Existing (2018) Conditions Pedestrian Volumes, a.m. and p.m. Peak Hours

Bridge Boston Charter School – This project calls for the renovation of the former Roxbury Comprehensive Health Center into the new Bridge Boston Charter School. The project was recently constructed.

1785 Columbus Avenue – The proposed project will consist of the demolition of the two existing buildings and the construction of a five-story social services building, primarily housing the Horizons for Homeless Children daycare center and supplemental office space as well as other social services. In addition, the project will include a small retail component and 146 underground parking spaces. This project is currently approved by the BPDA.

Amory Street Apartments – This project calls for the redevelopment of the BHA parcel located at 125 Amory Street. The redevelopment includes rehabilitating the current building and the construction of approximately 360 new residential units across three new buildings. This project will be served by 262 parking spaces and is currently approved by the BPDA.

Jackson Square Master Plan, Site III, Phase 3 – This project calls for the construction of several mixed-use buildings and is part of a larger project that aims to revitalize Jackson square. Site III, Phase 3 will include the construction of 144 residential units, 2,400 square feet of transit and pedestrian retail space, and 201 parking spaces to serve the new buildings. This project is currently approved by the BPDA.

3200 Washington Street – This project calls for the demolition of two existing buildings and the construction of three new buildings. These buildings will be mixed-use residential and retail development that will total approximately 100,000 gross square feet. This development will include 76 residential units, 5,364 gross square feet of ground floor retail space, and a garage facility containing 36 on-site parking spaces and enclosed bike storage. This project is currently under construction.

4.2.3 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area. Based on this review, it was determined that no roadway improvements in the vicinity of the study area are being planned.

4.2.4 No-Build Traffic Volumes

To develop the No-Build (2025) Condition traffic volumes, the one-half percent per year annual growth rate, compounded annually, was applied to the Existing (2018) Condition traffic volumes, and the traffic volumes associated with the background development projects listed above were added. The No-Build (2025) weekday morning and evening peak hour traffic volumes are shown on Figures 4-6 and Figure 4-7, respectively.

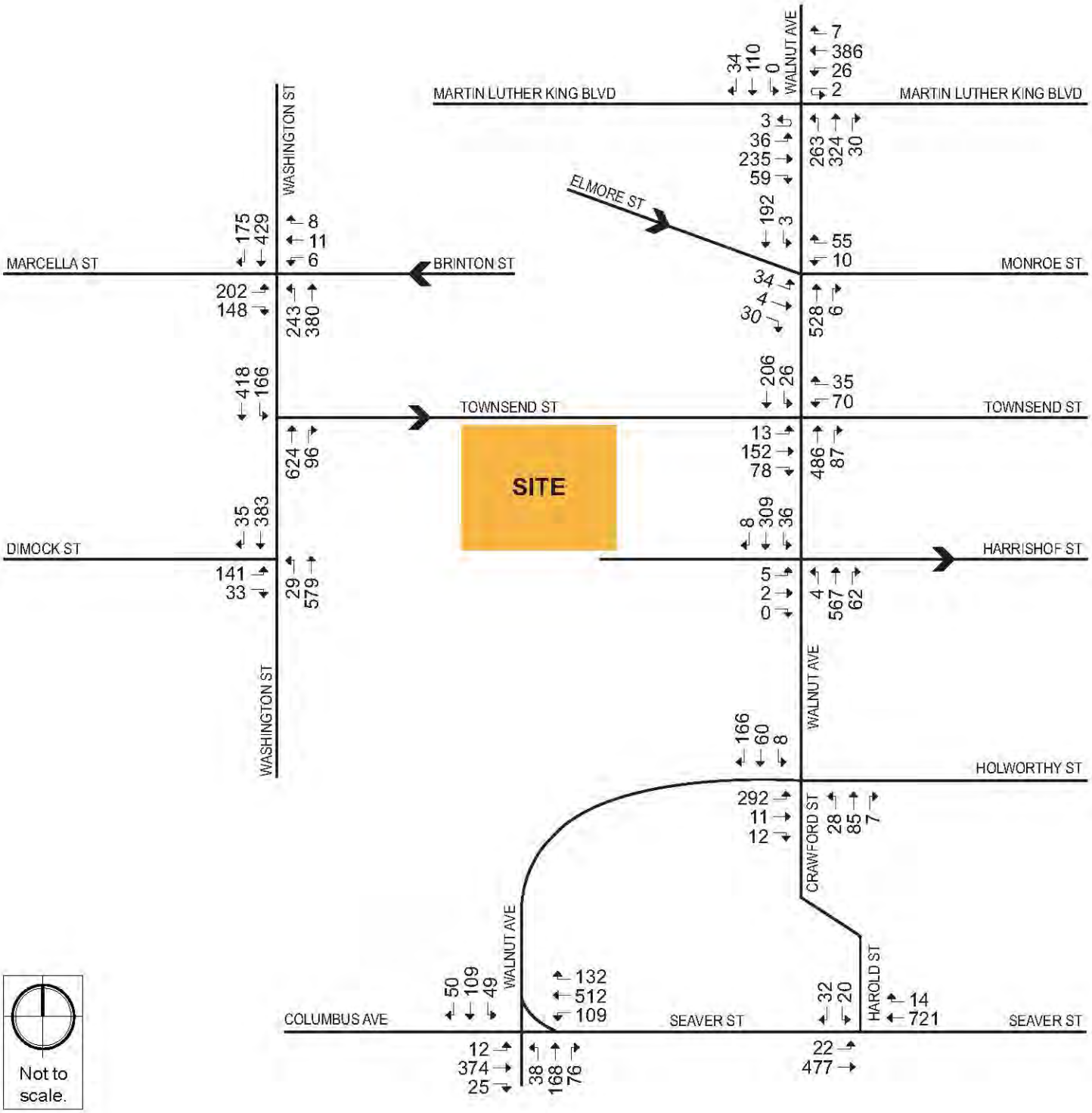

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Figure 4-6
No-Build (2025) Conditions Turning Movement Volumes, a.m. Peak Hour

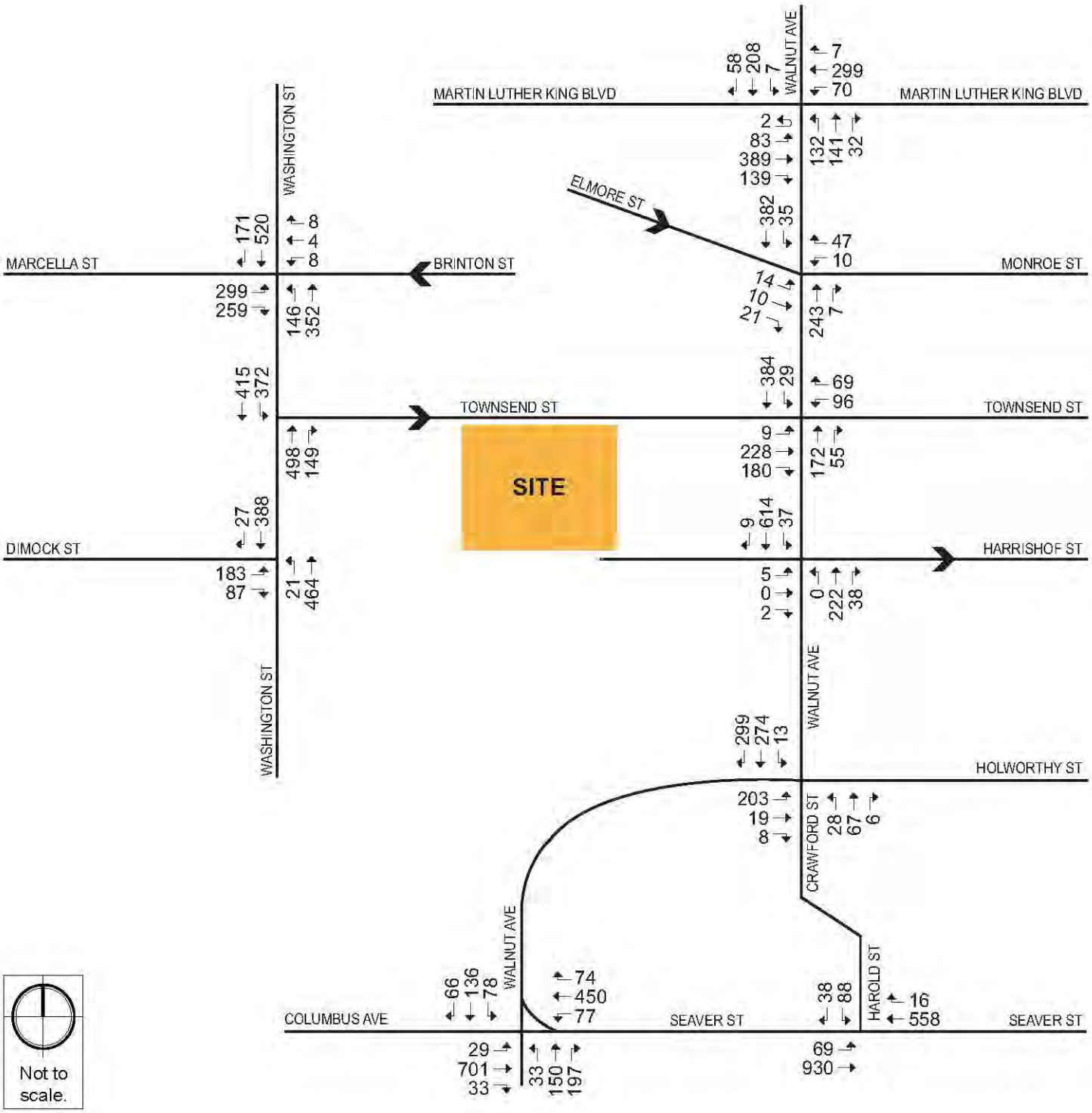

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Figure 4-7
No-Build (2025) Conditions Turning Movement Volumes, p.m. Peak Hour

4.3 Build (2025) Condition

The proposed Project will consist of the demolition of the former Radius Hospital and the construction of approximately 300 residential units and residential amenities. Parking between the Townsend and Harrishof wings will provide approximately 232 parking spaces. Mode shares, trip generation, and trip distribution are unchanged since the EPNF filing and will all be applied in the same manner to develop the Build (2025) Condition traffic volumes.

4.3.1 Site Access

Based on comments received from the community and City Staff, site access and egress will be from and to Townsend Street. Only emergency vehicles will be able to access the site via Harrishof Street.

4.3.2 Build Traffic Volumes

The vehicle trips were distributed through the study area according to the methodology outlined in the EPNF filing. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 4-8 and Figure 4-9, respectively. The trip assignments were added to the No-Build (2025) Condition vehicular traffic volumes to develop the Build (2025) Condition vehicular traffic volumes. The Build (2025) Condition a.m. and p.m. peak hour traffic volumes are shown on Figure 4-10 and Figure 4-11, respectively.

4.4 Transportation Mitigation Measures

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

The Proponent is responsible for preparation of a Transportation Access Plan Agreement (TAPA), which formalizes the findings of the Project's transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed.

The Project expects to contribute to certain mitigation measures that will not only offset the impact of the Project, but improve the existing transportation conditions in the Project area. In fact, as part of the permitting for this Project, HSH staff reviewed the drop-off and pick-up

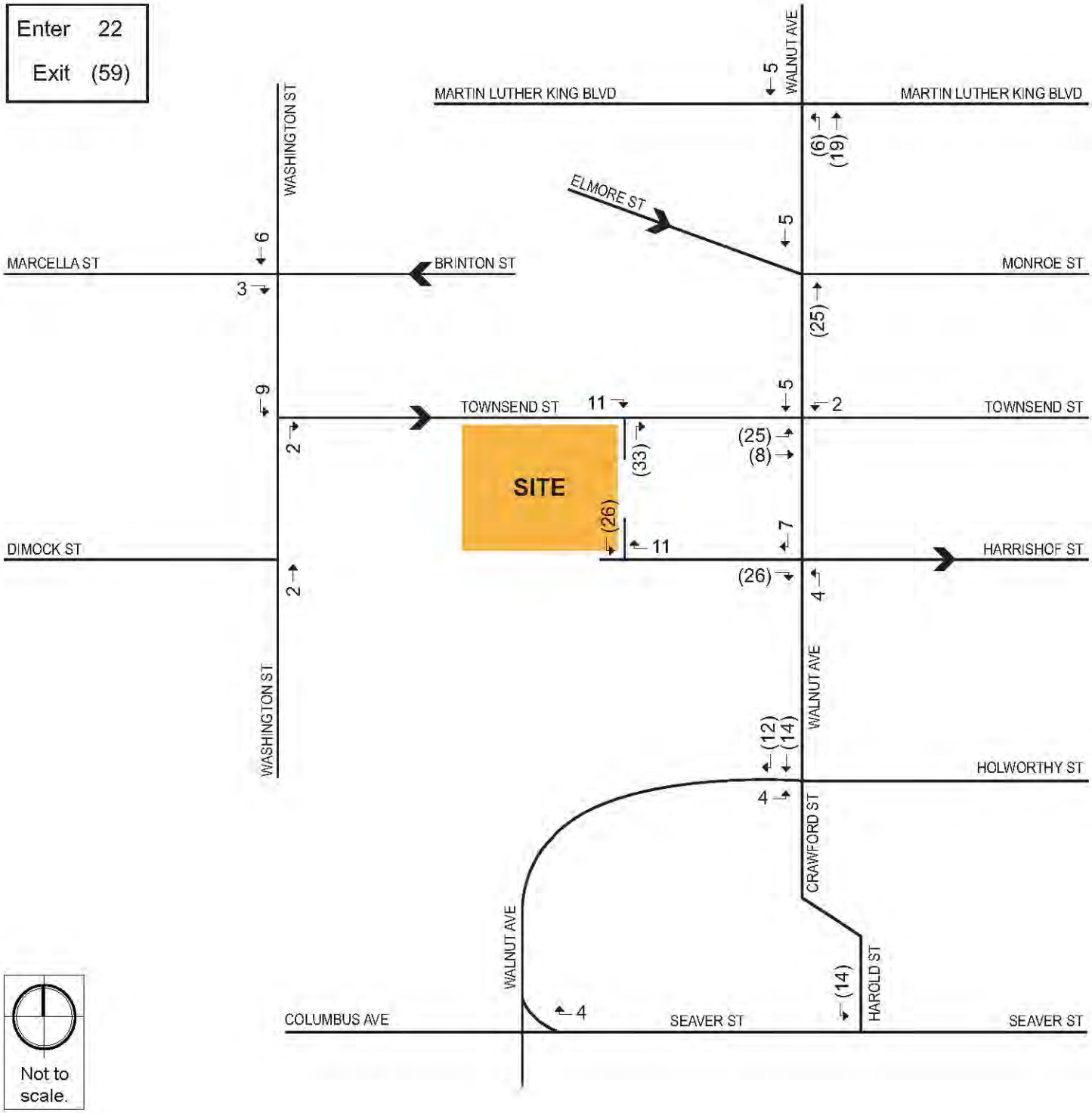

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Figure 4-8
Project-generated Trips, a.m. Peak Hour

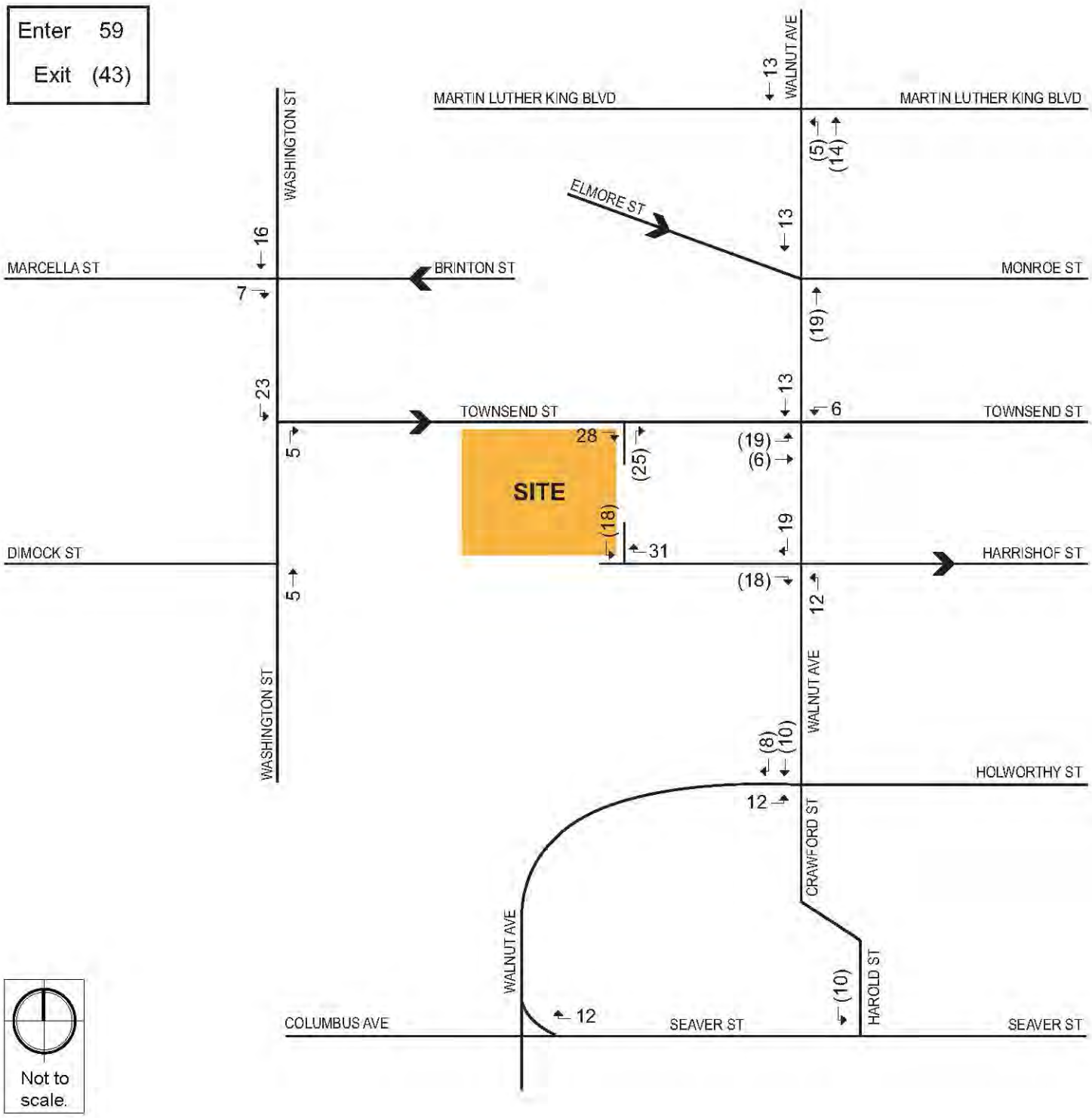

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Figure 4-9
Project-generated Trips, p.m. Peak Hour

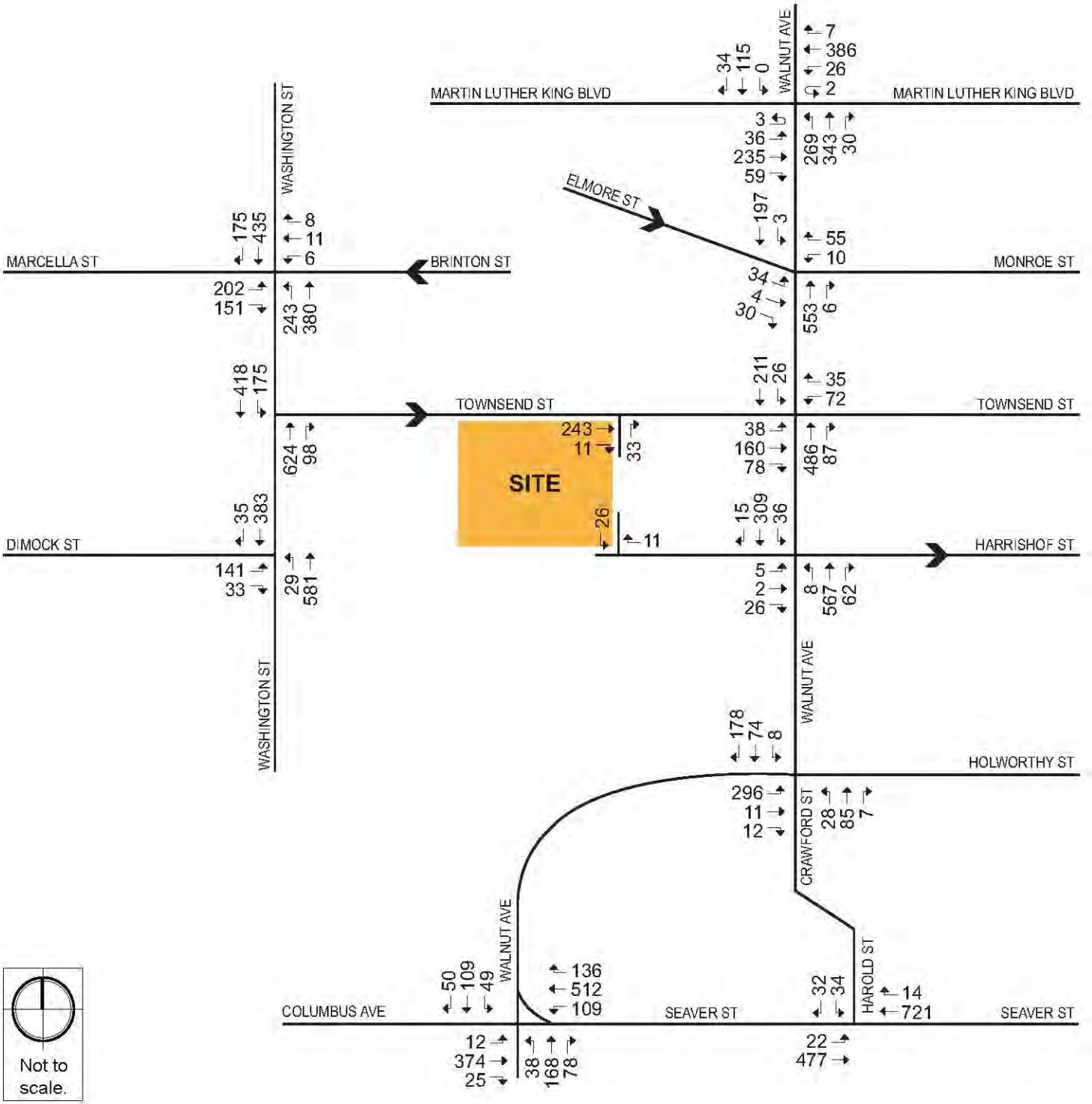

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Figure 4-10
Build (2025) Conditions Turning Movement Volumes, a.m. Peak Hour

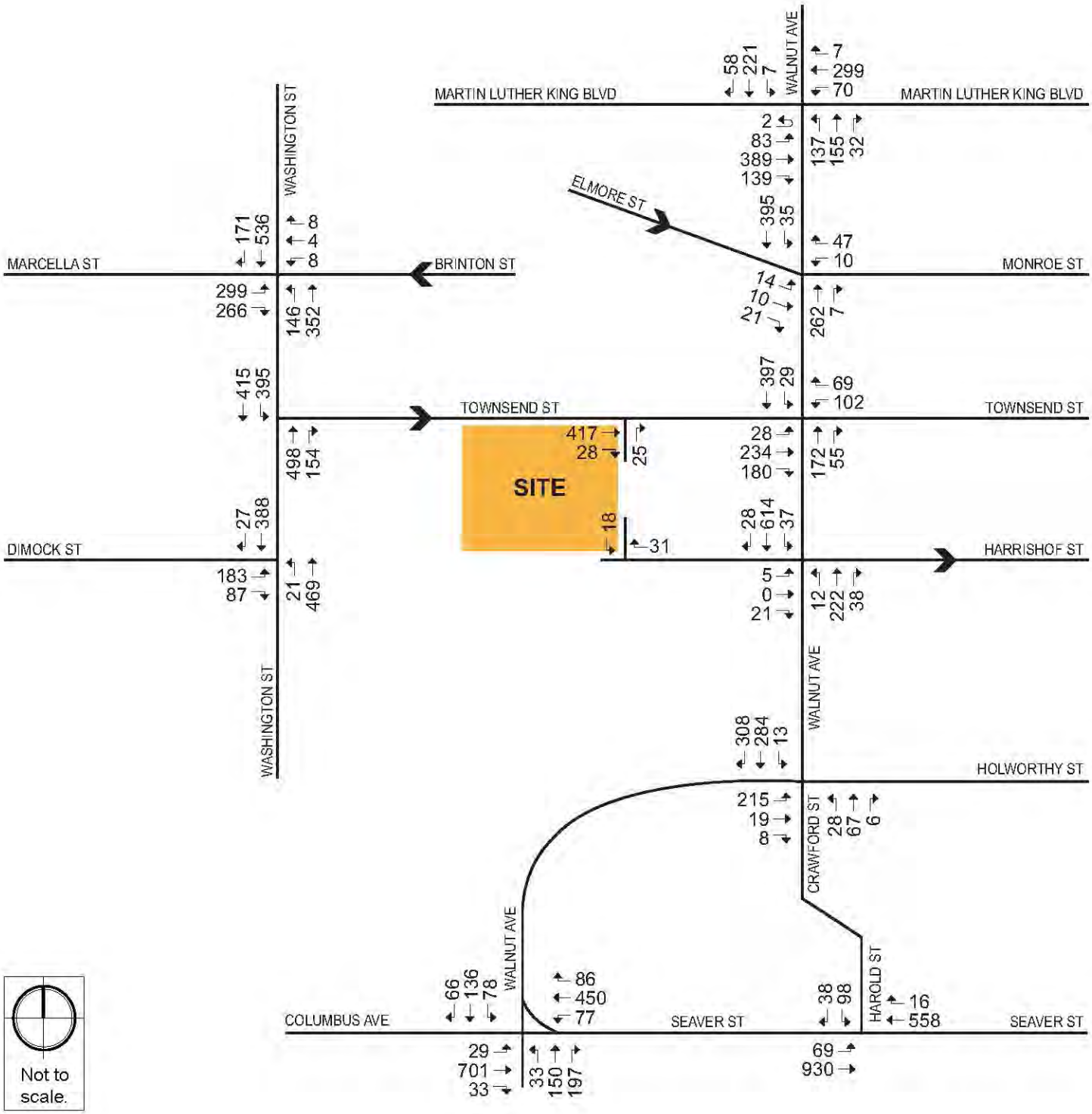

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Figure 4-11
Build (2025) Conditions Turning Movement Volumes, p.m. Peak Hour

operations of the Higginson School. Based on these observations, a new sign restricting travel up Harrishof Street from Walnut Street during school drop-off and pick-up times has already been installed. Mitigation measures that are expected as part of the Project include:

- Pedestrian safety improvements including adding a crosswalk at the intersection of Washington Street/Townsend Street;
- Pedestrian safety improvements along Walnut Street as part of the BTD Safe Routes to School program;
- Traffic signal timing improvements in the area, including improving the signal coordination along Washington Street and concurrent pedestrian phasing;
- Traffic operations improvements through the installation of Do Not Block the Box pavement markings at the intersections of Washington Street/Townsend Street, Walnut Street/Munroe Street, and Walnut Street/Townsend Street;
- Increasing the number of on-street parking spaces through widening of Townsend Street along the site frontage;

Potential additional mitigation measures that could be appropriate for a project with this level of impact include:

- Implementing traffic calming measures to slow traffic in the study area; and/or
- Bicycle improvements in the area, including exploring the feasibility of contraflow bike lanes on Townsend Street
- Traffic signal infrastructure improvements in the area.

Additional mitigation measures may be discussed with BTD as the Project moves through the permitting process. All mitigation measures will be detailed in the TAPA.

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

4.5 Traffic Operations Analysis

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

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 4-1 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay. LOS D or better is typically considered desirable during the peak hours of traffic in urban and suburban settings.

Table 4-1 Vehicle Level of Service Criteria

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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

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

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

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

Table 4-2 and Table 4-3 summarize the traffic capacity analysis for the study area intersection for the Existing, No-Build, and Build Conditions during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Attachment B.

Table 4-2 Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Movement	Existing (2018) Condition					No-Build (2025) Condition					Build (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Signalized Intersections															
Washington St/Marcella St/Brinton St	**C**	**23.1**	-	-	-	**C**	**25.0**	-	-	-	**C**	**25.4**	-	-	-
Marcella St EB L/R	D	52.5	0.88	168	#277	D	53.9	0.89	176	#309	D	54.4	0.90	178	#313
Brinton St WB L/T/R	C	20.6	0.07	9	29	C	20.4	0.07	9	29	C	20.4	0.07	9	29
Washington St NB L	B	18.0	0.56	61	#264	C	25.4	0.68	61	#308	C	16.5	0.69	62	#310
Washington St NB T	B	12.1	0.40	81	161	B	14.1	0.48	95	192	B	14.2	0.48	95	192
Washington St SB T	B	17.0	0.39	199	160	B	18.6	0.47	255	226	B	18.4	0.48	264	238
Washington St SB R	A	9.5	0.21	25	69	B	10.2	0.22	30	m69	B	10.3	0.22	30	m69
Washington St/Dimock St	**C**	**21.6**	-	-	-	**C**	**23.2**	-	-	-	**C**	**23.3**	-	-	-
Dimock St EB L/R	D	52.9	0.72	111	157	D	53.1	0.72	110	172	D	53.1	0.72	110	172
Washington St NB L/T	B	18.9	0.59	257	439	C	21.1	0.66	309	#575	C	21.2	0.66	311	#577
Washington St SB T/R	B	10.6	0.40	43	180	B	13.6	0.46	69	m23	B	13.9	0.46	75	m236
Martin Luther King Jr. Blvd/Walnut Ave	**C**	**26.9**	-	-	-	**C**	**27.4**	-	-	-	**C**	**28.0**	-	-	-
MLK Jr. Blvd EB L	D	44.2	0.25	19	62	D	44.2	0.26	19	63	D	44.2	0.26	19	63
MLK Jr. Blvd EB T | T	B	18.8	0.16	28	103	B	18.9	0.17	29	106	B	18.9	0.17	29	106
MLK Jr. Blvd EB R	A	0.0	0.04	0	0	A	0.1	0.04	0	0	A	0.1	0.04	0	0
MLK Jr. Blvd WB L	D	43.9	0.19	13	49	D	44.0	0.20	14	50	D	44.0	0.20	14	50
MLK Jr. Blvd WB T | T/R	C	21.6	0.31	70	171	C	21.8	0.32	72	177	C	21.8	0.32	72	177
Walnut Ave NB L	D	37.8	0.67	113	#358	D	39.1	0.69	119	#378	D	40.4	0.72	123	#389
Walnut Ave NB T/R	C	32.0	0.60	146	#410	C	32.8	0.63	154	#439	C	33.9	0.66	166	#472
Walnut Ave SB L/T/R	C	24.6	0.25	50	146	C	24.8	0.26	52	150	C	24.9	0.27	54	157
Townsend St/Walnut Ave	**B**	**16.2**	-	-	-	**B**	**17.4**	-	-	-	**B**	**18.9**	-	-	-
Townsend St EB L/T/R	C	25.8	0.63	55	150	C	26.0	0.64	61	163	C	28.4	0.70	74	160
Townsend St WB L/R	B	13.5	0.42	4	46	B	15.2	0.49	7	54	B	14.6	0.45	8	55
Walnut Ave NB T/R	B	15.4	0.62	87	#444	B	17.0	0.66	96	#491	B	18.4	0.68	107	#510
Walnut Ave SB L/T	A	9.8	0.27	28	137	B	10.6	0.29	31	150	B	11.5	0.30	35	160
Columbus Ave/Seaver St/Walnut Ave	**C**	**30.4**	-	-	-	**C**	**30.5**	-	-	-	**C**	**30.4**	-	-	-
Columbus Ave EB L/T/R	B	18.4	0.28	90	130	B	18.8	0.30	94	135	B	18.8	0.30	94	135
Seaver St WB L/T	C	25.1	0.49	179	244	C	26.7	0.54	188	257	C	26.5	0.54	187	258
Seaver St WB R	B	10.5	0.17	0	59	B	10.9	0.18	0	60	B	10.9	0.19	0	62
Walnut Ave NB L/T/R	E	55.2	0.84	166	#328	D	52.6	0.82	~179	#343	D	52.6	0.82	~179	#343
Walnut Ave SB L/T/R	D	47.6	0.71	105	#227	D	45.9	0.69	110	#239	D	45.9	0.69	110	#239
Harold St/Seaver St	**A**	**4.3**	-	-	-	**A**	**4.7**	-	-	-	**A**	**5.4**	-	-	-
Harold St WB L/R	C	24.0	0.29	11	46	C	23.9	0.31	12	47	C	27.7	0.37	21	60
Seaver St NB T/R	A	1.9	0.23	40	61	A	2.4	0.25	41	64	A	2.5	0.25	41	70
Seaver St SB L/T	A	5.7	0.17	100	m141	A	6.0	0.19	105	m14	A	6.5	0.19	105	m151

Table 4-2 Capacity Analysis Summary, Weekday a.m. Peak Hour (Continued)

Intersection/Movement	Existing (2018) Condition					No-Build (2025) Condition					Build (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Unsignalized Intersections															
Washington St/Townsend St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington St NB T/R	A	0.0	0.41	-	0	A	0.0	0.47	-	0	A	0.0	0.47	-	0
Washington St SB L/T	A	4.9	0.19	-	18	A	5.6	0.23	-	22	A	5.9	0.24	-	24
Walnut Ave/Elmore St/Munroe St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elmore St EB L/T/R	C	15.3	0.17	-	15	C	15.8	0.18	-	16	C	16.2	0.19	-	17
Munroe St WB L/R	B	12.8	0.13	-	11	B	13.1	0.14	-	12	B	13.4	0.14	-	12
Walnut Ave NB T/R	A	0.0	0.31	-	0	A	0.0	0.33	-	0	A	0.0	0.34	-	0
Walnut Ave SB L/T	A	0.2	0.00	-	0	A	0.2	0.00	-	0	A	0.2	0.00	-	0
Walnut Ave/Harrishof St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harrishof St EB L/T/R	C	24.0	0.06	-	5	D	25.5	0.06	-	5	D	26.5	0.07	-	5
Walnut Ave NB L/T/R	A	0.1	0.00	-	0	A	0.1	0.00	-	0	A	0.1	0.01	-	0
Walnut Ave SB L/T/R	A	1.3	0.04	-	3	A	1.4	0.04	-	3	A	1.3	0.04	-	3
Walnut Ave/Harold St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walnut Ave EB L/T/R	B	11.9	0.45	-	15	B	12.3	0.47	-	18	C	21.3	0.05	-	4
Harold St NB L/T/R	A	9.2	0.17	-	58	A	9.3	0.18	-	63	A	0.0	0.01	-	0
Walnut Ave SB L/T/R	A	9.5	0.31	-	33	A	9.7	0.32	-	35	A	0.8	0.03	-	2

Grey Shading indicates LOS E or F or decrease to LOS E or F in the future conditions.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

m Volumes for 95th percentile queue is metered by upstream signal.

Table 4-3 Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Movement	Existing (2018) Condition					No-Build (2025) Condition					Build (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Signalized Intersections															
Washington St/Marcella St/Brinton St	**D**	**41.7**	-	-	-	**E**	**55.1**	-	-	-	**E**	**64.5**	-	-	-
Marcella St EB L/R	E	57.0	0.96	314	#544	D	54.5	0.95	~344	#574	D	54.0	0.95	~371	#583
Brinton St WB L/T/R	B	14.8	0.04	6	21	B	14.8	0.04	6	21	B	14.8	0.04	6	21
Washington St NB L	D	50.8	0.78	53	m#199	F	>80	>1	~128	m#245	F	>80	>1	~139	m#236
Washington St NB T	C	23.0	0.47	110	213	C	27.0	0.58	139	250	C	27.6	0.59	140	250
Washington St SB T	D	41.3	0.67	324	m352	D	46.7	0.79	370	m372	D	41.9	0.83	383	m38
Washington St SB R	C	22.6	0.27	74	m89	C	22.6	0.26	78	m85	C	22.3	0.30	78	m83
Washington St/Dimock St	**C**	**28.0**	-	-	-	**C**	**28.3**	-	-	-	**C**	**28.4**	-	-	-
Dimock St EB L/R	E	55.5	0.84	167	227	E	55.8	0.84	167	253	E	55.8	0.84	167	253
Washington St NB L/T	C	22.0	0.55	212	342	C	23.6	0.61	242	391	C	23.8	0.62	247	397
Washington St SB T/R	B	14.0	0.44	90	m170	B	15.2	0.50	122	m187	B	15.3	0.50	128	m17
Martin Luther King Jr. Blvd/Walnut Ave	**C**	**27.6**	-	-	-	**C**	**27.5**	-	-	-	**C**	**28.8**	-	-	-
MLK Jr. Blvd EB L	D	48.8	0.48	44	117	D	48.9	0.49	45	119	D	48.9	0.49	45	119
MLK Jr. Blvd EB T | T	C	23.1	0.31	75	184	C	23.3	0.32	78	190	C	23.3	0.32	78	190
MLK Jr. Blvd EB R	A	0.1	0.09	0	0	A	0.1	0.10	0	0	A	0.1	0.10	0	0
MLK Jr. Blvd WB L	D	48.1	0.42	35	99	D	48.3	0.43	36	102	D	48.3	0.43	36	102
MLK Jr. Blvd WB T | T/R	C	23.3	0.26	56	144	C	23.5	0.27	58	150	C	23.5	0.27	58	150
Walnut Ave NB L	D	41.8	0.57	57	#211	D	40.9	0.56	59	#214	D	48.5	0.67	64	#243
Walnut Ave NB T/R	C	28.1	0.31	63	178	C	28.5	0.33	68	190	C	29.1	0.36	75	206
Walnut Ave SB L/T/R	C	33.5	0.58	130	#316	C	32.8	0.55	121	#337	D	35.1	0.63	145	#363
Townsend St/Walnut Ave	**C**	**21.6**	-	-	-	**C**	**22.9**	-	-	-	**C**	**23.5**	-	-	-
Townsend St EB L/T/R	C	30.2	0.78	110	#302	C	30.6	0.79	119	#330	C	31.5	0.80	132	#370
Townsend St WB L/R	C	30.3	0.71	23	#134	C	34.0	0.75	28	#156	C	30.3	0.72	30	#161
Walnut Ave NB T/R	B	11.4	0.28	36	133	B	12.0	0.30	41	138	B	12.6	0.31	48	138
Walnut Ave SB L/T	B	15.6	0.52	88	287	B	16.9	0.55	99	301	B	18.5	0.59	122	#343
Columbus Ave/Seaver St/Walnut Ave	**D**	**35.0**	-	-	-	**D**	**36.3**	-	-	-	**D**	**36.1**	-	-	-
Columbus Ave EB L/T/R	C	30.1	0.62	231	297	C	30.8	0.65	240	309	C	30.7	0.65	243	311
Seaver St WB L/T	D	38.5	0.59	180	246	D	41.2	0.66	198	264	D	40.3	0.63	188	256
Seaver St WB R	B	15.2	0.11	2	51	B	14.3	0.12	0	53	B	14.3	0.14	0	58
Walnut Ave NB L/T/R	D	36.9	0.64	242	#431	D	39.6	0.70	~298	#487	D	37.8	0.66	254	#452
Walnut Ave SB L/T/R	D	44.1	0.69	~225	#387	D	43.2	0.66	195	#374	D	46.9	0.73	~250	#415
Harold St/Seaver St	**B**	**15.5**	-	-	-	**B**	**14.5**	-	-	-	**B**	**15.1**	-	-	-
Harold St WB L/R	D	35.8	0.42	66	122	D	40.2	0.49	81	127	D	42.1	0.53	90	138
Seaver St NB T/R	A	5.7	0.22	73	97	A	4.9	0.2	43	101	A	5.0	0.22	45	101
Seaver St SB L/T	B	18.4	0.44	293	342	B	16.4	0.45	292	351	B	16.9	0.45	298	355

Table 4-3 Capacity Analysis Summary, Weekday p.m. Peak Hour (Continued)

Intersection/Movement	Existing (2018) Condition					No-Build (2025) Condition					Build (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Unsignalized Intersections															
Washington St/Townsend St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington St NB T/R	A	0.0	0.36	-	0	A	0.0	0.40	-	0	A	0.0	0.40	-	0
Washington St SB L/T	A	8.6	0.40	-	49	A	9.9	0.45	-	59	B	10.6	0.48	-	67
Walnut Ave/Elmore St/Munroe St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elmore St EB L/T/R	C	15.8	0.14	-	13	C	16.0	0.15	-	13	C	16.4	0.15	-	14
Munroe St WB L/R	B	12.1	0.12	-	11	B	12.2	0.13	-	11	B	12.4	0.13	-	12
Walnut Ave NB T/R	A	0.0	0.16	-	0	A	0.0	0.17	-	0	A	0.0	0.18	-	0
Walnut Ave SB L/T	A	0.9	0.03	-	2	A	1.0	0.03	-	2	A	1.0	0.03	-	2
Walnut Ave/Harrishof St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harrishof St EB L/T/R	C	19.6	0.05	-	4	C	20.7	0.05	-	4	C	16.2	0.12	-	10
Walnut Ave NB L/T/R	A	0.0	0.00	-	0	A	0.0	0.00	-	0	A	0.6	0.01	-	1
Walnut Ave SB L/T/R	A	0.8	0.03	-	2	A	0.8	0.03	-	2	A	0.8	0.03	-	2
Walnut Ave/Harold St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walnut Ave EB L/T/R	B	12.1	0.16	-	43	B	12.7	0.40	-	48	B	13.0	0.42	-	15
Harold St NB L/T/R	A	9.4	0.37	-	13	A	9.6	0.16	-	15	A	9.7	0.17	-	53
Walnut Ave SB L/T/R	C	18.7	0.76	-	165	C	22.3	0.80	-	203	C	24.0	0.81	-	205

As shown in Table 4-2 and Table 4-3, the majority of intersections and approaches operate within a desirable LOS under all three conditions with the exception of the signalized intersection of **Washington Street/Marcella Street/Brinton Street**, which operates at LOS C during the a.m. peak hour and LOS D to LOS E during the p.m. peak hour for both the NO Build and Build conditions. The Marcella Street eastbound approach operates at LOS D during the a.m. peak hour and LOS E during the p.m. peak hour. The longest queues at the intersection occur at the Marcella Street eastbound approach during the a.m. peak hour and p.m. peak hours.

Table 4-4 and Table 4-5 summarize the traffic capacity analysis for the study area intersection for the future conditions analysis during the a.m. and p.m. peak hours, respectively. The Build Mitigated section of the tables highlights the effect of the mitigation measures outlined in Section 2.4 on the delays and queues in the study area. With Mitigation, the **Washington Street/Marcella Street/Brinton Street intersection operates at LOS D in the a.m. peak hour and LOS C in the p.m. peak hour.**

Table 4-4 Mitigation Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Movement	No-Build (2025) Condition					Build (2025) Condition					Build Mitigated (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Signalized Intersections															
Washington St/Marcella St/Brinton St	**C**	**25.0**	-	-	-	**C**	**25.4**	-	-	-	**B**	**19.2**	-	-	-
Marcella St EB L/R	D	53.9	0.89	176	#309	D	54.4	0.90	178	#313	D	47.8	0.85	192	267
Brinton St WB L/T/R	C	20.4	0.07	9	29	C	20.4	0.07	9	29	B	17.2	0.06	9	25
Washington St NB L	C	25.4	0.68	61	#308	C	16.5	0.69	62	#310	B	14.7	0.55	83	140
Washington St NB T	B	14.1	0.48	95	192	B	14.2	0.48	95	192	A	10.3	0.42	95	181
Washington St SB T	B	18.6	0.47	255	226	B	18.4	0.48	264	238	B	12.8	0.41	91	310
Washington St SB R	B	10.2	0.22	30	m69	B	10.3	0.22	30	m69	A	6.7	0.20	10	m11
Washington St/Dimock St	**C**	**23.2**	-	-	-	**C**	**23.3**	-	-	-	**B**	**13.7**	-	-	-
Dimock St EB L/R	D	53.1	0.72	110	172	D	53.1	0.72	110	172	D	52.9	0.72	109	172
Washington St NB L/T	C	21.1	0.66	309	#575	C	21.2	0.66	311	#577	A	8.6	0.55	153	297
Washington St SB T/R	B	13.6	0.46	69	m235	B	13.9	0.46	75	m23	A	4.5	0.38	49	111
Martin Luther King Jr. Blvd/Walnut Ave	**C**	**27.4**	-	-	-	**C**	**28.0**	-	-	-	**C**	**24.8**	-	-	-
MLK Jr. Blvd EB L	D	44.2	0.26	19	63	D	44.2	0.26	19	63	D	37.2	0.20	14	59
MLK Jr. Blvd EB T | T	B	18.9	0.17	29	106	B	18.9	0.17	29	106	C	22.1	0.21	25	113
MLK Jr. Blvd EB R	A	0.1	0.04	0	0	A	0.1	0.04	0	0	A	0.1	0.04	0	0
MLK Jr. Blvd WB L	D	44.0	0.20	14	50	D	44.0	0.20	14	50	D	36.9	0.15	10	47
MLK Jr. Blvd WB T | T/R	C	21.8	0.32	72	177	C	21.8	0.32	72	177	C	25.2	0.41	65	#195
Walnut Ave NB L	D	39.1	0.69	119	#378	D	40.4	0.72	123	#389	C	31.8	0.70	87	#290
Walnut Ave NB T/R	C	32.8	0.63	154	#439	C	33.9	0.66	166	#472	C	25.5	0.65	116	326
Walnut Ave SB L/T/R	C	24.8	0.26	52	150	C	24.9	0.27	54	157	B	18.1	0.27	38	125

Grey Shading indicates LOS E or F or decrease to LOS E or F in the future conditions.
Black Shading indicates an improvement in LOS from E or F

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

Table 4-5 Mitigation Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Movement	No-Build (2025) Condition					Build (2025) Condition					Build Mitigated (2025) Condition				
	LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)		LOS	Delay (s)	V/C Ratio	%ile Queue Length (ft)	
				50th	95th				50th	95th				50th	95th
Signalized Intersections															
Washington St/Marcella St/Brinton St	**E**	**55.1**	-	-	-	**E**	**64.5**	-	-	-	**C**	**26.3**	-	-	-
Marcella St EB L/R	D	54.5	0.95	~344	#57	D	54.0	0.9	~371	#58	D	52.7	0.9	314	#541
Brinton St WB L/T/R	B	14.8	0.04	6	21	B	14.8	0.0	6	21	B	11.7	0.0	5	18
Washington St NB L	F	>80	>1	~128	m#24	F	>80	>1	~139	m#23	C	30.1	0.6	57	#171
Washington St NB T	C	27.0	0.58	139	250	C	27.6	0.5	140	250	B	17.0	0.4	135	210
Washington St SB T	D	46.7	0.79	370	m3	D	41.9	0.8	383	m3	B	11.6	0.6	138	m141
Washington St SB R	C	22.6	0.26	78	m8	C	22.3	0.3	78	m8	A	3.7	0.2	14	m20
Washington St/Dimock St	**C**	**28.3**	-	-	-	**C**	**28.4**	-	-	-	**B**	**17.9**	-	-	-
Dimock St EB L/R	E	55.8	0.84	167	253	E	55.8	0.8	167	253	D	49.7	0.7	165	236
Washington St NB L/T	C	23.6	0.61	242	391	C	23.8	0.6	247	397	B	10.4	0.4	138	268
Washington St SB T/R	B	15.2	0.50	122	m1	B	15.3	0.5	128	m1	A	5.1	0.3	64	m107
Martin Luther King Jr. Blvd/Walnut Ave	**C**	**27.5**	-	-	-	**C**	**28.8**	-	-	-	**C**	**25.6**	-	-	-
MLK Jr. Blvd EB L	D	48.9	0.49	45	119	D	48.9	0.4	45	119	D	40.4	0.4	32	#131
MLK Jr. Blvd EB T | T	C	23.3	0.32	78	190	C	23.3	0.3	78	190	C	25.4	0.4	67	188
MLK Jr. Blvd EB R	A	0.1	0.10	0	0	A	0.1	0.1	0	0	A	0.1	0.1	0	0
MLK Jr. Blvd WB L	D	48.3	0.43	36	102	D	48.3	0.4	36	102	D	40.2	0.3	26	#108
MLK Jr. Blvd WB T | T/R	C	23.5	0.27	58	150	C	23.5	0.2	58	150	C	25.6	0.3	51	147
Walnut Ave NB L	D	40.9	0.56	59	#21	D	48.5	0.6	64	#24	D	37.3	0.6	45	#172
Walnut Ave NB T/R	C	28.5	0.33	68	190	C	29.1	0.3	75	206	C	21.6	0.3	53	161
Walnut Ave SB L/T/R	C	32.8	0.55	121	#33	D	35.1	0.6	145	#36	C	27.5	0.6	102	257

As shown in Table 4-4 and Table 4-5, the proposed mitigation measures work to improve the all of the LOS E and LOS F movements in the study area. The intersection of **Washington Street/Marcella Street/Brinton Street**, which operates at LOS E under the No-Build and Build Conditions, improves to LOS C under the Build Mitigated Condition during the p.m. peak hour. The Washington Street northbound left-turn movement improves from LOS F under the No-Build and Build Conditions to LOS C under the Build Mitigated Condition during the p.m. peak hour.

The intersection of **Washington Street/Dimock Street** improves from LOS C to LOS B during the a.m. and p.m. peak hours. The Dimock Street eastbound approach improves from LOS E to LOS D during the p.m. peak hour.

The overall impact of the Project is minor, but the mitigation measures will help to minimize the impact further and improve upon the existing conditions.

Chapter 5.0

Sustainable Design and Climate Change Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Introduction

Sustainability is one of the Proponent and Design team's priorities for the Project. The goal for the development is to enhance the neighborhood, minimize negative environmental impact, and maximize occupant health and comfort. These goals will continue to be a major guide for decisions regarding design and operations for the Project.

This section describes how the Project will be designed to meet the requirements of Article 37 of the Code by achieving certification under the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) v4, New Construction rating system. Potential site-generated energy technologies are also described, as well as measures to make the Project resilient towards future climate conditions.

5.2 Green Building

The Project consists of one New Construction multifamily residential building. A LEED Checklist has been prepared for the new building and is included at the end of this section. The Project aims to achieve LEED certification at a minimum of the Silver level, though is currently targeting certification at the Gold. Please note that this is an initial credit checklist and applicable credits may change as the building design advances.

5.2.1 Integrative Process

Integrative Process (1 point): The Project team will evaluate the design prior to Schematic Design through the use of preliminary energy modeling analyses and a water budget analysis.

5.2.2 Location and Transportation (LT)

Sensitive Land Protection (1 point): The Project footprint has been sited such that it does not encroach on any area that is considered to be sensitive land (i.e. farmland, floodplains, habitat, water bodies, and wetlands).

Surrounding Density and Diverse Uses (4 points): Option 1 – The project location meets the minimum existing surrounding residential density requirements of 7 dwelling units per acre. Option 2 – The main entrance of the Project is within a ½-mile walking distance of eight or more existing and publicly available diverse uses (pharmacy, public park, education facility, restaurant, bank, hair care, daycare, community recreation center).

Access to Quality Transit (1 point): The Project is located within a ¼ mile walking distance to existing bus routes, which meet the minimum weekday/weekend trips to qualify for one point.

Bicycle Facilities (1 point): There is storage planned to accommodate 300 bicycles within the Project footprint, which exceeds one bicycle per dwelling unit. Short-term exterior bike storage will also be provided.

Green Vehicles (1 point): Parking within the Project is designed to ensure that 5% of the total number of spaces are designated as preferred parking for green vehicles, with electric vehicle charging available at 2% of the total parking spaces.

5.2.3 Sustainable Sites (SS)

Construction Activity Pollution Prevention (Prerequisite): The Project will comply with all pollution prevention requirements.

Site Assessment (1 point): The Project design team will complete a site survey to demonstrate relationships between site features and topography, hydrology, climate, vegetation, soils, human use, and human health effects.

Site Development – Protect or Restore Habitat (2 points): The Project will restore 30% of all portions of the site identified as previously disturbed using native or adapted vegetation.

Open Space (1 point): The Project will provide outdoor space greater than or equal to 30% of the total site area, including intensive vegetated roofs.

Heat Island Reduction (2 points): The landscape design will provide shade through vegetation and 3-year aged solar-reflectance paving at hardscaped areas. The Project will utilize a high-reflective roofing material while also incorporating vegetated roofing in select locations.

Light Pollution Reduction (1 point): The Project will specify lighting that meets the uplight and light trespass requirements.

5.2.4 Water Efficiency (WE)

Outdoor Water Use Reduction (Prerequisite): The Project will use drought-resistant vegetation and an efficient irrigation system reduce the Project's landscape water requirement by at least 50% from the calculated baseline.

Indoor Water Use Reduction (Prerequisite): Plumbing fixtures installed in the Project will be WaterSense labeled and contribute to a 50% reduction of water usage from the baseline. Appliances will be EnergyStar labeled and heating/cooling processes are specified to utilize high-efficiency systems with minimum demand on water usage.

Building-Level Water Metering (Prerequisite): The Project will utilize permanently installed water meters that measure the potable water use for the building and associated grounds.

Outdoor Water Use Reduction (1 point): The Project will use drought-resistant vegetation and an efficient irrigation system reduce the project's landscape water requirement by at least 50% from the calculated baseline.

Indoor Water Use Reduction (6 points): Plumbing fixtures installed in the Project will be WaterSense labeled and contribute to a 50% reduction of water usage from the baseline.

Water Metering (1 point): The Project will have water meters installed to monitor irrigation and tenant plumbing fixtures and fittings.

5.2.5 Energy and Atmosphere (EA)

Fundamental Commissioning and Verification (Prerequisite): Commissioning process activities will be completed for mechanical, electrical, and plumbing systems in accordance with ASHRAE guidelines as they relate to energy, water, indoor environmental quality, and durability.

Minimum Energy Performance (Prerequisite): The Project team will evaluate the building through use of a whole-building energy simulation to demonstrate an improvement of at least 5% in the proposed building performance as compared to the baseline rating.

Building-Level Energy Metering (Prerequisite): The Project will utilize building-level energy meters to provide data representing the total building energy consumption.

Fundamental Refrigerant Management (Prerequisite): Systems specified in the Project will not use CFC-based refrigerants.

Enhanced Commissioning (4 points): The Project Team will complete all of the enhanced commissioning procedures, and develop monitoring-based procedures and identify new points to be measured to assess performance of energy- and water-consuming systems.

Optimize Energy Performance (10 points): The Project team will evaluate the building through use of a whole-building energy simulation to demonstrate an improvement of 24% in the proposed building performance as compared to the baseline rating.

Advanced Energy Metering (1 point): The Project will have energy meters installed to monitor all whole-building energy sources used by the building, as well as individual sources that account for 10% or more of the total annual consumption.

Enhanced Refrigerant Management (1 point): The Project will utilize only refrigerants that have an ozone depletion potential of zero and a global warming potential of less than 50.

Green Power and Carbon Offsets (1 point): The Proponent will engage in a contract for a minimum of five years to have 50% of the Project's total energy consumption delivered by qualified, green power resources.

5.2.6 Materials and Resources (MR)

Storage and Collection of Recyclables (Prerequisite): The Project will provide dedicated areas for the collection and storage of recyclable material in the building.

Construction and Demolition Waste Management Plan (Prerequisite): The Project will develop and implement a construction and waste management plan.

Building Product Disclosure and Optimization – Environmental Product Declarations (1 point): The Project will use at least 20 different products from at least 5 different manufacturers that comply with all EDP conformance regulations.

Building Product Disclosure and Optimization – Sourcing of Raw Materials (1 point): The Project will use at least 20 different products from at least 5 different manufacturers that provide raw material supplier reports.

Building Product Disclosure and Optimization – Material Ingredients (1 point): The Project will use at least 20 different products from at least 5 different manufacturers that comply with documentation which demonstrates them to be environmentally, economically, and socially preferred.

Construction and Demolition Waste Management (1 point): The Project will divert 50% of its construction and demolition waste. Diverted materials will include at least three material streams.

5.2.7 Indoor Environmental Quality (IEQ)

Minimum Indoor Air Quality Performance (Prerequisite): The Project will comply with all minimum indoor air quality performance guidelines.

Environmental Tobacco Smoke Control (Prerequisite): The Project will prohibit smoking inside and outside the building except in designated areas.

Enhanced Indoor Air Quality Strategies (1 point): The Project will work to improve indoor air quality by complying with all enhanced IEQ strategies for entryway systems, interior cross-contamination prevention, filtration, and natural and mixed-mode ventilation design calculations.

Low-Emitting Materials (3 points): The Project will reduce concentrations of chemical contaminates by utilizing low VOC materials.

Construction Indoor Air Quality Management Plan (1 point): The Project will develop and implement an indoor air quality management plan to be used during construction to promote the well-being of the construction workers.

Indoor Air Quality Assessment (1 point): The building will be flushed out before occupancy to establish better indoor air quality.

Thermal Comfort (1 point): The building will meet all requirements of ASHRAE Standard 55-2010.

Interior Lighting (2 points): The building will be fitted with individual lighting controls and lighting fixtures that comply with lighting quality standards.

Daylight (2 points): The Project will provide glare-control devices and will demonstrate spatial daylight autonomy in 55% of regularly occupied areas.

Quality Views (1 point): 75% of all regularly occupied areas in the building will have glazing to provide quality views.

Acoustic Performance (1 point): The Project will meet all STC requirements to ensure quality acoustic design.

5.2.8 Innovation

Innovation (3 points): The Project Team is committed to pursuing advanced sustainability measures, which will advance the Project development in a direction to achieve two exemplary performance credits, two pilot credits, and one innovation credit.

1 point – Exemplary Performance - Heat Island Reduction
1 point – Exemplary Performance - Quality views
1 point – Innovation – Green Building Education

LEED Accredited Professional (1 point): The Project Team consists of the following LEED accredited professionals who will be directly involved in the design of the Project:

David Giuliano, LEED AP BD+C

Robb Van Marter, LEED AP BD+C

5.2.9 Regional Priority

Regional Priority (1 point): The points available in the Regional Priority Category are contingent on the Project's meeting certain thresholds for credits in previous categories as determined by the USGBC. The Project is tracking the Regional Priority credits for Optimize Energy Performance. The points in the Regional Priority category are automatically awarded pending the award of original credits to which they are linked.

5.3 Site-generated Energy

The Proponent has studied a number of different site-generated energy options for the Project. The technologies studied and potential feasibility of each is provided below.

Photovoltaics

Photovoltaic (PV) panels provide electricity and can help reduce the operating cost of a building. Approximately 20,600 sf of rooftop area could potentially be used for solar PV panels, after taking into account the space available for solar PV panels, as well as space necessary around the panels, between panels, etc. Assuming 12 watts per square foot, this allows for an approximately 247kW array. The feasibility of installing a solar PV system will be further evaluated and determined at the time of construction

Wind

The feasibility of generating electricity from wind sources was assessed and rejected for the following reasons:

- Competing roof area for mechanical equipment and amenities; and, small, vertical wind turbines provide limited electricity generation relative to total building demand.

Transpired Solar Collectors

The feasibility of using solar energy to preheat ventilation air was assessed and rejected for the following reasons:

- Transpired solar collectors are ideal for large opaque south-facing walls. Residential projects have too much glazing and not enough continuous opaque wall area to make this technology viable; and

- The Project includes energy recovery wheels to preheat all outside air entering the building. The energy recovery wheels recover heat from building return air that would otherwise be exhausted. The additional benefit of transpired solar collectors is limited.

Solar Thermal

The feasibility of generating thermal energy from solar thermal was assessed and rejected for the following reasons:

- Competing roof area for mechanical equipment, vegetated roofs and amenities; and

- Relatively low cost of natural gas compared to electricity which reduces the cost-effectiveness of solar thermal.

Geothermal (Ground Source Heat Pumps)

The feasibility of using geothermal sources to provide heating and cooling was assessed and rejected for the following reasons:

- Relatively low cost of natural gas and relatively high cost of electricity makes geothermal less cost-effective compared with energy conservation strategies.

Combined Heat and Power

Combined heat and power (CHP) systems, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated system. CHP systems are most advantageous for facilities such as this one that have a hot water demand year-round. Therefore, a smaller sized 25-50 kW CHP system to power the base hot water load of the building is currently being considered. This CHP system would operate via natural gas to produce hot water and electricity, and would primarily provide domestic hot water. Since CHP produces electricity using less expensive natural gas, but generates usable heat less efficiently than a conventional natural gas boiler, the net impact would be a slight increase of 1% to 2% in energy use, and a slight decrease of 1% to 2% in energy costs and carbon emissions. Additional analysis will be done in later stages of design to further evaluate the energy and financial implications of a CHP system.

With involvement and input from Eversource, including their approval to connect back into the grid, such a system could be further evaluated.

5.4 Climate Change Resilience

5.4.1 Introduction

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

A copy of the completed Climate Resiliency Checklist is included in Attachment C. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

5.4.2 Extreme Heat Events

The *Climate Ready Boston* report predicts that in Boston, there may be between 25 to 90 days with temperatures over 90 degrees by 2070, compared to an average of 11 days per year over 90 degrees between 1971 to 2000. The Project design will include measures to adapt

to these conditions, including utilizing a high-reflective roofing material while also incorporating vegetated roofing in select locations, planting street trees, constructing a high performance building envelope and including operable windows where possible.

5.4.3 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment, as necessary. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site and promote runoff recharge to the greatest extent practicable. The Project will increase the pervious area on the site from the existing condition, creating infiltration ability on the site.

5.4.4 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials and high efficiency irrigation systems will be installed. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name: 45 Townsend Street
Date: 12.10.2018

Y	?	N			
1			Credit	Integrative Process	1

8	3	5		**Location and Transportation**	**16**
		x	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
	2		Credit	High Priority Site	2
4		1	Credit	Surrounding Density and Diverse Uses	5
1		4	Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

7	2	1		**Sustainable Sites**	**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
2			Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
	2	1	Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

8	1	2		**Water Efficiency**	**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	1		Credit	Outdoor Water Use Reduction	2
6			Credit	Indoor Water Use Reduction	6
		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

17	15	1		**Energy and Atmosphere**	**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2		Credit	Enhanced Commissioning	6
10	8		Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
	2	1	Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
1	1		Credit	Green Power and Carbon Offsets	2

4	7	2		**Materials and Resources**	**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
	3	2	Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit	Construction and Demolition Waste Management	2

13	2	1		**Indoor Environmental Quality**	**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1		1	Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
2	1		Credit	Daylight	3
1			Credit	Quality Views	1
1			Credit	Acoustic Performance	1

4	2	0		**Innovation**	**6**
3	2		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

1	0	0		**Regional Priority**	**4**
1			Credit	Regional Priority Optimize Energy Performance	1
			Credit	Regional Priority	1
			Credit	Regional Priority	1
			Credit	Regional Priority	1

63	32	12	**TOTALS**	Possible Points:	**110**

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

Chapter 6.0

Environmental Protection

6.0 ENVIRONMENTAL PROTECTION

6.1 Shadow Analysis

6.1.1 Methodology

A shadow impact analysis was conducted to assess potential shadow impacts from the Project. The study evaluated the following four times of the year:

1. Spring Equinox (March 21) at 9:00 a.m., 12:00 noon, and 3:00 p.m.
2. Summer Solstice (June 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
3. Autumnal Equinox (September 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
4. Winter Solstice (December 21) at 9:00 a.m., 12:00 noon, and 3:00 p.m.

The shadow analysis identified existing and net new shadow that will be created by the Project, illustrating the likely shadow impact of the Project on existing conditions. The analysis focuses on nearby open spaces, sidewalks, and bus stops, adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 through 3.2-14 at the end of this section.

The analysis shows new shadow from the Project has markedly lessened due to the revised design since the filing of the PNF. The new shadow from the Project will generally be limited to nearby streets, sidewalks, portions of abutting properties, as well as the Project site. Twelve of the fourteen time periods studied have no shadow impacts on public open spaces or bus stops. New shadow will be cast onto portions of Horatio Harris Park at 6 p.m. on the Autumnal Equinox. The only time period which indicates shadow impacts on a bus stop is December 21 at 9:00 a.m.

6.1.2 Vernal Equinox (March 21)

On the vernal equinox, the sun remains relatively low in the sky which will cause Project-related net new shadow at 9:00 a.m. to be cast to the northwest across the Project site and the rear yards of the Academy Homes II site and the 33-35 Townsend Street parcels. (Figure 6.2-1). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., areas of net new shadow will rotate northward and will be cast on a small portion of the south side of Townsend Street with limited shadow cast on the rear yards of the houses at 21-35 Townsend Street and the Project site (Figure 6.2-2). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow will be cast to the northeast across portions of Townsend Street, portions of the parcels at 32-50 and 60 Townsend Street (Figure 6.2-3). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

6.1.3 Summer Solstice (June 21)

On the summer solstice, morning sun will cast shadow to the northwest but will remain confined to the Project site. (Figure 6.2-4). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 12:00 p.m., shadows will rotate to the north but will remain confined to the Project site (Figure 6.2-5). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m. on the summer solstice, shadows will fall over the Project Site and small portions of the southern side of Townsend Street (Figure 6.2-6). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 6:00 p.m., new shadow will extend in the southeasterly direction over small portions of the parcels at 40-60 Townsend Street and 67 Townsend Street, Townsend Street and its sidewalks and a small portion of Horatio Harris Park (Figure 6.2-7). No net new shadow will be cast onto bus stops in the vicinity of the Project.

6.1.4 Autumnal Equinox (September 21)

On the autumnal equinox, morning sun will cast new shadow across the Project site and the rear yard of the Academy Homes II site (Figure 6.2-8). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 12:00 p.m., areas of new shadow will rotate northward and will fall mostly across the Project site and a small portion of Townsend Street in front of the Project site (Figure 6.2-9). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow will be cast across portions of Townsend Street and its sidewalks and portions of the Project site (Figure 6.2-10). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 6:00 p.m., no new shadow from the Project will be cast across the surrounding area or the Project site. (Figure 6.2-11).

6.1.5 Winter Solstice (December 21)

The low angle sun during the winter solstice will cause new shadow to be cast across the parcels at 17-35 and 14-20 Townsend Street, a small portion of Academy Homes II, a sliver of Townsend Street and its sidewalks, and potentially a narrow band of shadow will be cast on the bus top at the intersection of Washington and Townsend streets (Figure 6.2-12). No net new shadow will be cast onto public open spaces in the vicinity of the Project.

Mid-day shadows will fall across the rear yards of parcels at 17-35 and 14-50 Townsend Street, and a small portion of Townsend Street and its sidewalks (Figure 6.2-13). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., narrow bands of new shadow will fall across various parcels to the north of the Project site, between Townsend and Elmore Street, portions of Townsend and Elmore Streets and their sidewalks and onto 33 Townsend Street (Figure 6.2-14). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

6.1.6 Conclusions

New shadow from the Project will generally be limited to the immediately surrounding streets and sidewalks, as well as parcels abutting the Project site. Twelve of the fourteen time periods studied have no shadow impacts on public open spaces or bus stops. A limited amount of new shadow is cast onto the Washington Street/Townsend Street bus stop during the morning of December 21. New shadow will also be cast onto Horatio Harris Park at 6:00 p.m. during the summer solstice. New shadow from the Project is mostly incremental and minor as compared to existing conditions.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-1
Shadow Study, March 21, 9:00 a.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-2
Shadow Study, March 21, 12:00 p.m.

45 Townsend Street **Boston, Massachusetts**

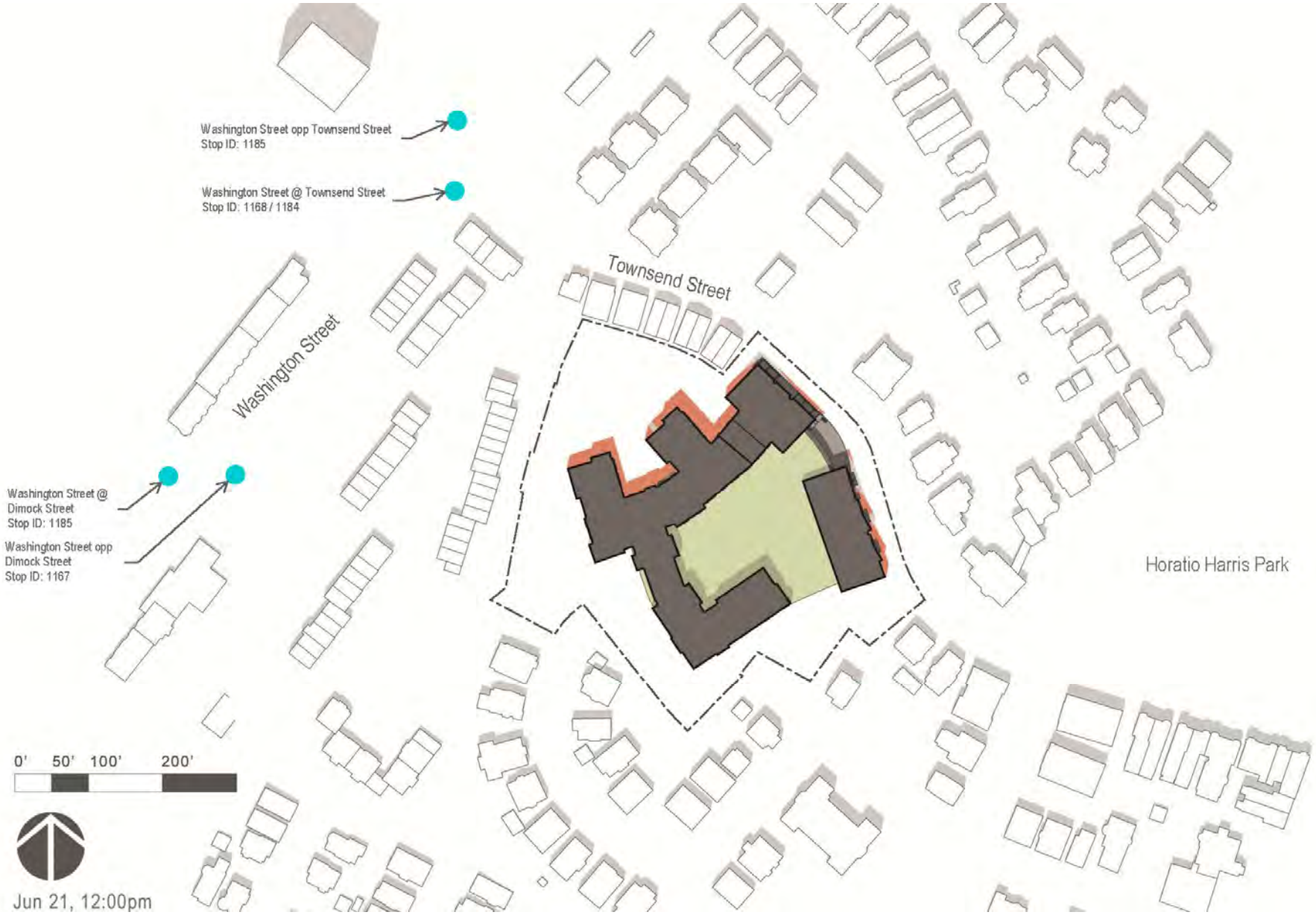
CUBE3

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

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-4
Shadow Study, June 21, 9:00 a.m.



45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-5
Shadow Study, June 21, 12:00 p.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

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

45 Townsend Street **Boston, Massachusetts**

CUBE3

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

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-8
Shadow Study, September 21, 9:00 a.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-9
Shadow Study, September 21, 12:00 p.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-10
Shadow Study, September 21, 3:00 p.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

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

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-12
Shadow Study, December 21, 9:00 a.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-13
Shadow Study, December 21, 12:00 p.m.

45 Townsend Street **Boston, Massachusetts**

CUBE3

Figure 6-14
Shadow Study, December 21, 3:00 p.m.

6.2 Wind Analysis

A qualitative assessment for the Project was prepared by Rowan Williams Davies & Irwin Inc. (RWDI). The Project is expected to meet the effective gust criterion, have minimal impact on wind conditions in the immediate surroundings, and have little to no impact on conditions in the extended surroundings.

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 3D model received from Epsilon Associates, Inc. in November 2018; (Figure 6-15)
- wind-tunnel studies undertaken by RWDI for similar projects in Boston;
- RWDI's engineering judgment, experience and expert knowledge of wind flows around building[1,2]; and,
- use of software developed by RWDI (Windestimator[3]) for estimating the potential wind conditions around generalized building forms.

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

6.2.1 Site and Building Information

The Project site, currently occupied by a number of multi-story structures, is located in the Roxbury neighborhood, south of Townsend Street and east of Codman Park, (Figure 6-16) and is situated at a higher elevation relative to the surroundings, and currently occupied by a five-story office building. The surroundings in all directions comprise low-rise residential buildings and dense, large street-trees. "Project North" is approximately 40°off Geographic North, as indicated below. Hereafter, references to building features and surroundings will be based on Project North, while references to wind directions will be based on Geographic North.

1 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.

2 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.

3 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.

The Project consists of two wood-framed buildings connected by a two-story parking structure (Figure 6-17). The buildings step up from four and six stories on Townsend to five stories at the top of the hill on the south end of the Project site. In total the Project is eight stories overall. The Project is generally comparable in height to the existing on-site building on Townsend Street. The buildings at the south end of the Project site are located on elevated ground, and therefore appear taller than the surroundings. Key pedestrian areas of interest include public sidewalks, main entrances, green roofs and landscaped plazas on the Project site.

6.2.2 Meteorological Data

Wind statistics at Boston Logan International Airport between 1995 and 2018 were analyzed and Figure 6-18 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 mph (red bands in the wind roses) are prevalent from the west-northwest direction throughout the year, while the strong winds from the southwest and northeast are also common.

6.2.3 BPDA Wind Criteria

The Boston Planning and Development Agency (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[4]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria, shown in Table 6-1, are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed).

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

Table 6-1 Boston Planning and Development Agency 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 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.

6.2.4 Pedestrian Wind Conditions

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 6-19, image a). 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 6-19, image b) is the main cause for increased wind activity around buildings at the pedestrian level. These flows subsequently accelerate around exposed building corners and narrow passages (Figure 6-19, image c). 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 6-19, image d) is a positive design strategy that is often used for wind control. Increased wind activity will be created on the lower windward roofs or terraces, however the green roofs above the residential portions of the building will be primarily for viewing only.

Flow Patterns

The following discussions on potential wind conditions around the Project focus on a comparative assessment of the impact of the Project in relation to the existing site. The most frequent and strongest winds in the area are from the west-northwest and northeast directions and occur during the winter and spring seasons.

The wind flow patterns of the predominant west-northwest (red arrows) and northeast (green arrows) winds around the existing site and Project are shown in Figure 6-20, images a and b, with reference to geographic north. Winds from the southwest are also frequent, but less likely to cause uncomfortable or unacceptable wind conditions on the site, but for potential acceleration under the residential bridge connector in the southwest. (blue arrows).

6.2.5 Results

As described in additional detail below, because of the proposed height of the Project and its surroundings, it is predicted that wind speeds on and around the Project will meet the effective gust criterion and the proposed Project will not cause any adverse wind conditions in the neighboring areas. In relation to the existing wind conditions on and around the site, the Project is expected to have minimal impact on wind conditions in the immediate surroundings and will have little to no impact on conditions in the extended surroundings.

The Project is moderate in height and the buildings are surrounded by large open spaces on-site. Wind accelerations are expected at the building corners and are expected to be localized to areas immediately around the buildings, particularly to the north and west of the buildings, however, winds speeds are anticipated to be suitable for the intended use of these areas.

Overall wind conditions are anticipated to be similar to those that currently prevail on and around the site –comfortable for standing in the warmer months and comfortable for walking in the colder months. These conditions are appropriate for the activity expected on the sidewalks throughout the year. Conditions predicted for the outdoor green areas and entrances are also appropriate for the warmer months when people frequent these areas more often. During the colder months, the higher wind speeds are acceptable in the plazas and green roof as the areas will not be in use for prolonged activities.

The main entrances to the Project are recessed from the main façade and designed with a canopy, both positive design features that will reduce wind impact at the entrances. Additional measures to improve wind conditions resulting from exposure to the northeast winds outside the Townsend Street entrances during the winter may be considered.

No Build – Effective Gust and Mean Speed

Wind conditions around the existing site are predicted to be appropriate for pedestrian activities. Wind speeds are expected to meet the effective gust criterion on an annual basis.

In regard to mean wind speeds, winds around the existing site are expected to be comfortable for standing at most areas during the warmer months. This is in large part due to the nature of the surrounding neighborhoods, which are comprised primarily of low-rise buildings of generally even height and streets densely lined by trees. The closely spaced buildings protect the streets from high wind activity as winds have the tendency to flow over the uniform terrain (Figure 6-19, image a). The dense trees around the Project site would further lower the wind activity during the warmer months.

As noted previously, wind speeds are seasonally stronger during the colder months, and without the protection afforded by leafed-out trees, the streets are relatively more exposed. Therefore, winds during the winter are likely to be rated comfortable for walking and would be acceptable as the area would not be used for prolonged activities.

Build – Effective Gust

The Project is similar in height to the existing building on Townsend Street. Although all of the Project's structures are comparable in height, because the site slopes upward in the southerly direction, those structures furthest from Townsend Street are elevated above the surroundings. This results in a stepped form that reduces the impact of winds from the northeast. To a large extent, the buildings shelter the outdoor green space on the roof of Level 4 from prevailing winds.

The proposed structures are also oriented so that generally their narrow facades face the predominant westerly winds. This orientation reduces façade area on which winds will downwash, thereby reducing the occurrence of downwash related wind impacts. The exposed building corners are subject to corner acceleration, however, due to the dense surroundings and moderate height of the proposed buildings, the impact is not expected to be a concern.

It is predicted that wind speeds on and around the Project will meet the effective gust criterion.

Build – Mean Speed

The addition of the Project will likely improve wind conditions to the east of the site, because the Project will shelter that area from the prevailing westerly winds. Since the building on Townsend Street is comparable in height to the existing building at that location, it is expected that wind conditions on Townsend Street will remain unchanged from the existing conditions. The interaction of winds with the Project will result in increased wind activity at the exposed

building corners on the west extremities of the buildings and the northern corners of the Townsend wing, but the resulting wind conditions are expected to be suitable for pedestrian use.

Overall, winds are predicted to continue to be comfortable for standing in the warmer months and comfortable for walking in the colder months. This includes conditions on the Project site as well as the surrounding sidewalks.

Key pedestrian areas on the site include main entrances, a garden and green roof, indicated in Figure 6-21. Main entrances of the Project are indicated in Figure 6-21 including access to Level 1 from Townsend Street, to Level 2 from the north, to Level 3 from the south, and to the garden on the west from Level 4. Townhouse entrances are located along the eastern edge of the Project with direct access units located on the west and within the courtyard on Level 4.

Private accesses to the green roof from residential units are located along the building facades facing the green roof. The following is a discussion on key outdoor areas of interest and the appropriateness of the predicted wind conditions for the intended usage of those areas.

Townsend Street Entrances

The Townsend Street main entrances are setback from the main façade and designed with an overhead canopy (Figure 6-22). Townhouse entrances located along Townsend Street are also designed with overhead canopies.

In general, the north façade of the building will be exposed to winds from the northeast and northwest. During the warmer months, due to the protection afforded by the dense trees in the vicinity, it is likely that wind conditions at the entrances would be comfortable for standing, which is appropriate for an entrance use. During the colder months, as a result of the increased exposure due to winter landscaping conditions, as well as the seasonally stronger winds, wind speeds would be rated comfortable for walking, rather than comfortable for standing.

The recessed locations of the main entrances protect them from northwest winds. The area will still be exposed to northeast winds that are more critical during the colder months. Wind conditions at these entrances are expected to be suitable during most of the year, but for some windy days in the colder months. Temporary mitigation measures such as planters may be considered.

The townhouse entrances located on Townsend Street will be exposed to winds from the northeast. In order to reduce wind speeds, coniferous landscaping in the form of hedges or planters or wind screens to be placed to the east and west of the entrances are being considered. An alternative option for the townhouse entrances is to recess them from the main façade in order to provide a protected transition to the ambient environment.

South Entrance

The south entrance is located in an underpass facing the southwest direction. While the area is protected from the northwest and northeast winds by the Project massing, it is exposed to winds from the southwest that would accelerate under the bridge (Figure 6-23). The surrounding area immediately south of the building is densely wooded and occupied by existing houses; these provide some blockage from the southwest winds. Wind conditions in the passage under the bridge and at the doorway on the west wall of the passage are expected to be comfortable for walking at most times during the year. These conditions are acceptable for pedestrians walking through the area, but higher than desirable for passive activities. Lower mean speeds can be achieved through the use of wind screens or coniferous planters or hedges to the southwest of the entrance.

East and Wests/Garden Entrances

The eastern entrance is on the downwind side of the Project relative to the predominant westerly winds and northeast winds that are important in the colder months. Wind conditions are expected to be appropriate for an entrance use on an annual basis.

The garden on the west side is at a lower elevation than the rest of the site to the west and protected by existing buildings and trees to the west. Wind conditions are expected to be appropriate for passive use of the area during the warmer months. During the winter these outdoor areas are not likely to be used for passive activities and anticipated wind conditions are acceptable.

Green Roof

The green roof is largely protected from prevailing winds by the building massing surrounding it. The impact of the underpass acceleration is not expected to extend into the main green roof area, particularly in the warmer months when the proposed trees on the roof would afford wind control. Wind conditions on the green roof are predicted to be comfortable for standing or sitting during the warmer months, which is appropriate for passive activities. Wind accelerating through the underpass could occasionally result in conditions windier than desirable for passive activities immediately near that area, but as noted previously, wind conditions are appropriate for the pedestrian use proposed in the underpass, and the winds are not expected to affect the usage of the green roof in general. During the winter, wind speeds on the green roof are expected to be comfortable for walking, which is acceptable as passive use of outdoor areas is not anticipated in the colder months.

6.2.6 Conclusion

The Project is expected to meet the effective gust criterion, have minimal impact on wind conditions in the immediate surroundings, and have little to no impact on conditions in the extended surroundings.

Overall wind conditions are anticipated to be similar to those that currently prevail on and around the site – comfortable for standing in the warmer months and comfortable for walking in the colder months. These conditions are appropriate for the activity expected on the sidewalks throughout the year. Conditions predicted for the outdoor green areas and entrances are also appropriate for the warmer months when these areas are more frequented. During the colder months, the higher wind speeds are acceptable on the garden and green roof as the areas will not be in active use.

45 Townsend Street Boston, Massachusetts

Figure 6-15
Rendering of the Proposed Development

45 Townsend Street Boston, Massachusetts

Figure 6-16
Aerial View of the Existing Site and Surroundings

45 Townsend Street Boston, Massachusetts

Figure 6-17

Proposed Site Plan (story count represents height above Townsend Street, not above local grade)

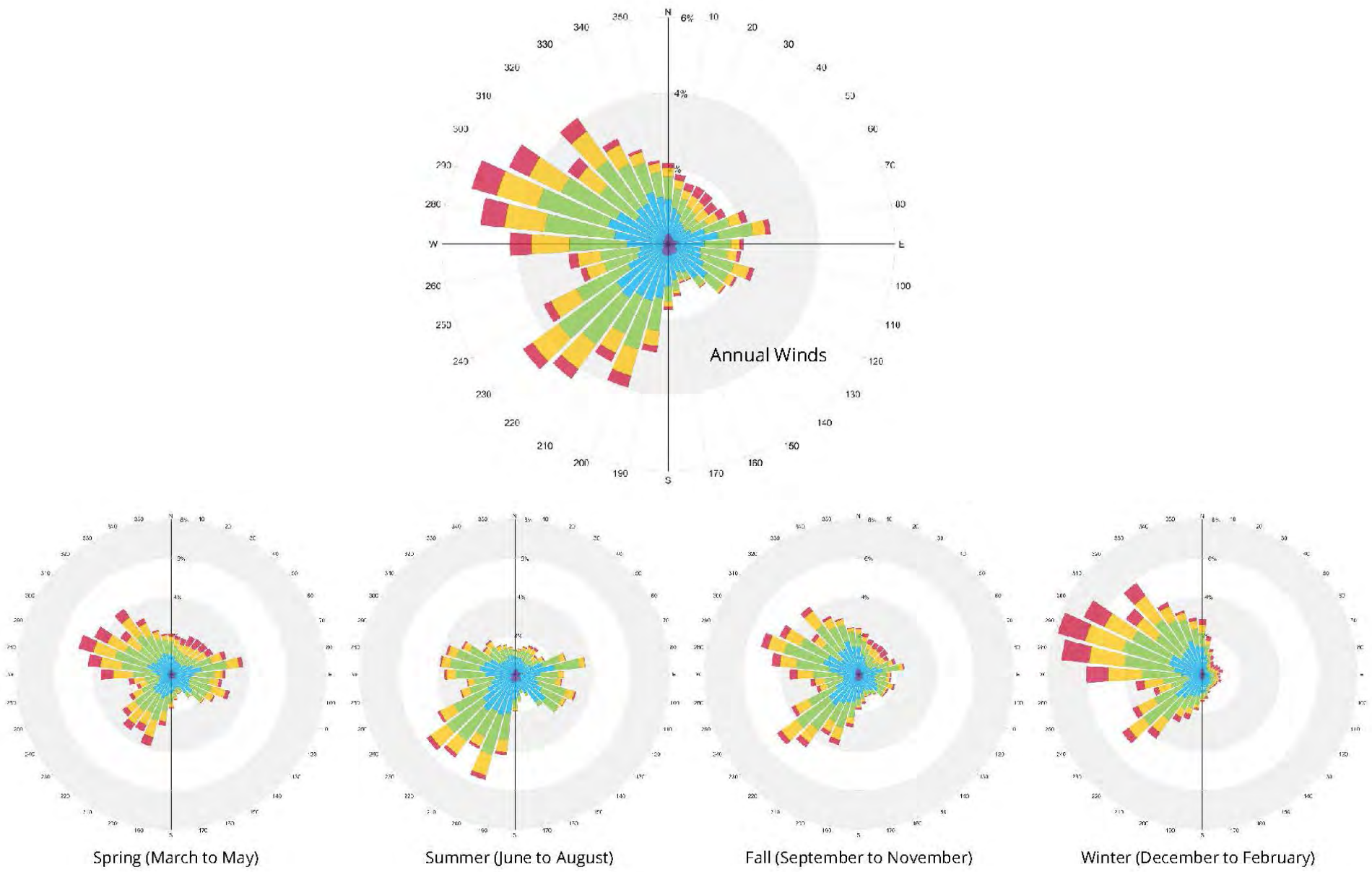
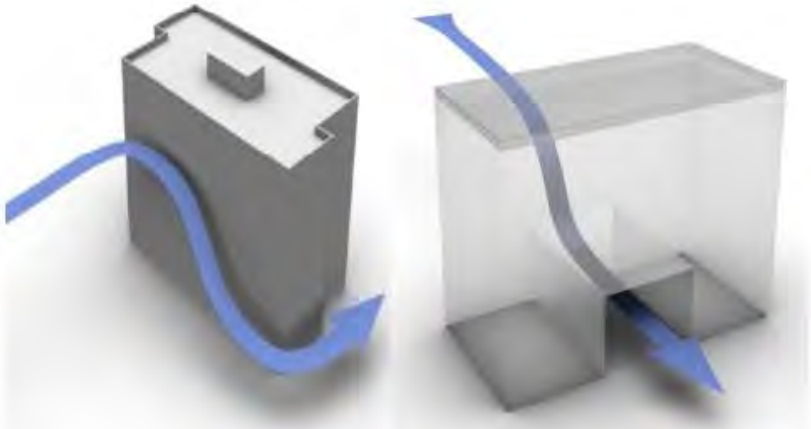


Figure 6-18

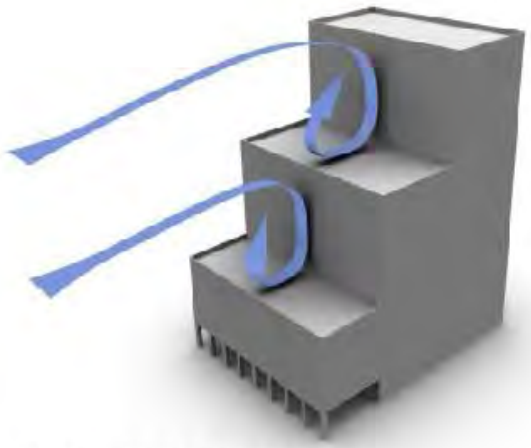
Directional Distribution of Winds (% Blowing From Direction) – Boston Logan International Airport (1995 to 2018)

a) Wind Flow over Low-rise Buildings

b) Downwashing Flow



c) Corner and Underpass Acceleration



d) Stepped Facade

Figure 6-19

General Wind Flow Phenomena around Buildings

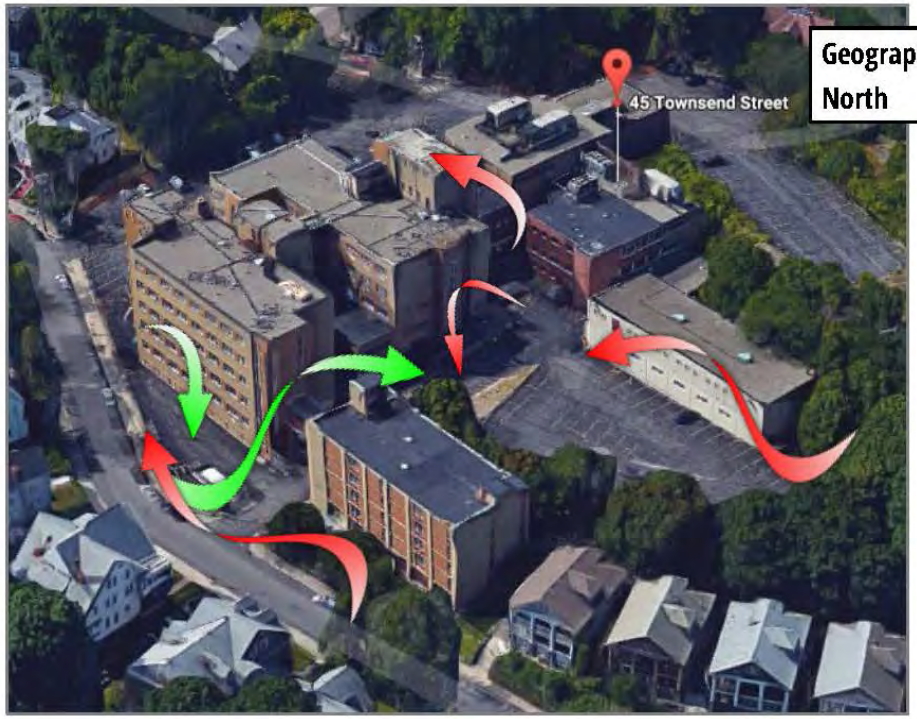


Image a – Wind Flow Pattern on Existing Site

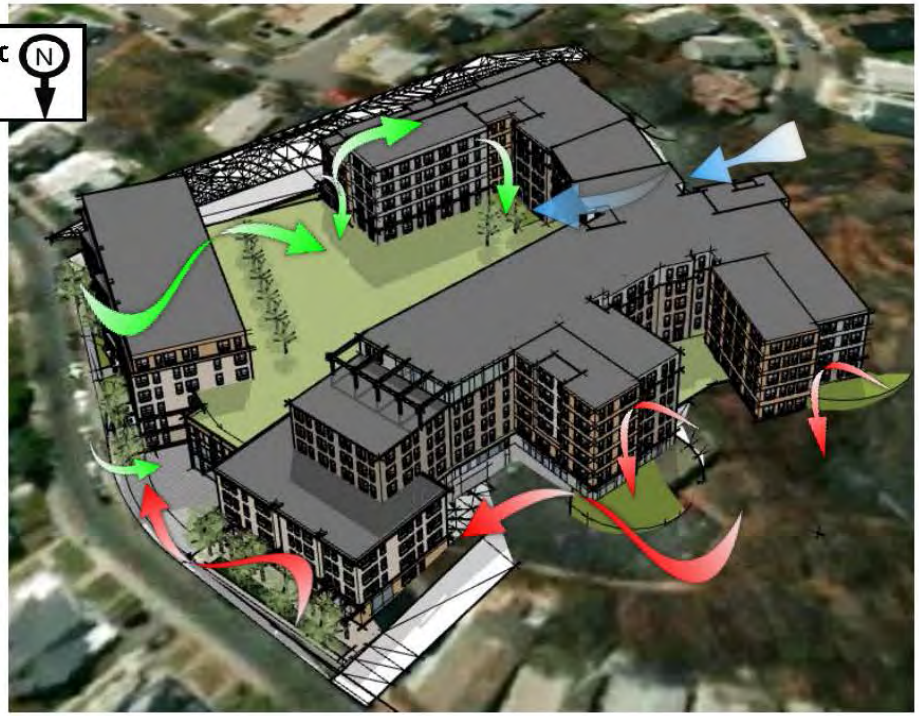


Image b – Wind Flow Pattern around Proposed Project

45 Townsend Street Boston, Massachusetts

Figure 6-21
Main Entrances and Accessible Outdoor Areas

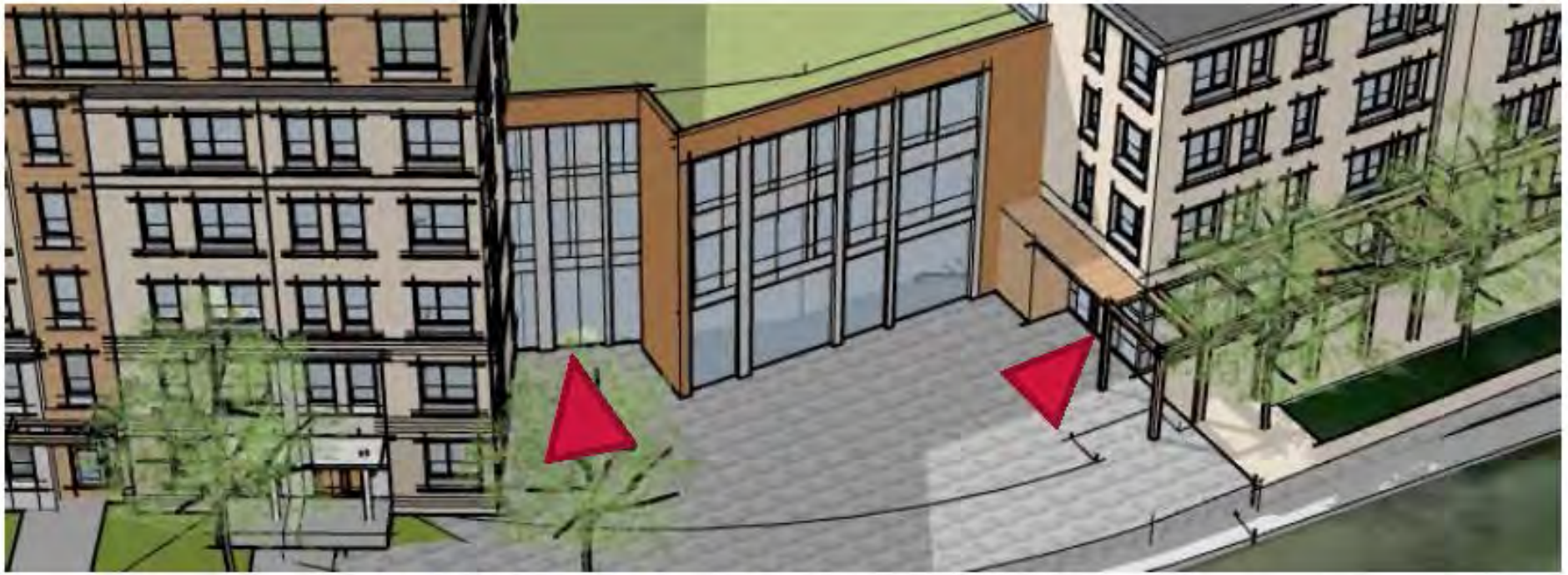


Figure 6-22
Main Entrances on Townsend Street

Figure 6-23
Wind Acceleration in the Passageway

6.3 Noise Impacts

6.3.1 Introduction

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

The analysis, which complies with BPDA requirements for noise studies, indicates that with appropriate noise controls, predicted sound levels from the Project will comply with local noise regulations.

6.3.2 Noise Terminology

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

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

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

The sound level meter used to measure noise is a standardized instrument.[5] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies, described in Hertz (Hz). A-weighted sound levels, reported in "dBA", emphasize middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies and are broadly accepted for sound level measurements and permitting efforts.

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

Because sounds in the environment vary with time, they are usually described with more than simply a single number. Two methods are used for describing variable sounds, exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment, A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value between 0 and 100 in terms of percentage. Several sound level metrics that are commonly reported in community noise studies are described below.

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

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

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

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

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

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

6.3.3 Noise Regulations and Criteria

The City of Boston has both a noise ordinance and noise regulations. Chapter 16 §26 of the Boston Municipal Code sets the general standard for noise that is considered 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 and is considered in this noise study.

Table 6.3-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. Table 6.3-1, below, identifies the maximum allowable sound pressure levels when measured at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

Table 6.3-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

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

Notes:
1. Noise standards from Regulation 2.5 "Zoning District Noise Standards", City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
2. All standards apply at the property line of the receiving property.
3. dB and dBA based on a reference pressure of 20 micropascals.
4. Daytime refers to the period between 7:00 a.m. and 6:00 p.m. daily, except Sunday.

6.3.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources in the vicinity of the Project site include: vehicular traffic along local roadways (including Townsend Street, Walnut Road, Harrishof Street, Haley Street, and Codman Park); birds; barking dogs (daytime only); vegetation rustle; pedestrian traffic; mechanical noise from nearby structures including the existing structures on the Project parcel; and the general city soundscape.

6.3.4.1 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Tuesday, February 14, 2017 during the daytime (1:00 p.m. to 3:15 p.m.) and on Wednesday, February 15, 2017 during nighttime hours (12:00 a.m. to 2:00 a.m.). All measurements were 20 minutes in duration.

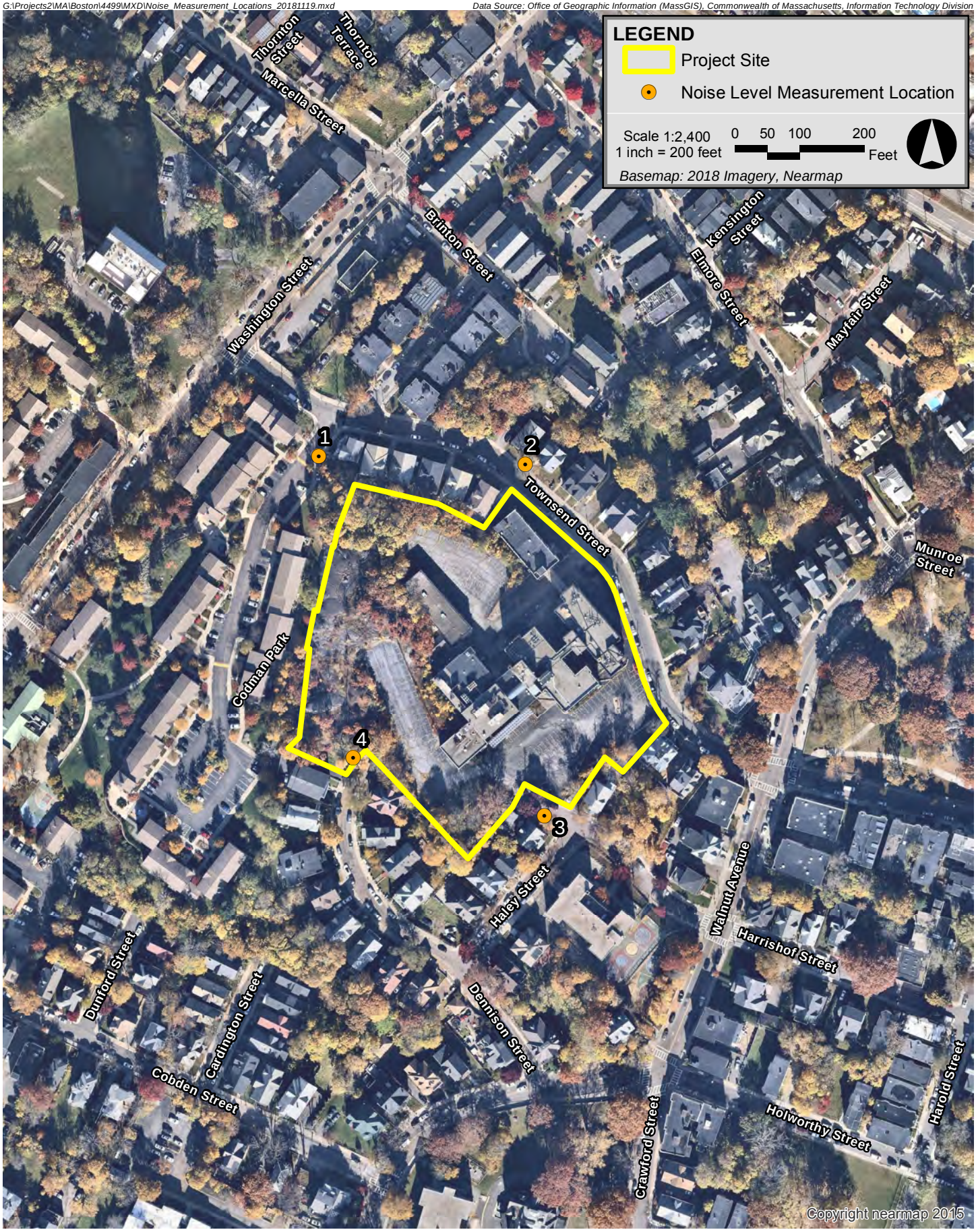
Sound levels were measured at publicly accessible locations at a height of five feet (1.5 meters) above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity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

6.3.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project area. Four noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 6-24 and described below.

- **Location 1** is at the southeast corner of Townsend Street and Codman Park, outside of #15 Townsend Street and is representative of the closest residential neighborhoods west of the Project (inclusive of the Codman Park project).

- **Location 2** is outside of #30 Townsend Street, along the northern sidewalk of Townsend Street northeast of the proposed Project, and in direct line of sight to the Project parcel. This location is representative of the closest residential use north of the Project.



45 Townsend Street Boston, Massachusetts

Epsilon Associates Inc.

Figure 6-24

Noise Measurement Locations

- **Location 3** is at the southwest corner of Haley Street and Harrishof Street, in front of #1 Haley Street, and in direct line of sight to the Project parcel. This location is representative of the closest residences to the east of the Project (inclusive of the Higginson Elementary School and the Huggins Lewis School).

- **Location 4** is located at the far northern end of Dennison Street, on the western sidewalk, north of #40 Dennison Street, and across from #35 Dennison Street. This

- location is representative of the residential receptors south of the Project and is in direct line of sight of the Project parcel.

6.3.4.3 Noise Monitoring Equipment

A Larson Davis Model 831 sound level meter equipped with a PCB PRM831 preamplifier, a PCB 377B20 half-inch microphone, and manufacturer-provided windscreen was used to collect background sound pressure level data. This instrumentation meets the "Type 1 - Precision" requirements set forth in ANSI S1.4 for acoustical measuring devices. The measurement equipment was calibrated in the field before and after the surveys with a Larson Davis CAL200 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. Statistical descriptors (L_{eq}, L_{90}, etc.) were calculated for each 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

6.3.4.4 Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 6.3-2, and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 38 to 46 dBA;

- The nighttime residual background (L_{90}) measurements ranged from 35 to 39 dBA;

- The daytime equivalent level (L_{eq}) measurements ranged from 46 to 66 dBA;

- The nighttime equivalent level (L_{eq}) measurements ranged from 40 to 63 dBA;

Table 6.3-2 Summary of Measured Background Noise Levels – February 14, 2017 (Daytime) & February 15, 2017 (Nighttime)

Location	Period	Start Time	LA_{eq}	LA_{max}	LA_{10}	LA_{50}	LA_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)								
								31.5	63	125	250	500	1k	2k	4k	8k
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	1:24 PM	56	74	59	51	46	59	51	44	42	39	40	36	30	25
2	Day	1:53 PM	64	84	68	55	43	53	46	44	40	38	37	33	28	26
3	Day	2:23 PM	46	71	45	42	41	51	46	44	41	36	35	31	25	23
4	Day	2:54 PM	66	78	71	59	38	53	46	40	38	35	32	28	24	24
1	Night	12:16 AM	50	75	50	43	39	50	44	37	36	36	34	30	25	23
2	Night	12:43 AM	63	89	59	39	35	46	42	36	35	32	31	25	19	21
3	Night	1:13 AM	40	56	42	39	38	47	45	40	40	35	31	25	20	21
4	Night	1:41 AM	40	55	43	37	36	47	41	37	36	33	31	27	21	21

Note: Sound pressure levels are rounded to the nearest whole decibel.

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Tuesday, February 14, 2017	44 °F	31%	Clear	Calm
Nighttime	Wednesday, February 15, 2017	28 °F	68%	Partly Cloudy	West @ 0-2 MPH

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3047
Microphone	Larson Davis	377B20	130579
Preamp	Larson Davis	PRM831	23825
Calibrator	Larson Davis	Cal200	7146

6.3.5 Future Conditions

6.3.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project will consist of ventilation, cooling, and emergency power noise sources. Project-related noise sources will be within, on top of, and next to the buildings. Ventilation apertures associated with noise sources will discharge sound at various heights and at various facades of the Project.

Table 6.3-3 provides a list of the anticipated major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 6.3-4. Sound power level data were generally provided by the manufacturer of each piece of equipment or assumed by Epsilon and based on comparable equipment. The sound power level for the enclosed combined mechanical and exhaust components of the emergency generator was calculated using the broadband sound pressure level provided at a reference distance and incorporated octave band data from a comparable unit.

The Project includes various noise-control measures to achieve compliance with the applicable noise regulations. As the design progresses, specifications for mechanical equipment and noise controls may change; however, appropriate measures will be taken to ensure compliance with the City of Boston Noise Standards. For the acoustical model, acoustical louvers were applied to the ventilation fans that will be used for intake and exhaust ventilation with regards to the parking garage. Two garage intake fans each will be located on the northern façade of the lower and upper parking garage levels. Four garage exhaust fans will be located on the southern façade of the upper parking garage level. As a noise control measure for the sensitive receptors to the north and west of the Project, a high-grade acoustical enclosure will be applied to the emergency generator. The emergency generator is proposed to be located on ground level near the northwestern corner of the Project. Alternatively, placing the emergency generator on the nearby rooftop, or a comparable generator/enclosure pairing, may be considered. To further limit impacts from the standby generator, its required routine, periodic testing will be conducted during daytime hours, when background sound levels are highest to reduce impacts on the community. A summary of the acoustical louvers for noise attenuation expected for the Project is presented in Table 6.3-5.

Table 6.3-3 Modeled Noise Sources

Noise Source	Quantity	Approximate Location	Size/Capacity
Garage Ventilation Intake Fan	2	Northern façade of the lower parking garage level	18,000 CFM
Garage Ventilation Intake Fan	2	Northern façade of the upper parking garage level	18,000 CFM
Garage Ventilation Exhaust Fan	4	Southern façade of the upper parking garage level	18,000 CFM
Rooftop ACCU's for Residential Use	48	Centered on the rooftop of the eastern side of the Project (180' elevation)	3,223 CFM
Rooftop ACCU's for Residential Use	260	Centered on the rooftop of the western and southern side of the Project (202'-8" elevation)	3,223 CFM
Emergency Generator	1	Ground level near the northwestern corner of the Project	400 kW

Table 6.3-4 Modeled Sound Power Levels per Noise Source

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Garage Ventilation Intake Fan[1]	90	90[4]	90	92	90	88	85	81	76	72
Garage Ventilation Exhaust Fan[1]	90	90[4]	90	92	90	88	85	81	76	72
Rooftop ACCU's for Residential Use[2]	70	52[5]	52[5]	52	61	64	66	61	59	52
Emergency Generator[3,]	98	100	100	107	101	97	88	84	78	77

Notes:

1. Greenheck SBE-3H42-30 18,000 CFM fan. Excludes attenuation identified in Table 6.3-5.
2. Bryant Air Conditioners- Model 126B. Unit 036-A. 3,223 CFM. Sound levels in dBA
3. Kohler Model: 400REOZJ diesel generator with Level 2 enclosure. Generator broadband sound pressure level converted to sound power level. Octave-band sound power levels have been approximated based on a representative sound level spectrum.
4. No data provided by manufacturer. Octave-band sound power level assumed to be equal to dB level in 63 Hz band.
5. No data provided by manufacturer. Octave-band sound power level assumed to be equal to dB level in 125 Hz band.

Table 6.3-5 Noise Controls and Attenuation by Source

Noise Source	Form of Mitigation	Broad-band (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Garage Ventilation Intake Fan	Louver[1]	-	11[2]	11	13	17	22	26	24	21	22
Garage Ventilation Exhaust Fan	Louver[1]	-	11[2]	11	13	17	22	26	24	21	22
Emergency Generator	Level 1 to Level 2 Enclosure[4]	11	-	-	-	-	-	-	-	-	-
Emergency Generator	Enclosure[3]	8	-	-	-	-	-	-	-	-	-

Notes:

1. Kinetics Noise Control KCAC-1 12-inch Acoustical Louver.
2. No data provided by manufacturer. Octave-band sound level assumed to be equal to the 63 Hz band level.
3. Required additional attenuation by an enclosure for the project to meet the City of Boston sound level limits. Alternatively, a comparable generator/enclosure model pairing, or relocation of the emergency generator, may be considered.
4. Additional attenuation from Kohler Level 1 enclosure to Level 2 enclosure. This attenuation is included in Table 6.3-4 sound power levels.

6.3.5.2 Noise Modeling Methodology

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

6.3.5.3 Future Sound Levels – Nighttime

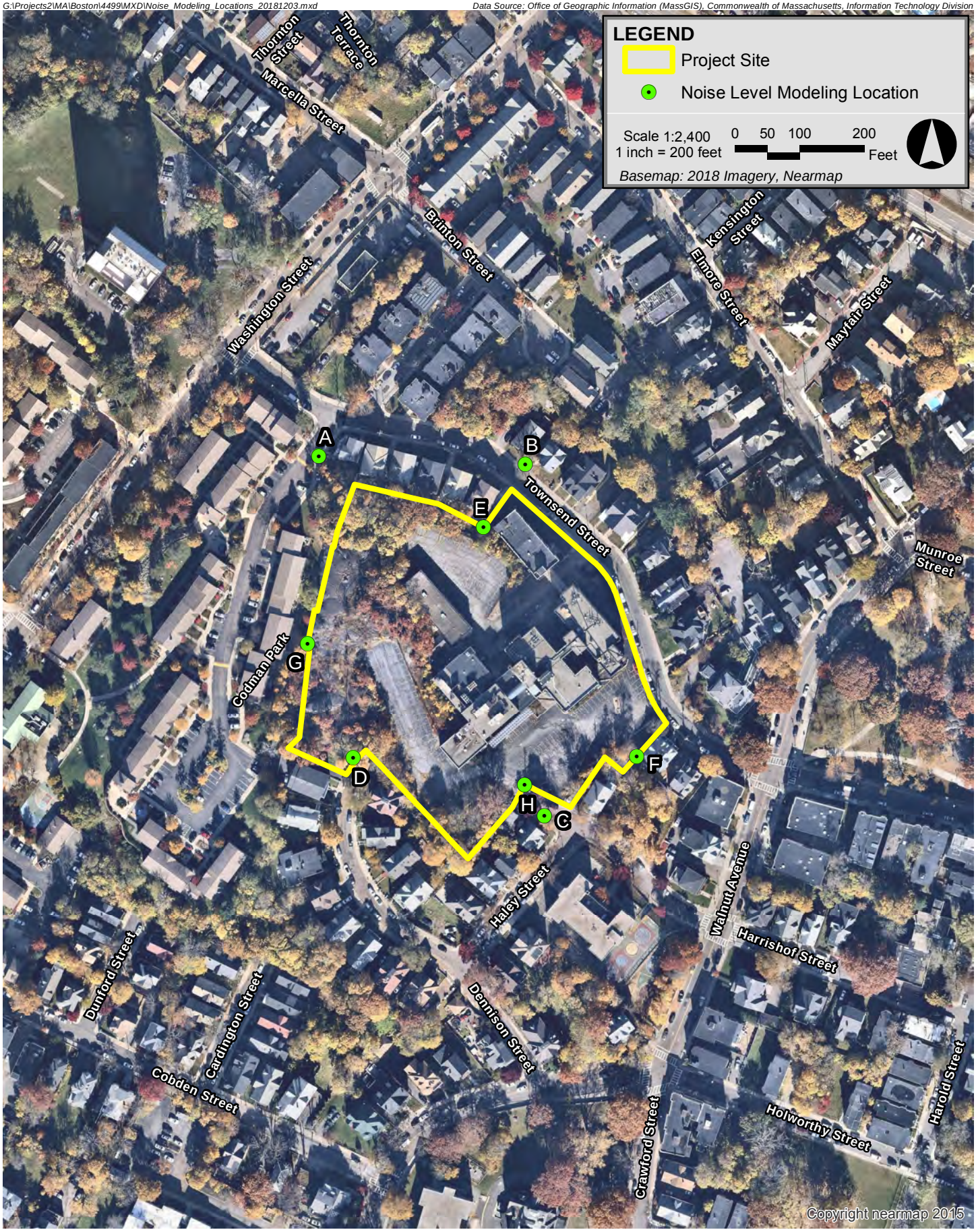
The analysis of sound levels at night considered all of the mechanical equipment without the emergency generator running, to simulate typical nighttime operating conditions at nearby receptors. Eight modeling locations were included in the analysis. Locations A through D are identical to measurement Locations 1 through 4. Four additional modeling locations, E through H, were added for additional residential uses in the vicinity of the Project. The modeling receptors, which correspond to the residential uses in the community, are depicted in Figure 6-25. The predicted exterior Project-only sound levels range from 29 to 41 dBA at nearby receptors. The City of Boston Residential limits have been applied to each of these locations. Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. The evaluation is presented in Table 6.3-6.

Table 6.3-6 Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	29	58	43	32	31	26	24	15	7	0
B	Residential	33	59	46	42	35	30	25	20	16	6
C	Residential	41	63	52	47	42	38	36	30	25	15
D	Residential	34	63	48	36	36	31	27	18	12	0
E	Residential	38	61	51	48	41	35	29	25	22	15
F	Residential	40	63	52	47	42	37	34	29	25	15
G	Residential	29	60	44	30	29	27	23	13	6	0
H	Residential	40	64	52	48	42	37	33	28	24	15
City of Boston Limits	**Residential**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**

6.3.5.4 Future Sound Levels – Daytime

As previously noted, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are higher, or during an interruption of power from the electrical grid. A second analysis combined the noise from the Project's mechanical equipment and its emergency generator to reflect worst-case conditions. The sound levels were calculated at the same receptors as in the nighttime analysis and were evaluated against daytime City of Boston limits. The predicted exterior Project-only daytime sound levels range from 29 to 58 dBA at nearby receptors. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeling locations. This evaluation is presented in Table 6.3-7.



45 Townsend Street Boston, Massachusetts

Epsilon Associates Inc.

Figure 6-25

Noise Modeling Locations

Table 6.3-7 Comparison of Future Predicted Project-Only Daytime Sound Levels to City of Boston Noise Standards

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	34	58	44	44	37	31	25	16	7	0
B	Residential	46	59	52	56	47	44	37	33	25	20
C	Residential	41	63	52	47	42	38	36	30	25	15
D	Residential	34	63	48	37	36	31	27	18	12	0
E	Residential	58	64	61	68	59	56	48	44	38	35
F	Residential	40	63	52	47	42	37	34	29	25	15
G	Residential	29	60	44	33	30	28	23	14	6	0
H	Residential	40	64	52	48	42	37	33	28	24	15
City of Boston Limits	**Residential**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**

6.3.6 Conclusions

Baseline noise levels were measured in the vicinity of the Project during the day and at night. At these and additional locations, future Project-only sound levels were calculated based on information provided by the manufacturers of the expected mechanical equipment. Project-only sound levels were compared to applicable limits.

Predicted mechanical equipment noise levels from the proposed Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, are expected to be at or below the octave-band requirements of City of Boston Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain below 50 dBA at residences during nighttime hours. The sound levels due to equipment associated with the Project are predicted to meet the residential zoning limits for sound for the City of Boston at the nearest residential receptors.

At this time, while the mechanical equipment and noise controls have been refined, they are still conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave-band limits of the City of Boston Noise Standards.

Chapter 7.0

Response to Comments

7.0 RESPONSE TO COMMENTS

7.1 Introduction

This Chapter provides responses to the BPDA Scoping Determination and the associated comment letters that were received on the Expanded PNF (EPNF) filed with the BPDA on July 12, 2017. Individual comments have been coded in the margins of the comment spreadsheet provided by BPDA. Responses to the comments follow the enclosed spreadsheet and can be identified using the comment code numbers. Table 7-1 provides a list of letters received and the associated abbreviation.

Table 7-1 BPDA Scoping Determination and Comment Letters Received

Commenter	*Abbreviation*
BPDA Scoping Determination	BPDA
Lauren Miller	LM
Edward Morgan	EM
Yanitza Pena	YP
Ralph Walton	RW
Mark Sutherland	MS
Neferiti Lawrence	NL
Tamara Lawrence	TL
Michael Kozu	MK
Jacquelyne Arrington	JA
Gina Cohen	GC

7.2 Responses to BPDA Scoping Determination

boston planning & development agency

BOSTON REDEVELOPMENT AUTHORITY
d/b/a Boston Planning and Development Agency ("BPDA")

SCOPING DETERMINATION FOR
45 TOWNSEND STREET ("THE PROJECT")
ROXBURY

PROPOSED PROJECT:	**45 TOWNSEND STREET**
PROJECT SITE:	**45 TOWNSEND STREET** **ROXBURY, MASSACHUSETTS**
PROPONENT:	**KENSINGTON INVESTMENT COMPANY ("KIC") ROXBURY LLC** **347 CONGRESS STREET** **BOSTON, MA 02110**
DATE:	**July 23, 2018**

The Boston Planning and Development Agency ("BPDA") is issuing this Scoping Determination in response to the following documentation submitted by KIC Roxbury LLC ("the Proponent") and as follow-up to discussions and review conducted with members of the KIC Team by BRA and other City of Boston agency staff.

Items submitted to the BRA include:

- Expanded Project Notification Form ("EPNF") which KIC Roxbury LLC filed for the 45 Townsend Street Project on July 12, 2017

Pursuant to Section 80B-5.3 of the Code, a scoping session was held on August 7, 2017 with the City's public agencies where the project was reviewed and discussed.

REGULATORY REVIEW/CITY OF BOSTON AGENCY COMMENTS

Comments provided herein reflect considerations and review by departments within the BRA and other City of Boston agencies.

Specifically, they are:

- BPDA Transportation/Infrastructure Planning
- BPDA Urban Design
- BRA Environmental Review
- Boston Transportation Department

Additional comments have been solicited and will be received from:

- Boston Parks Department
- Mayor's Commission for Persons with Disabilities
- Boston Environment Department
- Boston Water and Sewer Commission

STAKEHOLDER REVIEW/PUBLIC COMMENTS

- Public comments received by the BPDA during the comment period will be provided and will require response by the development team

- An Impact Advisory Group ("IAG") has been formed as part of the review process. Comments received by the BPDA during the comment period(s) from the IAG and from stakeholders will be provided and will also require full response by the development team.

- BPDA-sponsored public meetings are held to elicit feedback and comments on aspects of the project following submission of documents required for the review process and/or related to revisions in project scope/magnitude

PROJECT DESCRIPTION

Original Proposal – July 12, 2017
The Project proposes the redevelopment of the approximately 4.85-acre site bound by Townsend Street to the north, Academy Homes II to the west and Haley Street to the south. The Project includes up to approximately 380,000 square feet which contains up to approximately 322 rental units, approximately 4,500 square feet of new ground floor retail/commercial space, as well as community gathering space, and up to approximately 220 parking spaces. The development team proposes to have the project comply with the Inclusionary Development Policy through the creation of an off-site income restricted homeownership project within walking distance of the Project.

At this time the BPDA has not approved the Proposed Project

I. REVIEW / SUBMISSION REQUIREMENTS

Draft Project Impact Report ("DPIR"): In addition to full-size scale drawings, 10 copies of a bound booklet containing all submission materials reduced to size 8-1/2" x 11", except where otherwise specified, are required. The electronic copy should be submitted to the BRA via the following website: https://attachments.bostonplans.org/. The booklet should be printed on both sides of the page. In addition, an adequate number of copies must be available for community review. A copy of this Request for Additional Materials should be included in the booklet for review.

A. General Information

1. Applicant/Proponent Information BPDA 01

a. Development team

(1) Names

(a) Developer (including description of development entity and principals)
(b) Attorney
(c) Project consultants and architects
(d) Evidence of current status of existing partnership and ownership interest

(2) Business address, telephone number, FAX number and e-mail, where available for each

(3) Designated contact for each

b. Legal Information BPDA 02

(1) Legal judgments or actions pending concerning the Proposed Project

(2) History of tax arrears on property owned in Boston by Applicant or affiliates

(3) Nature and extent of any and all public easements into, through or surrounding the site.

B. Regulatory Controls and Permits BPDA 03

An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies, including a proposed application schedule shall be included in the Additional Materials.

C. Public Comments BPDA 04

The Supplemental Materials should include responses to any public comment and/or letters submitted to the BPDA.

D. IAG/Project Review Committee Comments BPDA 05

The Supplemental Materials must include responses to the IAG/Project Review Committee comment and/or letters submitted to the BPDA

II. OBSERVATIONS, RECOMMENDATIONS AND COMMENTS

A. OVERALL PROGRAM CONSIDERATIONS

The following represent areas of programmatic consideration for the project which the proponent is required to address.

- Inclusionary Development Policy ("IDP") Compliance: The Project should meet its IDP requirement through the onsite creation of affordable housing units. BPDA 06

- Economic Development: The Project program includes elements that are described as promoting economic benefit – specifically the retail/restaurant and co-working spaces. These elements in a predominantly housing focused project may be seen as adding additional and unnecessary traffic. BPDA 07

Consideration might be made by the Proponent as to whether these proposed elements are necessary or even desired by stakeholders and whether the financial resources needed to create the retail might be utilized for additional housing or some other more desired programmatic use.

- Acknowledgment is given to the Proponent's stated mission to create economic opportunity through homeownership. Consideration might be given to analysis of ways in which this can be done closer to the Project site (abutting properties) or onsite in response to stakeholder concerns. BPDA 08

B. BPDA URBAN DESIGN

The comments of BPDA Urban Design are incorporated herein by reference and made a part hereof. The Proponent is required to address the following comments.

- In response to the observations regarding the Project's overall massing and scope, the Proponent is encouraged to look at a reduction in the size of the project that reflects: BPDA 09
  - Utilizing the existing footprint of the site (e.g. existing buildings, layout, etc.) as the basis for considering alternative size for proposed program.
  - Given the site's geographic challenges (e.g. ledge, etc.), the utilization of existing layout will inform the placement of housing units as well as provide a basis for reviewing the number of housing units proposed thereby making a case for more or less density as appropriate.
- Focus on neighborhood context and creating a balance and complementarity between vehicular and pedestrian experience will be a key component to enabling the project to achieve a more successful design. Related considerations and suggestions include: BPDA 10
  - The Proponent will want to design the pedestrian and vehicular circulation to enhance the overall connectivity with the surrounding neighborhood and residential district
  - Any vehicular circulation should ensure a safe pedestrian environment, providing proper sidewalk and crosswalk design.
  - Development should recognize its visibility impacts
  - Redesign of the Project will want to reflect greater sensitivity to neighborhood context
- The response to the Scoping Determination will need to provide a sense of the Project's proposed sequencing or phasing strategy – with related time lines and milestones – based on any revisions. BPDA 11

C. BOSTON TRANSPORTATION DEPARTMENT AND BPDA TRANSPORTATION/INFRASTRUCTURE PLANNING

The comments of the Boston Transportation Department ("BTD") and BPDA Transportation/Infrastructure Planning are included. The Proponent is required to address all the following questions/comments:

- The development team's analysis for purposes of creating the EPNF, while adequate, might be enhanced by taking into consideration an expanded (at least additional quarter mile radius). It may prove useful to consider intersections and/or roads suggested by the Impact Advisory Group as basis for further analysis. Examples of streets/intersections to be considered may include but need not be limited to portions of: Walnut Avenue, Marcella Street, Dimock Street, Seaver Street, Washington Street, Westminster Street and Crawford Street BPDA 12
- Relatedly a reduction in scope will mitigate the need to create additional vehicular access points. For example the secondary access proposed for Harishof Street in its current iteration is problematic and might not be necessary with a project of reduced size. BPDA 13
- The Proponent proposed traffic calming measures – regardless of size and scope – will prove beneficial. Inclusion of such mitigation within the response to this scope is requested. BPDA 14

D. BPDA ENVIRONMENTAL REVIEW

The comments of the BRA Environmental Review Team are included. The Proponent is required to address all the following questions/comments:

- The project should pursue LEED Platinum or Gold for all buildings and commit to a minimum of LEED Silver Certification for all buildings. BPDA 15

- Additional Requirements for the current iteration of the proposal:
    - Sustainability Narrative and LEED Checklist - one specific for each building. ;
    - Climate Change Checklist - one for the whole project is fine for now.
    - The project should include on-site clean and or renewable energy systems to the greatest extent possible and specifically plan for building

mounted solar photovoltaic systems and natural gas fueled Combined Heat and Power Systems size to meet domestic hot water.

- The project should assess utility and state energy efficiency program opportunities and engage utility representatives to determine how to maximize building performance.
- If it has not done so already, the development team should see the Boston Article 37 Green Building and Climate Resiliency Guidelines web site for more detailed information and related documents and submit requested materials accordingly.

E. MAYOR'S COMMISSION FOR PERSONS WITH DISABILITIES

The comments of the Mayor's Commission for Persons with Disabilities are included. The Proponent is required to address all the following questions/comments:

- It is requirement of the City of Boston as of August 2014 that all development projects provide an Accessibility Checklist as part of the Article 80 process. If one has not been prepared, the development team should complete the documents provided in the Accessibility Guidelines http://www.bostonredevelopmentauthority.org/planning/planning-initiatives/accessibility-guidelines-and-checklist and submit for review by the Commission for additional comments BPDA 17

BPDA SCOPING DETERMINATION

BPDA.01 Applicant/Proponent information.

The requested Applicant and Proponent information is provided in Section 1.3.

BPDA.02 Legal information.

Legal information is provided in Section 1.4.

BPDA.03 Regulatory controls and permits.

An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies is provided in Section 1.5.

BPDA.04 The Supplemental Materials should include responses to any public comment/and or letters submitted to the BPDA.

Response to letters submitted to the BPDA are provided below.

BPDA.05 The Supplemental Materials must include responses to the IAG/Project Review Committee comment and/or letters submitted to the BPDA.

Response to letters submitted to the BPDA are provided below.

BPDA.06 The Project should meet its IDP requirement through the onsite creation of affordable housing units.

Compliance with the Inclusionary Development Policy ("IDP") is discussed in Section 2.4.

BPDA.07 The Project program includes elements that are described as promoting economic benefit – specifically the retail/restaurant and co-working spaces. These elements in a predominantly housing focused project may be seen as adding additional and unnecessary traffic. Consideration might be made by the Proponent as to whether these proposed elements are necessary or even desired by stakeholders and whether the financial resources needed to create the retail might be utilized for additional housing or some other more desired programmatic use.

As described in Section 2.3, the Project has eliminated retail, co-working, innovation and gallery space uses.

BPDA.08 Acknowledgement is given to the Proponent's stated mission to create economic opportunity through homeownership. Consideration might be given to analysis of ways in which this can be done closer to the Project site (abutting properties) or onsite in response to stakeholder concerns).

In response to community feedback, the Proponent will now satisfy the IDP requirements by providing 50 percent of the required units on site as rental apartments and 50 percent off-site home ownership units within one half mile of the Project site.

BPDA.09 In response to the observations regarding the Project's overall massing and scope, the Proponent is encouraged to look at a reduction in the size of the project that reflects:

- Utilizing the existing footprint of the site (e.g. existing buildings, layout, etc.) as the basis for considering alternative size for proposed program.
- Given the site's geographic challenges (e.g. ledge, etc.), the utilization of existing layout will inform the placement of housing units as well as provide a basis for reviewing the number of housing units proposed thereby making a case for more or less density as appropriate.

The Project's overall massing and scope is described in Section 2.0.

BPDA.10 Focus on neighborhood context and creating a balance and complementarity between vehicular and pedestrian experience will be a key component to enabling the project to achieve a more successful design. Related considerations and suggestions include:

- The Proponent will want to design the pedestrian and vehicular circulation to enhance the overall connectivity with the surrounding neighborhood and residential district.
- Any vehicular circulation should ensure a safe pedestrian environment, providing proper sidewalk and crosswalk design.
- Development should recognize its visibility impacts.
- Redesign of the Project will want to reflect greater sensitivity to neighborhood context.

The Project's design, as it relates to its context within the existing neighborhood, including vehicular and pedestrian considerations is discussed in Section 3.0.

BPDA.11 In response to the Scoping Determination will need to provide a sense of the Project's proposed sequencing or phasing strategy – with related time lines and milestones – based on any revisions.

As described in Section 2.4, 50 percent of the required IDP units will be provided on site as rental apartments and 50 percent will be provided off-site, within one half mile of the Project site, as home ownership units.BPDA.12The development team's

analysis for purposes of creating the EPNF, while adequate, might be enhanced by taking into consideration an expanded (at least additional quarter mile radius). It may prove useful to consider intersections and/or roads suggested by the Impact Advisory Group as basis for further analysis. Examples of streets/intersections to be considered may include but need not be limited to portions of: Walnut Avenue, Marcella Street, Dimock Street, Seaver Street, Washington Street, Westminster Street and Crawford Street.

The DPIR transportation study, included in Section 4.0, provides further information and analysis based on comments received during the permitting process, most notably analysis of additional intersections.

BPDA.13 Relatedly a reduction in scope will mitigate the need to create additional vehicular access points. For example the secondary access proposed for Harrishof Street in its current iteration is problematic and might not be necessary with a project of reduced size.

Access to the Project site from Harrishof Street will be maintain for the exclusive use of emergency vehicles.

BPDA.14 The Proponent proposed traffic calming measures – regardless of size and scope – will prove beneficial. Inclusion of such mitigation within the response to this scope is requested.

Proposed traffic mitigation measures are discussed in Section 4.0.

BPDA.15 The proponent should pursue LEED Platinum or Gold for all buildings and commit to a minimum of LEED Silver Certification for all buildings.

Section 5.0 discusses the Project's sustainability, including LEED Certification.

BPDA.16 Additional Requirements for the current iteration of the proposal:

- Sustainability Narrative and LEED Checklist – one specific for each building;
- Climate Change Checklist – one for the whole project is fine for now;
- The project should include on-site clean and or renewable energy systems to the greatest extent possible and specifically plan for building mounted solar photovoltaic systems and natural gas fueled Combined Heat and Power Systems size to meet domestic hot water;
- The project should assess utility and state energy efficiency program opportunities and engage utility representatives to determine how to maximize building performance;

- **If it has not done so already, the development team should see the Boston Article 37 Green Building and Climate Resiliency Guidelines website for more detailed information and related documents and submit requested materials accordingly.**

Section 5.0 provides an updated sustainability narrative, LEED Checklist, and an assessment of potential on-site renewable energy systems. An updated Climate Change Checklist is provided as Attachment C.

BPDA.17 **It is a requirement of the City of Boston as of August 2014 that all development projects provide an Accessibility Checklist as part of the Article 80 process.**

An updated Accessibility Checklist is provided as Attachment D.

7.3 Response to Public Comments

45 Townsend Street Public Comments via website form

Date	First Name	Last Name	Organization	Opinion	Comments	
7/19/2017	Lauren	Miller		Oppose	I'm against the proposal for the pool, cafe, and yoga studio. There is already access to pools, cafes (Haley House, Dudley Cafe, Ula, etc.), yoga studios (numerous in JP) nearby and new residents should be supporting these businesses and organizations. Having a shuttle to the T and the cafe/yoga studio/pool makes it so they will never have to interact with Roxbury residents (aka brown and black people).	LM.01
8/12/2017	Edward	Morgan		Neutral	There is a lot of aparments comming up for young people , what are there for the Elderly as far as care centers a lot of us need care centers close to where we live. Who will benefit from the construction The contractors? and white people, what about the traffic, parking?? ED.	EM.01
8/15/2017	Yaritza	Pena		Oppose	Things that stood out to me in the proposal that are concerning: *Two high rise buildings, rising 84 feet from the Townsend Street elevation (9 floors) and 127 feet from Townsend Street (12 floors). The taller building - at the top of the hill - would tower over New Academy Estates and Dennison Street. -In general, the Roxbury zoning height limit is 45 feet. * The developer wants their affordable housing money toward affordable ownership units at Bartlett Place, which is in the Highland Park sub-neighborhood, not the affected one (Townsend/ Walnut Ave / H streets) *The developer proposes a "Zen Courtyard" - hidden between the two buildings in the middle of the site - and a pool. Are they suggesting that market rate tenants would have an oasis from the rest of Roxbury? That's what it looks like. * The developers "letters of support" include: community members who are not direct abutters and are receiving significant funds from the developer's charitable arm (Lewis Family Foundation); the only letters from Townsend Street abutters are from a former resident who sold their property to Kensington and another person who was presumably their tenant; some Council of Elders residents and resident who lives at the corner of MLK Blvd., none of whom are "direct" abutters, despite what their letter states. This is obviously creating a problematic facade of community support that is non existent at this point. *ON STREET PARKING AVAILABILITY! I understand that this land/space is going to be developed at some point as our city continues to grow. However, developers need to go about handling the establishment of this property RESPONSIBLY and HONESTLY so that it integrates its vision with the vision of the community that already occupies this area of Roxbury so beautifully.	YP.01 YP.02 YP.03
8/20/2017	ralph	walton		Oppose	Project clams to be transit dependent & therefore have benefit of small amount of parking space. Developer should be required to back this up funding the MBTA to augment its fleet of buses drivers and maintenance personnel so as to raise the service on bus route to key bus route standards.	RW.01
8/31/2017	Mr Mark	Sutherland	GTNA	Oppose	The height is the problem along with the lack of listening to the Neighborhood & the Association concerns to make sure we are excepting the design and building concept for the community???	MS.01

8/31/2017	Nefertiti	Lawrence	Garrison Trotter Neighborhood Associate	Neutral	I am emailing to express my sincere concerns with the 45 Townsend street project. As a direct abutter and a Townsend street property owner of close to 20 years I am concerned with the magnitude of the project and the impact it will have on our neighborhood and community. The project is slated for 300 market rent units in an already thickly settled neighborhood. Many of the homes on Townsend are over 100 years old. Homeowners take pride in their property. Many of the homes are stately and enhance the beautiful Roxbury landscape. The structures Kensington is proposing do not maintain the beautiful structural integrity of this Roxbury neighborhood. In fact the structures protrude out of the landscape over shadowing and hiding beautiful historic homes. Jewish memorial /Radius hospital was constructed many years ago within the landscape and within the community. The buildings did not tower over homes instead fit nicely with the landscape. Being a hospital with parking on site much of the density and parking issues were minimal. The hospital sits back into their own and our homes have plenty of space from the large buildings. Kensington is proposing buildings that over shadow and take away direct abutters privacy. Lastly, Kensington has not addressed some major issues regarding the density, parking and impact on the community. The 45 Townsend street project needs to be revamped with the community in mine not just the long term profit to be made from such a large development. This project needs to be adjusted and revised given the community demands and suggestions in order to fit within this neighborhood.	NL.01 NL.02
8/31/2017	Nefertiti	Lawrence	GTNA	Neutral	I am emailing to express my sincere concerns with the 45 Townsend street project. As a direct abutter and a Townsend street property owner of close to 20 years I am concerned with the magnitude of the project and the impact it will have on our neighborhood and community. The project is slated for 300 market rent units in an already thickly settled neighborhood. Many of the homes on Townsend are over 100 years old. Homeowners take pride in their property. Many of the homes are stately and enhance the beautiful Roxbury landscape. The structures Kensington is proposing do not maintain the beautiful structural integrity of this Roxbury neighborhood. In fact the structures protrude out of the landscape over shadowing and hiding beautiful historic homes. Jewish memorial /Radius hospital was constructed many years ago within the landscape and within the community. The buildings did not tower over homes instead fit nicely with the landscape. Being a hospital with parking on site much of the density and parking issues were minimal. The hospital sits back into their own and our homes have plenty of space from the large buildings. Kensington is proposing buildings that over shadow and take away direct abutters privacy. Lastly, Kensington has not addressed some major issues regarding the density, parking and impact on the community. The 45 Townsend street project needs to be revamped with the community in mine not just the long term profit to be made from such a large development. This project needs to be adjusted and revised given the community demands and suggestions in order to fit within this neighborhood.	

8/31/2017	Tamara	Lawrence	GTNA	Neutral	Pros about the project: - The design of the property. Not the height but the overall design of the property. - There are several options for living (1 bedroom, 2 bedroom, and 3 bedrooms) - All the community to use the community spaces (pool and community/ meeting room) - The developers are taking the time to engage the community by holding meetings - property values will go up because of the market rate apartments Cons: - the scope and size of the project in an already dense community - lack of solution of a solution for addressing the parking issue in an already very dense and hard to park neighborhood. - the developers, while they are taking the time to engage the community, at times can be dismissive and standoffish. At times, the developers seem to not care about the significant impact a project of this size and scope will have on the community. - Encroaching on the direct abutters without taking the abutters needs and wants into consideration: the height of the buildings will block the city views of the abutters, the height and scope of the buildings will cast major shadows on the abutters properties. -The developers are not taking into consideration the school that is very close to the project. All that construction will not be good for the young children who attend the school. The noise factor and constant movement of the trucks throughout the school day is very disruptive. In addition, the traffic and potential street blockage will impede the students and their families from getting to school on time. - the environmental factors of demolishing several buildings - the rodent abatement: When Academy Holmes I and II were being built, the neighbor was infested with rodents. The city could not keep up with the abatement and as a result, our homes were infested. The city and Academy's solution to the problem was to provide traps. That is not good enough. They should have taken time to seal up the outsides of the homes and prevent (or limit) the infestation. - while the addition of this property will allow our property values to increase, the sharp increase in taxes will place a huge financial burden on homeowners. There has to be a better tax formula for homeowner to lessen the financial impact. People have worked hard for their homes and it is a shame that the city is allowing these multimillion dollar projects to push long time residents out of their home. Something has to be done to support the people who have been the backbone of the city. - Roxbury has the highest density, highest number of children, highest rate of low income housing, and 65% of the people who live in roxbury rent. Does Roxbury need additional rental units. Homeownership is missing from the community and should be part of this project. - offsite low income housing?????	TL.01 TL.02 TL.03 TL.04 TL.05

					That is not okay. The best communities are mixes communities. It is irresponsible for the developer not to include mix housing in the huge project. There are plenty of examples of mix communities that will still bring in the monies needed to make this project successful. Is the developer not including low income housing because the building standards will have to change? - what happens when the housing market can not sustain the rental cost? Will this project become a huge housing project (low income house)? This is a major concern for residents. What will happen if the apartments can not be rented for the market rate? - the market rate rent does not allow the average city and state employee to be able to afford to live in these apartments. The cost of housing is spiraling out of control and it does not allow people to be able to live comfortable. The cost of the market rate rent will likely mean multiple people living in one apartments. the developer needs to take a look at what they can do to promote people living and working in the community. I am a teacher and I am able to live close to work. This is a luxury for me. Most teachers can not afford to live in the city and if they do, they have to have roommates. Study show that when people work and live in their community, the community benefits. - parking, parking, parking, parking, parking, parking, parking, parking. The developer needs to take another look at the parking issue and overall traffic issue. Townsend Street is a one way street, that is heavily traveled. There is parking on one side of the street. As a homeowner, I can not park any place close to my house if I arrive home after 4:00 (which is most days). Imagine having a 322 apartment building with 230 parking spaces on a street that does not have parking. That is outrageous. While the developers state less people are driving, they need to come to this neighborhood throughout the day to see the traffic and parking situation. People have cars and they are driving. They are parking in front of my house. UGH!!!!! It is frustration to all of the people who live on the abutting streets who can not park in front of the homes we pay a hell of a lot of money for every month. I would like to see the developers provide parking for all the residents who are direct abutters. A solution for Townsend Street homeowners: remove the retaining wall and provide us with parking. Another solution: there are 2 vacant lots on Townsend St (8 Townsend) and a lot across from the hospital: create deeded parking for the residents. One more solution: give every abutter apartment a parking space in the new complex. - Gentrification can being with it much need and improved services to the community, if done in a thoughtful and purposeful manner. However, as in the past, the people who move into this apartment do not become involved in the community. This is sad because the residents are often left in the same situation, while to new project gets all the improved services. This is not a bad project, but somethings need to be considered before moving forward. I would like to see the developer really address the residents concerns.	TL.06 TL.07 TL.08

8/31/2017	Michael	Kozu	Project RIGHT, Inc.	Oppose	This project is too large for the residential neighborhood that it is being proposed for. It should not be considered a transit oriented development, it is too far from the orange line subway, and most people will not walk there to take the orange line, rather they will overload the bus stop for the Washington street bus that also has a lot of students trying to go to school and is over capacity during rush hours. It is misleading that they use other developments that are right on rapid transit subway lines as opposed to the limited capacity buses that run through Roxbury (including the 44 Humboldt line that is irregular, infrequent) that there has been clear documentation of racial disparities of poor public bus transportation in Boston's communities of color. The traffic and parking plan is poorly designed, with traffic pouring out of the parking lot on narrow, limited capacity street (Harrishof, which becomes a one way street) onto Walnut that has the Ellis and Higginson Schools with young children trying to get to school on a heavily travelled and fast traffic. This project will significantly add to the traffic congestion in the immediate area, that is compounded by the traffic generated by Latin Academy HS and Bridge Charter School on Townsend and Humboldt/ Warren St. The Project does not adequately address how it will mitigate its immense impact upon the abutting Higginson Elementary school, especially since its traffic will immediately go past the school and where children will play exposing them to further exhaust fumes for a population that has a disparity of asthma and other respiratory illnesses. The project does not adequately address the impact of the immediate abutters, including traffic, parking and construction (noise, dust, construction vehicles, trash removal, etc) and upon the numerous children and their families going to schools that are nearby. This project is too large and too dense for such a heavily populated area that has limited infrastructural resources and faces significant racial disparities.	MK.01 MK.03 MK.04 MK.05
9/26/2017	Jacquelyne	Arrington	Harold St Neigborhood/Garrison Trotter	Oppose	The Kensington proposal and presentation are insulting, callous and an affront to residents living for several decades in the abutting area of 45 Townsend Street. The design is out of character with the many Victorian homes, several are on the National Registry of Historic Homes, that are largely well maintained and cherished by current owners. The gentrification the Kensington project would bring the area is unforgivable. To rub it in, they want to put the low income housing out of sight at the Bartlett Yard site; SNOBS. Traffic is a nightmare now. The Kensington person who presented at the last public hearing was condescending and a liar as he tried to down play the traffic impact this project would have on the area. We have lousy public transportation, polluting slow buses, and little to no commuter parking in the area. Often we are unable to park near our homes now, and snow removal in the winter brings a nightmare. To experience no place to park causes angst and anxiety unbeknown to persons who happen not to live in the city. I am a senior citizen who has no plans to regularly use public transportation day or night, (scary) or ride a bike in the city ever! I rarely take my car into Boston because of the traffic congestion; use taxi, uber or use slow bus during day. Persons who talk constantly about using public transportation obviously don't use it; or they would make it better. I also have no plans to sell or leave my home in one of Boston's loveliest neighborhoods. I will also not be silent about my displeasure. Bad plan, bad endorsement by mayor Walsh.	JA.01
10/5/2017	Gina	Cohen	Council Tower	Neutral	I would like to be added to the list of notices regarding the building and community meetings. Thank you in advance for your attention to this matter. Regards, Gina Cohen Property Manager Council Tower	GC.01

LAUREN MILLER

LM.01 **I'm against the proposal for the pool, café and yoga studio. There is already access to pools, cafes (Haley House, Dudley Café, Ula, etc.), yoga studios (numerous in JP) nearby and new residents should be supporting these businesses and organizations. Having a shuttle to the T and the café/yoga studio/pool makes it so they will never have to interact with Roxbury residents (aka brown and black people).**

The initial plan to include a café was intended to provide a convenient gathering spot for residents of the broader neighborhood to meet and socialize; and to provide community access to the property. However, based on community feedback about the traffic impacts of a café, Kensington Investment Company's (KIC) has eliminated it from the development program.

It's important to note that the pool and yoga studio are part of the amenity package that will be provided to residents of the Project. The amenity package is a critical ingredient in marketing the property and facilitating a high quality of life for tenants.

The decision to offer shuttle services to the Jackson Square MBTA station is part of the KIC's plan to mitigate traffic impacts by encouraging residents of the complex to use public transit.

EDWARD MORGAN

EM.01 **There is a lot of apartments coming up for young people, what are there for the Elderly as far as care centers a lot of us need care centers close to where we live. Who will benefit from the construction. The contractors? and white people, what about the traffic, parking?**

KIC is sensitive to the need for senior housing. However, their business model and focus is on young adults. Regarding construction opportunities and benefits, KIC plans to conduct an extensive outreach program to maximize opportunities for minorities and women in the trades, and to meet the City of Boston workforce requirements.

KIC and the traffic consultant are looking at a number of approaches to mitigate the impacts of traffic and are working with the City of Boston to coordinate the implementation of Project-related traffic mitigations with BTD-led traffic initiatives.

YARITZA PENA

YP.01 Things that stood out to me in the proposal that are concerning: *Two high rise buildings, rising 84 feet from the Townsend Street elevation (9 floors) and 127 feet from Townsend Street (12 floors). The taller building - at the top of the hill - would tower over New Academy Estates and Dennison Street. -In general, the Roxbury zoning height limit is 45 feet.

Based on community and City of Boston feedback, KIC has refined the height and massing of the buildings. These revised design scenarios are described herein.

YP.02 The developer wants their affordable housing money toward affordable ownership units at Bartlett Place, which is in the Highland Park sub-neighborhood, not the affected one (Townsend/Walnut Ave / H streets).

As described in Section 2.4, the Project will provide on-site affordable housing units and off-site units located on Townsend Street.

YP.03 On-street parking availability! I understand that this land/space is going to be developed at some point as our city continues to grow. However, developers need to go about handling the establishment of this property responsibility and honestly so that it integrates its vision with the vision of the community that already occupies this area of Roxbury so beautifully.

KIC will continue to work closely with the neighborhood to get feedback and recommendations concerning Project design and are committed to building a project that enhances the existing beauty and character of the neighborhood.

RALPH WALTON

RW.01 **Project clams to be transit dependent & therefore have benefit of small amount of parking space. Developer should be required to back this up funding the MBTA to augment its fleet of buses drivers and maintenance personnel so as to raise the service on bus route to key bus route standards.**

KIC is committed to maximizing opportunities for tenants of the Project to use non-vehicular modes of travel, including public transit and biking. Toward this end, shuttle bus service to Jackson Square will be provided to residents of 45 Townsend Street. Additionally, bike storage will be included in the Project. In accordance with state law and regulations, providing funding for MBTA staff salaries is prohibited.

MARK SUTHERLAND

MS.01 **The height is the problem along with the lack of listening to the Neighborhood & the Association concerns to make sure we are accepting the design and building concept for the community?**

Over the past year, KIC has focused a great deal of attention and resources on evaluating neighborhood comments about the massing and height of the Project. The outcome of this analysis is reflected in the refined design described herein.

NEFERTITI LAWRENCE

NL.01 **The structures Kensington is proposing do not maintain the beautiful structural integrity of this Roxbury neighborhood. In fact the structures protrude out of the landscape over shadowing and hiding beautiful historic homes. Jewish memorial /Radius hospital was constructed many years ago within the landscape and within the community. The buildings did not tower over homes instead fit nicely with the landscape.**

Over the past year, KIC has focused a great deal of attention and resources on evaluating neighborhood comments about the massing and height of the Project. The outcome of this analysis is reflected in the refined design described herein.

NL.02 **Lastly, Kensington has not addressed some major issues regarding the density, parking and impact on the community.**

The above-referenced analysis included taking a more comprehensive look at density, parking, and mitigation of Project traffic impacts. KIC has incorporated changes relative to these concerns that will be presented to the neighborhood for feedback and recommendations in the fall of 2018.

TAMARA LAWRENCE

TL.01 **Cons: - the scope and size of the project in an already dense community - lack of solution of a solution for addressing the parking issue in an already very dense and hard to park neighborhood.**

The Project's parking ratio has been increased.

TL.02 **Encroaching on the direct abutters without taking the abutters needs and wants into consideration: the height of the buildings will block the city views of the abutters, the height and scope of the buildings will cast major shadows on the abutters' properties.**

Based on previous feedback from site abutters and residents of the broader neighborhood, KIC has refined the height and massing of the buildings. KIC has also been holding "one-on-one" meetings with direct abutters from Townsend, Dennison, and Harrishof Streets to address their concerns.

TL.03 **All that construction will not be good for the young children who attend the school. The noise factor and constant movement of the trucks throughout the school day is very disruptive. In addition, the traffic and potential street blockage will impede the students and their families from getting to school on time.**

In accordance with City of Boston requirements, KIC will prepare a Construction Management Plan (CMP) for review and approval by the Boston Transportation Department (BTD), and the Boston Planning & Development Agency (BPDA), The CMP will provide a detailed description of all measures that will be taken to address public safety and minimize disruption to the neighborhood.

TL.04 **The environmental factors of demolishing several buildings - the rodent abatement.**

KIC is also required to file a Demolition Plan with the City of Boston Environment Department and the BPDA. The Demolition Plan must include a detailed plan to protect public safety, minimize disruptions, and ensure proper disposal of all demolished materials. Rodent control is included in the document.

TL.05 **Homeownership is missing from the community and should be part of this project. – offsite low-income housing????? That is not okay. Is the developer not including low income housing because the building standards will have to change?**

As described in Section 2.4, KIC will comply with the City's IDP requirements for rental units and is also exploring homeownership opportunities. KIC looks forward to discussing this issue with neighborhood residents.

TL.06 **The cost of the market rate rent will likely mean multiple people living in one apartments. the developer needs to take a look at what they can do to promote people living and working in the community.**

KIC is working in accordance with one of the primary goals of the Roxbury Strategic Master Plan to create mixed-income housing.

TL.07 **Parking, parking, parking, parking, parking, parking, parking, parking. The developer needs to take another look at the parking issue and overall traffic issue. Townsend Street is a one-way street, that is heavily traveled. There is parking on one side of the street. As a homeowner, I can not park any place close to my house if I arrive home after 4:00 (which is most days). Imagine having a 322 apartment building with 230 parking spaces on a street that does not have parking.**

KIC has worked extensively with BTD to identify opportunities to coordinate mitigation of existing traffic with Project-related traffic.

Based on City of Boston and community feedback, KIC identified a number of traffic mitigation efforts, which are described in Section 4.0.

KIC will submit a Transportation Management Plan (TMP) to the City of Boston. The TMP will include measures that will be taken to encourage the use of public transit and other various modes of travel that do not involve use of personal vehicles. These measures include providing a shuttle to and from the Jackson Square MBTA Station to reduce the number of cars using neighborhood streets. KIC is also providing on-site bike storage for 300 bikes, along with on-site Zip Car rental for residents and the neighborhood to utilize in lieu of using personal vehicles.

TL.08 **I would like to see the developers provide parking for all the residents who are direct abutters. A solution for Townsend Street homeowners: remove the retaining wall and provide us with parking. Another solution: there are 2 vacant lots on Townsend St (8 Townsend) and a lot across from the hospital: create deeded parking for the residents. One more solution: give every abutter apartment a parking space in the new complex.**

If the neighborhood feels it is appropriate, the Proponent would like to support a joint initiative between the neighbors and KIC to request that BTD designate all the streets in Garrison Trotter as resident parking only.

MICHAEL KOZU

MK.01 **This project is too large for the residential neighborhood that it is being proposed for.**

In response to City and neighborhood feedback, KIC has refined the height and massing of the buildings.

MK.03 **The traffic and parking plan is poorly designed, with traffic pouring out of the parking lot on narrow, limited capacity street (Harrishof, which becomes a one-way street) onto Walnut that has the Ellis and Higginson Schools with young children trying to get to school on a heavily travelled and fast traffic. This project will significantly add to the traffic congestion in the immediate area, that is compounded by the traffic generated by Latin Academy HS and Bridge Charter School on Townsend and Humboldt/ Warren St.**

KIC has worked extensively with BTD to identify opportunities to coordinate mitigation of existing traffic with Project-related traffic.

MK.04 **The Project does not adequately address how it will mitigate its immense impact upon the abutting Higginson Elementary school, especially since its traffic will immediately go past the school and where children will play exposing them to further exhaust fumes for a population that has a disparity of asthma and other respiratory illnesses.**

Based on City and community feedback, additional traffic mitigation measures have been identified, as described in Section 4.0. As part of the Project's Transportation Management Plan, KIC is developing alternative transportation plans that will be reviewed by the BTD. For example, KIC is providing a shuttle for residents to and from the Jackson Square MBTA station to reduce the number of cars on the street.

MK 05 **The project does not adequately address the impact of the immediate abutters, including traffic, parking and construction (noise, dust, construction vehicles, trash removal, etc) and upon the numerous children and their families going to schools that are nearby.**

KIC looks forward to working with the neighborhood to continue to refine the Project's Construction Management Plan such that it will address all potential impacts.

JACQUELYNE ARRINGTON

JA.01 **The design is out of character with the many Victorian homes, several are on the National Registry of Historic Homes, that are largely well maintained and cherished by current owners.**

The Project design is consistent with some of the post-World War II multi-family apartment buildings in the neighborhood which have historic character and beauty.

GINA COHEN

GC.01 **I'd like to be added to the list of notices regarding the building and community meetings. Thank you in advance for your attention to this matter.**

Ms. Cohen's email address has been added to the Project outreach list: cohen@rogerson.org

Appendix A

Scoping Determination

boston planning & development agency

BOSTON REDEVELOPMENT AUTHORITY
d/b/a Boston Planning and Development Agency ("BPDA")

SCOPING DETERMINATION FOR
45 TOWNSEND STREET ("THE PROJECT")
ROXBURY

PROPOSED PROJECT:	**45 TOWNSEND STREET**
PROJECT SITE:	**45 TOWNSEND STREET** **ROXBURY, MASSACHUSETTS**
PROPONENT:	**KENSINGTON INVESTMENT COMPANY ("KIC") ROXBURY LLC** **347 CONGRESS STREET** **BOSTON, MA 02110**
DATE:	**July 23, 2018**

The Boston Planning and Development Agency ("BPDA") is issuing this Scoping Determination in response to the following documentation submitted by KIC Roxbury LLC ("the Proponent") and as follow-up to discussions and review conducted with members of the KIC Team by BRA and other City of Boston agency staff.

Items submitted to the BRA include:

- Expanded Project Notification Form ("EPNF") which KIC Roxbury LLC filed for the 45 Townsend Street Project on July 12, 2017

Pursuant to Section 80B-5.3 of the Code, a scoping session was held on August 7, 2017 with the City's public agencies where the project was reviewed and discussed.

REGULATORY REVIEW/CITY OF BOSTON AGENCY COMMENTS

Comments provided herein reflect considerations and review by departments within the BRA and other City of Boston agencies.

Specifically, they are:

- BPDA Transportation/Infrastructure Planning
- BPDA Urban Design
- BRA Environmental Review
- Boston Transportation Department

Additional comments have been solicited and will be received from:

- Boston Parks Department
- Mayor's Commission for Persons with Disabilities
- Boston Environment Department
- Boston Water and Sewer Commission

STAKEHOLDER REVIEW/PUBLIC COMMENTS

- Public comments received by the BPDA during the comment period will be provided and will require response by the development team

- An Impact Advisory Group ("IAG") has been formed as part of the review process. Comments received by the BPDA during the comment period(s) from the IAG and from stakeholders will be provided and will also require full response by the development team.

- BPDA-sponsored public meetings are held to elicit feedback and comments on aspects of the project following submission of documents required for the review process and/or related to revisions in project scope/magnitude

PROJECT DESCRIPTION

Original Proposal – July 12, 2017
The Project proposes the redevelopment of the approximately 4.85-acre site bound by Townsend Street to the north, Academy Homes II to the west and Haley Street to the south. The Project includes up to approximately 380,000 square feet which contains up to approximately 322 rental units, approximately 4,500 square feet of new ground floor retail/commercial space, as well as community gathering space, and up to approximately 220 parking spaces. The development team proposes to have the project comply with the Inclusionary Development Policy through the creation of an off-site income restricted homeownership project within walking distance of the Project.

At this time the BPDA has not approved the Proposed Project

I. REVIEW / SUBMISSION REQUIREMENTS

Draft Project Impact Report ("DPIR"): In addition to full-size scale drawings, 10 copies of a bound booklet containing all submission materials reduced to size 8-1/2" x 11", except where otherwise specified, are required. The electronic copy should be submitted to the BRA via the following website: https://attachments.bostonplans.org/. The booklet should be printed on both sides of the page. In addition, an adequate number of copies must be available for community review. A copy of this Request for Additional Materials should be included in the booklet for review.

A. General Information

1. Applicant/Proponent Information

a. Development team

(1) Names

(a) Developer (including description of development entity and principals)
(b) Attorney
(c) Project consultants and architects
(d) Evidence of current status of existing partnership and ownership interest

(2) Business address, telephone number, FAX number and e-mail, where available for each

(3) Designated contact for each

b. Legal Information

(1) Legal judgments or actions pending concerning the Proposed Project

(2) History of tax arrears on property owned in Boston by Applicant or affiliates

(3) Nature and extent of any and all public easements into, through or surrounding the site.

B. Regulatory Controls and Permits

An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies, including a proposed application schedule shall be included in the Additional Materials.

C. Public Comments

The Supplemental Materials should include responses to any public comment and/or letters submitted to the BPDA.

D. IAG/Project Review Committee Comments

The Supplemental Materials must include responses to the IAG/Project Review Committee comment and/or letters submitted to the BPDA

II. OBSERVATIONS, RECOMMENDATIONS AND COMMENTS

A. OVERALL PROGRAM CONSIDERATIONS

The following represent areas of programmatic consideration for the project which the proponent is required to address.

- Inclusionary Development Policy ("IDP") Compliance: The Project should meet its IDP requirement through the onsite creation of affordable housing units.

- Economic Development: The Project program includes elements that are described as promoting economic benefit – specifically the retail/restaurant and co-working spaces. These elements in a predominantly housing focused project may be seen as adding additional and unnecessary traffic.

Consideration might be made by the Proponent as to whether these proposed elements are necessary or even desired by stakeholders and whether the financial resources needed to create the retail might be utilized for additional housing or some other more desired programmatic use.

- Acknowledgment is given to the Proponent's stated mission to create economic opportunity through homeownership. Consideration might be given to analysis of ways in which this can be done closer to the Project site (abutting properties) or onsite in response to stakeholder concerns.

B. BPDA URBAN DESIGN

The comments of BPDA Urban Design are incorporated herein by reference and made a part hereof. The Proponent is required to address the following comments.

- In response to the observations regarding the Project's overall massing and scope, the Proponent is encouraged to look at a reduction in the size of the project that reflects:
  - Utilizing the existing footprint of the site (e.g. existing buildings, layout, etc.) as the basis for considering alternative size for proposed program.
  - Given the site's geographic challenges (e.g. ledge, etc.), the utilization of existing layout will inform the placement of housing units as well as provide a basis for reviewing the number of housing units proposed thereby making a case for more or less density as appropriate.
- Focus on neighborhood context and creating a balance and complementarity between vehicular and pedestrian experience will be a key component to enabling the project to achieve a more successful design. Related considerations and suggestions include:
  - The Proponent will want to design the pedestrian and vehicular circulation to enhance the overall connectivity with the surrounding neighborhood and residential district
  - Any vehicular circulation should ensure a safe pedestrian environment, providing proper sidewalk and crosswalk design.
  - Development should recognize its visibility impacts
  - Redesign of the Project will want to reflect greater sensitivity to neighborhood context
- The response to the Scoping Determination will need to provide a sense of the Project's proposed sequencing or phasing strategy – with related time lines and milestones – based on any revisions.

C. BOSTON TRANSPORTATION DEPARTMENT AND BPDA TRANSPORTATION/INFRASTRUCTURE PLANNING

The comments of the Boston Transportation Department ("BTD") and BPDA Transportation/Infrastructure Planning are included. The Proponent is required to address all the following questions/comments:

- The development team's analysis for purposes of creating the EPNF, while adequate, might be enhanced by taking into consideration an expanded (at least additional quarter mile radius). It may prove useful to consider intersections and/or roads suggested by the Impact Advisory Group as basis for further analysis. Examples of streets/intersections to be considered may include but need not be limited to portions of: Walnut Avenue, Marcella Street, Dimock Street, Seaver Street, Washington Street, Westminster Street and Crawford Street
- Relatedly a reduction in scope will mitigate the need to create additional vehicular access points. For example the secondary access proposed for Harishof Street in its current iteration is problematic and might not be necessary with a project of reduced size.
- The Proponent proposed traffic calming measures – regardless of size and scope – will prove beneficial. Inclusion of such mitigation within the response to this scope is requested.

D. BPDA ENVIRONMENTAL REVIEW

The comments of the BRA Environmental Review Team are included. The Proponent is required to address all the following questions/comments:

- The project should pursue LEED Platinum or Gold for all buildings and commit to a minimum of LEED Silver Certification for all buildings.

- Additional Requirements for the current iteration of the proposal:
    - Sustainability Narrative and LEED Checklist - one specific for each building. ;
    - Climate Change Checklist - one for the whole project is fine for now.
    - The project should include on-site clean and or renewable energy systems to the greatest extent possible and specifically plan for building

mounted solar photovoltaic systems and natural gas fueled Combined Heat and Power Systems size to meet domestic hot water.

- The project should assess utility and state energy efficiency program opportunities and engage utility representatives to determine how to maximize building performance.
- If it has not done so already, the development team should see the Boston Article 37 Green Building and Climate Resiliency Guidelines web site for more detailed information and related documents and submit requested materials accordingly.

E. MAYOR'S COMMISSION FOR PERSONS WITH DISABILITIES

The comments of the Mayor's Commission for Persons with Disabilities are included. The Proponent is required to address all the following questions/comments:

- It is requirement of the City of Boston as of August 2014 that all development projects provide an Accessibility Checklist as part of the Article 80 process. If one has not been prepared, the development team should complete the documents provided in the Accessibility Guidelines http://www.bostonredevelopmentauthority.org/planning/planning-initiatives/accessibility-guidelines-and-checklist and submit for review by the Commission for additional comments

Appendix B

Transportation

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 1
Location:	Roxbury, MA
Street 1:	Walnut Avenue/ Crawford Street
Street 2:	Holworthy Street
Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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TOTAL (CARS & TRUCKS)

	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	6	19	0	0	1	10	22	0	43	2	0	0	0	0	0
7:15 AM	0	8	18	1	0	1	11	24	0	39	3	2	0	0	0	0
7:30 AM	0	9	19	0	0	2	15	33	0	52	2	5	0	0	0	0
7:45 AM	0	8	20	1	0	2	18	42	0	67	1	1	0	0	0	0
8:00 AM	0	6	19	1	1	3	15	41	0	71	2	4	0	0	0	0
8:15 AM	0	7	21	2	0	1	12	39	0	68	5	4	0	0	0	0
8:30 AM	0	6	22	3	0	2	13	38	0	76	3	3	0	0	0	0
8:45 AM	0	5	20	1	0	1	11	36	0	73	3	2	0	0	0	0

	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	9	11	3	0	1	43	56	0	32	4	8	0	0	0	0
4:15 PM	0	8	14	2	0	2	45	58	0	36	4	3	0	0	0	0
4:30 PM	0	9	16	1	0	2	58	69	0	52	3	4	0	0	0	0
4:45 PM	0	7	16	2	0	1	69	79	0	47	5	2	0	0	0	0
5:00 PM	0	4	16	1	0	4	68	74	0	49	7	1	0	0	0	0
5:15 PM	0	7	17	2	0	6	70	67	0	48	3	1	0	0	0	0
5:30 PM	0	9	18	2	0	5	63	62	0	50	1	2	0	0	0	0
5:45 PM	0	8	17	1	0	4	54	56	0	42	6	5	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**27**	**82**	**7**	**1**	**8**	**58**	**160**	**0**	**282**	**11**	**12**	**0**	**0**	**0**	**0**
PHF	**0.94**				**0.92**				**0.93**				**0.00**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**27**	**65**	**6**	**0**	**13**	**265**	**289**	**0**	**196**	**18**	**8**	**0**	**0**	**0**	**0**
PHF	**0.94**				**0.95**				**0.94**				**0.00**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 1
Location:	Roxbury, MA
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Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

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TRUCKS

	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.00**				**0.25**				**0.00**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Crawford Street Northbound				Walnut Avenue Southbound				Walnut Avenue Eastbound				Holworthy Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.00**				**0.00**				**0.25**				**0.00**			

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 1
Location:	Roxbury, MA
Street 1:	Walnut Avenue/ Crawford Street
Street 2:	Holworthy Street
Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

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PEDESTRIANS & BICYCLES

	Crawford Street Northbound					Walnut Avenue Southbound					Walnut Avenue Eastbound					Holworthy Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	1		0	0	0	0		0	0	0	0		0	0	0	1	
7:15 AM	0	0	0	3		0	0	0	0		0	0	0	1		0	0	0	3	
7:30 AM	0	0	0	1		0	0	0	0		1	0	0	0		0	0	0	1	
7:45 AM	0	0	0	1		0	0	2	0		2	0	0	0		0	0	0	1	
8:00 AM	0	0	0	1		0	1	0	0		1	0	0	1		0	0	0	1	
8:15 AM	0	1	0	2		0	0	1	1		2	0	0	0		0	0	0	2	
8:30 AM	0	0	0	1		0	0	0	0		1	0	0	0		0	0	0	2	
8:45 AM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	0	0	

	Crawford Street Northbound					Walnut Avenue Southbound					Walnut Avenue Eastbound					Holworthy Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	2		0	0	1	0		1	1	0	0		0	0	0	2	
4:15 PM	0	1	0	0		0	0	0	1		0	0	0	0		0	0	0	9	
4:30 PM	0	0	0	1		0	0	1	0		0	1	0	0		0	0	0	1	
4:45 PM	0	0	0	2		0	0	1	0		1	0	0	1		0	0	0	2	
5:00 PM	0	0	0	1		0	1	1	1		0	0	0	0		0	0	0	3	
5:15 PM	0	0	0	3		0	0	0	0		1	0	1	0		0	0	0	5	
5:30 PM	0	0	0	1		0	3	1	0		0	0	0	0		0	0	0	3	
5:45 PM	0	0	0	1		0	0	0	0		0	0	0	1		0	0	0	4	

AM PEAK HOUR[1] 7:45 AM to 8:45 AM	Crawford Street Northbound					Walnut Avenue Southbound					Walnut Avenue Eastbound					Holworthy Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	1	0	5		0	1	3	1		6	0	0	1		0	0	0	6	

PM PEAK HOUR[1] 4:30 PM to 5:30 PM	Crawford Street Northbound					Walnut Avenue Southbound					Walnut Avenue Eastbound					Holworthy Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	7		0	1	3	1		2	1	1	1		0	0	0	11	

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 2
Location:	Roxbury, MA
Street 1:	Columbus Avenue/ Seaver Street
Street 2:	Walnut Avenue
Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

BOSTON TRAFFIC DATA
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TOTAL (CARS & TRUCKS)

	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	6	137	14	0	2	74	2	0	3	24	9	0	7	11	7
7:15 AM	0	13	140	17	0	2	75	3	0	4	26	10	0	9	15	9
7:30 AM	0	19	141	20	0	3	80	4	0	6	31	13	0	11	19	10
7:45 AM	0	25	139	23	0	2	83	5	0	7	35	15	0	12	23	12
8:00 AM	1	30	134	26	0	4	89	6	0	9	40	18	0	13	26	11
8:15 AM	0	27	119	35	0	3	94	7	0	11	44	21	0	12	27	12
8:30 AM	0	23	102	43	0	3	92	6	0	10	43	19	0	10	28	13
8:45 AM	0	21	98	41	0	2	89	5	0	9	41	17	0	9	26	12

	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	17	117	12	0	5	124	6	0	11	30	28	0	23	49	14
4:15 PM	0	19	116	14	2	6	127	7	0	13	32	30	0	22	47	15
4:30 PM	0	18	112	13	0	5	140	6	0	12	33	36	0	21	44	16
4:45 PM	0	20	111	14	0	7	151	8	0	10	34	41	0	22	37	17
5:00 PM	1	19	108	15	0	8	167	7	0	9	36	47	0	20	30	18
5:15 PM	0	18	110	19	1	6	180	8	0	7	38	52	0	18	32	16
5:30 PM	0	17	106	23	0	7	177	9	0	6	37	50	0	15	31	13
5:45 PM	0	15	104	21	0	5	173	7	0	7	35	47	0	16	28	14

AM PEAK HOUR 7:45 AM to 8:45 AM	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**105**	**494**	**127**	**0**	**12**	**358**	**24**	**0**	**37**	**162**	**73**	**0**	**47**	**104**	**48**
PHF		**0.95**				**0.95**				**0.89**				**0.98**		
HV %	**0.0%**	**0.0%**	**0.4%**	**0.0%**	**0.0%**	**0.0%**	**1.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**74**	**435**	**71**	**1**	**28**	**675**	**32**	**0**	**32**	**145**	**190**	**0**	**75**	**130**	**64**
PHF		**0.99**				**0.94**				**0.95**				**0.88**		
HV %	**0.0%**	**0.0%**	**0.2%**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 2
Location:	Roxbury, MA
Street 1:	Columbus Avenue/ Seaver Street
Street 2:	Walnut Avenue
Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

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TRUCKS

	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.50**				**0.00**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Seaver Street Northbound				Columbus Avenue Southbound				Walnut Avenue Eastbound				Walnut Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.25**				**0.00**				**0.00**			

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 2
Location:	Roxbury, MA
Street 1:	Columbus Avenue/ Seaver Street
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Count Date:	8/7/2018
Day of Week:	Tuesday
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PEDESTRIANS & BICYCLES

	Seaver Street Northbound					Columbus Avenue Southbound					Walnut Avenue Eastbound					Walnut Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	1	0	1		0	1	0	1		0	0	0	0		0	0	0	1	
7:15 AM	0	0	0	0		0	0	0	2		0	0	0	0		0	0	0	2	
7:30 AM	0	1	0	0		0	1	0	2		0	0	0	0		0	0	0	1	
7:45 AM	0	0	0	1		0	0	0	4		0	0	1	0		0	0	0	2	
8:00 AM	0	0	0	0		0	1	0	3		0	1	0	1		0	0	0	3	
8:15 AM	0	1	0	1		0	0	0	3		0	0	0	0		0	0	0	2	
8:30 AM	0	1	0	0		0	0	0	2		1	0	0	1		0	0	0	2	
8:45 AM	0	0	0	0		0	0	0	2		0	0	0	0		0	0	0	3	

	Seaver Street Northbound					Columbus Avenue Southbound					Walnut Avenue Eastbound					Walnut Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		0	1	0	2		0	0	0	0		0	0	0	3	
4:15 PM	0	1	0	1		0	0	0	3		0	0	0	1		0	0	0	2	
4:30 PM	0	0	0	2		0	0	0	4		0	1	0	0		0	0	0	3	
4:45 PM	0	1	0	0		0	0	0	2		1	0	0	0		0	1	0	2	
5:00 PM	0	0	1	1		0	1	0	3		0	0	0	1		0	0	0	4	
5:15 PM	0	1	0	3		0	0	0	4		0	0	0	0		0	0	0	5	
5:30 PM	0	0	0	1		0	0	0	5		0	0	0	1		0	0	0	6	
5:45 PM	0	0	0	1		0	0	0	3		0	0	0	0		0	0	0	4	

AM PEAK HOUR[1]	Seaver Street Northbound					Columbus Avenue Southbound					Walnut Avenue Eastbound					Walnut Avenue Westbound				
7:45 AM to 8:45 AM	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	2	0	2		0	1	0	12		1	1	1	2		0	0	0	9	

PM PEAK HOUR[1]	Seaver Street Northbound					Columbus Avenue Southbound					Walnut Avenue Eastbound					Walnut Avenue Westbound				
4:45 PM to 5:45 PM	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	2	1	5		0	1	0	14		1	0	0	2		0	1	0	17	

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 3
Location:	Roxbury, MA
Street 1:	Seaver Street
Street 2:	Harold Street
Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

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TOTAL (CARS & TRUCKS)

	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	153	3	1	5	85	0	0	0	0	0	0	6	0	4
7:15 AM	0	0	162	3	0	4	90	0	0	0	0	0	0	5	0	8
7:30 AM	1	0	169	2	0	3	101	0	0	0	0	0	0	4	0	11
7:45 AM	0	0	178	3	0	4	106	0	0	0	0	0	0	5	0	9
8:00 AM	0	0	184	2	0	5	116	0	0	0	0	0	0	4	0	7
8:15 AM	0	0	173	4	0	6	121	0	0	0	0	0	0	5	0	8
8:30 AM	2	0	161	5	0	6	115	0	0	0	0	0	0	5	0	7
8:45 AM	0	0	154	4	0	5	110	0	0	0	0	0	0	4	0	6

	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	130	2	0	10	165	0	0	0	0	0	0	24	0	16
4:15 PM	0	0	135	5	0	16	163	0	0	0	0	0	0	27	0	14
4:30 PM	0	0	131	7	0	21	176	0	0	0	0	0	0	30	0	12
4:45 PM	0	0	132	5	1	19	195	0	0	0	0	0	0	26	0	13
5:00 PM	1	0	131	2	0	17	218	0	0	0	0	0	0	22	0	12
5:15 PM	0	0	137	4	0	18	232	0	0	0	0	0	0	23	0	10
5:30 PM	0	0	138	5	0	17	225	0	0	0	0	0	0	21	0	8
5:45 PM	0	0	133	4	0	15	221	0	0	0	0	0	0	19	0	7

AM PEAK HOUR 7:45 AM to 8:45 AM	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	2	**0**	**696**	**14**	**0**	**21**	**458**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**31**
PHF		**0.96**				**0.94**				**0.00**				**0.89**		
HV %	**0.0%**	**0.0%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**0**	**539**	**15**	**0**	**67**	**896**	**0**	**0**	**0**	**0**	**0**	**0**	**85**	**0**	**37**
PHF		**0.97**				**0.96**				**0.00**				**0.90**		
HV %	**0.0%**	**0.0%**	**0.2%**	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Andrew Fabiszewski
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TRUCKS

	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0

	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.50**				**0.00**				**0.00**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Seaver Street Northbound				Seaver Street Southbound				Eastbound				Harold Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.25**				**0.00**				**0.00**			

Client:	Andrew Fabiszewski
Project #:	239_078_HSH
BTD #:	Location 3
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Count Date:	8/7/2018
Day of Week:	Tuesday
Weather:	Partly Sunny, 90°F

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PEDESTRIANS & BICYCLES

	Seaver Street Northbound					Seaver Street Southbound					Eastbound					Harold Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	1	0	0		0	1	0	1		0	0	0	0		0	0	0	3	
7:15 AM	0	0	0	0		0	0	0	2		0	0	0	0		0	0	0	2	
7:30 AM	0	1	0	1		0	1	0	3		0	0	0	0		0	0	0	1	
7:45 AM	0	1	0	1		0	0	0	3		0	0	0	0		0	0	0	3	
8:00 AM	0	0	1	2		0	0	0	4		0	0	0	0		0	0	0	5	
8:15 AM	0	1	0	0		0	1	0	3		0	0	0	0		0	0	0	4	
8:30 AM	0	1	0	0		0	0	0	5		0	0	0	0		0	0	2	6	
8:45 AM	0	0	0	0		0	0	0	2		0	0	0	0		0	0	0	3	

	Seaver Street Northbound					Seaver Street Southbound					Eastbound					Harold Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		0	1	0	2		0	0	0	0		0	0	0	3	
4:15 PM	0	1	0	0		0	0	0	1		0	0	0	0		0	0	0	1	
4:30 PM	0	0	0	0		0	0	0	4		0	0	0	0		0	0	0	2	
4:45 PM	0	1	0	0		0	0	0	3		0	0	0	0		0	0	0	3	
5:00 PM	0	1	0	1		0	1	0	6		0	0	0	0		0	0	0	6	
5:15 PM	0	0	0	0		0	0	0	5		0	0	0	0		0	0	0	4	
5:30 PM	0	0	0	0		0	0	0	6		0	0	0	0		0	0	0	5	
5:45 PM	0	0	0	0		0	0	0	5		0	0	0	0		0	0	0	4	

AM PEAK HOUR[1]	Seaver Street Northbound					Seaver Street Southbound					Eastbound					Harold Street Westbound				
7:45 AM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	0	3	1	3		0	1	0	15		0	0	0	0		0	0	2	18	

PM PEAK HOUR[1]	Seaver Street Northbound					Seaver Street Southbound					Eastbound					Harold Street Westbound				
5:00 PM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
6:00 PM	0	1	0	1		0	1	0	22		0	0	0	0		0	0	0	19	

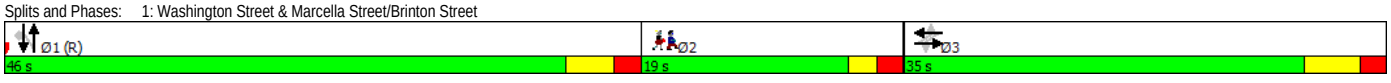
[1] *Peak hours corresponds to vehicular peak hours.*

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	193	0	143	6	11	8	235	317	0	0	364	169	
Future Volume (vph)	193	0	143	6	11	8	235	317	0	0	364	169	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99							0.98	
Frt		0.943			0.957							0.850	
Flt Protected		0.972			0.988		0.950						
Satd. Flow (prot)	0	1716	0	0	1784	0	1805	1643	0	0	1863	1567	
Flt Permitted		0.807			0.916		0.451						
Satd. Flow (perm)	0	1425	0	0	1654	0	857	1643	0	0	1863	1533	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			9							84	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			438		
Travel Time (s)		18.3			5.6			7.9			10.0		
Confl. Bikes (#/hr)			1			1						2	
Peak Hour Factor	0.98	0.98	0.98	0.89	0.89	0.89	0.91	0.91	0.91	0.93	0.93	0.93	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	197	0	146	7	12	9	258	348	0	0	391	182	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	343	0	0	28	0	258	348	0	0	391	182	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	35.0	35.0		35.0	35.0		46.0	46.0			46.0	46.0	19.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		46.0%	46.0%			46.0%	46.0%	19%
Maximum Green (s)	29.0	29.0		29.0	29.0		40.5	40.5			40.5	40.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													26
Act Effct Green (s)		23.5			23.5		53.6	53.6			53.6	53.6	
Actuated g/C Ratio		0.24			0.24		0.54	0.54			0.54	0.54	
v/c Ratio		0.88			0.07		0.56	0.40			0.39	0.21	
Control Delay		52.5			20.6		18.0	12.1			16.7	9.5	
Queue Delay		0.0			0.0		0.0	0.0			0.3	0.0	
Total Delay		52.5			20.6		18.0	12.1			17.0	9.5	
LOS		D			C		B	B			B	A	
Approach Delay		52.5			20.6			14.6			14.6		
Approach LOS		D			C			B			B		
Queue Length 50th (ft)		168			9		61	81			199	25	
Queue Length 95th (ft)		#277			29		#264	161			160	69	
Internal Link Dist (ft)		725			165			268			358		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		463			486		459	879			997	859	
Starvation Cap Reductn		0			0		0	0			190	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.74			0.06		0.56	0.40			0.48	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 64 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 72.5% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	127	32	28	513	324	34	
Future Volume (vph)	127	32	28	513	324	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor					1.00		
Frt	0.973				0.987		
Flt Protected	0.962			0.997			
Satd. Flow (prot)	1754	0	0	1655	1607	0	
Flt Permitted	0.962			0.966			
Satd. Flow (perm)	1754	0	0	1604	1607	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	12				7		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.83	0.83	0.94	0.94	0.90	0.90	
Heavy Vehicles (%)	1%	3%	0%	1%	3%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	153	39	30	546	360	38	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	192	0	0	576	398	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	26.0		53.0	53.0	53.0		21.0
Total Split (%)	26.0%		53.0%	53.0%	53.0%		21%
Maximum Green (s)	20.5		47.0	47.0	47.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							32
Act Effct Green (s)	14.6			61.3	61.3		
Actuated g/C Ratio	0.15			0.61	0.61		
v/c Ratio	0.72			0.59	0.40		
Control Delay	52.9			18.9	10.6		
Queue Delay	0.0			0.0	0.0		
Total Delay	52.9			18.9	10.6		
LOS	D			B	B		
Approach Delay	52.9			18.9	10.6		
Approach LOS	D			B	B		
Queue Length 50th (ft)	111			257	43		
Queue Length 95th (ft)	157			439	180		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	369			982	987		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.52			0.59	0.40		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

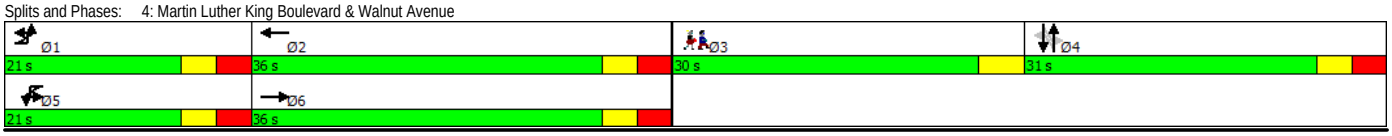
Splits and Phases: 3: Washington Street & Dimock Street

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations															
Traffic Volume (vph)	3	35	227	57	2	25	373	7	254	310	29	0	106	33	
Future Volume (vph)	3	35	227	57	2	25	373	7	254	310	29	0	106	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250		0		0	50		0	0		0	
Storage Lanes		1		1		1		0	1		0	0		0	
Taper Length (ft)		25				25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor										1.00					
Frt				0.850			0.997			0.987			0.968		
Flt Protected		0.950				0.950			0.950						
Satd. Flow (prot)	0	1805	3505	1615	0	1805	3321	0	1805	1856	0	0	1811	0	
Flt Permitted		0.950				0.950			0.662						
Satd. Flow (perm)	0	1805	3505	1615	0	1805	3321	0	1258	1856	0	0	1811	0	
Right Turn on Red				Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)				176			1			4			12		
Link Speed (mph)			30				30			30			30		
Link Distance (ft)			550				928			283			636		
Travel Time (s)			12.5				21.1			6.4			14.5		
Confl. Bikes (#/hr)											4				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	3%	0%	0%	1%	0%	0%	2%	0%	
Parking (#/hr)							0								
Adj. Flow (vph)	3	36	234	59	2	26	385	7	267	326	31	0	114	35	
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	39	234	59	0	28	392	0	267	357	0	0	149	0	
Turn Type	Prot	Prot	NA	Free	Prot	Prot	NA		Perm	NA			NA		
Protected Phases	1	1	6		5	5	2			4			4		3
Permitted Phases				Free					4			4			
Detector Phase	1	1	6		5	5	2		4	4		4	4		
Switch Phase															
Minimum Initial (s)	6.0	6.0	8.0		6.0	6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		0.0
Lost Time Adjust (s)		0.0	0.0			0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0			6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	None	Max		None	None		None	None		None
Walk Time (s)															7.0
Flash Dont Walk (s)															19.0
Pedestrian Calls (#/hr)															5
Act Effct Green (s)		6.9	33.9	81.1		6.6	31.1		25.9	25.9			25.9		
Actuated g/C Ratio		0.09	0.42	1.00		0.08	0.38		0.32	0.32			0.32		
v/c Ratio		0.25	0.16	0.04		0.19	0.31		0.67	0.60			0.25		
Control Delay		44.2	18.8	0.0		43.9	21.6		37.8	32.0			24.6		
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Delay		44.2	18.8	0.0		43.9	21.6		37.8	32.0			24.6		
LOS		D	B	A		D	C		D	C			C		
Approach Delay			18.5				23.1			34.5			24.6		
Approach LOS			B				C			C			C		
Queue Length 50th (ft)		19	28	0		13	70		113	146			50		
Queue Length 95th (ft)		62	103	0		49	171		#358	#410			146		
Internal Link Dist (ft)			470				848			203			556		
Turn Bay Length (ft)				250					50						
Base Capacity (vph)		346	1463	1615		346	1273		401	595			586		
Starvation Cap Reductn		0	0	0		0	0		0	0			0		
Spillback Cap Reductn		0	0	0		0	0		0	0			0		
Storage Cap Reductn		0	0	0		0	0		0	0			0		
Reduced v/c Ratio		0.11	0.16	0.04		0.08	0.31		0.67	0.60			0.25		

Intersection Summary

Area Type: Other
Cycle Length: 118
Actuated Cycle Length: 81.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 26.9 Intersection LOS: C
Intersection Capacity Utilization 61.2% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



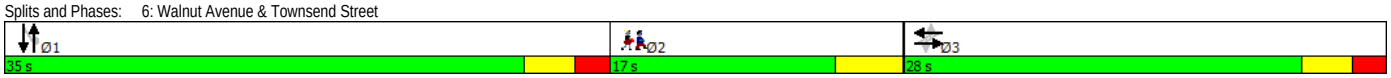
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	13	137	75	64	0	31	0	469	84	25	199	0	
Future Volume (vph)	13	137	75	64	0	31	0	469	84	25	199	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor								1.00					
Frt		0.955			0.955			0.980					
Flt Protected		0.997			0.968						0.994		
Satd. Flow (prot)	0	1809	0	0	1550	0	0	1643	0	0	1685	0	
Flt Permitted		0.978			0.540						0.920		
Satd. Flow (perm)	0	1775	0	0	864	0	0	1643	0	0	1559	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		32			82			13					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)									4				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	0%	1%	5%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	14	144	79	67	0	33	0	499	89	27	216	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	237	0	0	100	0	0	588	0	0	243	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		11
Act Effct Green (s)		11.2			11.2			32.1			32.1		
Actuated g/C Ratio		0.20			0.20			0.57			0.57		
v/c Ratio		0.63			0.42			0.62			0.27		
Control Delay		25.8			13.5			15.4			9.8		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		25.8			13.5			15.4			9.8		
LOS		C			B			B			A		
Approach Delay		25.8			13.5			15.4			9.8		
Approach LOS		C			B			B			A		
Queue Length 50th (ft)		55			4			87			28		
Queue Length 95th (ft)		150			46			#444			137		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		765			411			946			892		
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		0.31			0.24			0.62			0.27		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 56.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 63.1%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	37	162	73	47	104	48	105	494	127	12	358	24	
Future Volume (vph)	37	162	73	47	104	48	105	494	127	12	358	24	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00		
Frt		0.964			0.967				0.850		0.991		
Flt Protected		0.993			0.988			0.991			0.998		
Satd. Flow (prot)	0	1811	0	0	1801	0	0	3578	1615	0	3533	0	
Flt Permitted		0.911			0.710			0.778			0.931		
Satd. Flow (perm)	0	1659	0	0	1294	0	0	2808	1554	0	3295	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		18			15				134		8		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	12		2	2		12	2		11	9		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.89	0.89	0.89	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	
Adj. Flow (vph)	42	182	82	48	106	49	111	520	134	13	377	25	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	306	0	0	203	0	0	631	134	0	415	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		1.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	21.0	21.0		21.0	21.0		36.0	36.0	36.0	36.0	36.0		33.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		40.0%	40.0%	40.0%	40.0%	40.0%		37%
Maximum Green (s)	16.0	16.0		16.0	16.0		31.0	31.0	31.0	31.0	31.0		30.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													23.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)		19.1			19.1			41.1	41.1		41.1		
Actuated g/C Ratio		0.21			0.21			0.46	0.46		0.46		
v/c Ratio		0.84			0.71			0.49	0.17		0.28		
Control Delay		55.2			47.6			25.1	10.5		18.4		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		55.2			47.6			25.1	10.5		18.4		
LOS		E			D			C	B		B		
Approach Delay		55.2			47.6			22.5			18.4		
Approach LOS		E			D			C			B		
Queue Length 50th (ft)		166			105			179	0		90		
Queue Length 95th (ft)		#328			#227			244	59		130		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		366			286			1281	782		1508		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.84			0.71			0.49	0.17		0.28		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 66 (73%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 30.4 Intersection LOS: C
Intersection Capacity Utilization 58.8% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Seaver Street/Columbus Avenue & Walnut Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	19	31	696	14	21	458
Future Volume (vph)	19	31	696	14	21	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98		1.00			1.00
Frt	0.917		0.997			
Flt Protected	0.981					0.998
Satd. Flow (prot)	1680	0	3595	0	0	3603
Flt Permitted	0.981					0.911
Satd. Flow (perm)	1678	0	3595	0	0	3287
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	34		3			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	3	15		18	18	
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	21	34	718	14	22	477
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	732	0	0	499
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	39.0		51.0		51.0	51.0
Total Split (%)	43.3%		56.7%		56.7%	56.7%
Maximum Green (s)	34.0		46.0		46.0	46.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	8.4		78.8			78.8
Actuated g/C Ratio	0.09		0.88			0.88
v/c Ratio	0.29		0.23			0.17
Control Delay	24.0		1.9			5.7
Queue Delay	0.0		0.0			0.0
Total Delay	24.0		1.9			5.7
LOS	C		A			A
Approach Delay	24.0		1.9			5.7
Approach LOS	C		A			A
Queue Length 50th (ft)	11		40			100
Queue Length 95th (ft)	46		61			m141
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	655		3149			2879
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.08		0.23			0.17

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 28 (31%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.29			
Intersection Signal Delay: 4.3		Intersection LOS: A	
Intersection Capacity Utilization 49.0%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 11: Seaver Street & Harold Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	552	88	155	358
Future Volume (Veh/h)	0	0	552	88	155	358
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	607	97	161	373
Pedestrians	13					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.86	0.79			0.79	
vC, conflicting volume	1364	668			717	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1003	452			513	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			81	
cM capacity (veh/h)	186	482			843	

Direction, Lane #	NB 1	SB 1
Volume Total	704	534
Volume Left	0	161
Volume Right	97	0
cSH	1700	843
Volume to Capacity	0.41	0.19
Queue Length 95th (ft)	0	18
Control Delay (s)	0.0	4.9
Lane LOS		A
Approach Delay (s)	0.0	4.9
Approach LOS		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	68.7%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	4	29	10	0	53	0	507	6	3	185	0
Future Volume (Veh/h)	33	4	29	10	0	53	0	507	6	3	185	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.96	0.96	0.96	0.95	0.95	0.95
Hourly flow rate (vph)	36	4	32	11	0	57	0	528	6	3	195	0
Pedestrians		5			5			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.79	0.79	1.00	0.79	0.79	0.79	1.00			0.79		
vC, conflicting volume	794	745	206	777	742	536	200			539		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592	530	200	571	526	275	194			279		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	99	96	97	100	91	100			100		
cM capacity (veh/h)	296	357	833	321	358	602	1378			1015		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	68	534	198
Volume Left	36	11	0	3
Volume Right	32	57	6	0
cSH	421	527	1700	1015
Volume to Capacity	0.17	0.13	0.31	0.00
Queue Length 95th (ft)	15	11	0	0
Control Delay (s)	15.3	12.8	0.0	0.2
Lane LOS	C	B		A
Approach Delay (s)	15.3	12.8	0.0	0.2
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.3		
Intersection Capacity Utilization			44.1%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	0	0	0	0	4	548	60	35	295	8
Future Volume (Veh/h)	5	2	0	0	0	0	4	548	60	35	295	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.96	0.96	0.96
Hourly flow rate (vph)	9	3	0	0	0	0	4	602	66	36	307	8
Pedestrians		7			4			3			4	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1037	1070	321	1034	1041	643	322			672		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1014	1049	264	1012	1019	643	265			672		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	100	100	100	100	100			96		
cM capacity (veh/h)	199	208	737	199	217	475	1242			928		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	672	351
Volume Left	9	4	36
Volume Right	0	66	8
cSH	201	1242	928
Volume to Capacity	0.06	0.00	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	24.0	0.1	1.3
Lane LOS	C	A	A
Approach Delay (s)	24.0	0.1	1.3
Approach LOS	C		

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	53.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	282	11	12	0	0	0	27	82	7	8	58	160
Future Vol, veh/h	282	11	12	0	0	0	27	82	7	8	58	160
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	303	12	13	0	0	0	29	87	7	9	63	174
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.9	9.2	9.5
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	23%	92%	4%
Vol Thru, %	71%	4%	26%
Vol Right, %	6%	4%	71%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	116	305	226
LT Vol	27	282	8
Through Vol	82	11	58
RT Vol	7	12	160
Lane Flow Rate	123	328	246
Geometry Grp	1	1	1
Degree of Util (X)	0.173	0.446	0.306
Departure Headway (Hd)	5.041	4.9	4.484
Convergence, Y/N	Yes	Yes	Yes
Cap	707	731	798
Service Time	3.103	2.962	2.535
HCM Lane V/C Ratio	0.174	0.449	0.308
HCM Control Delay	9.2	11.9	9.5
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.6	2.3	1.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	288	0	250	8	4	8	141	299	0	0	465	165	
Future Volume (vph)	288	0	250	8	4	8	141	299	0	0	465	165	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99							0.98	
Frt		0.937			0.946							0.850	
Flt Protected		0.974			0.980		0.950						
Satd. Flow (prot)	0	1700	0	0	1747	0	1787	1643	0	0	1863	1567	
Flt Permitted		0.819			0.825		0.251						
Satd. Flow (perm)	0	1430	0	0	1470	0	472	1643	0	0	1863	1532	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			10							76	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			438		
Travel Time (s)		18.3			5.6			7.9			10.0		
Confl. Bikes (#/hr)			1			1						2	
Peak Hour Factor	0.96	0.96	0.96	0.83	0.83	0.83	0.98	0.98	0.98	0.94	0.94	0.94	
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	1%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	300	0	260	10	5	10	144	305	0	0	495	176	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	560	0	0	25	0	144	305	0	0	495	176	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	43.0	43.0		43.0	43.0		38.0	38.0			38.0	38.0	19.0
Total Split (%)	43.0%	43.0%		43.0%	43.0%		38.0%	38.0%			38.0%	38.0%	19%
Maximum Green (s)	37.0	37.0		37.0	37.0		32.5	32.5			32.5	32.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													34
Act Effct Green (s)		37.7			37.7		39.4	39.4			39.4	39.4	
Actuated g/C Ratio		0.38			0.38		0.39	0.39			0.39	0.39	
v/c Ratio		0.96			0.04		0.78	0.47			0.67	0.27	
Control Delay		57.0			14.8		50.8	23.0			40.3	22.6	
Queue Delay		0.0			0.0		0.0	0.0			1.0	0.0	
Total Delay		57.0			14.8		50.8	23.0			41.3	22.6	
LOS		E			B		D	C			D	C	
Approach Delay		57.0			14.8			31.9			36.4		
Approach LOS		E			B			C			D		
Queue Length 50th (ft)		314			6		53	110			324	74	
Queue Length 95th (ft)		#544			21		m#199	213			m352	m89	
Internal Link Dist (ft)		725			165			268			358		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		585			562		185	647			734	649	
Starvation Cap Reductn		0			0		0	0			82	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.96			0.04		0.78	0.47			0.76	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 9 (9%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 41.7 Intersection LOS: D
Intersection Capacity Utilization 84.4% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street

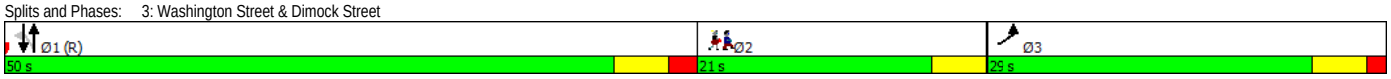
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	161	84	20	421	340	26	
Future Volume (vph)	161	84	20	421	340	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor					1.00		
Frt	0.954				0.990		
Flt Protected	0.968			0.998			
Satd. Flow (prot)	1737	0	0	1641	1641	0	
Flt Permitted	0.968			0.974			
Satd. Flow (perm)	1737	0	0	1602	1641	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	24				5		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.83	0.83	0.95	0.95	0.96	0.96	
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	194	101	21	443	354	27	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	295	0	0	464	381	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	29.0		50.0	50.0	50.0		21.0
Total Split (%)	29.0%		50.0%	50.0%	50.0%		21%
Maximum Green (s)	23.5		44.0	44.0	44.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							72
Act Effct Green (s)	19.2			52.5	52.5		
Actuated g/C Ratio	0.19			0.52	0.52		
v/c Ratio	0.84			0.55	0.44		
Control Delay	55.5			22.0	14.0		
Queue Delay	0.0			0.0	0.0		
Total Delay	55.5			22.0	14.0		
LOS	E			C	B		
Approach Delay	55.5			22.0	14.0		
Approach LOS	E			C	B		
Queue Length 50th (ft)	167			212	90		
Queue Length 95th (ft)	227			342	m170		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	426			840	863		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.69			0.55	0.44		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 5 (5%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Washington Street & Dimock Street

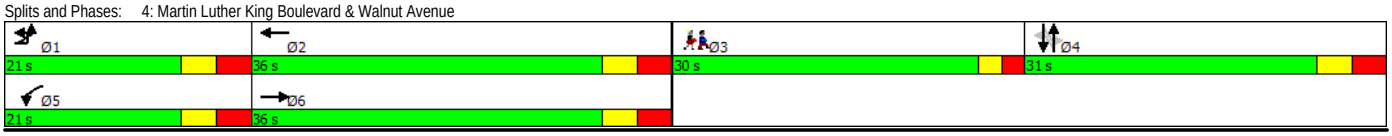


Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations														
Traffic Volume (vph)	2	80	376	134	68	289	7	127	131	31	7	201	56	
Future Volume (vph)	2	80	376	134	68	289	7	127	131	31	7	201	56	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250	0		0	50		0	0		0	
Storage Lanes		1		1	1		0	1		0	0		0	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor									1.00					
Frt				0.850		0.997			0.971			0.971		
Flt Protected		0.950			0.950			0.950				0.999		
Satd. Flow (prot)	0	1754	3539	1599	1770	3354	0	1805	1810	0	0	1802	0	
Flt Permitted		0.950			0.950			0.414				0.992		
Satd. Flow (perm)	0	1754	3539	1599	1770	3354	0	787	1810	0	0	1789	0	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)				176		2			9			10		
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			550			928			283			636		
Travel Time (s)			12.5			21.1			6.4			14.5		
Confl. Bikes (#/hr)										4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.94	0.94	0.94	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	3%	2%	1%	2%	2%	0%	0%	2%	0%	0%	3%	0%	
Parking (#/hr)						0								
Adj. Flow (vph)	2	87	409	146	72	304	7	135	139	33	8	242	67	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	89	409	146	72	311	0	135	172	0	0	317	0	
Turn Type	Prot	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA		
Protected Phases	1	1	6		5	2			4			4		3
Permitted Phases				Free				4			4			
Detector Phase	1	1	6		5	2		4	4		4	4		
Switch Phase														
Minimum Initial (s)	6.0	6.0	8.0		6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	Max		None	None		None	None		None
Walk Time (s)														7.0
Flash Dont Walk (s)														19.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		9.0	31.7	85.8	8.3	31.0		25.8	25.8			25.8		
Actuated g/C Ratio		0.10	0.37	1.00	0.10	0.36		0.30	0.30			0.30		
v/c Ratio		0.48	0.31	0.09	0.42	0.26		0.57	0.31			0.58		
Control Delay		48.8	23.1	0.1	48.1	23.3		41.8	28.1			33.5		
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay		48.8	23.1	0.1	48.1	23.3		41.8	28.1			33.5		
LOS		D	C	A	D	C		D	C			C		
Approach Delay			21.5			28.0			34.1			33.5		
Approach LOS			C			C			C			C		
Queue Length 50th (ft)		44	75	0	35	56		57	63			130		
Queue Length 95th (ft)		117	184	0	99	144		#211	178			#316		
Internal Link Dist (ft)			470			848			203			556		
Turn Bay Length (ft)				250				50						
Base Capacity (vph)		316	1309	1599	319	1213		237	551			545		
Starvation Cap Reductn		0	0	0	0	0		0	0			0		
Spillback Cap Reductn		0	0	0	0	0		0	0			0		
Storage Cap Reductn		0	0	0	0	0		0	0			0		
Reduced v/c Ratio		0.28	0.31	0.09	0.23	0.26		0.57	0.31			0.58		

Intersection Summary

Area Type: Other
Cycle Length: 118
Actuated Cycle Length: 85.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 27.6 Intersection LOS: C
Intersection Capacity Utilization 58.5% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



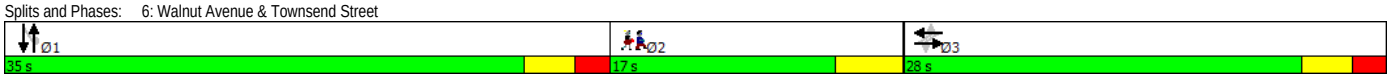
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	9	216	174	88	0	62	0	166	53	28	371	0	
Future Volume (vph)	9	216	174	88	0	62	0	166	53	28	371	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor								0.99					
Frt		0.941			0.944			0.967					
Flt Protected		0.999			0.971						0.997		
Satd. Flow (prot)	0	1786	0	0	1567	0	0	1632	0	0	1689	0	
Flt Permitted		0.993			0.388						0.970		
Satd. Flow (perm)	0	1775	0	0	626	0	0	1632	0	0	1643	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		49			82			23					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)									4				
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	9	225	181	97	0	68	0	178	57	30	403	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	415	0	0	165	0	0	235	0	0	433	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		16
Act Effct Green (s)		16.8			16.8			30.8			30.8		
Actuated g/C Ratio		0.28			0.28			0.51			0.51		
v/c Ratio		0.78			0.71			0.28			0.52		
Control Delay		30.2			30.3			11.4			15.6		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		30.2			30.3			11.4			15.6		
LOS		C			C			B			B		
Approach Delay		30.2			30.3			11.4			15.6		
Approach LOS		C			C			B			B		
Queue Length 50th (ft)		110			23			36			88		
Queue Length 95th (ft)		#302			#134			133			287		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		722			294			842			836		
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		0.57			0.56			0.28			0.52		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 60.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 6: Walnut Avenue & Townsend Street

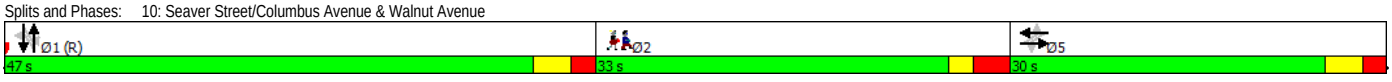


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	32	145	190	75	130	64	74	435	71	28	675	32	
Future Volume (vph)	32	145	190	75	130	64	74	435	71	28	675	32	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.95		1.00		
Frt		0.930			0.968				0.850		0.993		
Flt Protected		0.996			0.986			0.993			0.998		
Satd. Flow (prot)	0	1742	0	0	1800	0	0	3585	1615	0	3574	0	
Flt Permitted		0.951			0.691			0.635			0.916		
Satd. Flow (perm)	0	1662	0	0	1261	0	0	2292	1534	0	3279	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		45			13				72		5		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	14		5	5		14	2		22	17		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.99	0.99	0.99	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	34	153	200	85	148	73	75	439	72	30	718	34	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	387	0	0	306	0	0	514	72	0	782	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	30.0	30.0		30.0	30.0		47.0	47.0	47.0	47.0	47.0		33.0
Total Split (%)	27.3%	27.3%		27.3%	27.3%		42.7%	42.7%	42.7%	42.7%	42.7%		30%
Maximum Green (s)	25.0	25.0		25.0	25.0		42.0	42.0	42.0	42.0	42.0		28.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		3.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													21.0
Pedestrian Calls (#/hr)													39
Act Effct Green (s)		38.2			38.2			42.0	42.0		42.0		
Actuated g/C Ratio		0.35			0.35			0.38	0.38		0.38		
v/c Ratio		0.64			0.69			0.59	0.11		0.62		
Control Delay		36.9			44.1			38.5	15.2		30.1		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		36.9			44.1			38.5	15.2		30.1		
LOS		D			D			D	B		C		
Approach Delay		36.9			44.1			35.6			30.1		
Approach LOS		D			D			D			C		
Queue Length 50th (ft)		242			~225			180	2		231		
Queue Length 95th (ft)		#431			#387			246	51		297		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		606			446			875	630		1255		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.64			0.69			0.59	0.11		0.62		

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 73 (66%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 35.0 Intersection LOS: D
Intersection Capacity Utilization 80.6% 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: 10: Seaver Street/Columbus Avenue & Walnut Avenue

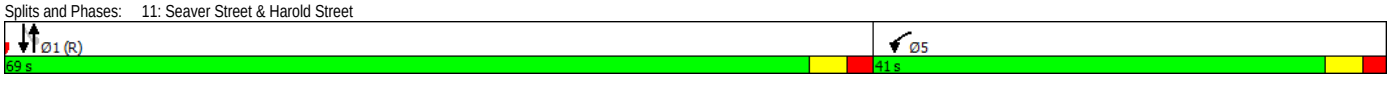


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	85	37	539	15	67	896
Future Volume (vph)	85	37	539	15	67	896
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99		1.00			1.00
Frt	0.959		0.996			
Flt Protected	0.966					0.997
Satd. Flow (prot)	1739	0	3589	0	0	3599
Flt Permitted	0.966					0.856
Satd. Flow (perm)	1738	0	3589	0	0	3086
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	21		4			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	1	22		19	19	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	94	41	556	15	70	933
Shared Lane Traffic (%)						
Lane Group Flow (vph)	135	0	571	0	0	1003
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	41.0		69.0		69.0	69.0
Total Split (%)	37.3%		62.7%		62.7%	62.7%
Maximum Green (s)	36.0		64.0		64.0	64.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	22		0		0	0
Act Effct Green (s)	19.3		80.7			80.7
Actuated g/C Ratio	0.18		0.73			0.73
v/c Ratio	0.42		0.22			0.44
Control Delay	35.8		5.7			18.4
Queue Delay	0.0		0.0			0.0
Total Delay	35.8		5.7			18.4
LOS	D		A			B
Approach Delay	35.8		5.7			18.4
Approach LOS	D		A			B
Queue Length 50th (ft)	66		73			293
Queue Length 95th (ft)	122		97			342
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	583		2634			2264
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.23		0.22			0.44

Intersection Summary

Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 19 (17%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Seaver Street & Harold Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	440	142	357	366
Future Volume (Veh/h)	0	0	440	142	357	366
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.96	0.96	0.94	0.94
Hourly flow rate (vph)	0	0	458	148	380	389
Pedestrians	7					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.85	0.83			0.83	
vC, conflicting volume	1688	539			613	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1273	343			432	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			60	
cM capacity (veh/h)	94	581			945	

Direction, Lane #	NB 1	SB 1
Volume Total	606	769
Volume Left	0	380
Volume Right	148	0
cSH	1700	945
Volume to Capacity	0.36	0.40
Queue Length 95th (ft)	0	49
Control Delay (s)	0.0	8.6
Lane LOS		A
Approach Delay (s)	0.0	8.6
Approach LOS		

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	77.7%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	10	20	10	0	45	0	230	7	34	369	0
Future Volume (Veh/h)	14	10	20	10	0	45	0	230	7	34	369	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	18	13	25	13	0	59	0	258	8	37	397	0
Pedestrians		13			13			1			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90	0.99	0.90			0.99		
vC, conflicting volume	815	763	411	778	759	285	410			279		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	726	669	292	686	664	277	291			271		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	96	96	100	92	100			97		
cM capacity (veh/h)	268	327	669	291	329	745	1142			1280		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	56	72	266	434
Volume Left	18	13	0	37
Volume Right	25	59	8	0
cSH	388	582	1700	1280
Volume to Capacity	0.14	0.12	0.16	0.03
Queue Length 95th (ft)	13	11	0	2
Control Delay (s)	15.8	12.1	0.0	0.9
Lane LOS	C	B		A
Approach Delay (s)	15.8	12.1	0.0	0.9
Approach LOS	C	B		

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	0	0	0	0	214	37	36	588	9
Future Volume (Veh/h)	5	0	2	0	0	0	0	214	37	36	588	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.95	0.95	0.95
Hourly flow rate (vph)	9	0	3	0	0	0	0	235	41	38	619	9
Pedestrians		8			4			2			3	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	966	988	634	964	972	262	636			280		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	861	887	464	859	868	262	467			280		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	100	100	100	100			97		
cM capacity (veh/h)	223	230	499	225	236	779	917			1294		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	276	666
Volume Left	9	0	38
Volume Right	3	41	9
cSH	259	917	1294
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	19.6	0.0	0.8
Lane LOS	C		A
Approach Delay (s)	19.6	0.0	0.8
Approach LOS	C		

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	62.4%	ICU Level of Service		B	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	196	18	8	0	0	0	27	65	6	13	265	289
Future Vol, veh/h	196	18	8	0	0	0	27	65	6	13	265	289
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	209	19	9	0	0	0	29	69	6	14	279	304
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.1	9.4	18.7
HCM LOS	B	A	C

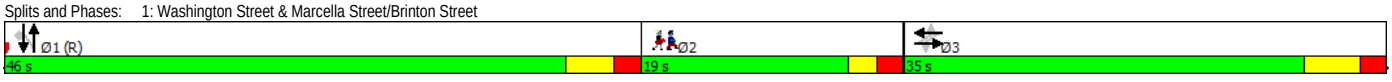
Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	28%	88%	2%
Vol Thru, %	66%	8%	47%
Vol Right, %	6%	4%	51%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	98	222	567
LT Vol	27	196	13
Through Vol	65	18	265
RT Vol	6	8	289
Lane Flow Rate	104	236	597
Geometry Grp	1	1	1
Degree of Util (X)	0.155	0.374	0.731
Departure Headway (Hd)	5.365	5.706	4.412
Convergence, Y/N	Yes	Yes	Yes
Cap	670	633	812
Service Time	3.381	3.71	2.488
HCM Lane V/C Ratio	0.155	0.373	0.735
HCM Control Delay	9.4	12.1	18.7
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.5	1.7	6.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	202	0	148	6	11	8	243	380	0	0	429	175	
Future Volume (vph)	202	0	148	6	11	8	243	380	0	0	429	175	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99							0.98	
Frt		0.943			0.957							0.850	
Flt Protected		0.972			0.988		0.950						
Satd. Flow (prot)	0	1716	0	0	1784	0	1805	1643	0	0	1863	1567	
Flt Permitted		0.806			0.915		0.388						
Satd. Flow (perm)	0	1423	0	0	1652	0	737	1643	0	0	1863	1533	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			9							76	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			438		
Travel Time (s)		18.3			5.6			7.9			10.0		
Confl. Bikes (#/hr)			1			1						2	
Peak Hour Factor	0.98	0.98	0.98	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	206	0	151	7	12	9	264	413	0	0	461	188	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	357	0	0	28	0	264	413	0	0	461	188	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	35.0	35.0		35.0	35.0		46.0	46.0			46.0	46.0	19.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		46.0%	46.0%			46.0%	46.0%	19%
Maximum Green (s)	29.0	29.0		29.0	29.0		40.5	40.5			40.5	40.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													26
Act Effct Green (s)		24.3			24.3		52.8	52.8			52.8	52.8	
Actuated g/C Ratio		0.24			0.24		0.53	0.53			0.53	0.53	
v/c Ratio		0.89			0.07		0.68	0.48			0.47	0.22	
Control Delay		53.9			20.4		25.4	14.1			18.2	10.2	
Queue Delay		0.0			0.0		0.0	0.0			0.4	0.0	
Total Delay		53.9			20.4		25.4	14.1			18.6	10.2	
LOS		D			C		C	B			B	B	
Approach Delay		53.9			20.4			18.5			16.1		
Approach LOS		D			C			B			B		
Queue Length 50th (ft)		176			9		61	95			255	30	
Queue Length 95th (ft)		#309			29		#308	192			226	m69	
Internal Link Dist (ft)		725			165			268			358		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		463			485		388	867			983	845	
Starvation Cap Reductn		0			0		0	0			173	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.77			0.06		0.68	0.48			0.57	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 64 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 25.0 Intersection LOS: C
Intersection Capacity Utilization 77.1% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	141	33	29	579	383	35	
Future Volume (vph)	141	33	29	579	383	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor					1.00		
Frt	0.974				0.989		
Flt Protected	0.961			0.998			
Satd. Flow (prot)	1754	0	0	1657	1610	0	
Flt Permitted	0.961			0.965			
Satd. Flow (perm)	1754	0	0	1602	1610	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	11				6		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.92	0.92	0.94	0.94	0.92	0.92	
Heavy Vehicles (%)	1%	3%	0%	1%	3%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	153	36	31	616	416	38	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	189	0	0	647	454	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	26.0		53.0	53.0	53.0		21.0
Total Split (%)	26.0%		53.0%	53.0%	53.0%		21%
Maximum Green (s)	20.5		47.0	47.0	47.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							32
Act Effct Green (s)	14.5			61.4	61.4		
Actuated g/C Ratio	0.14			0.61	0.61		
v/c Ratio	0.72			0.66	0.46		
Control Delay	53.1			21.1	13.6		
Queue Delay	0.0			0.0	0.0		
Total Delay	53.1			21.1	13.6		
LOS	D			C	B		
Approach Delay	53.1			21.1	13.6		
Approach LOS	D			C	B		
Queue Length 50th (ft)	110			309	69		
Queue Length 95th (ft)	172			#575	m235		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	368			983	991		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.51			0.66	0.46		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

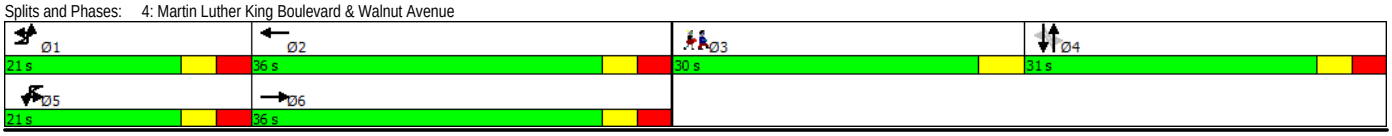
Splits and Phases: 3: Washington Street & Dimock Street

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations															
Traffic Volume (vph)	3	36	235	59	2	26	386	7	263	324	30	0	110	34	
Future Volume (vph)	3	36	235	59	2	26	386	7	263	324	30	0	110	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250		0		0	50		0	0		0	
Storage Lanes		1		1		1		0	1		0	0		0	
Taper Length (ft)		25				25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor										1.00					
Frt				0.850			0.997			0.987			0.968		
Flt Protected		0.950				0.950			0.950						
Satd. Flow (prot)	0	1805	3505	1615	0	1805	3321	0	1805	1856	0	0	1812	0	
Flt Permitted		0.950				0.950			0.659						
Satd. Flow (perm)	0	1805	3505	1615	0	1805	3321	0	1252	1856	0	0	1812	0	
Right Turn on Red				Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)				176			1			4			12		
Link Speed (mph)			30				30			30			30		
Link Distance (ft)			550				928			283			636		
Travel Time (s)			12.5				21.1			6.4			14.5		
Confl. Bikes (#/hr)											4				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	3%	0%	0%	1%	0%	0%	2%	0%	
Parking (#/hr)							0								
Adj. Flow (vph)	3	37	242	61	2	27	398	7	277	341	32	0	118	37	
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	40	242	61	0	29	405	0	277	373	0	0	155	0	
Turn Type	Prot	Prot	NA	Free	Prot	Prot	NA		Perm	NA			NA		
Protected Phases	1	1	6		5	5	2			4			4		3
Permitted Phases				Free					4			4			
Detector Phase	1	1	6		5	5	2		4	4		4	4		
Switch Phase															
Minimum Initial (s)	6.0	6.0	8.0		6.0	6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		0.0
Lost Time Adjust (s)		0.0	0.0			0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0			6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	None	Max		None	None		None	None		None
Walk Time (s)															7.0
Flash Dont Walk (s)															19.0
Pedestrian Calls (#/hr)															5
Act Effct Green (s)		7.0	33.9	81.2		6.7	31.1		25.9	25.9			25.9		
Actuated g/C Ratio		0.09	0.42	1.00		0.08	0.38		0.32	0.32			0.32		
v/c Ratio		0.26	0.17	0.04		0.20	0.32		0.69	0.63			0.26		
Control Delay		44.2	18.9	0.1		44.0	21.8		39.1	32.8			24.8		
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Delay		44.2	18.9	0.1		44.0	21.8		39.1	32.8			24.8		
LOS		D	B	A		D	C		D	C			C		
Approach Delay			18.5				23.3			35.5			24.8		
Approach LOS			B				C			D			C		
Queue Length 50th (ft)		19	29	0		14	72		119	154			52		
Queue Length 95th (ft)		63	106	0		50	177		#378	#439			152		
Internal Link Dist (ft)			470				848			203			556		
Turn Bay Length (ft)				250					50						
Base Capacity (vph)		345	1462	1615		345	1272		399	595			586		
Starvation Cap Reductn		0	0	0		0	0		0	0			0		
Spillback Cap Reductn		0	0	0		0	0		0	0			0		
Storage Cap Reductn		0	0	0		0	0		0	0			0		
Reduced v/c Ratio		0.12	0.17	0.04		0.08	0.32		0.69	0.63			0.26		

Intersection Summary

Area Type: Other
Cycle Length: 118
Actuated Cycle Length: 81.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 27.4 Intersection LOS: C
Intersection Capacity Utilization 62.6% ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



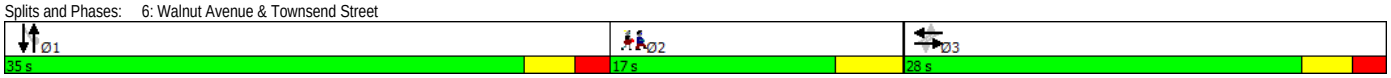
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	13	152	78	70	0	35	0	486	87	26	206	0	
Future Volume (vph)	13	152	78	70	0	35	0	486	87	26	206	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor								1.00					
Frt		0.957			0.955			0.979					
Flt Protected		0.997			0.968						0.994		
Satd. Flow (prot)	0	1813	0	0	1550	0	0	1642	0	0	1685	0	
Flt Permitted		0.979			0.517						0.916		
Satd. Flow (perm)	0	1780	0	0	828	0	0	1642	0	0	1553	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		30			82			13					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)									4				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	0%	1%	5%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	14	160	82	74	0	37	0	517	93	28	224	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	256	0	0	111	0	0	610	0	0	252	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		11
Act Effct Green (s)		11.9			11.9			31.7			31.7		
Actuated g/C Ratio		0.21			0.21			0.56			0.56		
v/c Ratio		0.64			0.46			0.66			0.29		
Control Delay		26.0			15.2			17.0			10.6		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		26.0			15.2			17.0			10.6		
LOS		C			B			B			B		
Approach Delay		26.0			15.2			17.0			10.6		
Approach LOS		C			B			B			B		
Queue Length 50th (ft)		61			7			96			31		
Queue Length 95th (ft)		163			54			#491			150		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		765			395			928			872		
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		0.33			0.28			0.66			0.29		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 56.4			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 65.3%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	38	168	76	49	109	50	109	512	132	12	374	25	
Future Volume (vph)	38	168	76	49	109	50	109	512	132	12	374	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00		
Frt		0.964			0.968				0.850		0.991		
Flt Protected		0.993			0.988			0.991			0.999		
Satd. Flow (prot)	0	1811	0	0	1803	0	0	3578	1615	0	3537	0	
Flt Permitted		0.913			0.718			0.762			0.931		
Satd. Flow (perm)	0	1662	0	0	1310	0	0	2750	1554	0	3295	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		18			15				139		8		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	12		2	2		12	2		11	9		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.89	0.89	0.89	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	
Adj. Flow (vph)	43	189	85	50	111	51	115	539	139	13	394	26	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	317	0	0	212	0	0	654	139	0	433	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		1.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	21.0	21.0		21.0	21.0		36.0	36.0	36.0	36.0	36.0		33.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		40.0%	40.0%	40.0%	40.0%	40.0%		37%
Maximum Green (s)	16.0	16.0		16.0	16.0		31.0	31.0	31.0	31.0	31.0		30.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													23.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)		20.2			20.2			40.0	40.0		40.0		
Actuated g/C Ratio		0.22			0.22			0.44	0.44		0.44		
v/c Ratio		0.82			0.69			0.54	0.18		0.30		
Control Delay		52.6			45.9			26.7	10.9		18.8		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		52.6			45.9			26.7	10.9		18.8		
LOS		D			D			C	B		B		
Approach Delay		52.6			45.9			23.9			18.8		
Approach LOS		D			D			C			B		
Queue Length 50th (ft)		~179			110			188	0		94		
Queue Length 95th (ft)		#343			#239			257	60		135		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		387			306			1221	767		1467		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.82			0.69			0.54	0.18		0.30		

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 66 (73%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 30.5		Intersection LOS: C	
Intersection Capacity Utilization 60.7%		ICU Level of Service B	
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.

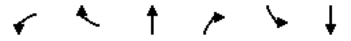
Splits and Phases: 10: Seaver Street/Columbus Avenue & Walnut Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	32	721	14	22	477
Future Volume (vph)	20	32	721	14	22	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.97		1.00			1.00
Frt	0.916		0.997			
Flt Protected	0.981					0.998
Satd. Flow (prot)	1659	0	3595	0	0	3603
Flt Permitted	0.981					0.908
Satd. Flow (perm)	1657	0	3595	0	0	3276
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	36		3			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	3	15		18	18	
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	22	36	743	14	23	497
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	757	0	0	520
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	39.0		51.0		51.0	51.0
Total Split (%)	43.3%		56.7%		56.7%	56.7%
Maximum Green (s)	34.0		46.0		46.0	46.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	8.4		75.2			75.2
Actuated g/C Ratio	0.09		0.84			0.84
v/c Ratio	0.31		0.25			0.19
Control Delay	23.9		2.4			6.0
Queue Delay	0.0		0.0			0.0
Total Delay	23.9		2.4			6.0
LOS	C		A			A
Approach Delay	23.9		2.4			6.0
Approach LOS	C		A			A
Queue Length 50th (ft)	12		41			105
Queue Length 95th (ft)	47		64			m148
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	649		3004			2737
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.09		0.25			0.19

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 28 (31%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 4.7		Intersection LOS: A	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 11: Seaver Street & Harold Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	624	96	166	418
Future Volume (Veh/h)	0	0	624	96	166	418
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	686	105	173	435
Pedestrians	13					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.83	0.75			0.75	
vC, conflicting volume	1532	752			804	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1094	497			567	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			77	
cM capacity (veh/h)	151	428			757	

Direction, Lane #	NB 1	SB 1
Volume Total	791	608
Volume Left	0	173
Volume Right	105	0
cSH	1700	757
Volume to Capacity	0.47	0.23
Queue Length 95th (ft)	0	22
Control Delay (s)	0.0	5.6
Lane LOS		A
Approach Delay (s)	0.0	5.6
Approach LOS		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	76.7%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	4	30	10	0	55	0	528	6	3	192	0
Future Volume (Veh/h)	34	4	30	10	0	55	0	528	6	3	192	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.96	0.96	0.96	0.95	0.95	0.95
Hourly flow rate (vph)	37	4	33	11	0	59	0	550	6	3	202	0
Pedestrians		5			5			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.77	0.77	0.99	0.77	0.77	0.77	0.99			0.77		
vC, conflicting volume	825	774	213	807	771	558	207			561		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	599	533	203	576	529	269	197			273		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	99	96	96	100	90	100			100		
cM capacity (veh/h)	284	346	828	309	348	590	1371			992		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	74	70	556	205
Volume Left	37	11	0	3
Volume Right	33	59	6	0
cSH	407	516	1700	992
Volume to Capacity	0.18	0.14	0.33	0.00
Queue Length 95th (ft)	16	12	0	0
Control Delay (s)	15.8	13.1	0.0	0.2
Lane LOS	C	B		A
Approach Delay (s)	15.8	13.1	0.0	0.2
Approach LOS	C	B		

Intersection Summary					
Average Delay	2.3				
Intersection Capacity Utilization	45.6%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	0	0	0	0	4	567	62	36	309	8
Future Volume (Veh/h)	5	2	0	0	0	0	4	567	62	36	309	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.96	0.96	0.96
Hourly flow rate (vph)	9	3	0	0	0	0	4	623	68	38	322	8
Pedestrians		7			4			3			4	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1078	1112	336	1076	1082	665	337			695		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1055	1091	272	1052	1059	665	273			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	100	100	100	100	100			96		
cM capacity (veh/h)	185	195	724	185	203	462	1226			910		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	695	368
Volume Left	9	4	38
Volume Right	0	68	8
cSH	187	1226	910
Volume to Capacity	0.06	0.00	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	25.5	0.1	1.4
Lane LOS	D	A	A
Approach Delay (s)	25.5	0.1	1.4
Approach LOS	D		

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	54.5%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	292	11	12	0	0	0	28	85	7	8	60	166
Future Vol, veh/h	292	11	12	0	0	0	28	85	7	8	60	166
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	314	12	13	0	0	0	30	90	7	9	65	180
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.3	9.3	9.7
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	23%	93%	3%
Vol Thru, %	71%	3%	26%
Vol Right, %	6%	4%	71%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	120	315	234
LT Vol	28	292	8
Through Vol	85	11	60
RT Vol	7	12	166
Lane Flow Rate	128	339	254
Geometry Grp	1	1	1
Degree of Util (X)	0.18	0.464	0.319
Departure Headway (Hd)	5.087	4.932	4.521
Convergence, Y/N	Yes	Yes	Yes
Cap	700	725	791
Service Time	3.156	2.999	2.577
HCM Lane V/C Ratio	0.183	0.468	0.321
HCM Control Delay	9.3	12.3	9.7
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.7	2.5	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	299	0	259	8	4	8	146	352	0	0	520	171	
Future Volume (vph)	299	0	259	8	4	8	146	352	0	0	520	171	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99										0.98	
Frt		0.937			0.946							0.850	
Flt Protected		0.974			0.980		0.950						
Satd. Flow (prot)	0	1700	0	0	1761	0	1787	1643	0	0	1863	1567	
Flt Permitted		0.819			0.824		0.164						
Satd. Flow (perm)	0	1430	0	0	1481	0	309	1643	0	0	1863	1532	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			10							76	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			448		
Travel Time (s)		18.3			5.6			7.9			10.2		
Confl. Bikes (#/hr)			1						5			2	
Peak Hour Factor	0.96	0.96	0.96	0.83	0.83	0.83	0.98	0.98	0.98	0.94	0.94	0.94	
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	1%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	311	0	270	10	5	10	149	359	0	0	553	182	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	581	0	0	25	0	149	359	0	0	553	182	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	43.0	43.0		43.0	43.0		38.0	38.0			38.0	38.0	19.0
Total Split (%)	43.0%	43.0%		43.0%	43.0%		38.0%	38.0%			38.0%	38.0%	19%
Maximum Green (s)	37.0	37.0		37.0	37.0		32.5	32.5			32.5	32.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													34
Act Effct Green (s)		39.7			39.7		37.4	37.4			37.4	37.4	
Actuated g/C Ratio		0.40			0.40		0.37	0.37			0.37	0.37	
v/c Ratio		0.95			0.04		1.30	0.58			0.79	0.29	
Control Delay		54.5			14.8		202.6	27.0			42.6	22.6	
Queue Delay		0.0			0.0		0.0	0.0			4.1	0.0	
Total Delay		54.5			14.8		202.6	27.0			46.7	22.6	
LOS		D			B		F	C			D	C	
Approach Delay		54.5			14.8			78.5			40.8		
Approach LOS		D			B			E			D		
Queue Length 50th (ft)		~344			6		~128	139			370	78	
Queue Length 95th (ft)		#574			21		m#245	250			m372	m85	
Internal Link Dist (ft)		725			165			268			368		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		610			593		115	614			697	621	
Starvation Cap Reductn		0			0		0	0			84	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.95			0.04		1.30	0.58			0.90	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 9 (9%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 55.1 Intersection LOS: E
Intersection Capacity Utilization 88.7% 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.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street

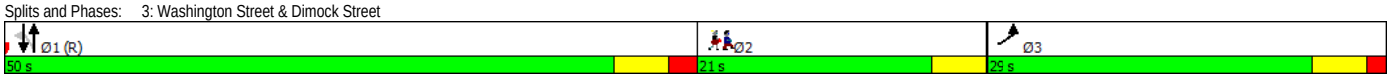
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	183	87	21	464	388	27	
Future Volume (vph)	183	87	21	464	388	27	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor					1.00		
Frt	0.956				0.991		
Flt Protected	0.967			0.998			
Satd. Flow (prot)	1739	0	0	1641	1643	0	
Flt Permitted	0.967			0.972			
Satd. Flow (perm)	1739	0	0	1598	1643	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	22				4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Bikes (#/hr)						4	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.96	0.96	
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	199	95	22	488	404	28	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	294	0	0	510	432	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	29.0		50.0	50.0	50.0		21.0
Total Split (%)	29.0%		50.0%	50.0%	50.0%		21%
Maximum Green (s)	23.5		44.0	44.0	44.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							72
Act Effct Green (s)	19.2			52.5	52.5		
Actuated g/C Ratio	0.19			0.52	0.52		
v/c Ratio	0.84			0.61	0.50		
Control Delay	55.8			23.6	15.2		
Queue Delay	0.0			0.0	0.0		
Total Delay	55.8			23.6	15.2		
LOS	E			C	B		
Approach Delay	55.8			23.6	15.2		
Approach LOS	E			C	B		
Queue Length 50th (ft)	167			242	122		
Queue Length 95th (ft)	253			391	m187		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	425			838	863		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.69			0.61	0.50		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 5 (5%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 28.3		Intersection LOS: C	
Intersection Capacity Utilization 66.5%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Washington Street & Dimock Street

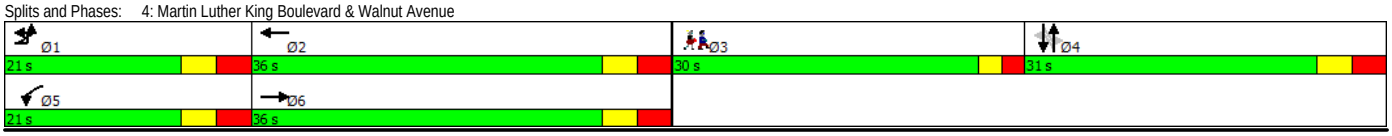


Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations														
Traffic Volume (vph)	2	83	389	139	70	299	7	132	141	32	7	208	58	
Future Volume (vph)	2	83	389	139	70	299	7	132	141	32	7	208	58	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250	0		0	50		0	0		0	
Storage Lanes		1		1	1		0	1		0	0		0	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor				0.98		1.00						1.00		
Frt				0.850		0.997			0.972			0.971		
Flt Protected		0.950			0.950			0.950				0.999		
Satd. Flow (prot)	0	1754	3539	1599	1770	3352	0	1805	1817	0	0	1797	0	
Flt Permitted		0.950			0.950			0.437				0.991		
Satd. Flow (perm)	0	1754	3539	1566	1770	3352	0	830	1817	0	0	1782	0	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)				176		2			9			10		
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			550			928			283			636		
Travel Time (s)			12.5			21.1			6.4			14.5		
Confl. Bikes (#/hr)				1			2						2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.94	0.94	0.94	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	3%	2%	1%	2%	2%	0%	0%	2%	0%	0%	3%	0%	
Parking (#/hr)						0								
Adj. Flow (vph)	2	90	423	151	74	315	7	140	150	34	8	226	63	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	92	423	151	74	322	0	140	184	0	0	297	0	
Turn Type	Prot	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA		
Protected Phases	1	1	6		5	2			4			4		3
Permitted Phases				Free				4			4			
Detector Phase	1	1	6		5	2		4	4		4	4		
Switch Phase														
Minimum Initial (s)	6.0	6.0	8.0		6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	Max		None	None		None	None		None
Walk Time (s)														7.0
Flash Dont Walk (s)														19.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		9.2	31.8	86.0	8.4	31.0		25.9	25.9			25.9		
Actuated g/C Ratio		0.11	0.37	1.00	0.10	0.36		0.30	0.30			0.30		
v/c Ratio		0.49	0.32	0.10	0.43	0.27		0.56	0.33			0.55		
Control Delay		48.9	23.3	0.1	48.3	23.5		40.9	28.5			32.8		
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay		48.9	23.3	0.1	48.3	23.5		40.9	28.5			32.8		
LOS		D	C	A	D	C		D	C			C		
Approach Delay			21.6			28.1			33.9			32.8		
Approach LOS			C			C			C			C		
Queue Length 50th (ft)		45	78	0	36	58		59	68			121		
Queue Length 95th (ft)		119	190	0	102	150		#214	190			#337		
Internal Link Dist (ft)			470			848			203			556		
Turn Bay Length (ft)				250				50						
Base Capacity (vph)		316	1309	1566	319	1211		249	552			542		
Starvation Cap Reductn		0	0	0	0	0		0	0			0		
Spillback Cap Reductn		0	0	0	0	0		0	0			0		
Storage Cap Reductn		0	0	0	0	0		0	0			0		
Reduced v/c Ratio		0.29	0.32	0.10	0.23	0.27		0.56	0.33			0.55		

Intersection Summary

Area Type: Other
Cycle Length: 118
Actuated Cycle Length: 86
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 27.5 Intersection LOS: C
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



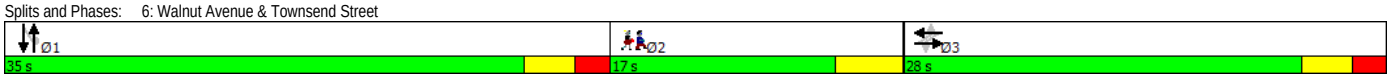
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	9	228	180	96	0	69	0	172	55	29	384	0	
Future Volume (vph)	9	228	180	96	0	69	0	172	55	29	384	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99						0.99					
Frt		0.942			0.943			0.967					
Flt Protected		0.999			0.972						0.996		
Satd. Flow (prot)	0	1772	0	0	1567	0	0	1633	0	0	1687	0	
Flt Permitted		0.993			0.388						0.968		
Satd. Flow (perm)	0	1761	0	0	626	0	0	1633	0	0	1640	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		48			82			23					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)			1						1			2	
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	9	238	188	105	0	76	0	185	59	32	417	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	435	0	0	181	0	0	244	0	0	449	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		16
Act Effct Green (s)		18.1			18.1			30.7			30.7		
Actuated g/C Ratio		0.29			0.29			0.50			0.50		
v/c Ratio		0.79			0.75			0.30			0.55		
Control Delay		30.6			34.0			12.0			16.9		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		30.6			34.0			12.0			16.9		
LOS		C			C			B			B		
Approach Delay		30.6			34.0			12.0			16.9		
Approach LOS		C			C			B			B		
Queue Length 50th (ft)		119			28			41			99		
Queue Length 95th (ft)		#330			#156			138			301		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		702			289			824			816		
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		0.62			0.63			0.30			0.55		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 61.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 22.9		Intersection LOS: C	
Intersection Capacity Utilization 83.9%		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: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	33	150	197	78	136	66	77	450	74	29	701	33	
Future Volume (vph)	33	150	197	78	136	66	77	450	74	29	701	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00		
Frt		0.930			0.968				0.850		0.993		
Flt Protected		0.996			0.986			0.993			0.998		
Satd. Flow (prot)	0	1746	0	0	1802	0	0	3585	1615	0	3541	0	
Flt Permitted		0.953			0.669			0.615			0.912		
Satd. Flow (perm)	0	1669	0	0	1222	0	0	2220	1557	0	3236	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		45			13				78		5		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	12		2	2		12	2		11	9		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.89	0.89	0.89	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	
Adj. Flow (vph)	37	169	221	80	139	67	81	474	78	31	738	35	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	427	0	0	286	0	0	555	78	0	804	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	30.0	30.0		30.0	30.0		47.0	47.0	47.0	47.0	47.0		33.0
Total Split (%)	27.3%	27.3%		27.3%	27.3%		42.7%	42.7%	42.7%	42.7%	42.7%		30%
Maximum Green (s)	25.0	25.0		25.0	25.0		42.0	42.0	42.0	42.0	42.0		28.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		3.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													21.0
Pedestrian Calls (#/hr)													39
Act Effct Green (s)		38.2			38.2			42.0	42.0		42.0		
Actuated g/C Ratio		0.35			0.35			0.38	0.38		0.38		
v/c Ratio		0.70			0.66			0.66	0.12		0.65		
Control Delay		39.6			43.2			41.2	14.3		30.8		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		39.6			43.2			41.2	14.3		30.8		
LOS		D			D			D	B		C		
Approach Delay		39.6			43.2			37.9			30.8		
Approach LOS		D			D			D			C		
Queue Length 50th (ft)		~298			195			198	0		240		
Queue Length 95th (ft)		#487			#374			264	53		309		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		609			432			847	642		1238		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.70			0.66			0.66	0.12		0.65		

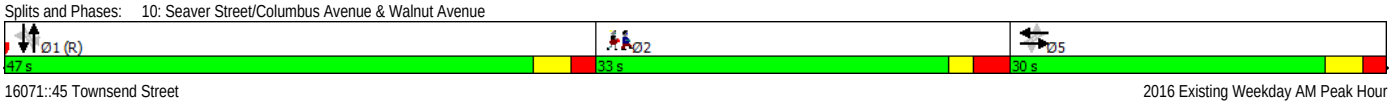
Intersection Summary

Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 73 (66%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 36.3		Intersection LOS: D	
Intersection Capacity Utilization 83.2%		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: 10: Seaver Street/Columbus Avenue & Walnut Avenue

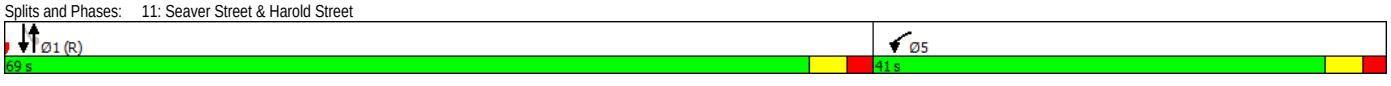


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	38	558	16	69	930
Future Volume (vph)	88	38	558	16	69	930
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99		1.00			1.00
Frt	0.959		0.996			
Flt Protected	0.966					0.997
Satd. Flow (prot)	1744	0	3589	0	0	3599
Flt Permitted	0.966					0.853
Satd. Flow (perm)	1739	0	3589	0	0	3075
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	21		4			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	3	15		18	18	
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	98	42	575	16	72	969
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	0	591	0	0	1041
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	41.0		69.0		69.0	69.0
Total Split (%)	37.3%		62.7%		62.7%	62.7%
Maximum Green (s)	36.0		64.0		64.0	64.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	22		0		0	0
Act Effct Green (s)	16.7		83.3			83.3
Actuated g/C Ratio	0.15		0.76			0.76
v/c Ratio	0.49		0.22			0.45
Control Delay	40.2		4.9			16.4
Queue Delay	0.0		0.0			0.0
Total Delay	40.2		4.9			16.4
LOS	D		A			B
Approach Delay	40.2		4.9			16.4
Approach LOS	D		A			B
Queue Length 50th (ft)	81		43			292
Queue Length 95th (ft)	127		101			351
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	584		2717			2327
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.24		0.22			0.45

Intersection Summary

Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 19 (17%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 70.0%		ICU Level of Service C	
Analysis Period (min) 15			

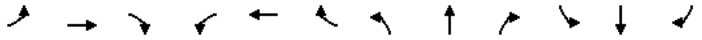
Splits and Phases: 11: Seaver Street & Harold Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	498	149	372	415
Future Volume (Veh/h)	0	0	498	149	372	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.96	0.96	0.94	0.94
Hourly flow rate (vph)	0	0	519	155	396	441
Pedestrians	7					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.82	0.80			0.80	
vC, conflicting volume	1836	604			681	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1352	374			471	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			55	
cM capacity (veh/h)	75	535			877	

Direction, Lane #	NB 1	SB 1
Volume Total	674	837
Volume Left	0	396
Volume Right	155	0
cSH	1700	877
Volume to Capacity	0.40	0.45
Queue Length 95th (ft)	0	59
Control Delay (s)	0.0	9.9
Lane LOS		A
Approach Delay (s)	0.0	9.9
Approach LOS		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	10	21	10	0	47	0	243	7	35	382	0
Future Volume (Veh/h)	14	10	21	10	0	47	0	243	7	35	382	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	18	13	27	13	0	62	0	273	8	38	411	0
Pedestrians		13			13			1			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.91	0.91	0.90	0.91	0.91	0.98	0.90			0.98		
vC, conflicting volume	849	794	425	812	790	300	424			294		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	747	686	311	705	682	280	309			274		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	96	95	100	92	100			97		
cM capacity (veh/h)	260	321	655	283	323	735	1127			1264		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	75	281	449
Volume Left	18	13	0	38
Volume Right	27	62	8	0
cSH	384	576	1700	1264
Volume to Capacity	0.15	0.13	0.17	0.03
Queue Length 95th (ft)	13	11	0	2
Control Delay (s)	16.0	12.2	0.0	1.0
Lane LOS	C	B		A
Approach Delay (s)	16.0	12.2	0.0	1.0
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.6		
Intersection Capacity Utilization			52.5%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	0	0	0	0	222	38	37	614	9
Future Volume (Veh/h)	5	0	2	0	0	0	0	222	38	37	614	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.95	0.95	0.95
Hourly flow rate (vph)	9	0	3	0	0	0	0	244	42	39	646	9
Pedestrians		8			4			2			3	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82					
vC, conflicting volume	1004	1026	660	1002	1010	272	663			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	898	925	480	895	905	272	483			290		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	100	100	100	100			97		
cM capacity (veh/h)	208	215	481	209	221	769	890			1283		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	286	694
Volume Left	9	0	39
Volume Right	3	42	9
cSH	242	890	1283
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	20.7	0.0	0.8
Lane LOS	C		A
Approach Delay (s)	20.7	0.0	0.8
Approach LOS	C		

Intersection Summary					
Average Delay		0.8			
Intersection Capacity Utilization		64.3%	ICU Level of Service	C	
Analysis Period (min)		15			

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	203	19	8	0	0	0	28	67	6	13	274	299
Future Vol, veh/h	203	19	8	0	0	0	28	67	6	13	274	299
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	218	20	9	0	0	0	30	71	6	14	298	325
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.7	9.6	22.3
HCM LOS	B	A	C

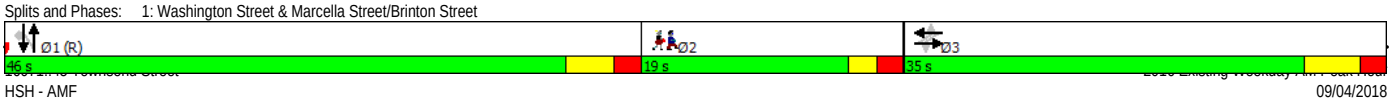
Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	28%	88%	2%
Vol Thru, %	66%	8%	47%
Vol Right, %	6%	3%	51%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	101	230	586
LT Vol	28	203	13
Through Vol	67	19	274
RT Vol	6	8	299
Lane Flow Rate	107	247	637
Geometry Grp	1	1	1
Degree of Util (X)	0.164	0.4	0.789
Departure Headway (Hd)	5.48	5.825	4.46
Convergence, Y/N	Yes	Yes	Yes
Cap	657	621	803
Service Time	3.501	3.831	2.549
HCM Lane V/C Ratio	0.163	0.398	0.793
HCM Control Delay	9.6	12.7	22.3
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.6	1.9	8.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	202	0	151	6	11	8	243	380	0	0	442	175	
Future Volume (vph)	202	0	151	6	11	8	243	380	0	0	442	175	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.98			0.99		0.99					0.96	
Frt		0.942			0.957							0.850	
Flt Protected		0.972			0.988		0.950						
Satd. Flow (prot)	0	1700	0	0	1783	0	1805	1643	0	0	1863	1567	
Flt Permitted		0.807			0.915		0.375						
Satd. Flow (perm)	0	1410	0	0	1648	0	708	1643	0	0	1863	1510	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			9							76	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			438		
Travel Time (s)		18.3			5.6			7.9			10.0		
Confl. Peds. (#/hr)	1		11	11		1	12					12	
Confl. Bikes (#/hr)			1			1						2	
Peak Hour Factor	0.98	0.98	0.98	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	206	0	154	7	12	9	264	413	0	0	475	188	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	360	0	0	28	0	264	413	0	0	475	188	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	35.0	35.0		35.0	35.0		46.0	46.0			46.0	46.0	19.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%		46.0%	46.0%			46.0%	46.0%	19%
Maximum Green (s)	29.0	29.0		29.0	29.0		40.5	40.5			40.5	40.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													26
Act Effct Green (s)		24.6			24.6		52.5	52.5			52.5	52.5	
Actuated g/C Ratio		0.25			0.25		0.52	0.52			0.52	0.52	
v/c Ratio		0.90			0.07		0.71	0.48			0.49	0.23	
Control Delay		54.8			20.4		27.8	14.3			18.6	10.2	
Queue Delay		0.0			0.0		0.0	0.0			0.4	0.0	
Total Delay		54.8			20.4		27.8	14.3			19.0	10.2	
LOS		D			C		C	B			B	B	
Approach Delay		54.8			20.4			19.6			16.5		
Approach LOS		D			C			B			B		
Queue Length 50th (ft)		177			9		68	95			271	31	
Queue Length 95th (ft)		#316			29		#315	191			240	m68	
Internal Link Dist (ft)		725			165			268			358		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		459			484		371	862			977	828	
Starvation Cap Reductn		0			0		0	0			168	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.78			0.06		0.71	0.48			0.59	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 64 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 78.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	141	33	29	585	383	35	
Future Volume (vph)	141	33	29	585	383	35	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.98			1.00	1.00		
Frt	0.974				0.989		
Flt Protected	0.961			0.998			
Satd. Flow (prot)	1743	0	0	1657	1607	0	
Flt Permitted	0.961			0.965			
Satd. Flow (perm)	1719	0	0	1601	1607	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	11				6		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Peds. (#/hr)	7	6	19			19	
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.92	0.92	0.94	0.94	0.92	0.92	
Heavy Vehicles (%)	1%	3%	0%	1%	3%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	153	36	31	622	416	38	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	189	0	0	653	454	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	26.0		53.0	53.0	53.0		21.0
Total Split (%)	26.0%		53.0%	53.0%	53.0%		21%
Maximum Green (s)	20.5		47.0	47.0	47.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							32
Act Effct Green (s)	14.6			61.3	61.3		
Actuated g/C Ratio	0.15			0.61	0.61		
v/c Ratio	0.72			0.67	0.46		
Control Delay	53.1			21.4	14.3		
Queue Delay	0.0			0.0	0.0		
Total Delay	53.1			21.4	14.3		
LOS	D			C	B		
Approach Delay	53.1			21.4	14.3		
Approach LOS	D			C	B		
Queue Length 50th (ft)	110			315	81		
Queue Length 95th (ft)	173			#585	m239		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	366			981	987		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.52			0.67	0.46		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 23.6		Intersection LOS: C	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Washington Street & Dimock Street

4: Martin Luther King Boulevard & Walnut Avenue

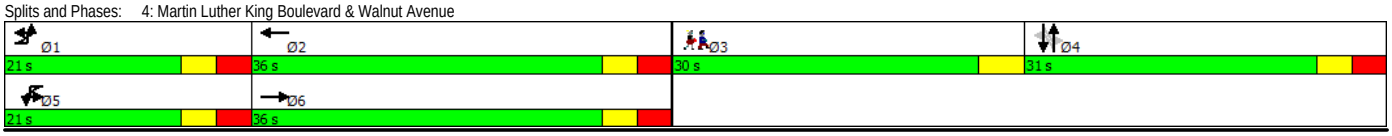
Timing Plan: AM Peak

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations															
Traffic Volume (vph)	3	36	235	59	2	26	388	7	269	343	30	0	110	39	
Future Volume (vph)	3	36	235	59	2	26	388	7	269	343	30	0	110	39	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250		0		0	50		0	0		0	
Storage Lanes		1		1		1		0	1		0	0		0	
Taper Length (ft)		25				25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor										1.00					
Frt				0.850			0.997			0.988			0.965		
Flt Protected		0.950				0.950			0.950						
Satd. Flow (prot)	0	1805	3505	1615	0	1805	3321	0	1805	1858	0	0	1807	0	
Flt Permitted		0.950				0.950			0.654						
Satd. Flow (perm)	0	1805	3505	1615	0	1805	3321	0	1243	1858	0	0	1807	0	
Right Turn on Red				Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)				176			1			3			14		
Link Speed (mph)			30				30			30			30		
Link Distance (ft)			550				928			283			636		
Travel Time (s)			12.5				21.1			6.4			14.5		
Confl. Bikes (#/hr)											4				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	3%	0%	0%	1%	0%	0%	2%	0%	
Parking (#/hr)							0								
Adj. Flow (vph)	3	37	242	61	2	27	400	7	283	361	32	0	118	42	
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	40	242	61	0	29	407	0	283	393	0	0	160	0	
Turn Type	Prot	Prot	NA	Free	Prot	Prot	NA		Perm	NA			NA		
Protected Phases	1	1	6		5	5	2			4			4		3
Permitted Phases				Free					4			4			
Detector Phase	1	1	6		5	5	2		4	4		4	4		
Switch Phase															
Minimum Initial (s)	6.0	6.0	8.0		6.0	6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		0.0
Lost Time Adjust (s)		0.0	0.0			0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0			6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	None	Max		None	None		None	None		None
Walk Time (s)															7.0
Flash Dont Walk (s)															19.0
Pedestrian Calls (#/hr)															5
Act Effct Green (s)		7.0	33.9	81.2		6.7	31.1		25.9	25.9			25.9		
Actuated g/C Ratio		0.09	0.42	1.00		0.08	0.38		0.32	0.32			0.32		
v/c Ratio		0.26	0.17	0.04		0.20	0.32		0.71	0.66			0.27		
Control Delay		44.2	18.9	0.1		44.0	21.8		40.3	33.9			24.6		
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Delay		44.2	18.9	0.1		44.0	21.8		40.3	33.9			24.6		
LOS		D	B	A		D	C		D	C			C		
Approach Delay			18.5				23.3			36.6			24.6		
Approach LOS			B				C			D			C		
Queue Length 50th (ft)		19	29	0		14	73		123	166			53		
Queue Length 95th (ft)		63	106	0		50	178		#388	#472			155		
Internal Link Dist (ft)			470				848			203			556		
Turn Bay Length (ft)				250					50						
Base Capacity (vph)		345	1462	1615		345	1272		396	595			586		
Starvation Cap Reductn		0	0	0		0	0		0	0			0		
Spillback Cap Reductn		0	0	0		0	0		0	0			0		
Storage Cap Reductn		0	0	0		0	0		0	0			0		
Reduced v/c Ratio		0.12	0.17	0.04		0.08	0.32		0.71	0.66			0.27		

Intersection Summary

Area Type: Other
Cycle Length: 118
Actuated Cycle Length: 81.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 27.9 Intersection LOS: C
Intersection Capacity Utilization 64.0% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



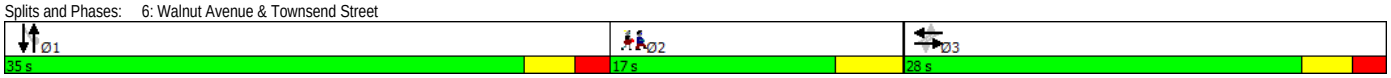
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	38	160	104	70	0	35	0	486	87	26	206	0	
Future Volume (vph)	38	160	104	70	0	35	0	486	87	26	206	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor								1.00					
Frt		0.954			0.955			0.979					
Flt Protected		0.994			0.968						0.994		
Satd. Flow (prot)	0	1802	0	0	1550	0	0	1642	0	0	1685	0	
Flt Permitted		0.945			0.478						0.915		
Satd. Flow (perm)	0	1713	0	0	765	0	0	1642	0	0	1551	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		33			82			13					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)									4				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	0%	1%	5%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	40	168	109	74	0	37	0	517	93	28	224	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	317	0	0	111	0	0	610	0	0	252	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		11
Act Effct Green (s)		13.7			13.7			31.0			31.0		
Actuated g/C Ratio		0.24			0.24			0.54			0.54		
v/c Ratio		0.73			0.45			0.68			0.30		
Control Delay		29.3			14.7			18.8			11.7		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		29.3			14.7			18.8			11.7		
LOS		C			B			B			B		
Approach Delay		29.3			14.7			18.8			11.7		
Approach LOS		C			B			B			B		
Queue Length 50th (ft)		81			7			112			36		
Queue Length 95th (ft)		206			54			#510			156		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		728			364			892			836		
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		0.44			0.30			0.68			0.30		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 57.4			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 62.9%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	38	168	76	49	109	50	109	516	132	12	374	25	
Future Volume (vph)	38	168	76	49	109	50	109	516	132	12	374	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00		
Frt		0.964			0.967				0.850		0.991		
Flt Protected		0.993			0.988			0.991			0.999		
Satd. Flow (prot)	0	1803	0	0	1799	0	0	3578	1615	0	3569	0	
Flt Permitted		0.910			0.722			0.757			0.933		
Satd. Flow (perm)	0	1652	0	0	1313	0	0	2732	1552	0	3332	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		18			15				135		8		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	2		11	9		2	2		12	12		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.98	0.98	0.89	0.89	0.89	
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	40	177	80	52	115	53	111	527	135	13	420	28	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	297	0	0	220	0	0	638	135	0	461	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		1.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	21.0	21.0		21.0	21.0		36.0	36.0	36.0	36.0	36.0		33.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		40.0%	40.0%	40.0%	40.0%	40.0%		37%
Maximum Green (s)	16.0	16.0		16.0	16.0		31.0	31.0	31.0	31.0	31.0		30.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													23.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)		19.7			19.7			40.5	40.5		40.5		
Actuated g/C Ratio		0.22			0.22			0.45	0.45		0.45		
v/c Ratio		0.79			0.74			0.52	0.17		0.31		
Control Delay		50.6			49.5			26.2	11.1		18.8		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		50.6			49.5			26.2	11.1		18.8		
LOS		D			D			C	B		B		
Approach Delay		50.6			49.5			23.6			18.8		
Approach LOS		D			D			C			B		
Queue Length 50th (ft)		160			116			182	0		101		
Queue Length 95th (ft)		#321			#251			252	61		142		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		374			298			1230	773		1504		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.79			0.74			0.52	0.17		0.31		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 66 (73%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 30.2 Intersection LOS: C
Intersection Capacity Utilization 60.6% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Seaver Street/Columbus Avenue & Walnut Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	32	721	14	22	477
Future Volume (vph)	34	32	721	14	22	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98		1.00			1.00
Frt	0.934		0.997			
Flt Protected	0.975					0.998
Satd. Flow (prot)	1692	0	3595	0	0	3603
Flt Permitted	0.975					0.908
Satd. Flow (perm)	1689	0	3595	0	0	3276
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	36		3			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	3	15		18	18	
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	38	36	743	14	23	497
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	757	0	0	520
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	39.0		51.0		51.0	51.0
Total Split (%)	43.3%		56.7%		56.7%	56.7%
Maximum Green (s)	34.0		46.0		46.0	46.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	8.8		74.8			74.8
Actuated g/C Ratio	0.10		0.83			0.83
v/c Ratio	0.37		0.25			0.19
Control Delay	27.8		2.5			6.5
Queue Delay	0.0		0.0			0.0
Total Delay	27.8		2.5			6.5
LOS	C		A			A
Approach Delay	27.8		2.5			6.5
Approach LOS	C		A			A
Queue Length 50th (ft)	21		41			106
Queue Length 95th (ft)	60		70			m155
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	661		2986			2721
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.11		0.25			0.19

Intersection Summary

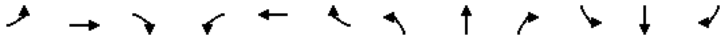
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 28 (31%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 11: Seaver Street & Harold Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	624	102	182	418
Future Volume (Veh/h)	0	0	624	102	182	418
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	686	112	190	435
Pedestrians	13					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.83	0.74			0.74	
vC, conflicting volume	1570	755			811	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1117	495			570	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			75	
cM capacity (veh/h)	142	426			750	

Direction, Lane #	NB 1	SB 1
Volume Total	798	625
Volume Left	0	190
Volume Right	112	0
cSH	1700	750
Volume to Capacity	0.47	0.25
Queue Length 95th (ft)	0	25
Control Delay (s)	0.0	6.2
Lane LOS		A
Approach Delay (s)	0.0	6.2
Approach LOS		

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	4	30	10	0	55	0	553	6	3	192	0
Future Volume (Veh/h)	34	4	30	10	0	55	0	553	6	3	192	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.96	0.96	0.96	0.95	0.95	0.95
Hourly flow rate (vph)	37	4	33	11	0	59	0	576	6	3	202	0
Pedestrians		5			5			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.75	0.75	1.00	0.75	0.75	0.75	1.00			0.75		
vC, conflicting volume	851	800	213	833	797	584	207			587		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	625	557	207	601	553	281	201			285		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	96	96	100	90	100			100		
cM capacity (veh/h)	267	329	826	292	330	570	1370			964		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	74	70	582	205
Volume Left	37	11	0	3
Volume Right	33	59	6	0
cSH	388	496	1700	964
Volume to Capacity	0.19	0.14	0.34	0.00
Queue Length 95th (ft)	17	12	0	0
Control Delay (s)	16.5	13.4	0.0	0.2
Lane LOS	C	B		A
Approach Delay (s)	16.5	13.4	0.0	0.2
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.4		
Intersection Capacity Utilization			46.9%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	0	0	0	0	4	567	62	36	335	8
Future Volume (Veh/h)	5	2	0	0	0	0	4	567	62	36	335	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.96	0.96	0.96
Hourly flow rate (vph)	9	3	0	0	0	0	4	623	68	38	349	8
Pedestrians		7			4			3			4	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1105	1139	363	1102	1109	665	364			695		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1081	1117	294	1078	1085	665	295			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	100	100	100	100	100			96		
cM capacity (veh/h)	177	187	701	177	195	462	1197			910		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	695	395
Volume Left	9	4	38
Volume Right	0	68	8
cSH	179	1197	910
Volume to Capacity	0.07	0.00	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	26.5	0.1	1.3
Lane LOS	D	A	A
Approach Delay (s)	26.5	0.1	1.3
Approach LOS	D		

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	55.8%	ICU Level of Service		B	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	292	11	12	0	0	0	28	85	7	8	74	178
Future Vol, veh/h	292	11	12	0	0	0	28	85	7	8	74	178
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	314	12	13	0	0	0	30	90	7	9	80	193
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.5	9.4	10.1
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	23%	93%	3%
Vol Thru, %	71%	3%	28%
Vol Right, %	6%	4%	68%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	120	315	260
LT Vol	28	292	8
Through Vol	85	11	74
RT Vol	7	12	178
Lane Flow Rate	128	339	283
Geometry Grp	1	1	1
Degree of Util (X)	0.182	0.47	0.357
Departure Headway (Hd)	5.13	4.997	4.545
Convergence, Y/N	Yes	Yes	Yes
Cap	693	715	786
Service Time	3.208	3.072	2.606
HCM Lane V/C Ratio	0.185	0.474	0.36
HCM Control Delay	9.4	12.5	10.1
HCM Lane LOS	A	B	B
HCM 95th-tile Q	0.7	2.5	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	299	0	266	8	4	8	146	352	0	0	555	171	
Future Volume (vph)	299	0	266	8	4	8	146	352	0	0	555	171	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	25		0	0		50	
Storage Lanes	0		0	0		0	1		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.98			0.99		1.00					0.96	
Frt		0.936			0.946							0.850	
Flt Protected		0.974			0.980		0.950						
Satd. Flow (prot)	0	1688	0	0	1740	0	1787	1643	0	0	1863	1567	
Flt Permitted		0.821			0.825		0.115						
Satd. Flow (perm)	0	1415	0	0	1462	0	215	1643	0	0	1863	1509	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		71			10							76	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		805			245			348			448		
Travel Time (s)		18.3			5.6			7.9			10.2		
Confl. Peds. (#/hr)	8		9	9		8	10					10	
Confl. Bikes (#/hr)			1						5			2	
Peak Hour Factor	0.96	0.96	0.96	0.83	0.83	0.83	0.98	0.98	0.98	0.94	0.94	0.94	
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	1%	2%	0%	0%	2%	1%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5	
Parking (#/hr)								0					
Adj. Flow (vph)	311	0	277	10	5	10	149	359	0	0	590	182	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	588	0	0	25	0	149	359	0	0	590	182	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm	
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1					1	
Detector Phase	3	3		3	3		1	1			1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0	7.0
Minimum Split (s)	14.0	14.0		14.0	14.0		13.5	13.5			13.5	13.5	19.0
Total Split (s)	43.0	43.0		43.0	43.0		38.0	38.0			38.0	38.0	19.0
Total Split (%)	43.0%	43.0%		43.0%	43.0%		38.0%	38.0%			38.0%	38.0%	19%
Maximum Green (s)	37.0	37.0		37.0	37.0		32.5	32.5			32.5	32.5	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5	
Lead/Lag							Lead	Lead			Lead	Lead	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	None
Walk Time (s)													7.0
Flash Dont Walk (s)													8.0
Pedestrian Calls (#/hr)													34
Act Effct Green (s)		40.8			40.8		36.3	36.3			36.3	36.3	
Actuated g/C Ratio		0.41			0.41		0.36	0.36			0.36	0.36	
v/c Ratio		0.95			0.04		1.94	0.60			0.87	0.31	
Control Delay		53.6			14.8		474.8	28.5			43.2	22.5	
Queue Delay		0.0			0.0		0.0	0.0			14.8	0.0	
Total Delay		53.6			14.8		474.8	28.5			57.9	22.5	
LOS		D			B		F	C			E	C	
Approach Delay		53.6			14.8			159.4			49.6		
Approach LOS		D			B			F			D		
Queue Length 50th (ft)		~375			6		~145	144			398	78	
Queue Length 95th (ft)		#587			21		m#243	251			m386	m81	
Internal Link Dist (ft)		725			165			268			368		
Turn Bay Length (ft)							25					50	
Base Capacity (vph)		619			602		77	595			675	595	
Starvation Cap Reductn		0			0		0	0			84	0	
Spillback Cap Reductn		0			0		0	0			0	0	
Storage Cap Reductn		0			0		0	0			0	0	
Reduced v/c Ratio		0.95			0.04		1.94	0.60			1.00	0.31	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 9 (9%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.94
Intersection Signal Delay: 79.8 Intersection LOS: E
Intersection Capacity Utilization 91.4% ICU Level of Service F
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.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street

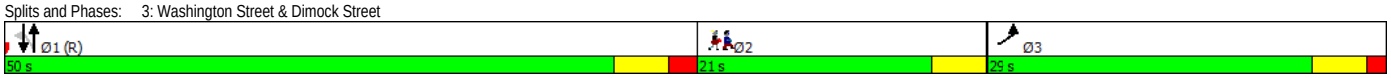
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	183	87	21	481	388	27	
Future Volume (vph)	183	87	21	481	388	27	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.94			1.00	1.00		
Frt	0.956				0.991		
Flt Protected	0.967			0.998			
Satd. Flow (prot)	1714	0	0	1641	1640	0	
Flt Permitted	0.967			0.973			
Satd. Flow (perm)	1635	0	0	1599	1640	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	22				4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	531			1461	553		
Travel Time (s)	12.1			33.2	12.6		
Confl. Peds. (#/hr)	32	12	28			28	
Confl. Bikes (#/hr)						4	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.96	0.96	
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%	
Bus Blockages (#/hr)	0	0	0	5	5	0	
Parking (#/hr)			0	0	0	0	
Adj. Flow (vph)	199	95	22	506	404	28	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	294	0	0	528	432	0	
Turn Type	Prot		Perm	NA	NA		
Protected Phases	3			1	1		2
Permitted Phases			1				
Detector Phase	3		1	1	1		
Switch Phase							
Minimum Initial (s)	8.0		8.0	8.0	8.0		7.0
Minimum Split (s)	13.5		14.0	14.0	14.0		21.0
Total Split (s)	29.0		50.0	50.0	50.0		21.0
Total Split (%)	29.0%		50.0%	50.0%	50.0%		21%
Maximum Green (s)	23.5		44.0	44.0	44.0		17.0
Yellow Time (s)	4.0		4.0	4.0	4.0		4.0
All-Red Time (s)	1.5		2.0	2.0	2.0		0.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.5			6.0	6.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							10.0
Pedestrian Calls (#/hr)							72
Act Effct Green (s)	19.5			52.2	52.2		
Actuated g/C Ratio	0.20			0.52	0.52		
v/c Ratio	0.84			0.63	0.50		
Control Delay	55.9			24.5	15.4		
Queue Delay	0.0			0.0	0.0		
Total Delay	55.9			24.5	15.4		
LOS	E			C	B		
Approach Delay	55.9			24.5	15.4		
Approach LOS	E			C	B		
Queue Length 50th (ft)	167			257	133		
Queue Length 95th (ft)	254			411	m170		
Internal Link Dist (ft)	451			1381	473		
Turn Bay Length (ft)							
Base Capacity (vph)	419			834	857		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.70			0.63	0.50		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 5 (5%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 28.7		Intersection LOS: C	
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Washington Street & Dimock Street



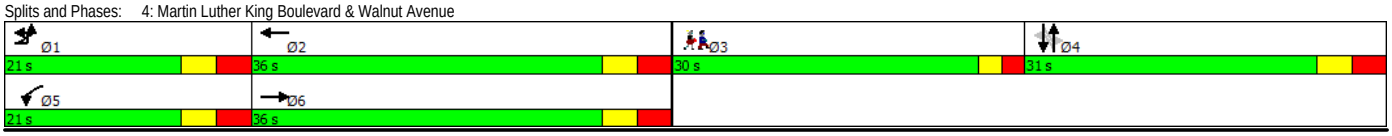
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations														
Traffic Volume (vph)	2	83	389	139	70	305	7	137	155	32	7	208	71	
Future Volume (vph)	2	83	389	139	70	305	7	137	155	32	7	208	71	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250	0		0	50		0	0		0	
Storage Lanes		1		1	1		0	1		0	0		0	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor				0.98		1.00						1.00		
Frt				0.850		0.997			0.974			0.966		
Flt Protected		0.950			0.950			0.950				0.999		
Satd. Flow (prot)	0	1754	3539	1599	1770	3352	0	1805	1820	0	0	1788	0	
Flt Permitted		0.950			0.950			0.381				0.992		
Satd. Flow (perm)	0	1754	3539	1566	1770	3352	0	724	1820	0	0	1776	0	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)				176		2			8			13		
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			550			928			283			636		
Travel Time (s)			12.5			21.1			6.4			14.5		
Confl. Bikes (#/hr)				1			2						2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.94	0.94	0.94	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	3%	2%	1%	2%	2%	0%	0%	2%	0%	0%	3%	0%	
Parking (#/hr)						0								
Adj. Flow (vph)	2	90	423	151	74	321	7	146	165	34	8	251	86	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	92	423	151	74	328	0	146	199	0	0	345	0	
Turn Type	Prot	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA		
Protected Phases	1	1	6		5	2			4			4		3
Permitted Phases				Free				4			4			
Detector Phase	1	1	6		5	2		4	4		4	4		
Switch Phase														
Minimum Initial (s)	6.0	6.0	8.0		6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	21.0	21.0	36.0		21.0	36.0		31.0	31.0		31.0	31.0		30.0
Total Split (%)	17.8%	17.8%	30.5%		17.8%	30.5%		26.3%	26.3%		26.3%	26.3%		25%
Maximum Green (s)	15.0	15.0	30.0		15.0	30.0		25.0	25.0		25.0	25.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	Max		None	None		None	None		None
Walk Time (s)														7.0
Flash Dont Walk (s)														19.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		9.2	31.8	86.0	8.4	31.0		25.9	25.9			25.9		
Actuated g/C Ratio		0.11	0.37	1.00	0.10	0.36		0.30	0.30			0.30		
v/c Ratio		0.49	0.32	0.10	0.43	0.27		0.67	0.36			0.64		
Control Delay		48.9	23.3	0.1	48.3	23.5		48.6	29.1			35.0		
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay		48.9	23.3	0.1	48.3	23.5		48.6	29.1			35.0		
LOS		D	C	A	D	C		D	C			C		
Approach Delay			21.6			28.1			37.3			35.0		
Approach LOS			C			C			D			C		
Queue Length 50th (ft)		45	78	0	36	60		64	75			144		
Queue Length 95th (ft)		119	190	0	102	152		#243	206			#363		
Internal Link Dist (ft)			470			848			203			556		
Turn Bay Length (ft)				250				50						
Base Capacity (vph)		316	1309	1566	319	1211		217	553			543		
Starvation Cap Reductn		0	0	0	0	0		0	0			0		
Spillback Cap Reductn		0	0	0	0	0		0	0			0		
Storage Cap Reductn		0	0	0	0	0		0	0			0		
Reduced v/c Ratio		0.29	0.32	0.10	0.23	0.27		0.67	0.36			0.64		

Intersection Summary

Area Type:	Other		
Cycle Length: 118			
Actuated Cycle Length: 86			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 28.8		Intersection LOS: C	
Intersection Capacity Utilization 61.5%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue



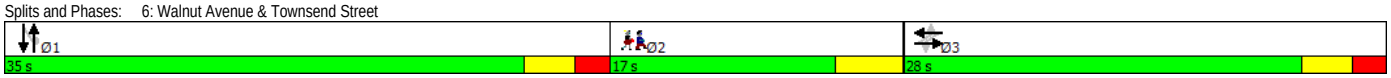
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	28	234	198	96	0	69	0	172	55	29	384	0	
Future Volume (vph)	28	234	198	96	0	69	0	172	55	29	384	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99						0.99					
Frt		0.942			0.943			0.967					
Flt Protected		0.997			0.972						0.996		
Satd. Flow (prot)	0	1768	0	0	1567	0	0	1633	0	0	1687	0	
Flt Permitted		0.973			0.417						0.967		
Satd. Flow (perm)	0	1726	0	0	672	0	0	1633	0	0	1638	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		48			82			23					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)			1						1			2	
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	29	244	206	105	0	76	0	185	59	32	417	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	479	0	0	181	0	0	244	0	0	449	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		16
Act Effct Green (s)		20.6			20.6			30.5			30.5		
Actuated g/C Ratio		0.32			0.32			0.48			0.48		
v/c Ratio		0.81			0.67			0.31			0.58		
Control Delay		32.1			26.2			12.7			18.2		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		32.1			26.2			12.7			18.2		
LOS		C			C			B			B		
Approach Delay		32.1			26.2			12.7			18.2		
Approach LOS		C			C			B			B		
Queue Length 50th (ft)		138			27			48			116		
Queue Length 95th (ft)		#390			#149			138			#302		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		660			297			789			780		
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		0.73			0.61			0.31			0.58		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 64			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 86.4%		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: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	33	150	197	78	136	66	77	462	74	29	701	33	
Future Volume (vph)	33	150	197	78	136	66	77	462	74	29	701	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.95		1.00		
Frt		0.930			0.968				0.850		0.994		
Flt Protected		0.996			0.986			0.993			0.998		
Satd. Flow (prot)	0	1742	0	0	1801	0	0	3585	1615	0	3578	0	
Flt Permitted		0.950			0.673			0.619			0.913		
Satd. Flow (perm)	0	1661	0	0	1228	0	0	2234	1534	0	3272	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		45			13				75		5		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	14		5	5		14	2		22	17		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.99	0.99	0.99	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	35	158	207	89	155	75	78	467	75	31	746	35	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	400	0	0	319	0	0	545	75	0	812	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	30.0	30.0		30.0	30.0		47.0	47.0	47.0	47.0	47.0		33.0
Total Split (%)	27.3%	27.3%		27.3%	27.3%		42.7%	42.7%	42.7%	42.7%	42.7%		30%
Maximum Green (s)	25.0	25.0		25.0	25.0		42.0	42.0	42.0	42.0	42.0		28.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		3.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													21.0
Pedestrian Calls (#/hr)													39
Act Effct Green (s)		38.2			38.2			42.0	42.0		42.0		
Actuated g/C Ratio		0.35			0.35			0.38	0.38		0.38		
v/c Ratio		0.66			0.73			0.64	0.12		0.65		
Control Delay		37.8			46.9			40.7	14.6		30.7		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		37.8			46.9			40.7	14.6		30.7		
LOS		D			D			D	B		C		
Approach Delay		37.8			46.9			37.5			30.7		
Approach LOS		D			D			D			C		
Queue Length 50th (ft)		254			~250			194	0		243		
Queue Length 95th (ft)		#452			#415			261	52		311		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		606			435			852	632		1252		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.66			0.73			0.64	0.12		0.65		

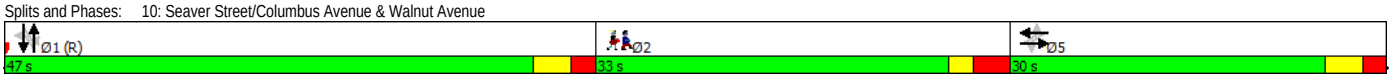
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 73 (66%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 36.4 Intersection LOS: D
Intersection Capacity Utilization 83.6% 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: 10: Seaver Street/Columbus Avenue & Walnut Avenue

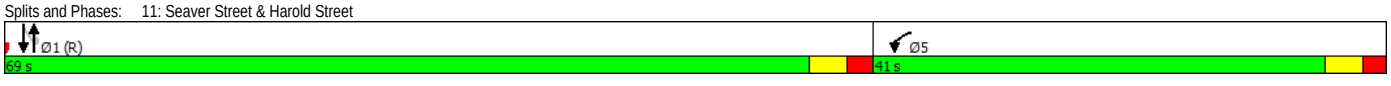


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	38	558	16	69	930
Future Volume (vph)	98	38	558	16	69	930
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98		1.00			1.00
Frt	0.962		0.996			
Flt Protected	0.965					0.997
Satd. Flow (prot)	1732	0	3589	0	0	3599
Flt Permitted	0.965					0.853
Satd. Flow (perm)	1730	0	3589	0	0	3075
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	19		4			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	1	22		19	19	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	109	42	575	16	72	969
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	591	0	0	1041
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	41.0		69.0		69.0	69.0
Total Split (%)	37.3%		62.7%		62.7%	62.7%
Maximum Green (s)	36.0		64.0		64.0	64.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	22		0		0	0
Act Effct Green (s)	17.1		82.9			82.9
Actuated g/C Ratio	0.16		0.75			0.75
v/c Ratio	0.53		0.22			0.45
Control Delay	42.2		5.0			16.9
Queue Delay	0.0		0.0			0.0
Total Delay	42.2		5.0			16.9
LOS	D		A			B
Approach Delay	42.2		5.0			16.9
Approach LOS	D		A			B
Queue Length 50th (ft)	90		45			298
Queue Length 95th (ft)	138		101			354
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	579		2705			2317
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.26		0.22			0.45

Intersection Summary

Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 19 (17%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Seaver Street & Harold Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	498	166	414	415
Future Volume (Veh/h)	0	0	498	166	414	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.96	0.96	0.94	0.94
Hourly flow rate (vph)	0	0	519	173	440	441
Pedestrians	7					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.80	0.78			0.78	
vC, conflicting volume	1934	612			699	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1429	366			476	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			49	
cM capacity (veh/h)	58	532			858	

Direction, Lane #	NB 1	SB 1
Volume Total	692	881
Volume Left	0	440
Volume Right	173	0
cSH	1700	858
Volume to Capacity	0.41	0.51
Queue Length 95th (ft)	0	75
Control Delay (s)	0.0	11.4
Lane LOS		B
Approach Delay (s)	0.0	11.4
Approach LOS		

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	87.9%	ICU Level of Service	E	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	10	21	10	0	47	0	262	7	35	382	0
Future Volume (Veh/h)	14	10	21	10	0	47	0	262	7	35	382	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	18	13	27	13	0	62	0	294	8	38	411	0
Pedestrians		13			13			1			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.91	0.91	0.90	0.91	0.91	0.98	0.90			0.98		
vC, conflicting volume	870	815	425	832	811	321	424			315		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	747	686	299	706	682	293	298			286		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	96	95	100	91	100			97		
cM capacity (veh/h)	258	319	658	282	321	718	1127			1241		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	75	302	449
Volume Left	18	13	0	38
Volume Right	27	62	8	0
cSH	383	566	1700	1241
Volume to Capacity	0.15	0.13	0.18	0.03
Queue Length 95th (ft)	13	11	0	2
Control Delay (s)	16.1	12.3	0.0	1.0
Lane LOS	C	B		A
Approach Delay (s)	16.1	12.3	0.0	1.0
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.6		
Intersection Capacity Utilization			53.5%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	0	0	0	0	222	38	37	632	9
Future Volume (Veh/h)	5	0	2	0	0	0	0	222	38	37	632	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.95	0.95	0.95
Hourly flow rate (vph)	9	0	3	0	0	0	0	244	42	39	665	9
Pedestrians		8			4			2			3	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	1024	1046	680	1022	1029	272	682			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	915	942	493	913	922	272	496			290		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	100	100	100	100			97		
cM capacity (veh/h)	200	208	468	201	213	769	872			1283		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	286	713
Volume Left	9	0	39
Volume Right	3	42	9
cSH	233	872	1283
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	21.3	0.0	0.8
Lane LOS	C		A
Approach Delay (s)	21.3	0.0	0.8
Approach LOS	C		

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	65.2%	ICU Level of Service		C	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔			↑	
Traffic Vol, veh/h	203	19	8	0	0	0	28	67	6	13	284	307
Future Vol, veh/h	203	19	8	0	0	0	28	67	6	13	284	307
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	216	20	9	0	0	0	30	71	6	14	299	323
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.6	9.6	22
HCM LOS	B	A	C

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	28%	88%	2%
Vol Thru, %	66%	8%	47%
Vol Right, %	6%	3%	51%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	101	230	604
LT Vol	28	203	13
Through Vol	67	19	284
RT Vol	6	8	307
Lane Flow Rate	107	245	636
Geometry Grp	1	1	1
Degree of Util (X)	0.163	0.396	0.786
Departure Headway (Hd)	5.467	5.82	4.452
Convergence, Y/N	Yes	Yes	Yes
Cap	658	621	801
Service Time	3.488	3.824	2.541
HCM Lane V/C Ratio	0.163	0.395	0.794
HCM Control Delay	9.6	12.6	22
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.6	1.9	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	0	151	6	11	8	243	380	0	0	442	175
Future Volume (vph)	202	0	151	6	11	8	243	380	0	0	442	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	25		0	0		50
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.99		0.99					0.95
Frt		0.942			0.957							0.850
Flt Protected		0.972			0.988		0.950					
Satd. Flow (prot)	0	1693	0	0	1783	0	1805	1643	0	0	1863	1567
Flt Permitted		0.807			0.904		0.421					
Satd. Flow (perm)	0	1404	0	0	1626	0	791	1643	0	0	1863	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			9							86
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			245			348			438	
Travel Time (s)		18.3			5.6			7.9			10.0	
Confl. Peds. (#/hr)	1		11	11		1	12					12
Confl. Bikes (#/hr)			1			1						2
Peak Hour Factor	0.98	0.98	0.98	0.89	0.89	0.89	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5
Parking (#/hr)								0				
Adj. Flow (vph)	206	0	154	7	12	9	264	413	0	0	475	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	28	0	264	413	0	0	475	188
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1					1
Detector Phase	3	3		3	3		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0		23.5	23.5			23.5	23.5
Total Split (s)	44.0	44.0		44.0	44.0		56.0	56.0			56.0	56.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		56.0%	56.0%			56.0%	56.0%
Maximum Green (s)	38.0	38.0		38.0	38.0		50.5	50.5			50.5	50.5
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		27.9			27.9		60.6	60.6			60.6	60.6
Actuated g/C Ratio		0.28			0.28		0.61	0.61			0.61	0.61
v/c Ratio		0.85			0.06		0.55	0.42			0.42	0.20
Control Delay		47.8			17.2		15.0	10.4			12.3	6.9
Queue Delay		0.0			0.0		0.0	0.0			0.7	0.0
Total Delay		47.8			17.2		15.0	10.4			13.0	6.9
LOS		D			B		B	B			B	A
Approach Delay		47.8			17.2			12.2			11.3	
Approach LOS		D			B			B			B	
Queue Length 50th (ft)		192			9		83	94			92	10
Queue Length 95th (ft)		267			25		146	182			314	m111
Internal Link Dist (ft)		725			165			268			358	
Turn Bay Length (ft)							25					50
Base Capacity (vph)		560			623		478	995			1128	931
Starvation Cap Reductn		0			0		0	0			339	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0
Reduced v/c Ratio		0.64			0.04		0.55	0.42			0.60	0.20

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 34 (34%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 19.3 Intersection LOS: B
Intersection Capacity Utilization 78.5% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	141	33	29	585	383	35
Future Volume (vph)	141	33	29	585	383	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98			1.00	0.99	
Frt	0.974				0.989	
Flt Protected	0.961			0.998		
Satd. Flow (prot)	1743	0	0	1657	1604	0
Flt Permitted	0.961			0.966		
Satd. Flow (perm)	1718	0	0	1602	1604	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11				10	
Link Speed (mph)	30			30	30	
Link Distance (ft)	531			1461	553	
Travel Time (s)	12.1			33.2	12.6	
Confl. Peds. (#/hr)	7	6	19			19
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.92	0.92	0.94	0.94	0.92	0.92
Heavy Vehicles (%)	1%	3%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	153	36	31	622	416	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	0	653	454	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	3			1	1	
Permitted Phases			1			
Detector Phase	3		1	1	1	
Switch Phase						
Minimum Initial (s)	8.0		8.0	8.0	8.0	
Minimum Split (s)	25.5		25.0	25.0	25.0	
Total Split (s)	28.0		72.0	72.0	72.0	
Total Split (%)	28.0%		72.0%	72.0%	72.0%	
Maximum Green (s)	22.5		66.0	66.0	66.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.5		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.5			6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		C-Max	C-Max	C-Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	13.0		12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	14.6			73.9	73.9	
Actuated g/C Ratio	0.15			0.74	0.74	
v/c Ratio	0.72			0.55	0.38	
Control Delay	52.9			8.7	4.5	
Queue Delay	0.0			0.0	0.0	
Total Delay	52.9			8.7	4.5	
LOS	D			A	A	
Approach Delay	52.9			8.7	4.5	
Approach LOS	D			A	A	
Queue Length 50th (ft)	110			154	49	
Queue Length 95th (ft)	172			301	111	
Internal Link Dist (ft)	451			1381	473	
Turn Bay Length (ft)						
Base Capacity (vph)	400			1183	1188	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.47			0.55	0.38	

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 31 (31%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Washington Street & Dimock Street

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations															
Traffic Volume (vph)	3	36	235	59	2	26	388	7	269	343	30	0	110	39	
Future Volume (vph)	3	36	235	59	2	26	388	7	269	343	30	0	110	39	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250		0		0	50		0	0		0	
Storage Lanes		1		1		1		0	1		0	0		0	
Taper Length (ft)		25				25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor										1.00					
Frt				0.850			0.997			0.988			0.965		
Flt Protected		0.950				0.950			0.950						
Satd. Flow (prot)	0	1805	3505	1615	0	1805	3321	0	1805	1858	0	0	1807	0	
Flt Permitted		0.950				0.950			0.656						
Satd. Flow (perm)	0	1805	3505	1615	0	1805	3321	0	1246	1858	0	0	1807	0	
Right Turn on Red				Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)				207			1			5			18		
Link Speed (mph)			30				30			30			30		
Link Distance (ft)			550				928			283			636		
Travel Time (s)			12.5				21.1			6.4			14.5		
Confl. Bikes (#/hr)											4				
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	3%	0%	0%	1%	0%	0%	2%	0%	
Parking (#/hr)							0								
Adj. Flow (vph)	3	37	242	61	2	27	400	7	283	361	32	0	118	42	
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	40	242	61	0	29	407	0	283	393	0	0	160	0	
Turn Type	Prot	Prot	NA	Free	Prot	Prot	NA		Perm	NA			NA		
Protected Phases	1	1	6		5	5	2			4			4		3
Permitted Phases				Free					4			4			
Detector Phase	1	1	6		5	5	2		4	4		4	4		
Switch Phase															
Minimum Initial (s)	6.0	6.0	8.0		6.0	6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	12.0	12.0	22.0		12.0	12.0	22.0		36.0	36.0		36.0	36.0		30.0
Total Split (%)	12.0%	12.0%	22.0%		12.0%	12.0%	22.0%		36.0%	36.0%		36.0%	36.0%		30%
Maximum Green (s)	6.0	6.0	16.0		6.0	6.0	16.0		30.0	30.0		30.0	30.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		0.0
Lost Time Adjust (s)		0.0	0.0			0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0			6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	None	Max		None	None		None	None		None
Walk Time (s)															7.0
Flash Dont Walk (s)															19.0
Pedestrian Calls (#/hr)															5
Act Effct Green (s)		6.8	20.4	61.2		6.8	18.0		19.9	19.9			19.9		
Actuated g/C Ratio		0.11	0.33	1.00		0.11	0.29		0.33	0.33			0.33		
v/c Ratio		0.20	0.21	0.04		0.15	0.42		0.70	0.65			0.27		
Control Delay		37.2	22.1	0.1		36.8	25.2		31.8	25.5			17.8		
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Delay		37.2	22.1	0.1		36.8	25.2		31.8	25.5			17.8		
LOS		D	C	A		D	C		C	C			B		
Approach Delay			19.9				26.0			28.2			17.8		
Approach LOS			B				C			C			B		
Queue Length 50th (ft)		14	25	0		10	65		87	116			36		
Queue Length 95th (ft)		59	113	0		47	#195		#290	326			123		
Internal Link Dist (ft)			470				848			203			556		
Turn Bay Length (ft)				250					50						
Base Capacity (vph)		199	1169	1615		199	977		687	1026			1004		
Starvation Cap Reductn		0	0	0		0	0		0	0			0		
Spillback Cap Reductn		0	0	0		0	0		0	0			0		
Storage Cap Reductn		0	0	0		0	0		0	0			0		
Reduced v/c Ratio		0.20	0.21	0.04		0.15	0.42		0.41	0.38			0.16		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 61.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 24.8 Intersection LOS: C
Intersection Capacity Utilization 64.0% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue

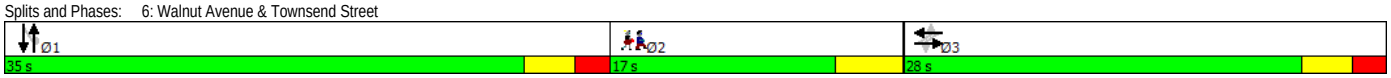
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	38	160	104	70	0	35	0	486	87	26	206	0	
Future Volume (vph)	38	160	104	70	0	35	0	486	87	26	206	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor								1.00					
Frt		0.954			0.955			0.979					
Flt Protected		0.994			0.968						0.994		
Satd. Flow (prot)	0	1802	0	0	1550	0	0	1642	0	0	1685	0	
Flt Permitted		0.945			0.478						0.915		
Satd. Flow (perm)	0	1713	0	0	765	0	0	1642	0	0	1551	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		33			82			13					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)									4				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	0%	1%	5%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	40	168	109	74	0	37	0	517	93	28	224	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	317	0	0	111	0	0	610	0	0	252	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	28.0	28.0		28.0	28.0			35.0		35.0	35.0		17.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%			43.8%		43.8%	43.8%		21%
Maximum Green (s)	23.0	23.0		23.0	23.0			30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		11
Act Effct Green (s)		13.7			13.7			31.0			31.0		
Actuated g/C Ratio		0.24			0.24			0.54			0.54		
v/c Ratio		0.73			0.45			0.68			0.30		
Control Delay		29.3			14.7			18.8			11.7		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		29.3			14.7			18.8			11.7		
LOS		C			B			B			B		
Approach Delay		29.3			14.7			18.8			11.7		
Approach LOS		C			B			B			B		
Queue Length 50th (ft)		81			7			112			36		
Queue Length 95th (ft)		206			54			#510			156		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		728			364			892			836		
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		0.44			0.30			0.68			0.30		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 57.4			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 62.9%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 6: Walnut Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	38	168	76	49	109	50	109	516	132	12	374	25	
Future Volume (vph)	38	168	76	49	109	50	109	516	132	12	374	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.96		1.00		
Frt		0.964			0.968				0.850		0.991		
Flt Protected		0.993			0.988			0.991			0.999		
Satd. Flow (prot)	0	1811	0	0	1803	0	0	3578	1615	0	3537	0	
Flt Permitted		0.913			0.718			0.763			0.931		
Satd. Flow (perm)	0	1662	0	0	1310	0	0	2754	1554	0	3295	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		18			15				139		8		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	12		2	2		12	2		11	9		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.89	0.89	0.89	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	
Adj. Flow (vph)	43	189	85	50	111	51	115	543	139	13	394	26	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	317	0	0	212	0	0	658	139	0	433	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		1.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	21.0	21.0		21.0	21.0		36.0	36.0	36.0	36.0	36.0		33.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		40.0%	40.0%	40.0%	40.0%	40.0%		37%
Maximum Green (s)	16.0	16.0		16.0	16.0		31.0	31.0	31.0	31.0	31.0		30.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													23.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)		20.2			20.2			40.0	40.0		40.0		
Actuated g/C Ratio		0.22			0.22			0.44	0.44		0.44		
v/c Ratio		0.82			0.69			0.54	0.18		0.30		
Control Delay		52.6			45.9			26.6	10.9		18.8		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		52.6			45.9			26.6	10.9		18.8		
LOS		D			D			C	B		B		
Approach Delay		52.6			45.9			23.9			18.8		
Approach LOS		D			D			C			B		
Queue Length 50th (ft)		~179			110			188	0		94		
Queue Length 95th (ft)		#343			#239			261	61		135		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		387			306			1222	767		1467		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.82			0.69			0.54	0.18		0.30		

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 66 (73%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 30.5		Intersection LOS: C	
Intersection Capacity Utilization 60.8%		ICU Level of Service B	
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: 10: Seaver Street/Columbus Avenue & Walnut Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	32	721	14	22	477
Future Volume (vph)	34	32	721	14	22	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98		1.00			1.00
Frt	0.934		0.997			
Flt Protected	0.975					0.998
Satd. Flow (prot)	1692	0	3595	0	0	3603
Flt Permitted	0.975					0.908
Satd. Flow (perm)	1689	0	3595	0	0	3276
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	36		3			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	3	15		18	18	
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	38	36	743	14	23	497
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	757	0	0	520
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	39.0		51.0		51.0	51.0
Total Split (%)	43.3%		56.7%		56.7%	56.7%
Maximum Green (s)	34.0		46.0		46.0	46.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	8.8		74.8			74.8
Actuated g/C Ratio	0.10		0.83			0.83
v/c Ratio	0.37		0.25			0.19
Control Delay	27.8		2.5			6.5
Queue Delay	0.0		0.0			0.0
Total Delay	27.8		2.5			6.5
LOS	C		A			A
Approach Delay	27.8		2.5			6.5
Approach LOS	C		A			A
Queue Length 50th (ft)	21		41			105
Queue Length 95th (ft)	60		70			m151
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	661		2986			2721
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.11		0.25			0.19

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 28 (31%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 11: Seaver Street & Harold Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	624	102	182	418
Future Volume (Veh/h)	0	0	624	102	182	418
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.91	0.96	0.96
Hourly flow rate (vph)	0	0	686	112	190	435
Pedestrians	13					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.89	0.83			0.83	
vC, conflicting volume	1570	755			811	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1322	607			674	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			75	
cM capacity (veh/h)	115	414			773	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	798	190	435
Volume Left	0	190	0
Volume Right	112	0	0
cSH	1700	773	1700
Volume to Capacity	0.47	0.25	0.26
Queue Length 95th (ft)	0	24	0
Control Delay (s)	0.0	11.2	0.0
Lane LOS		B	
Approach Delay (s)	0.0	3.4	
Approach LOS			

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	56.0%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	4	30	10	0	55	0	553	6	3	192	0
Future Volume (Veh/h)	34	4	30	10	0	55	0	553	6	3	192	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.96	0.96	0.96	0.95	0.95	0.95
Hourly flow rate (vph)	37	4	33	11	0	59	0	576	6	3	202	0
Pedestrians		5			5			6				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.75	0.75		0.75	0.75	0.75				0.75		
vC, conflicting volume	851	800	213	833	797	584	207			587		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	636	568	213	612	564	281	207			285		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	96	96	100	90	100			100		
cM capacity (veh/h)	261	323	823	286	324	570	1370			964		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	74	70	582	205
Volume Left	37	11	0	3
Volume Right	33	59	6	0
cSH	381	493	1700	964
Volume to Capacity	0.19	0.14	0.34	0.00
Queue Length 95th (ft)	18	12	0	0
Control Delay (s)	16.7	13.5	0.0	0.2
Lane LOS	C	B		A
Approach Delay (s)	16.7	13.5	0.0	0.2
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.4		
Intersection Capacity Utilization			46.9%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	0	0	0	0	4	567	62	36	335	8
Future Volume (Veh/h)	5	2	0	0	0	0	4	567	62	36	335	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.96	0.96	0.96
Hourly flow rate (vph)	9	3	0	0	0	0	4	623	68	38	349	8
Pedestrians		7			4			3			4	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1105	1139	363	1102	1109	665	364			695		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1081	1117	294	1078	1085	665	295			695		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	100	100	100	100	100			96		
cM capacity (veh/h)	177	187	701	177	195	462	1197			910		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	695	395
Volume Left	9	4	38
Volume Right	0	68	8
cSH	179	1197	910
Volume to Capacity	0.07	0.00	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	26.5	0.1	1.3
Lane LOS	D	A	A
Approach Delay (s)	26.5	0.1	1.3
Approach LOS	D		

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	55.8%	ICU Level of Service		B	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	292	11	12	0	0	0	28	85	7	8	74	178
Future Vol, veh/h	292	11	12	0	0	0	28	85	7	8	74	178
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	314	12	13	0	0	0	30	90	7	9	80	193
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.5	9.4	10.1
HCM LOS	B	A	B

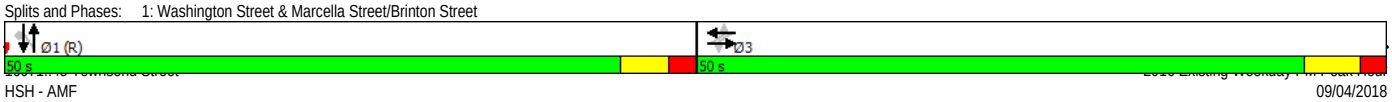
Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	23%	93%	3%
Vol Thru, %	71%	3%	28%
Vol Right, %	6%	4%	68%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	120	315	260
LT Vol	28	292	8
Through Vol	85	11	74
RT Vol	7	12	178
Lane Flow Rate	128	339	283
Geometry Grp	1	1	1
Degree of Util (X)	0.182	0.47	0.357
Departure Headway (Hd)	5.13	4.997	4.545
Convergence, Y/N	Yes	Yes	Yes
Cap	693	715	786
Service Time	3.208	3.072	2.606
HCM Lane V/C Ratio	0.185	0.474	0.36
HCM Control Delay	9.4	12.5	10.1
HCM Lane LOS	A	B	B
HCM 95th-tile Q	0.7	2.5	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	0	266	8	4	8	146	352	0	0	555	171
Future Volume (vph)	299	0	266	8	4	8	146	352	0	0	555	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	25		0	0		50
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.98							0.95
Frt		0.936			0.946							0.850
Flt Protected		0.974			0.980		0.950					
Satd. Flow (prot)	0	1679	0	0	1733	0	1787	1643	0	0	1863	1567
Flt Permitted		0.821			0.826		0.249					
Satd. Flow (perm)	0	1400	0	0	1457	0	468	1643	0	0	1863	1490
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			10							60
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			245			348			448	
Travel Time (s)		18.3			5.6			7.9			10.2	
Confl. Peds. (#/hr)	8		9	9		8	10					10
Confl. Bikes (#/hr)			1						5			2
Peak Hour Factor	0.96	0.96	0.96	0.83	0.83	0.83	0.98	0.98	0.98	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	1%	2%	0%	0%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	5	0	0	0	5
Parking (#/hr)								0				
Adj. Flow (vph)	311	0	277	10	5	10	149	359	0	0	590	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	588	0	0	25	0	149	359	0	0	590	182
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1					1
Detector Phase	3	3		3	3		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	25.0	25.0		25.0	25.0		23.5	23.5			23.5	23.5
Total Split (s)	50.0	50.0		50.0	50.0		50.0	50.0			50.0	50.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%			50.0%	50.0%
Maximum Green (s)	44.0	44.0		44.0	44.0		44.5	44.5			44.5	44.5
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5			3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0		5.5	5.5			5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		41.7			41.7		46.8	46.8			46.8	46.8
Actuated g/C Ratio		0.42			0.42		0.47	0.47			0.47	0.47
v/c Ratio		0.95			0.04		0.68	0.47			0.68	0.25
Control Delay		52.7			11.7		34.2	17.1			9.7	4.0
Queue Delay		0.0			0.0		0.0	0.0			2.8	0.0
Total Delay		52.7			11.7		34.2	17.1			12.6	4.0
LOS		D			B		C	B			B	A
Approach Delay		52.7			11.7			22.1			10.6	
Approach LOS		D			B			C			B	
Queue Length 50th (ft)		314			5		57	134			152	17
Queue Length 95th (ft)		#541			18		#181	212			m151	m22
Internal Link Dist (ft)		725			165			268			368	
Turn Bay Length (ft)							25					50
Base Capacity (vph)		647			646		219	769			872	729
Starvation Cap Reductn		0			0		0	0			177	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0
Reduced v/c Ratio		0.91			0.04		0.68	0.47			0.85	0.25

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 59 (59%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 26.8 Intersection LOS: C
Intersection Capacity Utilization 91.4% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Marcella Street/Brinton Street



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	183	87	21	481	388	27
Future Volume (vph)	183	87	21	481	388	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.93			1.00	0.99	
Frt	0.956				0.991	
Flt Protected	0.967			0.998		
Satd. Flow (prot)	1711	0	0	1641	1635	0
Flt Permitted	0.967			0.975		
Satd. Flow (perm)	1619	0	0	1601	1635	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	25				6	
Link Speed (mph)	30			30	30	
Link Distance (ft)	531			1461	553	
Travel Time (s)	12.1			33.2	12.6	
Confl. Peds. (#/hr)	32	12	28			28
Confl. Bikes (#/hr)						4
Peak Hour Factor	0.92	0.92	0.95	0.95	0.96	0.96
Heavy Vehicles (%)	1%	1%	0%	2%	1%	0%
Bus Blockages (#/hr)	0	0	0	5	5	0
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	199	95	22	506	404	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	294	0	0	528	432	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	3			1	1	
Permitted Phases			1			
Detector Phase	3		1	1	1	
Switch Phase						
Minimum Initial (s)	8.0		8.0	8.0	8.0	
Minimum Split (s)	25.5		25.0	25.0	25.0	
Total Split (s)	38.0		62.0	62.0	62.0	
Total Split (%)	38.0%		62.0%	62.0%	62.0%	
Maximum Green (s)	32.5		56.0	56.0	56.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.5		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.5			6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0		2.0	2.0	2.0	
Recall Mode	None		C-Max	C-Max	C-Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	13.0		12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	20.5			68.0	68.0	
Actuated g/C Ratio	0.20			0.68	0.68	
v/c Ratio	0.79			0.49	0.39	
Control Delay	49.7			10.6	5.1	
Queue Delay	0.0			0.0	0.0	
Total Delay	49.7			10.6	5.1	
LOS	D			B	A	
Approach Delay	49.7			10.6	5.1	
Approach LOS	D			B	A	
Queue Length 50th (ft)	165			142	63	
Queue Length 95th (ft)	236			277	m105	
Internal Link Dist (ft)	451			1381	473	
Turn Bay Length (ft)						
Base Capacity (vph)	572			1088	1113	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.51			0.49	0.39	

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 65 (65%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 68.1%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Washington Street & Dimock Street

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations														
Traffic Volume (vph)	2	83	389	139	70	305	7	137	155	32	7	208	71	
Future Volume (vph)	2	83	389	139	70	305	7	137	155	32	7	208	71	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0		250	0		0	50		0	0		0	
Storage Lanes		1		1	1		0	1		0	0		0	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor				0.98		1.00						1.00		
Frt				0.850		0.997			0.974			0.966		
Flt Protected		0.950			0.950			0.950				0.999		
Satd. Flow (prot)	0	1754	3539	1599	1770	3352	0	1805	1820	0	0	1788	0	
Flt Permitted		0.950			0.950			0.411				0.991		
Satd. Flow (perm)	0	1754	3539	1566	1770	3352	0	781	1820	0	0	1774	0	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)				207		2			10			17		
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			550			928			283			636		
Travel Time (s)			12.5			21.1			6.4			14.5		
Confl. Bikes (#/hr)				1			2						2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.94	0.94	0.94	0.83	0.83	0.83	
Heavy Vehicles (%)	0%	3%	2%	1%	2%	2%	0%	0%	2%	0%	0%	3%	0%	
Parking (#/hr)						0								
Adj. Flow (vph)	2	90	423	151	74	321	7	146	165	34	8	251	86	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	92	423	151	74	328	0	146	199	0	0	345	0	
Turn Type	Prot	Prot	NA	Free	Prot	NA		Perm	NA		Perm	NA		
Protected Phases	1	1	6		5	2			4			4		3
Permitted Phases				Free				4			4			
Detector Phase	1	1	6		5	2		4	4		4	4		
Switch Phase														
Minimum Initial (s)	6.0	6.0	8.0		6.0	8.0		8.0	8.0		8.0	8.0		5.0
Minimum Split (s)	12.0	12.0	14.0		12.0	14.0		14.0	14.0		14.0	14.0		30.0
Total Split (s)	14.0	14.0	23.0		13.0	22.0		34.0	34.0		34.0	34.0		30.0
Total Split (%)	14.0%	14.0%	23.0%		13.0%	22.0%		34.0%	34.0%		34.0%	34.0%		30%
Maximum Green (s)	8.0	8.0	17.0		7.0	16.0		28.0	28.0		28.0	28.0		26.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0			0.0		
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0			6.0		
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None	Max		None	Max		None	None		None	None		None
Walk Time (s)														7.0
Flash Dont Walk (s)														19.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		7.9	18.7	64.5	7.2	18.0		19.0	19.0			19.0		
Actuated g/C Ratio		0.12	0.29	1.00	0.11	0.28		0.29	0.29			0.29		
v/c Ratio		0.43	0.41	0.10	0.38	0.35		0.64	0.37			0.65		
Control Delay		40.5	25.4	0.1	40.2	25.7		37.5	21.6			27.3		
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay		40.5	25.4	0.1	40.2	25.7		37.5	21.6			27.3		
LOS		D	C	A	D	C		D	C			C		
Approach Delay			21.7			28.4			28.3			27.3		
Approach LOS			C			C			C			C		
Queue Length 50th (ft)		32	67	0	26	52		45	53			101		
Queue Length 95th (ft)		#131	188	0	#108	150		#173	161			255		
Internal Link Dist (ft)			470			848			203			556		
Turn Bay Length (ft)				250				50						
Base Capacity (vph)		239	1026	1566	211	938		372	874			856		
Starvation Cap Reductn		0	0	0	0	0		0	0			0		
Spillback Cap Reductn		0	0	0	0	0		0	0			0		
Storage Cap Reductn		0	0	0	0	0		0	0			0		
Reduced v/c Ratio		0.38	0.41	0.10	0.35	0.35		0.39	0.23			0.40		

Intersection Summary

Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 64.5			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 61.5%		ICU Level of Service B	
Analysis Period (min) 15			

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

Splits and Phases: 4: Martin Luther King Boulevard & Walnut Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	28	234	198	96	0	69	0	172	55	29	384	0	
Future Volume (vph)	28	234	198	96	0	69	0	172	55	29	384	0	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99						0.99					
Frt		0.942			0.943			0.967					
Flt Protected		0.997			0.972						0.996		
Satd. Flow (prot)	0	1768	0	0	1567	0	0	1633	0	0	1687	0	
Flt Permitted		0.974			0.432						0.967		
Satd. Flow (perm)	0	1727	0	0	697	0	0	1633	0	0	1638	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		49			82			22					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		173			609			254			242		
Travel Time (s)		3.9			13.8			5.8			5.5		
Confl. Bikes (#/hr)			1						1			2	
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	
Parking (#/hr)					0			0			0		
Adj. Flow (vph)	29	244	206	105	0	76	0	185	59	32	417	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	479	0	0	181	0	0	244	0	0	449	0	
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3						1			
Detector Phase	3	3		3	3			1		1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0			10.0		10.0	10.0		13.0
Minimum Split (s)	13.0	13.0		13.0	13.0			18.0		18.0	18.0		17.0
Total Split (s)	29.0	29.0		29.0	29.0			33.0		33.0	33.0		18.0
Total Split (%)	36.3%	36.3%		36.3%	36.3%			41.3%		41.3%	41.3%		23%
Maximum Green (s)	24.0	24.0		24.0	24.0			28.0		28.0	28.0		14.0
Yellow Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		0.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		5.0			5.0			5.0			5.0		
Lead/Lag								Lead		Lead	Lead		Lag
Lead-Lag Optimize?								Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0		2.0
Recall Mode	None	None		None	None			Max		Max	Max		None
Walk Time (s)								7.0		7.0	7.0		7.0
Flash Dont Walk (s)								6.0		6.0	6.0		6.0
Pedestrian Calls (#/hr)								0		0	0		16
Act Effct Green (s)		20.2			20.2			28.6			28.6		
Actuated g/C Ratio		0.33			0.33			0.46			0.46		
v/c Ratio		0.80			0.64			0.32			0.59		
Control Delay		30.0			23.4			13.3			19.3		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		30.0			23.4			13.3			19.3		
LOS		C			C			B			B		
Approach Delay		30.0			23.4			13.3			19.3		
Approach LOS		C			C			B			B		
Queue Length 50th (ft)		129			26			47			112		
Queue Length 95th (ft)		#370			#139			142			#340		
Internal Link Dist (ft)		93			529			174			162		
Turn Bay Length (ft)													
Base Capacity (vph)		716			326			769			759		
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		0.67			0.56			0.32			0.59		

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 61.6			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 86.4%		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: 6: Walnut Avenue & Townsend Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	33	150	197	78	136	66	77	462	74	29	701	33	
Future Volume (vph)	33	150	197	78	136	66	77	462	74	29	701	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		175	0		0	
Storage Lanes	0		0	0		0	0		2	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	
Ped Bike Factor		0.99			0.99			1.00	0.95		1.00		
Frt		0.930			0.968				0.850		0.994		
Flt Protected		0.996			0.986			0.993			0.998		
Satd. Flow (prot)	0	1742	0	0	1801	0	0	3585	1615	0	3578	0	
Flt Permitted		0.950			0.673			0.619			0.913		
Satd. Flow (perm)	0	1661	0	0	1228	0	0	2234	1534	0	3272	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		45			13				75		5		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		429			277			619			380		
Travel Time (s)		9.8			6.3			14.1			8.6		
Confl. Peds. (#/hr)	14		5	5		14	2		22	17		2	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.99	0.99	0.99	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	35	158	207	89	155	75	78	467	75	31	746	35	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	400	0	0	319	0	0	545	75	0	812	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA		
Protected Phases		5			5			1			1		2
Permitted Phases	5			5			1		1	1			
Detector Phase	5	5		5	5		1	1	1	1	1		
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0	13.0	13.0		33.0
Total Split (s)	30.0	30.0		30.0	30.0		47.0	47.0	47.0	47.0	47.0		33.0
Total Split (%)	27.3%	27.3%		27.3%	27.3%		42.7%	42.7%	42.7%	42.7%	42.7%		30%
Maximum Green (s)	25.0	25.0		25.0	25.0		42.0	42.0	42.0	42.0	42.0		28.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		3.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0			5.0			5.0	5.0		5.0		
Lead/Lag							Lead	Lead	Lead	Lead	Lead		Lag
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													21.0
Pedestrian Calls (#/hr)													39
Act Effct Green (s)		38.2			38.2			42.0	42.0		42.0		
Actuated g/C Ratio		0.35			0.35			0.38	0.38		0.38		
v/c Ratio		0.66			0.73			0.64	0.12		0.65		
Control Delay		37.8			46.9			40.7	14.6		30.7		
Queue Delay		0.0			0.0			0.0	0.0		0.0		
Total Delay		37.8			46.9			40.7	14.6		30.7		
LOS		D			D			D	B		C		
Approach Delay		37.8			46.9			37.5			30.7		
Approach LOS		D			D			D			C		
Queue Length 50th (ft)		254			~250			194	0		243		
Queue Length 95th (ft)		#452			#415			261	52		311		
Internal Link Dist (ft)		349			197			539			300		
Turn Bay Length (ft)									175				
Base Capacity (vph)		606			435			852	632		1252		
Starvation Cap Reductn		0			0			0	0		0		
Spillback Cap Reductn		0			0			0	0		0		
Storage Cap Reductn		0			0			0	0		0		
Reduced v/c Ratio		0.66			0.73			0.64	0.12		0.65		

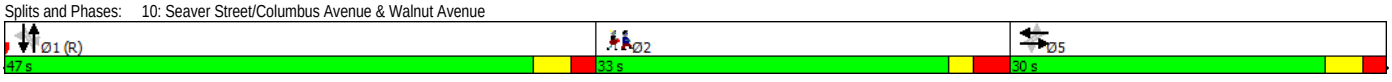
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 73 (66%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 36.4 Intersection LOS: D
Intersection Capacity Utilization 83.6% 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: 10: Seaver Street/Columbus Avenue & Walnut Avenue

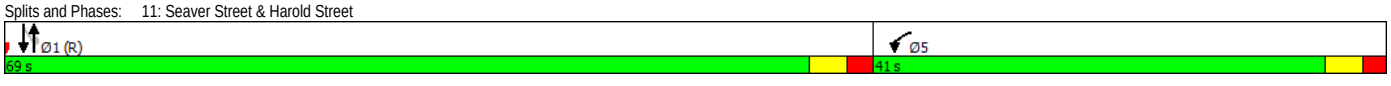


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	38	558	16	69	930
Future Volume (vph)	98	38	558	16	69	930
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98		1.00			1.00
Frt	0.962		0.996			
Flt Protected	0.965					0.997
Satd. Flow (prot)	1732	0	3589	0	0	3599
Flt Permitted	0.965					0.853
Satd. Flow (perm)	1730	0	3589	0	0	3075
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	19		4			
Link Speed (mph)	30		30			30
Link Distance (ft)	117		756			619
Travel Time (s)	2.7		17.2			14.1
Confl. Peds. (#/hr)	1	22		19	19	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.90	0.90	0.97	0.97	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	109	42	575	16	72	969
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	591	0	0	1041
Turn Type	Prot		NA		Perm	NA
Protected Phases	5		1			1
Permitted Phases					1	
Detector Phase	5		1		1	1
Switch Phase						
Minimum Initial (s)	8.0		20.0		20.0	20.0
Minimum Split (s)	31.0		25.0		25.0	25.0
Total Split (s)	41.0		69.0		69.0	69.0
Total Split (%)	37.3%		62.7%		62.7%	62.7%
Maximum Green (s)	36.0		64.0		64.0	64.0
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Walk Time (s)	7.0		8.0		8.0	8.0
Flash Dont Walk (s)	19.0		12.0		12.0	12.0
Pedestrian Calls (#/hr)	22		0		0	0
Act Effct Green (s)	17.1		82.9			82.9
Actuated g/C Ratio	0.16		0.75			0.75
v/c Ratio	0.53		0.22			0.45
Control Delay	42.2		5.0			16.9
Queue Delay	0.0		0.0			0.0
Total Delay	42.2		5.0			16.9
LOS	D		A			B
Approach Delay	42.2		5.0			16.9
Approach LOS	D		A			B
Queue Length 50th (ft)	90		45			298
Queue Length 95th (ft)	138		101			354
Internal Link Dist (ft)	37		676			539
Turn Bay Length (ft)						
Base Capacity (vph)	579		2705			2317
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.26		0.22			0.45

Intersection Summary

Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 19 (17%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Seaver Street & Harold Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	498	166	414	415
Future Volume (Veh/h)	0	0	498	166	414	415
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.96	0.96	0.94	0.94
Hourly flow rate (vph)	0	0	519	173	440	441
Pedestrians	7					
Lane Width (ft)	0.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			553			348
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1934	612			699	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2003	471			571	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			50	
cM capacity (veh/h)	28	511			872	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	692	440	441
Volume Left	0	440	0
Volume Right	173	0	0
cSH	1700	872	1700
Volume to Capacity	0.41	0.50	0.26
Queue Length 95th (ft)	0	72	0
Control Delay (s)	0.0	13.3	0.0
Lane LOS		B	
Approach Delay (s)	0.0	6.6	
Approach LOS			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	10	21	10	0	47	0	262	7	35	382	0
Future Volume (Veh/h)	14	10	21	10	0	47	0	262	7	35	382	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.89	0.89	0.89	0.93	0.93	0.93
Hourly flow rate (vph)	18	13	27	13	0	62	0	294	8	38	411	0
Pedestrians		13			13			1			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			1			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								410			557	
pX, platoon unblocked	0.93	0.93	0.92	0.93	0.93	0.98	0.92			0.98		
vC, conflicting volume	870	815	425	832	811	321	424			315		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	766	707	328	726	703	294	327			287		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	96	95	100	91	100			97		
cM capacity (veh/h)	256	318	650	279	320	717	1127			1241		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	75	302	449
Volume Left	18	13	0	38
Volume Right	27	62	8	0
cSH	380	564	1700	1241
Volume to Capacity	0.15	0.13	0.18	0.03
Queue Length 95th (ft)	13	11	0	2
Control Delay (s)	16.2	12.4	0.0	1.0
Lane LOS	C	B		A
Approach Delay (s)	16.2	12.4	0.0	1.0
Approach LOS	C	B		

Intersection Summary					
Average Delay			2.6		
Intersection Capacity Utilization			53.5%	ICU Level of Service	A
Analysis Period (min)			15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	0	0	0	0	222	38	37	632	9
Future Volume (Veh/h)	5	0	2	0	0	0	0	222	38	37	632	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.25	0.25	0.25	0.91	0.91	0.91	0.95	0.95	0.95
Hourly flow rate (vph)	9	0	3	0	0	0	0	244	42	39	665	9
Pedestrians		8			4			2			3	
Lane Width (ft)		12.0			0.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											254	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	1024	1046	680	1022	1029	272	682			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	912	940	488	910	919	272	491			290		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	99	100	100	100	100			97		
cM capacity (veh/h)	200	207	469	201	213	769	871			1283		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	286	713
Volume Left	9	0	39
Volume Right	3	42	9
cSH	233	871	1283
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	21.3	0.0	0.8
Lane LOS	C		A
Approach Delay (s)	21.3	0.0	0.8
Approach LOS	C		

Intersection Summary					
Average Delay			0.8		
Intersection Capacity Utilization			65.2%	ICU Level of Service	C
Analysis Period (min)			15		

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔			↑	
Traffic Vol, veh/h	203	19	8	0	0	0	28	67	6	13	284	307
Future Vol, veh/h	203	19	8	0	0	0	28	67	6	13	284	307
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	216	20	9	0	0	0	30	71	6	14	299	323
Number of Lanes	0	1	0	0	0	0	0	1	0	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.6	9.6	22
HCM LOS	B	A	C

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	28%	88%	2%
Vol Thru, %	66%	8%	47%
Vol Right, %	6%	3%	51%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	101	230	604
LT Vol	28	203	13
Through Vol	67	19	284
RT Vol	6	8	307
Lane Flow Rate	107	245	636
Geometry Grp	1	1	1
Degree of Util (X)	0.163	0.396	0.786
Departure Headway (Hd)	5.467	5.82	4.452
Convergence, Y/N	Yes	Yes	Yes
Cap	658	621	801
Service Time	3.488	3.824	2.541
HCM Lane V/C Ratio	0.163	0.395	0.794
HCM Control Delay	9.6	12.6	22
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.6	1.9	8

Appendix C

Climate Change Checklist

Boston Planning & Development Agency
Climate Resiliency Report Summary

Submitted: 01/13/2019 22:55:05

A.1 - Project Information

Project Name:	45 Townsend Street			
Project Address:	45 Townsend Street			
Filing Type:	Initial (PNF, EPNF, NPC or other substantial filing)			
Filing Contact:	Charlotte Lewis	KIC Roxbury, LLC	clewis@kicboston.com	617-346-6276
Is MEPA approval required?	No	MEPA date:		

A.2 - Project Team

Owner / Developer:	KIC Roxbury, LLC
Architect:	CUBE 3 Studio LLC
Engineer:	BLW Engineers, Inc.
Sustainability / LEED:	KIC Roxbury, LLC; CUBE 3 Studio, LLC
Permitting:	Epsilon Associates, Inc
Construction Management:	TBD

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Residential
List the First Floor Uses:	Residential units, residential lobby, parking
List any Critical Site Infrastructure and or Building Uses:	None

Site and Building:

Site Area (SF):	211307	Building Area (SF):	400000
Building Height (Ft):	69.0	Building Height (Stories):	8
Existing Site Elevation – Low (Ft BCB):	107	Existing Site Elevation – High (Ft BCB):	170
Proposed Site Elevation – Low (Ft BCB):	107	Proposed Site Elevation – High (Ft BCB):	170
Proposed First Floor Elevation (Ft BCB):	110	Below grade spaces/levels (#):	0

Article 37 Green Building:

LEED Version - Rating System:	BD+C v4	LEED Certification:	Yes
Proposed LEED rating:	Gold	Proposed LEED point score (Pts.):	63

Boston Planning & Development Agency

Climate Resiliency Report Summary

Building Envelope:

When reporting R values, differentiate between R discontinuous and R continuous. For example, use "R13" to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

Roof:	38	Exposed Floor :	30
Foundation Wall:	0	Slab Edge (at or below grade):	10

Vertical Above-grade Assemblies (%'s are of total vertical area and together should total 100%):

Area of Opaque Curtain Wall & Spandrel Assembly:	0	Wall & Spandrel Assembly Value:	N/A
Area of Framed & Insulated / Standard Wall:	75	Wall Value:	21
Area of Vision Window:	25	Window Glazing Assembly Value:	3.85
		Window Glazing SHGC:	.25
Area of Doors:	TBD	Door Assembly Value :	TBD

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	Estimated based on building type, proposed systems and energy code requirements.		
Annual Electric (kWh):	6286550	Peak Electric (kW):	382
Annual Heating (MMbtu/hr):	15122	Peak Heating (MMbtu):	451
Annual Cooling (Tons/hr):	TBD	Peak Cooling (Tons):	
Energy Use - Below ASHRAE 90.1 - 2013 (%):		Have the local utilities reviewed the building energy performance?:	No
Energy Use - Below Mass. Code (%):		Energy Use Intensity (kBtu/SF):	48

Back-up / Emergency Power System

Electrical Generation Output (kW):	400	Number of Power Units:	1
System Type (kW):	Diesel Generator	Fuel Source:	Diesel

Emergency and Critical System Loads (in the event of a service interruption)

Electric (kW):		Heating (MMbtu/hr):	
		Cooling (Tons/hr):	

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons):

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

Energy modeling will be performed throughout the design process. The design options will be analyzed for energy savings and energy cost savings at 100% DD and 100% CD.

Describe building specific passive energy efficiency measures including orientation, massing, building envelop, and systems:

The project will be designed with a high performance envelope including the use of optimized insulation, high performance windows, tight air sealing, and reduced thermal bridging. Solar shading and natural ventilation will also aid in the passive cooling of the building.

Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:

The project will utilize optimized building systems including a variable refrigerant flow system, and a high-efficiency gas fired domestic hot water system. Common areas will be fitted with occupancy control sensors, and all fixtures will be high efficiency and all plumbing fixtures will be low flow to further reduce energy and water use.

Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:

Currently, these are not part of the design but will be analyzed as the project and budget progress.

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

The team did not utilize a plant outside of the building beyond electricity available from the grid. Should the grid become a smart grid, the building will be enabled to adapt to that technology.

Describe any energy efficiency assistance or support provided or to be provided to the project:

The team will be meeting with utilities to determine and finalize the options for rebates and incentives for technologies and controls in the building.

B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

The current systems are reliant on an efficient form of electricity from the grid, which has reduced its emissions by more than 15% over the past 5 years. This trend is likely to continue with regulations, and as the building requires system upgrades, the building could migrate to all electric systems.

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.):	8	Temperature Range - High (Deg.):	91
Annual Heating Degree Days:	5621	Annual Cooling Degree Days	750

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90° (#):	60	Days - Above 100° (#):	30
Number of Heatwaves / Year (#):	6	Average Duration of Heatwave (Days):	5

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

Heat island effect will be greatly minimized through the use of high albedo roofing materials, green roofs, and reducing the use of hardscaping on the site.

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

Future higher temperatures will be managed through a number of measures including the use of shade trees on site, high performance building envelope, incorporating energy recovery ventilation, and minimizing the heat island effect.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

The building will include a generator for life safety systems.

D - Extreme Precipitation Events

Boston Planning & Development Agency

Climate Resiliency Report Summary

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25". There is a significant probability that this will increase to at least 6" by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours)	6

Describe all building and site measures for reducing storm water run-off:

The landscape will be designed to include features such as rain gardens and cisterns that will slow and minimize storm water runoff. The building will include an infiltration system for the first one inch of run-off.

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

Green roofs and a stormwater retention system will minimize runoff while allowing for the harvesting of stormwater for use in irrigation.

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA Special Flood Hazard Area?	No	What Zone:	
What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)?			
Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see SLR-FHA online map)?	No		

If you answered YES to either of the above questions, please complete the following questions.
Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2' of sea level rise above 2013 tide levels, an additional 2.5" to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project's Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by adding 12" of freeboard for buildings, and 24" of freeboard for critical facilities and infrastructure and any ground floor residential units.

What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)?

What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)?

First Floor Elevation (Ft BCB):

What are the Site Elevations at Building (Ft BCB)?

What is the Accessible Route Elevation (Ft BCB)?

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

Describe any strategies that would support rapid recovery after a weather event:

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

Boston Planning & Development Agency

Climate Resiliency Report Summary

Thank you for completing the Boston Climate Change Checklist!

For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

Appendix D

Accessibility Checklist

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information:

If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.

Project Name:	**45 Townsend Residential**
Primary Project Address:	**45 Townsend St. Boston, MA 02119**
Total Number of Phases/Buildings:	**1**
Primary Contact (Name / Title / Company / Email / Phone):	**Charlotte Lewis / SVP People, Culture & Marketing/ Kensington Investment Co. / clewis@kicboston.com / 617-790-3923**
Owner / Developer:	**KIC Roxbury, LLC**
Architect:	**CUBE3**
Civil Engineer:	**Howard Stein Hudson**
Landscape Architect:	**Ground, Inc.**
Permitting:	**Epsilon Associates, Inc.**
Construction Management:	**Janeyco**

At what stage is the project at time of this questionnaire? Select below:

	PNF / Expanded PNF Submitted	**Draft / Final Project Impact Report Submitted**	BPDA Board Approved
	BPDA Design Approved	Under Construction	Construction Completed:

Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	Yes, Residential units sink depth from 6 ½" to 8"

2. Building Classification and Description:

This section identifies preliminary construction information about the project including size and uses.

What are the dimensions of the project?

Site Area:	*211,272 SF*	Building Area:	*400,000 GSF*
Building Height:	*69 FT – 10 IN*	Number of Stories:	*8 Flrs.*

First Floor Elevation:	~212'	Is there below grade space:		*Yes*
What is the Construction Type? (Select most appropriate type)				
	Wood Frame	Masonry	Steel Frame	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	**Residential - Multi-unit, Four +**	Institutional	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	*Residential entry lobby, Community Room, Townhomes*			

3. Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The project site is currently occupied by an unoccupied hospital complex. The neighborhood is predominately residential, comprised of single family and multi-family homes. The site is defined by ledge and rock outcroppings, with a ~45' grade change from the Townsend Street sidewalk to the top of the hill at Dennison Street.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	- Jackson Square T Stop - Orange Line (0.7 miles) - Bus Lines 32, 34, 36, 42, 44 (0.2 – 0.3 miles)
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	- Dimock Community Health Center Complex - Higginson Elementary School - Boston Islamic Center - Museum of the National Center of Afro-American Artists - Academy Homes II housing development, Council - Tower senior housing development
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	Shelburne Community Center, Melnea Cass Recreational Complex

4. Surrounding Site Conditions – Existing:

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

Is the development site within a historic district? ***If yes,*** identify which district:	No
Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	Yes. The sidewalks along Townsend Street do not contain pedestrian ramps. The sidewalk width along Townsend Street varies from approximately 6 ft to approximately 7ft (front of curb to back of sidewalk). The existing sidewalks are concrete. The cross slope on the sidewalk along Townsend Street ranges from approximately 5.6%-1%. The slope of the existing sidewalk along Townsend street ranges from approximately 0.5%-3%.
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	No

5. Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	Yes, Neighborhood Residential
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	Frontage Zone width- 14—48’ Pedestrian Zone width- 5’ Furnishing Zone width- 1.5’-8’ All sidewalks are proposed to be 5’ in width. All sidewalks will have a cross slope of 1.5% or less. The slope of the sidewalk along Townsend Street ranges from approximately 0.7%-3%.

List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	The proposed materials are concrete and vertical granite curb for the walkways on Townsend street. This sidewalk will be located both on private property and on the City of Boston right-of-way.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	There are no sidewalk cafes. There will be street lights, hydrants, and utility poles. The hydrants and utility poles are existing. The street lights will be set back from the curb face 1.5'.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	Yes, the proponent will be seeking a pedestrian easement with the Public Improvement Commission.
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	Yes. A pedestrian easement will be sought for the sidewalk on Townsend Street. Specific repairs including cut outs for parking/curb line relocation and curb cut closures and relocation.
6. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	220 spaces are currently planned in the garage with an additional 12 surface spaces along the driveway.
What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	The total number is 9, 2 of which are Van Accessible

Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	The exterior accessible visitor parking is located at the top of the driveway located on the southern portion of the site and there are accessible parking spaces within the garage for tenants.
Has a drop-off area been identified? ***If yes,*** will it be accessible?	Yes and yes it will be accessible.
7. Circulation and Accessible Routes: *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors.*	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	Flush condition
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	Yes, all entrances besides emergency and utility are accessible.
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	To be developed as project progresses. The project as a whole is universally designed.
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	
What is the total number of proposed housing units or hotel rooms for the development?	300
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP	All 300 units will be for rent. 45 IDP units (15% of the 300). 50% of the IDP units will be rental on site and 50% will be affordable homeownership off site

(Inclusionary Development Policy) units?	
If a residential development, how many accessible Group 2 units are being proposed?	The program contains 300 new construction rental units. Per Massachusetts Architectural Access Board, Section 9.4 Multiple Dwellings, 95% of the rental units are required to be provided as Group 1 units. As defined by the State, Group 1 units are "units that have features that can be modified without structural change to meet the specific needs of an occupant with a disability." The remaining 5% of the units are required to be provided as Group 2A units, which will be at least 15 units. The Project contains a variety of different unit types, including studios, 1-bedroom units, 2-bedroom units, and 3-bedroom units. The number of Group 2A units of each type will be directly proportional to the actual number included in the project. The locations of the units have not yet been determined, but the intent is for the Group 2A units to be evenly distributed throughout the new-construction building to cover all representative floors levels, views, and amenities. The design of the Group 2A units is not confirmed, but the intent is to meet or exceed the MAAB requirements for kitchens, bathrooms, and bedrooms (see MAAB Sections 521 CMR 44.00, 45.00, and 47.00 for minimum accessible amenities intended to be met). As defined by the State, Group 2A units are "units that have features similar to Group 1, but have the additional feature of greater floor space to accommodate the needs of occupants who need such space due to their disability."
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	2 or 3 Group 2 units will also be IDP units
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	N/A
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes***, provide reason.	No
Are there interior elevators, ramps or lifts located in the development for access around architectural	

barriers and/or to separate floors? ***If yes,*** describe:	Yes, the building is equipped with interior elevators to provide access to all habitable levels and common areas within the building.
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.*	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	Landscaping improvements, including shade extra trees along Townsend Street, will be provided. Barrier-free parking reserved for accessible vehicles is provided on-site, as is accessible public open space.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All spaces within the building will be accessible to those with disabilities.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Yes, all public restrooms will be ADA compliant
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	The proposed plan has not yet been reviewed with the Disability Commissioner or their Architectural Access staff.
Has the proponent presented the proposed plan to the Disability Advisory Board at one of their	The proposed plan has not yet been presented.

monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	

10. Attachments

Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.

Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances.
Provide a diagram of the accessible route connections through the site, including distances.
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable)
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry.
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. • • • •

This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

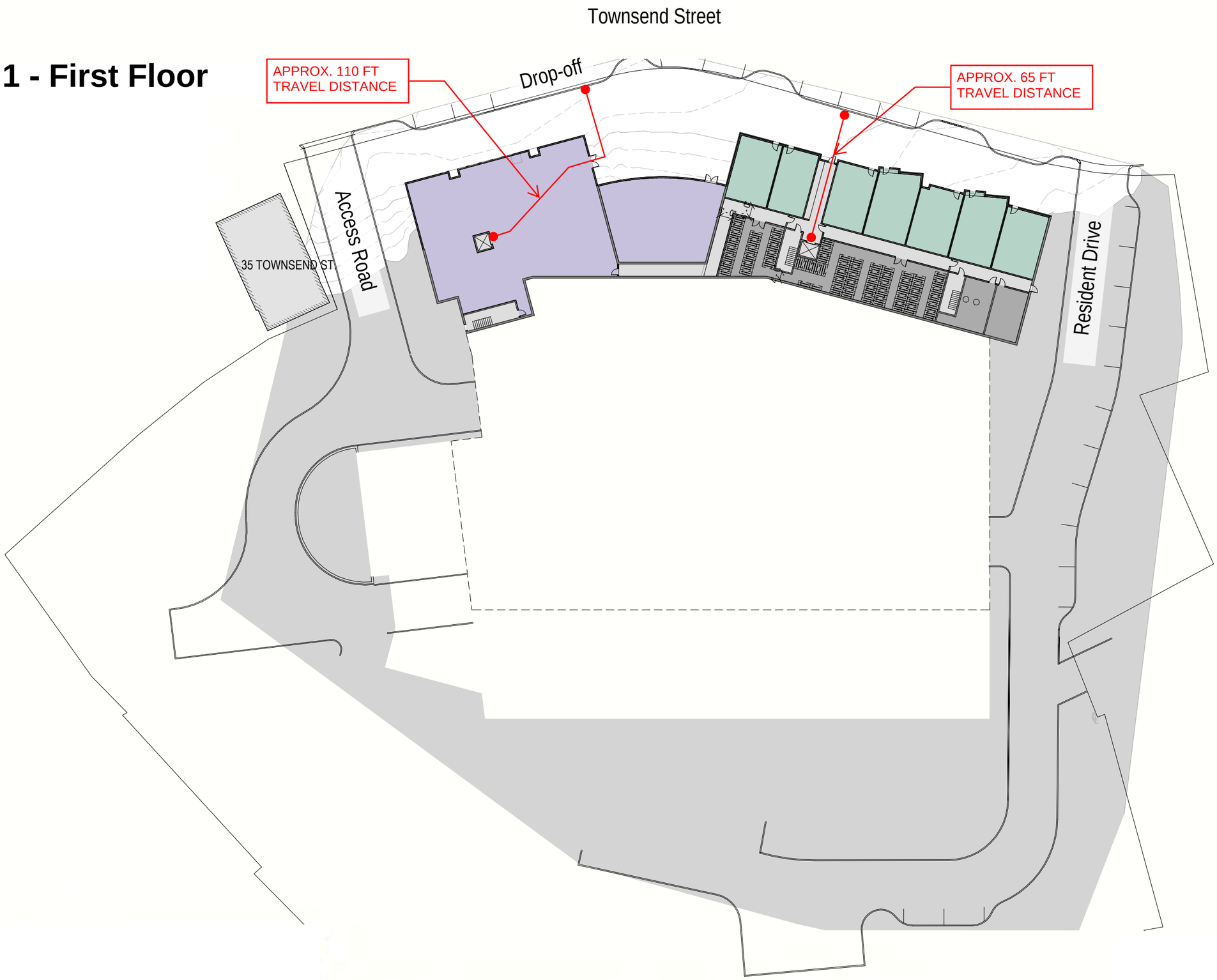
For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

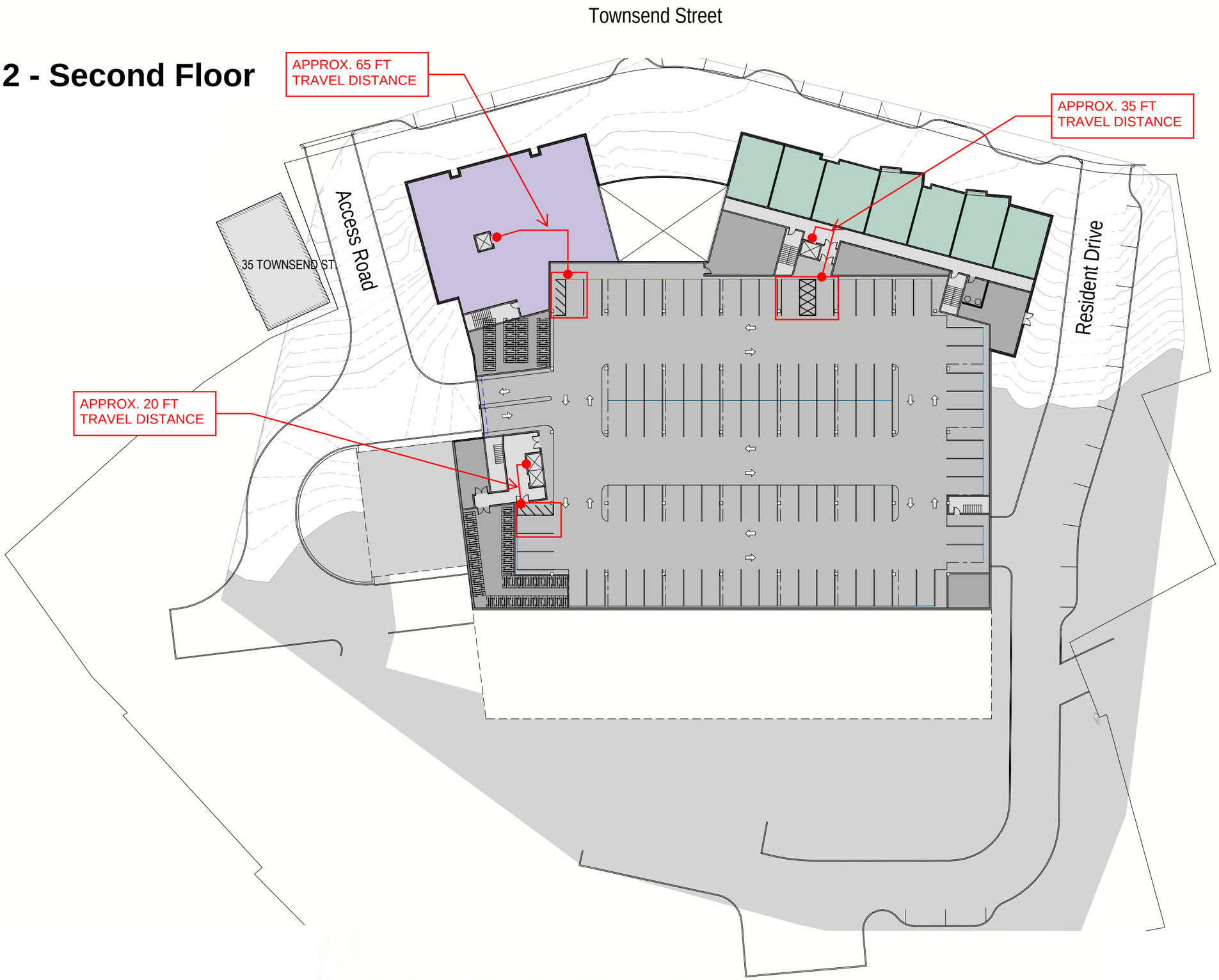
Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682

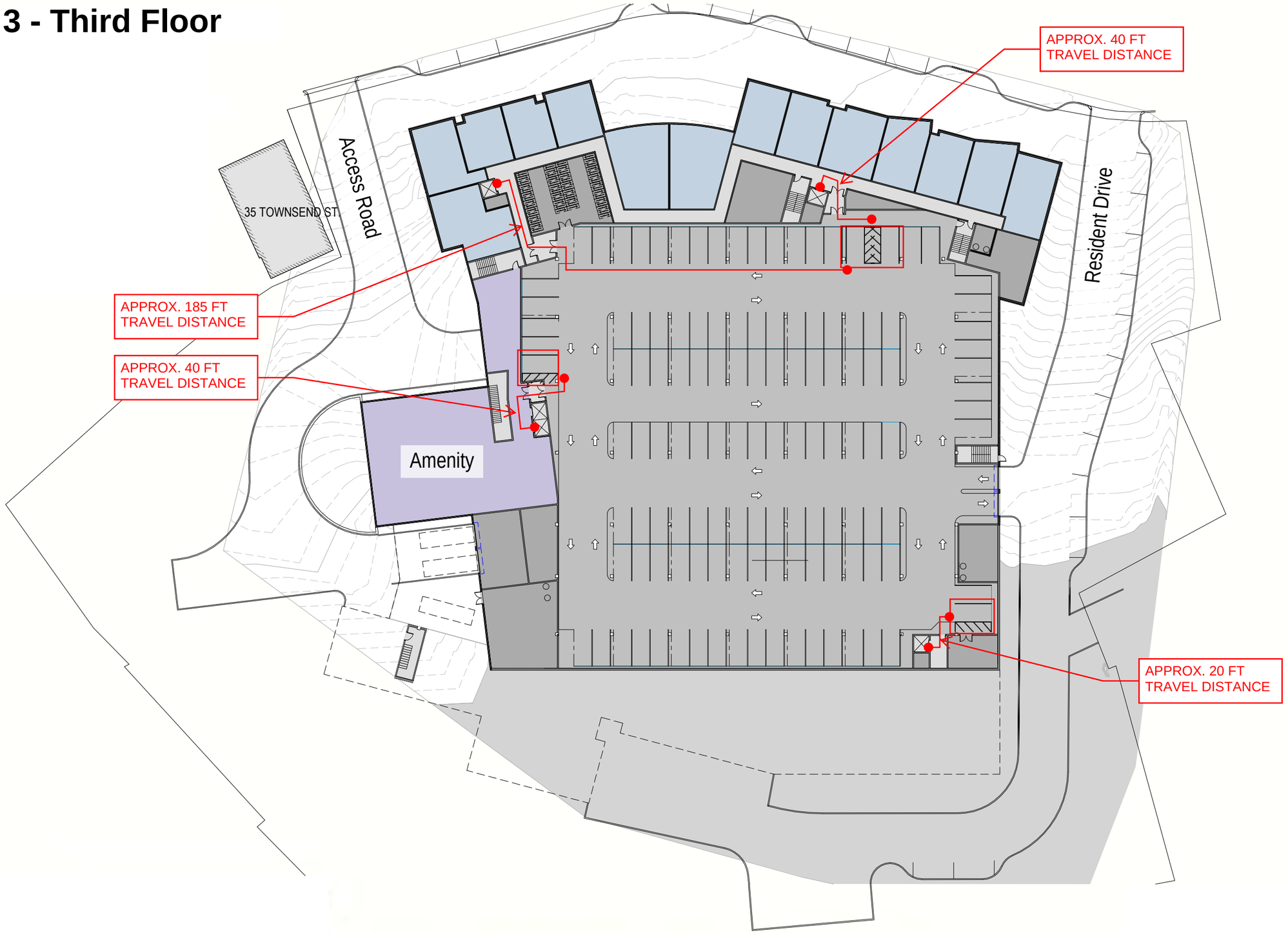
1 - First Floor



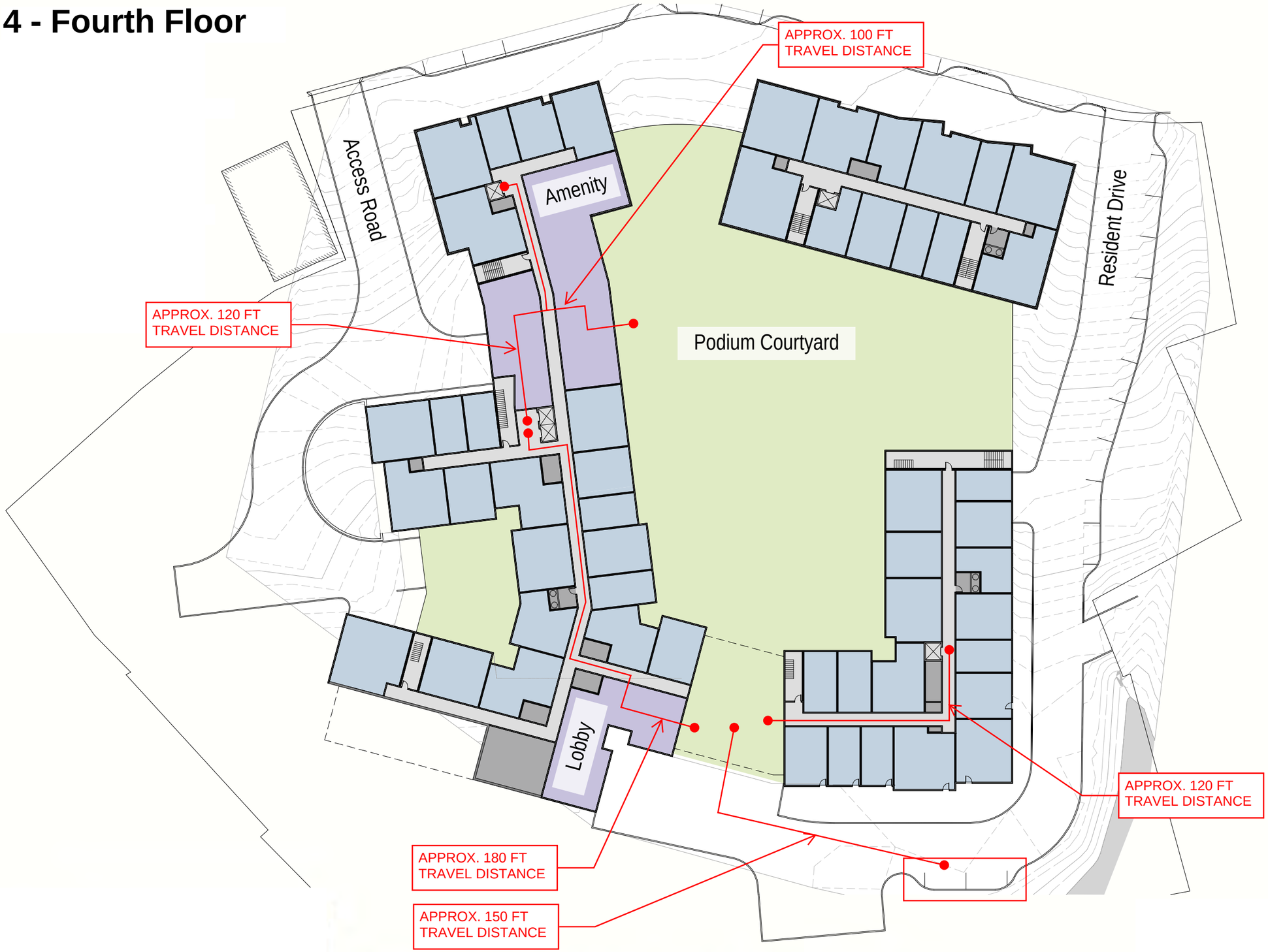
2 - Second Floor



3 - Third Floor



4 - Fourth Floor



8 - Eighth Floor