275 Albany Street

Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

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

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

Submitted by:
BH Normandy 275 Albany Street, LLC
c/o Normandy Real Estate Partners
200 Clarendon Street
Boston, Massachusetts 02116

In Association with:
ADD Inc
The Walsh Company
Mel Shuman Law
Howard/Stein-Hudson Associates
Nitsch Engineering
WSP Flack + Kurtz
LFR, Inc.

January 15, 2010

Epsilon
ASSOCIATES INC.

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Section 1.0

General Information

1.0 GENERAL INFORMATION

1.1 Introduction

BH Normandy 275 Albany Street LLC (the Proponent) proposes to construct a hotel development on the 1.27-acre parcel at 275 Albany Street, between Traveler and East Berkeley Streets in Boston's South End. The project site, which was formerly used as a parking lot by the Teradyne Corporation, is currently vacant. The proposed project will include two hotels: a 16-story select service hotel, which will have a restaurant on its first floor; and a 9-story extended-stay hotel. The hotels together will have approximately 408 rooms. While the split between the two types of hotels has not been finally determined, current plans anticipate approximately 210 rooms in the select service hotel and approximately 198 rooms in the extended-stay hotel. The select-service hotel will include an approximately 4,000 square-foot (approximately 267-seat) restaurant on its first floor. A 3-level, above-ground parking garage with approximately 137 parking spaces will serve both hotels.

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

1.2 Development Team

The Proponent is a limited liability corporation (LLC) formed by Blue Hawk Investment LLC (Blue Hawk) and Normandy Real Estate Partners (Normandy). Blue Hawk is a private real estate investment/development firm based in Newton, MA. The firm and its affiliates focus on mixed-use developments including, residential, hospitality and office programs. Blue Hawk, its principals and affiliated entities are responsible for the development and investment of over $550 million of projects in New England.

Normandy is one of the nation's leading real estate private equity firms, owning and operating one of the largest diversified real estate portfolios in the Northeast/Mid-Atlantic region. Over the past decade, Normandy has acquired or developed over 25 million square feet of commercial space, 2,500 residential units, 1,100 hotel rooms, and numerous land development sites. In April 2009, Normandy purchased the John Hancock Tower in downtown Boston. Normandy's investments are acquired and managed through a series of fully-discretionary investment funds, backed by some of the world's most prestigious institutional investors.

The Proponent has enlisted a team of planners, engineers, attorneys, and consultants to assist them with project development. The Project Team is listed below...

Proponent:	BH Normandy 275 Albany Street LLC c/o Normandy Real Estate Partners 200 Clarendon Street Boston, MA 02116 Justin D. Krebs (617) 275-0100 Paul A. Ferreira (617) 663-5768
Architect:	ADD Inc. 210 Main Street Cambridge, MA 02139 (617) 234-3100 James Gray, Principal Tamara Roy
Permitting Consultant:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Peggy Briggs David Hewett
Transportation and Parking Consultant:	Howard / Stein – Hudson Associates 38 Chauncy Street, 9th Floor Boston, MA 02111 (617) 482-7800 Guy Busa, P.E. Elizabeth Peart, P.E.
Legal Counsel	Mel Shuman Law 189 Eliot Street Brookline, MA 02467 (617) 487-5228 Melvin R. Shuman

Geotechnical Consultant:	LFR, Inc. 194 Forbes Road Braintree, Massachusetts 02184 (781) 356-7300 Allen Walker Rick Stromberg
Civil Engineer:	Nitsch Engineering 186 Lincoln Street Boston, MA 02111 (617) 338-0063 John Schmid, P.E.
MEP Engineer:	WSP Flack + Kurtz 88 Black Falcon Avenue Suite 210 Boston, MA 02210 617.210.1600 Michael Brown
Construction Manager:	The Walsh Company 99 Summer Street Boston, MA 02210 (617) 443-0978 Kevin Daly

1.3 Legal Information

1.3.1 Legal Judgments or Actions Pending Concerning the Project

The Proponent is not aware of any legal judgments in effect or legal actions pending that would prevent the Proponent from undertaking the Project.

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

None of the Project property is in tax arrears to the City of Boston.

1.3.3 Evidence of Site Control/Nature of Public Easements

The Proponent acquired fee simple title to the property known as 275 Albany Street, Boston, Massachusetts (the "site") in December 2006. There are no public easements encumbering the site.

1.4 Project Site

The Project site is approximately 1.27 acres in size (55,485 square feet) and is bounded on three sides by roadways: Albany Street to the east, Traveler Street to the north, and East Berkeley Street to the south (See Figures 1-1 and 1-2). To the west are the Planet Self Storage Warehouse and a five-story brick building that houses a restaurant (the *Medieval Manor*) and several small offices. Further west is Harrison Avenue. The portion of Albany Street directly adjacent to the Project site is within the Massachusetts Highway Department (MassHighway) state highway layout. Directly to the east of Albany Street is the elevated Southeast Expressway (I-93), which is approximately 25 to 30 feet above grade. The Project site was formerly used as parking lot, but is now vacant. There are no structures on the site. Figure 1-3 is the ALTA Survey of the Project site. The metes and bounds description is included in Appendix A.

The Project area encompasses the site as well as the public sidewalks directly adjacent to the site on Albany, East Berkeley, and Traveler Streets, which, subject to public approvals, will be upgraded and improved, including the installation of street trees.

1.4.1 Current Zoning

The Project is located within (i) the South End Neighborhood District, as established by Article 64 of the Boston Zoning Code (Zoning Code), (ii) the Restricted Parking Overlay District established by Section 3-1A[c] of the Zoning Code, and (iii) the Groundwater Conservation Overlay District as governed by Article 32 of the Zoning Code, as amended. Figure 1-4 identifies the Project site on the City Zoning Map.

The Project is within a designated Economic Development Area of the South End Neighborhood District, or areas which were created to encourage the creation of job opportunities, including retail and commercial uses. The proposed hotel use is allowed as of right at the site.

The highest portion of the Project will be the 16-floor select-service hotel which will be 199'-8" feet high, including the mechanical penthouse. The proposed total square gross square footage (based on the Zoning Code) is 252,935 square feet, and the Project's floor area ratio (FAR) will be approximately 4.56. The Project will require relief from the provisions the Code for both height and FAR. Since parking serving a hotel use is a conditional use in the Restricted Parking District, additional zoning relief will be required for the parking use. In addition, further zoning relief will be required for construction of the new building because any significant construction in the Groundwater Conservation Overlay District is treated as a conditional use under Article 32.

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275 Albany Street   Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1

USGS Locus Map

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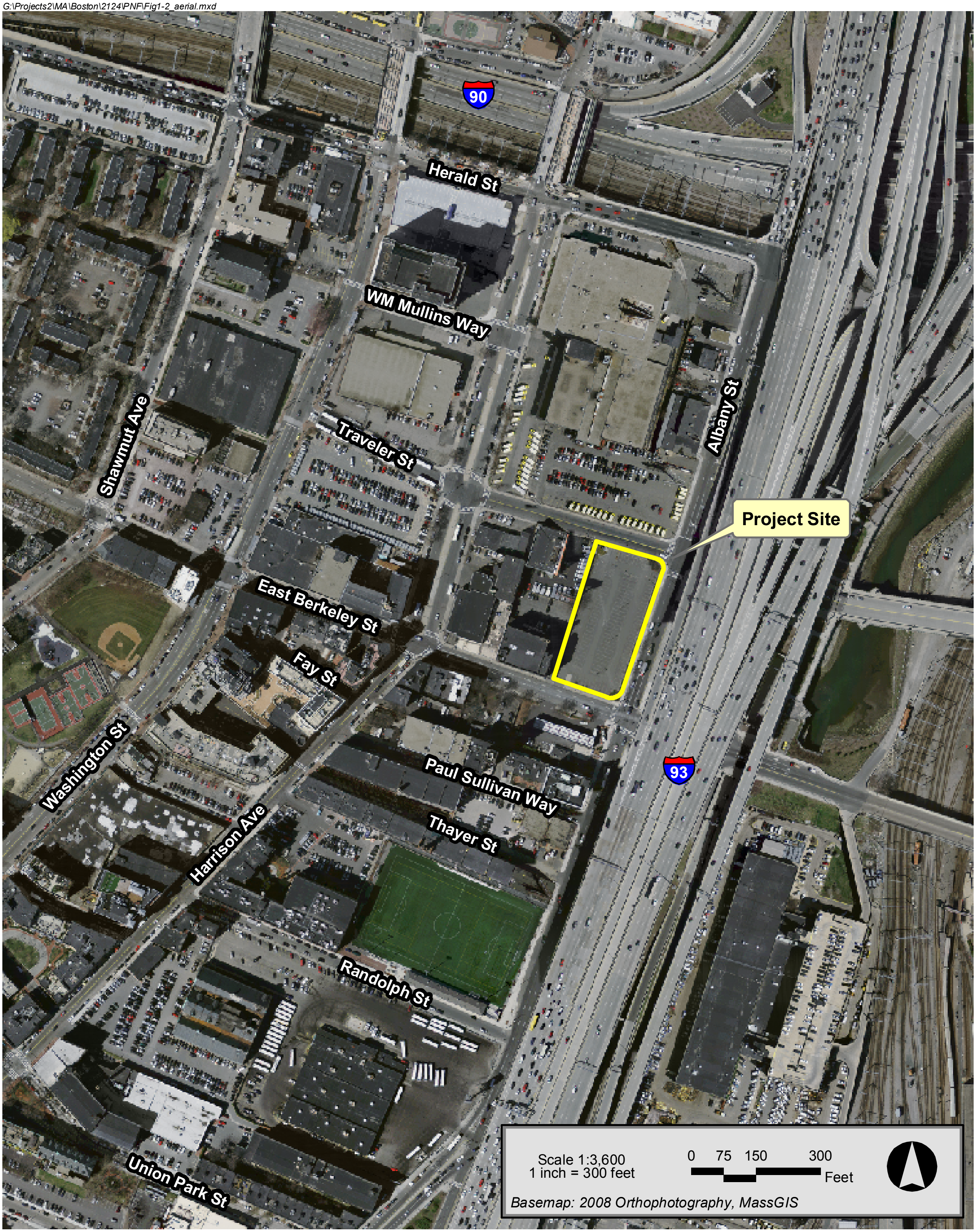
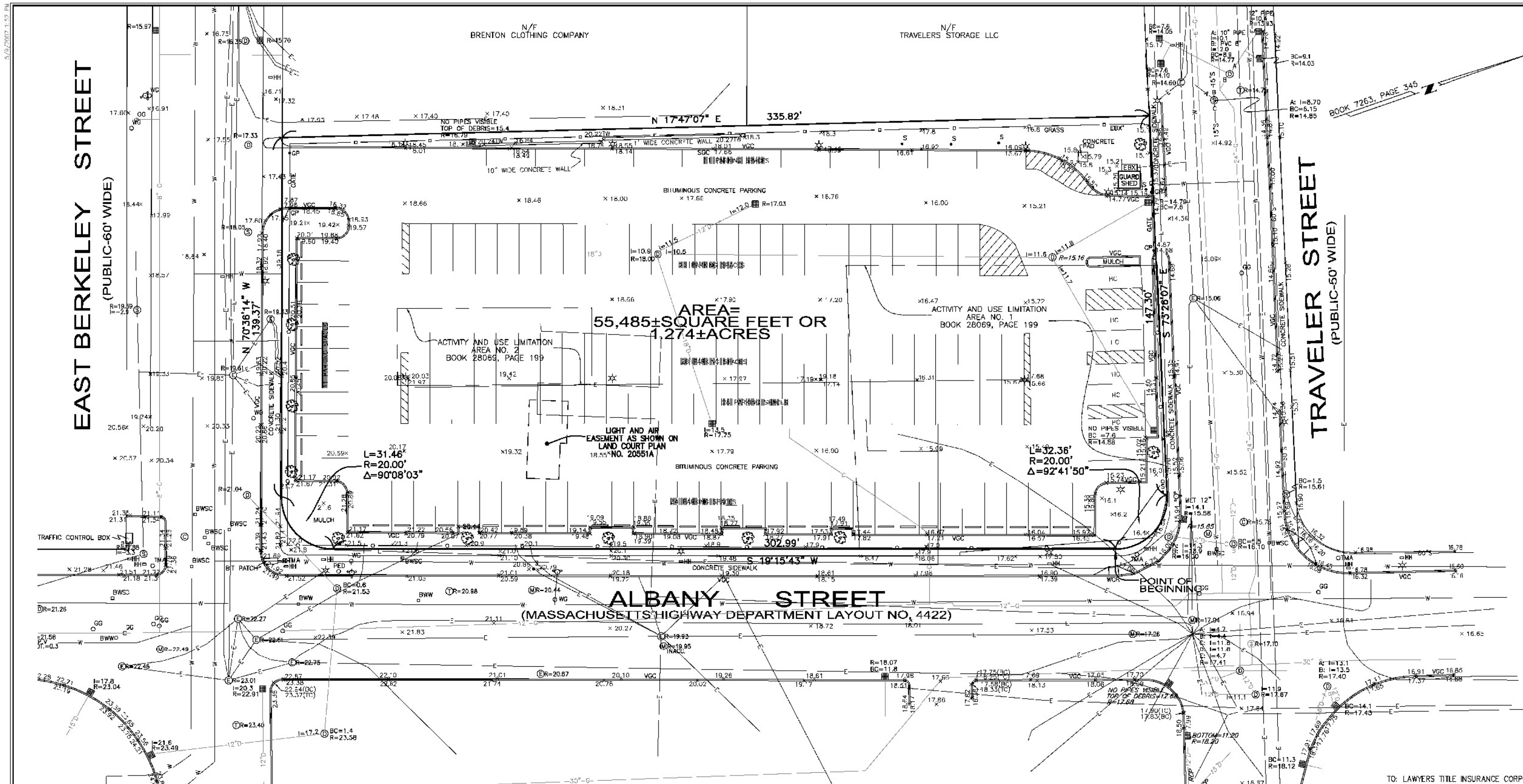


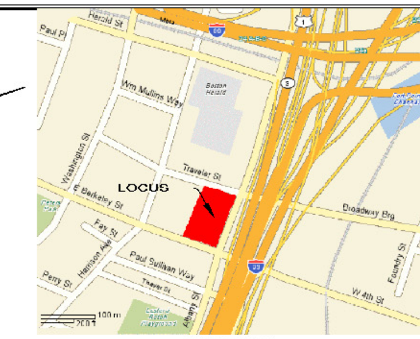
275 Albany Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-2

Aerial Locus Map





LOCUS MAP
NOT TO SCALE

REFERENCES:

SUFFOLK COUNTY REGISTRY OF DEEDS:

BOOK 7263, PAGE 345
BOOK 9758, PAGE 122

MASSACHUSETTS LAND COURT:

LAND COURT PLAN NO. 20551A

CITY OF BOSTON ENGINEERING DEPARTMENT:

L-308
L-625
L-8606
L-8764
FIELD BOOK 585, PAGES 28-29
FIELD BOOK 665, PAGES 94-97
FIELD BOOK 679, PAGES 34-35
FIELD BOOK 704, PAGES 18-19

A PLAN ENTITLED "STREET LINE MAP, SOUTH END PROJECT R-56, BOSTON REDEVELOPMENT AUTHORITY", PREPARED BY YUNITS ENGINEERING AND DATED AUGUST 26, 1968.

LEGAL DESCRIPTION:

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS, AS SHOWN ON A TAKING PLAN RECORDED IN THE SUFFOLK COUNTY REGISTRY OF DEEDS IN BOOK 7263, PAGE 345 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERLY SIDELINE OF ALBANY STREET, THENCE RUNNING S19°15'43"W, BY SAID WESTERLY LINE OF ALBANY STREET, A DISTANCE OF 302.99 FEET TO A POINT OF CURVATURE;

THENCE BY SAID WESTERLY LINE OF ALBANY STREET AND THE NORTHERLY LINE OF EAST BERKELEY STREET BY A CURVE TO THE RIGHT, HAVING A RADIUS OF 20.00 FEET AND AN ARC LENGTH OF 31.46 FEET TO A POINT OF TANGENCY;

THENCE N70°36'14"W, BY SAID NORTHERLY LINE OF EAST BERKELEY STREET, A DISTANCE OF 139.37 FEET TO A POINT;

THENCE N17°47'07"E, A DISTANCE OF 335.82 FEET TO A POINT ON THE SOUTHERLY SIDELINE OF TRAVELER STREET;

THENCE S73°26'07"E, BY SAID SOUTHERLY LINE OF TRAVELER STREET, A DISTANCE OF 147.30 FEET TO A POINT OF CURVATURE;

THENCE BY SAID SOUTHERLY LINE OF TRAVELER STREET AND THE WESTERLY LINE OF ALBANY STREET, BY A CURVE TO THE RIGHT, HAVING A RADIUS OF 20.00 FEET AND AN ARC LENGTH OF 32.36 FEET TO THE POINT OF BEGINNING.

CONTAINING APPROXIMATELY 55,485 SQUARE FEET OF LAND.

TO: LAWYERS TITLE INSURANCE CORPORATION
EDWARDS ANGELL PALMER & DODGE LLP
BH NORMANDY 275 ALBANY STREET LLC

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS", JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND NSPS IN 1999, AND INCLUDES ITEMS 2, 3, 4, 5, 8, 9, 10, 11(B), 13, 14, AND 15 OF TABLE A THEREOF. PURSUANT TO THE ACCURACY STANDARDS ADOPTED BY ALTA, NSPS, AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT THE MEASUREMENTS WERE MADE IN ACCORDANCE WITH THE "MINIMUM ANGLE, DISTANCE, AND CLOSURE REQUIREMENTS WHICH CONTROL LAND BOUNDARIES FOR ALTA/ACSM LAND TITLE SURVEYS."

I FURTHER CERTIFY THAT THE PARCELS SHOWN HEREON LIE WITHIN A ZONE "C" (AREA OF MINIMAL FLOODING) AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR THE CITY OF BOSTON, MASSACHUSETTS.
COMMUNITY PANEL NO. 250286 0010C, EFFECTIVE DATE: APRIL 1, 1982

GRAPHIC SCALE

20 10 0 20 40 60

SCALE: 1"=20'

Nitsch Engineering

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- Land Surveying
- Transportation Engineering
- Planning
- GIS Services

JOB #	6388
FILE:	6388_ALTA1.dwg
SCALE:	1"=20'
DATE:	APRIL 18, 2007
PROJECT MANAGER:	PRL
FIELD BOOK:	392
DRAFTED BY:	PRL
CHECKED BY:	PSL

REV.	COMMENTS	DATE
	REVISIONS	

ALTA/ACSM LAND TITLE SURVEY
275 ALBANY STREET
BOSTON, MASSACHUSETTS

PREPARED FOR:
BLUE HAWK INVESTMENTS, LLC
275 GROVE STREET, SUITE 2-400, NEWTON, MASSACHUSETTS 02466

SHEET:
S-1
OF REV.

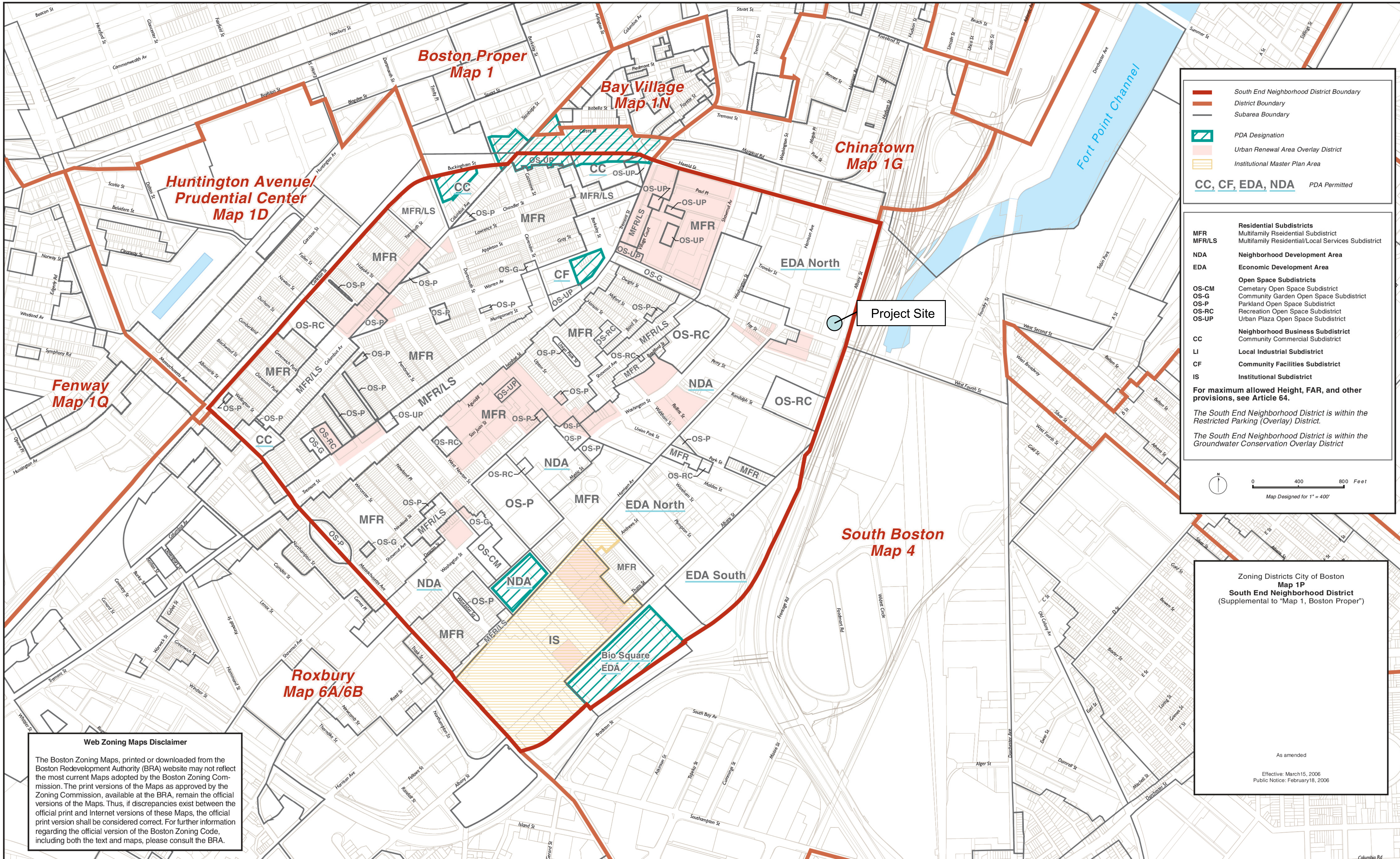


Figure 1-4

Zoning Map

The Property is within an area of the South End Neighborhood District in which Planned Development Areas (PDA's) are expressly permitted. If the Proponent decides to seek PDA designation for the Project site, the proposed PDA Plan that would govern development of the Project for zoning purposes will be submitted under separate cover for public comment and hearing and for review and approval by the BRA and the Boston Zoning Commission as part of the public review process required under Article 80C of the Zoning Code.

1.5 Project Benefits

Significant public benefits and amenities will be realized as a result of the Project, and include the following:

- An increase in the supply of affordable hotel rooms to serve Boston's events and tourist travelers, particularly those using the Boston Convention and Exhibition Center;

- An active pedestrian environment fostered by use of the hotel, nighttime lighting and signage, a restaurant, improved sidewalks, street trees, and attractive building facades,

- Increased safety and vitality of the area as a result of the activated streetscape and public improvements;

- An increase in property taxes from approximately $30,000 currently generated annually for the existing surface parking lots, to approximately $2M annually for the proposed hotels;

- An approximately $1.2M contribution to the Neighborhood Housing trust that can be used to support affordable housing and an approximately $245,000 contribution to the Neighborhood Jobs Trust;

- Construction of the proposed Project will employ an estimated work force ranging from approximately 50 workers during foundation work to up to 200 workers at the peak of construction;

- The Project will employ approximately 200 employees (full-time equivalents) in management, operations, customer service, retail, and food service functions; and

- A new LEED certifiable "green" building.

1.6 Permitting

1.6.1 Article 80 Review Process and Zoning

The proposed Project is subject to review by the Boston Redevelopment Authority (BRA) pursuant to Article 80B, Large Project Review of the Boston Zoning Code. If the Proponent decides to seek PDA designation for the Project site, the Project will also be reviewed under Article 80C, Planned Development Area Review. If the Proponent decides not to seek PDA designation for the Project site, the Project will require variances and conditional use permits from the Board of Appeal under current provisions of the Zoning Code as described in Section 1.4.1 above or a rezoning of the Project area.

1.6.2 Boston Landmarks Commission; South End Landmarks District Commission

The proposed Project is located in the Protection Area of the South End Landmark District. Projects in the Protection Area are subject to limited review by the South End Landmarks District Commission relating to land coverage, height, landscape and topography.

1.6.3 State Reviews

The Project is subject to review under the Massachusetts Environmental Policy Act (MEPA), and the Proponent plans to submit an Environmental Notification Form (ENF) to the Executive Office of Energy and Environmental Affairs (EEA) MEPA Office to initiate MEPA review. The Project exceeds the MEPA transportation review threshold at 310 CMR 11.03(6)(a)6 (Generation of 3,000 or more new average daily trips (adt) on roadways providing access to a single location). Although this threshold is exceeded when unadjusted Institute of Transportation Engineers (ITE) trip generation numbers for vehicle trips associated with the proposed hotel are used, it is expected that many hotel guests will be out-of-town visitors associated with conventions and shows at the nearby Boston Convention and Exhibition Center (BCEC). As such, they are less likely to arrive by private automobile, and likely to generate fewer average daily trips (adt) than the ITE standard hotel guest. The adjusted adt number associated with the Project (2,454 trips) is well below the MEPA EIR review standard. The adjusted adt calculation is the standard methodology used by the Boston Transportation Department.

The proposed Project is also subject to review by the Massachusetts Historical Commission (MHC) to determine if it will have an adverse affect on historic resources. The ENF submitted to the MEPA Office will be submitted to MHC to trigger MHC review.

1.6.4 Anticipated Permits

Table 1-1 on the following page lists the federal, state and local permits and approvals the Proponent expects will be required for the Project. Given the preliminary nature of Project design, this list is subject to change.

Table 1-1 Anticipated Permits and Approvals

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

1.7 Public Participation/Community Outreach

The Proponent is committed to maintaining an open dialogue with all interested parties during the public review of the Project. Thus far, the Proponent has met with the Old Dover Neighborhood Association and the Washington Gateway neighborhood community groups to give them an overview of the Project and elicit feedback, which was generally very positive. The Proponent intends in the near future to present the Project to the *Harrison Albany Strategic Plan* Study Advisory Group to introduce them to the Project and get their feedback.

The Article 80 Process will also offer the opportunity for public review and comment. The Proponent expects at least two community meetings in addition to a City Agency Scoping Meeting and at least one Boston Civic Design Committee meeting which will also be open to the public. In addition, the zoning relief required for the project will require public hearings before some combination of the BRA, the Boston Zoning Commission and the Board of Appeal. A public Consultation Session will also be held as part of the MEPA review process.

Section 2.0

Project Description

2.0 PROJECT DESCRIPTION

This chapter describes the proposed Project, including its site context, the proposed program, and its consistency with planning.

2.1 Project Site and Context

As described in Section 1.4, the Project site, located at 275 Albany Street, is an unused parking lot, approximately 1.27 acres in size (55,485 square feet). In addition to the Project property itself, the Project site also includes the public sidewalks directly adjacent to the site on Albany, East Berkeley, and Traveler Streets, which, subject to public approvals, will be improved with street trees, as well as other potential improvements such as granite pavers. Figure 1-3 is the ALTA Survey of the Project site.

The Project is situated in the southeast portion of the South End neighborhood of Boston, specifically within the Harrison-Albany Street Corridor. The Harrison-Albany Street Corridor encompasses a variety of land use types including light industrial, wholesale distribution, medical, commercial, and some residential. There are also a number of underutilized and vacant parcels, including the proposed Project site itself that provide the opportunity for new development.

The area north of the Project site on the opposite side of Traveler Street is dominated by the Boston Herald headquarters property which occupies almost the entire block between Traveler Street and Herald Street. Beyond Herald Street are rail lines and the Massachusetts Turnpike (I-90), which is approximately 900 feet north of the Project site.

Development to the east is separated from the Project site by Albany Street, the elevated Southeast Expressway, the southern tip of the Fort Point Channel, and the many railroad tracks leading to South Station, all of which combine to separate the Project site from other development to the east both physically and perceptually. Other than the Boston Sanitation Office, which abuts the east side of the Expressway, the nearest development to the east is the Macallen Condominiums at the corner of West 4th Street and Foundry Street, approximately 1,100 feet away from the Project site.

A Mobil gas station occupies the corner of Albany Street and East Berkeley Street opposite the Project site. Otherwise, however, the area on the opposite side of East Berkeley Street is dominated by the Pine Street Inn homeless shelter, which occupies almost the entire block between East Berkeley Street and Paul Sullivan Way. The Pine Street Inn provides a range of services, including permanent supportive housing, job training, emergency shelter and street outreach. Farther to the south, the area between Paul Sullivan Way and Thayer Street is occupied by refurbished former industrial buildings which house retail shops, art galleries and studios, as well as residential space. In the next block south, between Thayer Street and Randolph Street, is the Rotch Playground and a mixed use building at the corner of Harrison and Randolph. Much of the block on the south side of Randolph Street is taken up by the MBTA bus maintenance yard.

The proposed Project site will occupy only about half of the block surrounded by Traveler Street, Albany Street, East Berkeley Street, and Harrison Avenue. The area west of the Project site within the block is occupied by the 5-story building on East Berkeley Street that houses the Medieval Manor Restaurant and a number of small offices, Quinzani's Bakery, the Ho Kong Bean Sprout Company, and the large Planet Self Storage Building. Farther west, between Harrison Avenue and Washington Street, and north of Traveler Street is the 11-story office building 1000 Washington Street (formerly Teradyne) with its associated parking garage and the Graybar Electric Building. South of Traveler Street is a parking lot leased by Tufts University Medical Center and a 6-story mixed use building. West of Harrison and south of East Berkeley, the area is predominantly composed of mixed use (retail and residential), low-rise (approximately 5-story) buildings.

2.2 Project Description

The proposed Project comprises two hotels joined by a common aboveground parking garage, loading dock, roof terrace, and swimming pool. One hotel is envisioned to be a "select-service" hotel and the other an extended-stay hotel.

The select-service hotel will occupy the northern end of the site and its front door will be on Traveler Street. The select–service hotel will have approximately 210 rooms and will be 16 stories high (not including the mechanical penthouse). Select-service hotels provide a less costly alternative for guests compared to a full-service hotel and are aimed at both business and leisure travelers. The select-service hotel includes an approximately 4,000-square foot restaurant on the ground floor, occupying the corner of the building at the Albany and Traveler Street intersection, where it will help to enliven the street environment. The hotel will feature a swimming pool and a roof terrace on the second level.

The extended-stay hotel will have an L-shaped footprint and will occupy the southern end of the site. Its front door will be on East Berkeley Street. The extended-stay hotel will have approximately 198 rooms and will be nine stories high (not including the mechanical penthouse) on the East Berkeley side and seven stories high on the Albany Street side. Extended-stay hotels are designed for the business traveler who generally plans to stay a week or more. The proposed hotel will be well positioned to serve visitors and exhibitors at the Boston Convention and Exhibition Center (BCEC) (which is about a 10-minute cab ride away) who often require longer stays to attend conventions.

The two hotels will share a 3-level, approximately 137-space, aboveground garage that will be situated between the two hotels to the rear (*i.e.*, west) of the site. Access to the garage will be provided from both Traveler and East Berkeley Streets. Egress from the garage will be onto Traveler Street. Loading docks for the hotels will be interior to the buildings and accessed directly off of Albany Street. Chapter 3 provides a complete description of traffic operations.

The overall height of the buildings (based upon the Zoning Code) as currently envisioned will be 199′-8″ feet (above the mean average grade of the site) for the select-service hotel, which includes the mechanical penthouse that is anticipated to occupy greater than one-third the area of the roof, and 115′-4″ for the extended stay hotel which does not include the mechanical penthouse because it is not expected to occupy greater than one-third of the roof area. The parking structure will be approximately 27 feet high.

The approximate total gross floor area for the select-service hotel will be 125,820 square feet and 116,815 for the extended-stay. In addition, there will be approximately 10,300 square feet of complementary use, consisting of approximately 8,300 square feet on the 16th floor of the select-service hotel, and approximately 2,000 square feet on the second floor, which will be used for a swimming pool. The gross floor area of the parking will be approximately 64,665 square feet, and the gross floor area of the mechanical space will be approximately 14,685 square feet. Thus the total gross square footage for the entire Project will be 332,285 square feet. For purposes of calculating the Project's Floor Area Ratio (FAR) under the Boston Zoning Code, which excludes floor space for parking required under the Zoning Code and mechanical space, the total gross floor area will be 252,935. Given the lot size of 55,485 square feet, the FAR for the Project will be 4.56. Table 2-1 on the following page summarizes this information.

Figure 2-1 shows the proposed site plan for the Project. Figures 2-2 through 2-5 are floor plans; Figure 2-6 is a sections drawing; and Figures 2-7 and 2-8 are computer renderings. All Chapter 2 Figures are included at the end of the chapter.

Table 2-1 Project Summary – Square Footage by Use and Floor

Total Site Area: 55,485 square feet (s.f.)						
Gross Area Select-Service Hotel: 125,820 s.f.						
Gross Area – Extended Stay Hotel: 116,815 s.f.						
Gross Area – Parking at Grade/Loading: 25,785 s.f.						
Parking Mezzanine: 19,440 s.f.						
Parking Second Floor: 19,440 s.f.						
Mechanical: 14,685 s.f.						
Total Gross Area: 332,285 s.f.						
Total Gross Area for FAR Calculation**: 252,935 s.f.						
Project FAR: 4.56						
** FAR, as determined by the Boston Zoning Code, excludes the floor area for parking and mechanical.						
Floor	Gross Area	Select-Service Hotel	Extended-Stay Hotel	Complementary Use	Parking and Loading	Mechanical and Storage
Penthouse	8,300					8,300
16	8,300			8,300		
15	8,300	8,300				
14	8,300	8,300				
13	8,300	8,300				
12	8,300	8,300				
11	8,300	8,300				
10	13,450	8,300				5,150
9	16,225	8,300	7,925			
8	16,225	8,300	7,925			
7	23,840	8,300	15,540			
6	23,840	8,300	15,540			
5	23,840	8,300	15,540			
4	23,840	8,300	15,540			
3	23,840	8,300	15,540			
2	45,280	8,300	15,540	2,000	19,440	
Mezzanine	19,440				19,440	
1 Ground	44,365	9,620	7,725		25,785	1,235
Totals	**332,285**	**125,820**	**116,815**	**10,300**	**64,665**	**14,685**

2.3 Consistency with Planning

This section discusses the Project in relation to various planning efforts that pertain to it.

2.3.1 Harrison-Albany Corridor Strategic Plan

The BRA is currently undertaking a planning study of the Harrison-Albany Street Corridor. The purpose of the *Harrison-Albany Corridor Strategic Plan* study, which began in early 2009, is to gauge economic conditions, business needs, and resident concerns and to advise City economic development, transportation, and urban design interventions. The study will result in a vision for the area, including potential zoning recommendations to encourage appropriate development. A study Advisory Group (AG), appointed by Mayor Menino, began meeting in April 2009. The Proponent intends to meet with the AG to present the Project to them and get their feedback regarding the Project's design.

2.3.2 Executive Order 385

Executive Order 385, "Planning for Growth" ("EO 385"), expressly seeks to promote sustainable economic development in the Commonwealth of Massachusetts. The proposed Project has been designed to meet the objective of EO 385 of promoting sustainable economic activity that protects natural resources.

The proposed Project will redevelop an underutilized, vacant urban site and create a vibrant development that will support the state and local economy. It will employ an estimated 200 full time employees. The proposed Project will rely entirely on existing infrastructure and is expected to have only minor impacts on the environment. The Proponent will implement mitigation measures to minimize, to the extent practicable, any unavoidable resource impacts.

2.3.3 Open Space Plan 2008-2012

The City of Boston's Parks Department current open space plan, *Open Space Plan 2008-2012*, reports that the South End has less open space acreage per capita than other parts of the City. This is compensated for to some extent, however, by a relatively large number of different facilities such as ball fields, courts, play lots and well landscaped small open residential squares. Parks nearby the Project site, *e.g.*, Rotch Playground, are reported to receive heavy usage.

The proposed Project is not expected to have any significant negative impact on open space. It will replace an underutilized vacant parcel with an attractive new development that will help enliven the public realm and streetscape in what is now a "gritty" area adjacent to the Southeast Expressway. The Project will not directly impact any open space and is unlikely to result in any significant increase in use of nearby parks. The Project includes both indoor recreational space as well as a terrace greenspace for guests. The Project will also add street trees along Albany Street to enhance the quality of the streetscape adjacent to the proposed hotels.

2.3.4 Consistency with Metropolitan Area Planning Council Planning

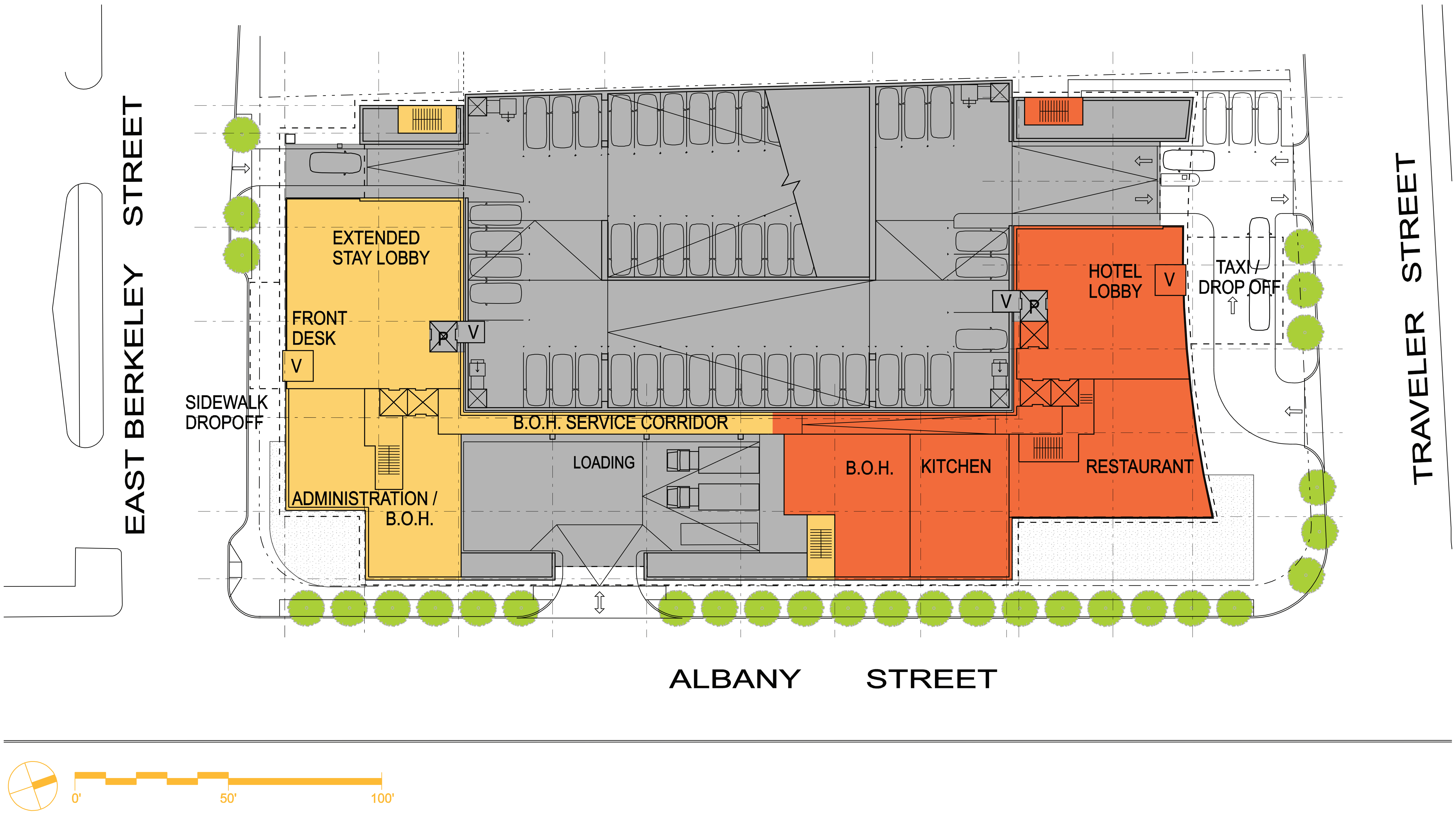
In May 2008, the Metropolitan Area Planning Council (MAPC), the regional planning agency representing Boston, adopted a new regional plan called "MetroFuture: Making A Greater Boston Region." MetroFuture calls for growth to be focused in city and town centers, near transit and infrastructure, and to preserve both environmental and financial resources that would be lost to sprawling, low density development.

The proposed Project is fully consistent with the goals of MetroFuture. The Project will redevelop an underutilized urban site that is well served by existing infrastructure systems. As discussed in Section 3.4, the Project's transportation demand management program will help to greatly reduce the Project's dependency on single occupancy vehicles. The Project will help support both the Boston and regional economy by helping to support functions at the BCEC and by providing a relatively low-cost hotel option for tourists.

275 ALBANY ST
IN THE SOUTH END

Figure 2-1
Site Plan

47
34
24
105



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REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

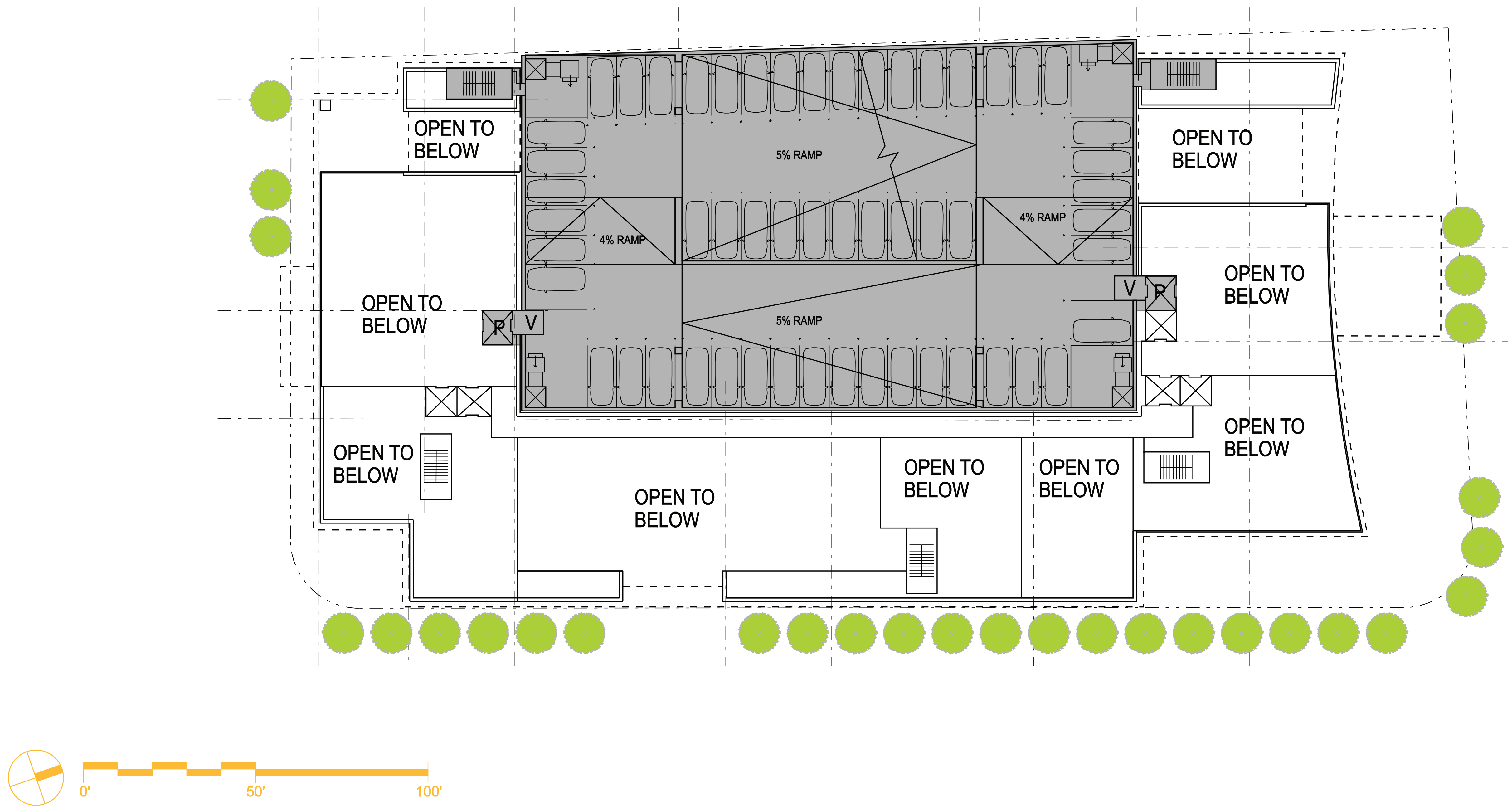
EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 2-2
Mezzanine Level Plan



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275 ALBANY ST
IN THE SOUTH END

Figure 2-3
Second Floor Plan

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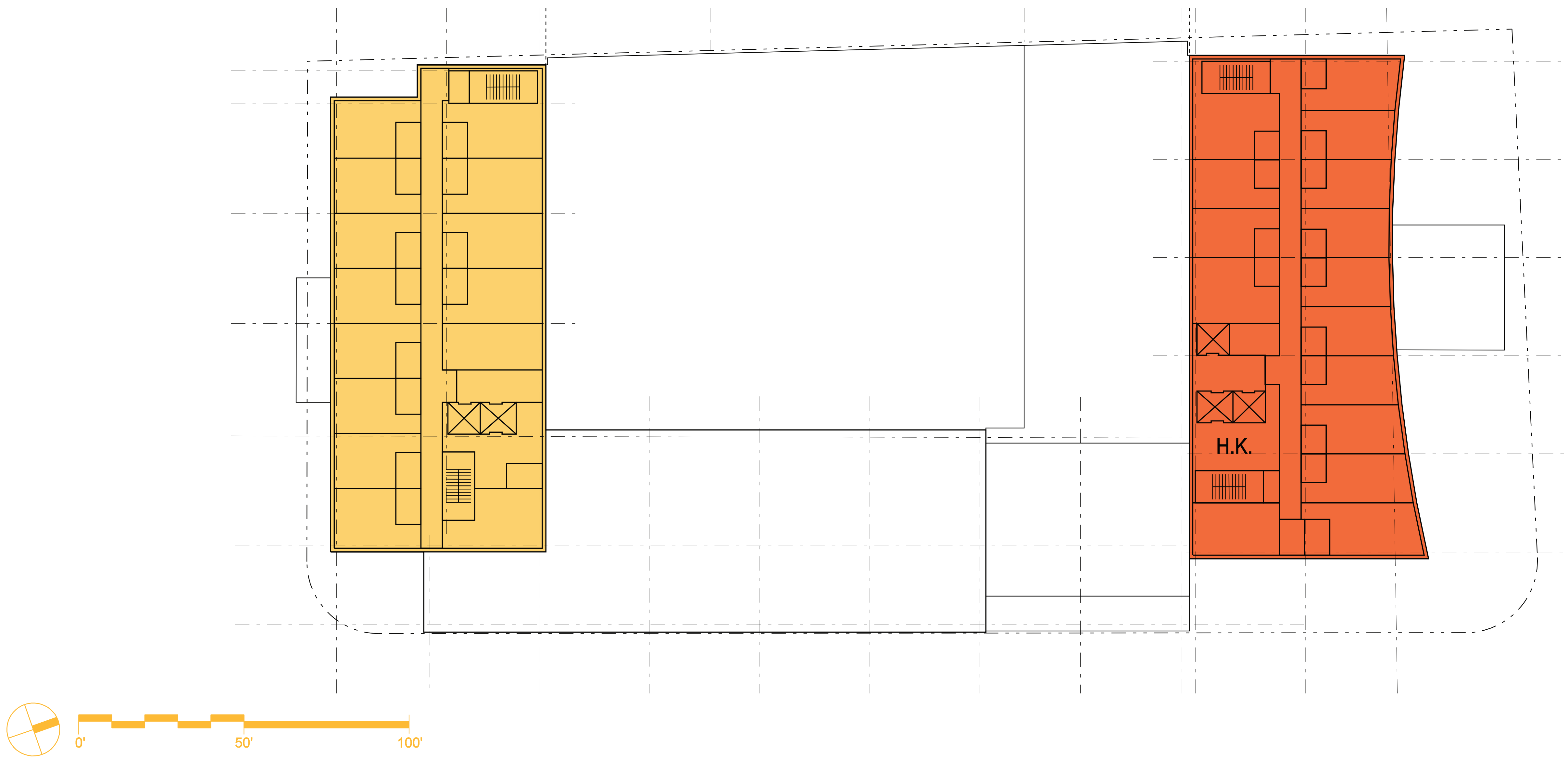
275 ALBANY ST
IN THE SOUTH END

Figure 2-4
Typical Floor Plan



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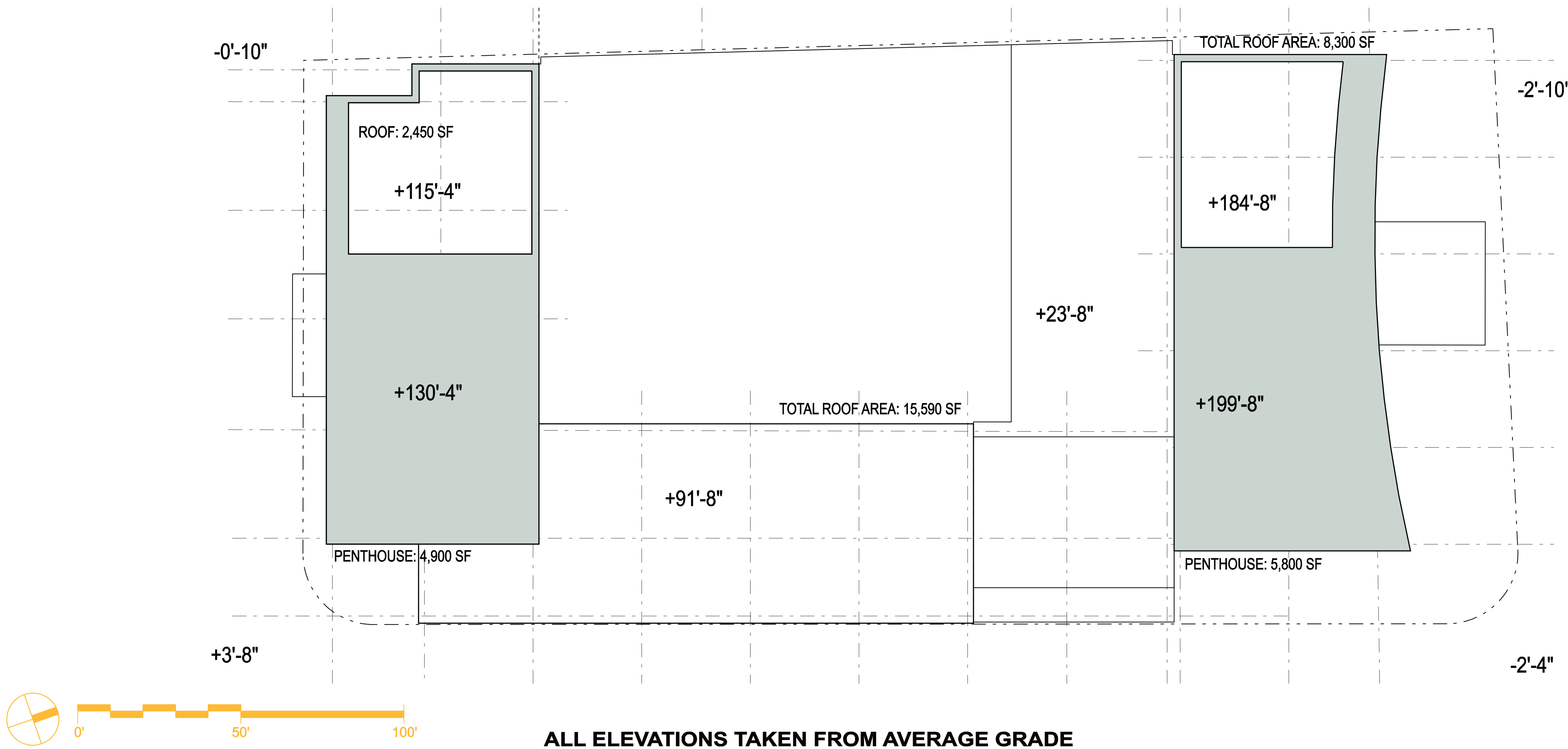
275 ALBANY ST
IN THE SOUTH END

Figure 2-5
Roof Plan



ALL ELEVATIONS TAKEN FROM AVERAGE GRADE

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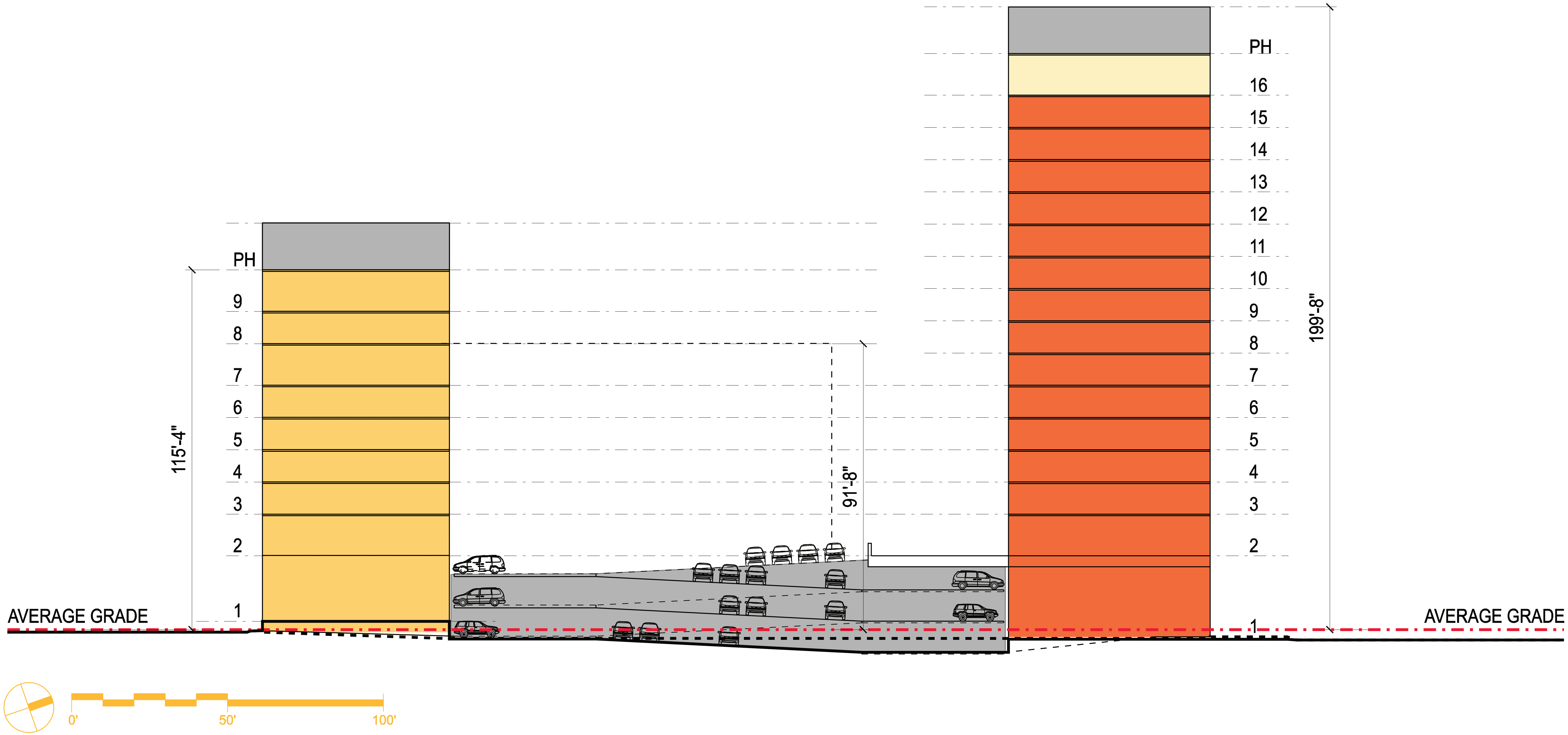

275 ALBANY ST
IN THE SOUTH END

Figure 2-6
Building Section

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275 ALBANY ST

IN THE SOUTH END

Figure 2-7
Photo Rendering
Looking North

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275 ALBANY ST
IN THE SOUTH END

Figure 2-8
Photo Rendering
Looking Southwest

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REAL ESTATE PARTNERS

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Section 3.0

Transportation

3.0 TRANSPORTATION

3.1 Introduction

3.1.1 Purpose of the Transportation Component

This section describes the transportation-related components of the Project site at 275 Albany Street. It adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Article 80 development review process. This transportation study includes an evaluation of existing site conditions, trip generation, parking demand, loading operations, transit services, and pedestrian activity.

3.1.2 Description of the Project

The Project site at 275 Albany Street is located in the South End neighborhood of Boston, as shown in **Figure 3-1.** The site is bounded by Albany Street to the east, East Berkeley Street to the south, buildings on private property to the west, and Traveler Street to the north.

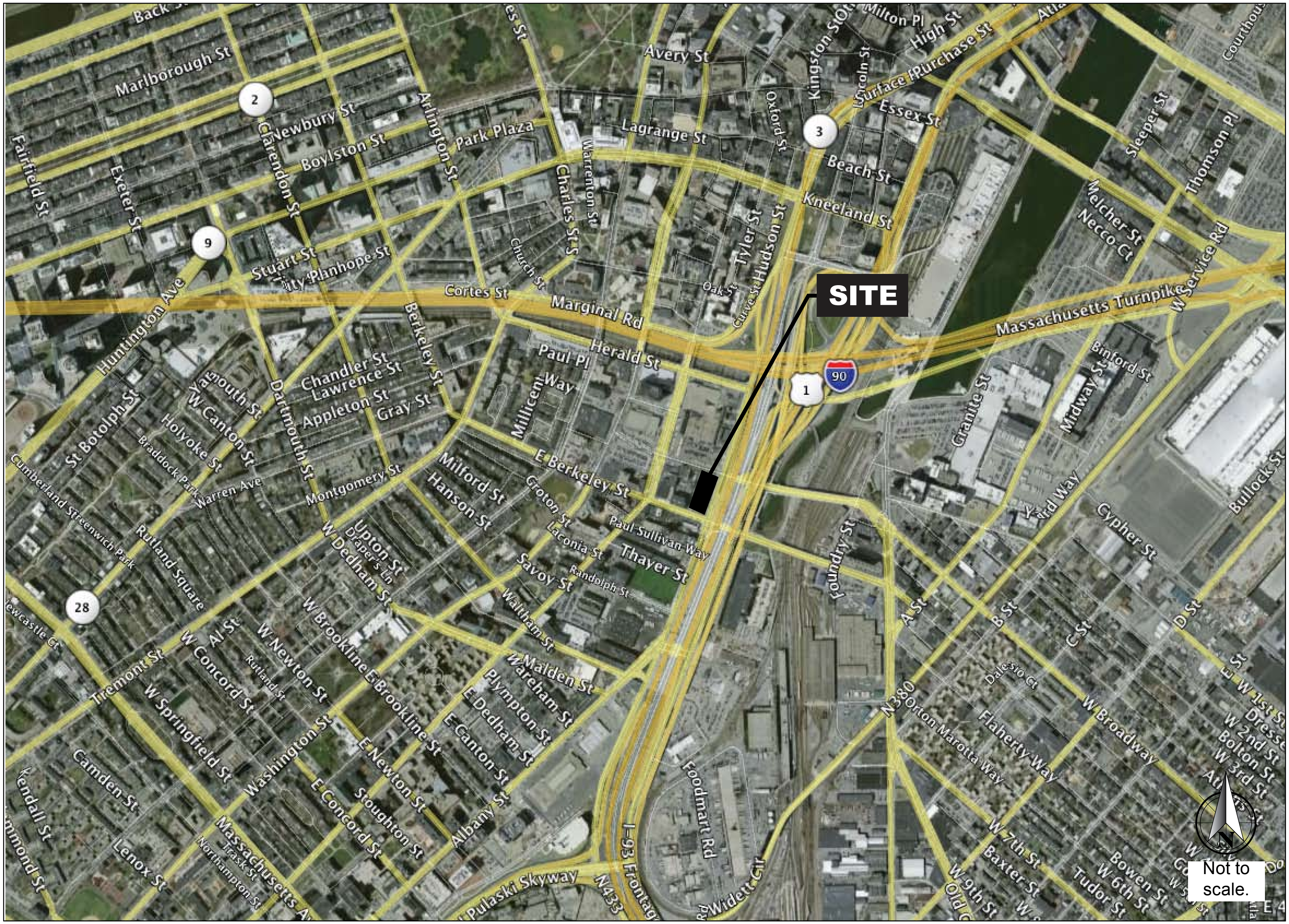
The Project site was formerly used as a 150-space parking lot for Teradyne employees and has been vacant since 2006, when Teradyne relocated out of Boston.

The Project includes two hotels and a shared parking garage. The extended-stay hotel, with 198 rooms, will be located on the southern side of the site along East Berkeley Street. The select-service hotel, with 210 rooms, will be located on the northern side of the site along Traveler Street. The hotels will share an on-site parking garage with 137 spaces.

Overall, the Project will contain about 325,000 square feet (sf), including the square footage allotted to the hotels, the garage, mechanical equipment, and storage. **Table 3-1** summarizes the development program for transportation purposes.

Table 3-1 Development Program for 275 Albany Street Transportation Analysis

Type of Use	Size
Extended-stay Hotel	198 rooms
Select-service Hotel	210 rooms
Parking	137 spaces



275 Albany Street   Boston, Massachusetts

Howard/Stein-Hudson Associates, Inc.
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Figure 3-1
Locus Map

3.1.3 Study Area

The study area is generally bounded by Dorchester Avenue to the east, East Berkeley Street to the south, Washington Street to the west, and Traveler Street to the north. It includes the following eight intersections, as shown in **Figure 3-2.**

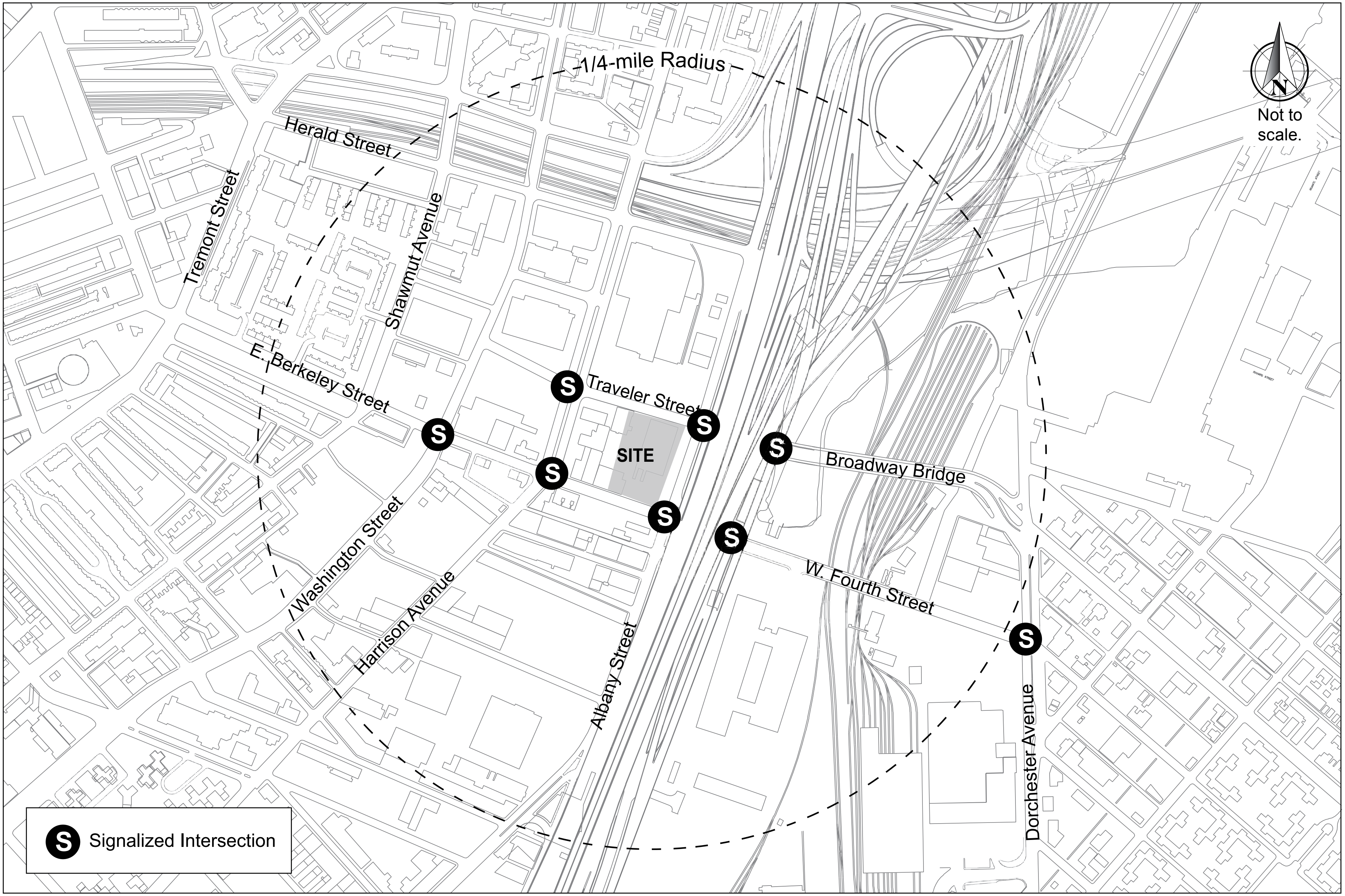
- Harrison Avenue/Traveler Street;
- Albany Street/Traveler Street;
- Broadway Bridge/Frontage Road/Traveler Street;
- East Berkeley Street/Washington Street;
- East Berkeley Street/Harrison Street;
- Albany Street/East Berkeley Street;
- Frontage Road/West Fourth Street/East Berkeley Street; and
- Dorchester Avenue/West Fourth Street.

The Harrison Avenue and Albany Street corridors have recently been the focus of an in-depth study by the City of Boston. The study area for the *Harrison-Albany Corridor Strategic Plan* is bounded by the Massachusetts Turnpike to the north, the Massachusetts Avenue Connector to the south, Massachusetts Avenue to the west, and generally Washington Street/Harrison Avenue to the west. The 275 Albany Street Project site lies within the New York Streets sub-area, so named because of the now mostly vanished network of streets named after towns in New York State. Although work on the Strategic Plan is still ongoing, the City and their study team have emphasized the need for a finer network of streets in the New York Streets sub-area to provide enhanced access and circulation. Presentations to the public have also emphasized the need to improve and beautify the pedestrian connections between the South End and South Boston, specifically along the West Fourth Street/East Berkeley Street corridor and the Broadway Bridge/ Traveler Street corridor.

3.1.4 Methodology

The study team conducted this transportation study and supporting analysis in accordance with BTD guidelines.

Section 3.2 includes an inventory of existing (2009) transportation conditions, with roadway capacities, parking, transit, and pedestrian conditions.



275 Albany Street   Boston, Massachusetts

Howard/Stein-Hudson Associates, Inc.
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Figure 3-2

Study Area Intersections

Section 3.3 evaluates future transportation conditions, including the impacts associated with the Project and other neighboring projects. Long-term impacts are evaluated for the year 2014, based on a five-year horizon from the existing year (2009). Expected roadway, parking, transit, pedestrian, and loading conditions are identified. No-Build Conditions (2014), which include general background growth and additional vehicular traffic associated with specific planned developments near the Project site, are presented in **Section 3.3.1.** Build Conditions (2014), which include specific travel demand forecasts for the Project, are presented in **Section 3.3.2.**

3.2 Existing Transportation Conditions

3.2.1 Existing Roadway Conditions

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

Albany Street, an extension of an urban minor arterial, runs north–south, providing access between downtown Boston and Eustis Street in Roxbury. Adjacent to the site, Albany Street is one-way southbound and generally has three travel lanes. North of the site near Kneeland Street, Albany Street interfaces with the regional highway system with an off-ramp to I-90 west and I-93 south. At Traveler Street, southbound Albany Street traffic can turn left and left again under the elevated I-93 mainline to access I-93 northbound. South of the site, near Union Park, Albany Street becomes two-way to its terminus at Eustis Street. Near the Project site, parking is not allowed along Albany Street. New sidewalks and curbs on Albany Street adjacent to the site were recently completed as part of Central Artery construction.

East Berkeley Street, an urban extension of a minor arterial, runs one-way westbound from Albany Street to Tremont Street. After crossing Tremont Street, this roadway becomes Berkeley Street and continues through the Back Bay to Storrow Drive. Adjacent to the site, two general travel lanes are provided. On-street parking is provided on the south side of the street, with peak-hour restrictions. A bus stop is located on the north side near the Project site. Sidewalks are provided on both sides of the street and are in good condition.

Traveler Street, a local street, provides east–west, two-way travel between Frontage Road and Harrison Avenue. At its intersection with Harrison Avenue, Traveler Street becomes one-way westbound to Washington Street. At the intersection of Traveler Street and Albany Street, eastbound Traveler Street traffic can proceed through toward the Broadway Bridge or turn right on Albany Street. On-street parking for buses is provided on both sides of Traveler Street to the west of Harrison Avenue. Sidewalks are considered to be in good condition.

Frontage Road is an urban arterial connecting I-93 to the local street network in the South End and South Boston. Frontage Road, which is one-way northbound, starts at Southampton Street and ends at the Broadway Bridge. Frontage Road varies in width from two to three lanes.

Broadway Bridge, located at the western end of Broadway, is an urban minor arterial running east–west from Traveler Street to City Point in South Boston. The bridge has two travel lanes in each direction. No parking is allowed on the bridge. East of the bridge, West Broadway continues into residential South Boston and is generally one to two travel lanes per direction, due to the variable width. Parking is generally allowed on both sides of the street throughout the study area. Outside the study area, at Dorchester Street, West Broadway becomes East Broadway.

Harrison Avenue, a minor urban arterial, runs in a north–south direction, providing access between downtown Boston and Warren Street in Roxbury. Harrison Avenue has four travel lanes divided by a raised median, two running in each direction near the site. South of East Berkeley Street, Harrison Avenue narrows to two lanes, one in each direction. Parking is allowed on both sides of the street. Sidewalks are provided on both sides of the street and considered to be in good condition near the site.

Washington Street is an urban arterial running north–south. The roadway was recently reconstructed as part of the MBTA Silver Line bus rapid transit project. To the south of East Berkeley Street, it has one shared, bus-only, right-turn lane running in each direction, with only a single through lane in each direction for general traffic. North of East Berkeley Street, Washington Street is one-way northbound, with a bus contra-flow lane for Silver Line southbound operations. On-street parking is provided.

West Fourth Street is a local street that traverses Fort Point Channel, connecting Albany Street in the west and Dorchester Street to the southeast. One segment of West Fourth Street between A Street and B Street is classified as an urban minor arterial. From A Street to Dorchester Avenue, the roadway is again classified as a local street. The West Fourth Street Bridge between Dorchester Avenue and the Frontage Road is classified as an urban principal arterial. West Fourth Street is generally in good condition in the study area.

From Dorchester Street to D Street, West Fourth Street provides two-way traffic flow, with parking on both sides of the street. In this segment, a single travel lane is provided in each direction. Between B Street and Dorchester Avenue, West Fourth Street provides two-way traffic flow, with a travel lane in each direction. Parking restrictions vary from no parking to parking on one or both sides of the street. Between Dorchester Avenue and Frontage Road, the West Fourth Street Bridge provides a single travel lane in each direction. Parking is not permitted on this segment.

Dorchester Avenue, an urban extension of a minor arterial between Congress Street and Summer Street, runs north–south in the study area. Dorchester Avenue continues south of Summer Street as a private roadway, providing access to the United States Postal Service (USPS) General Mail Facility. South of Fort Point Channel, Dorchester Avenue is open to public travel and crosses Broadway and West Fourth Street, where it continues down to Dorchester Lower Mills and Milton. Between Fort Point Channel and West Broadway, Dorchester Avenue generally consists of one lane in each direction; parking is prohibited on each side of the roadway. Between West Broadway and West Fourth Street, Dorchester Avenue generally consists of two lanes in each direction; additional turning lanes are provided at the intersections. Metered on-street parking is provided on each side of the roadway between West Broadway and West Fourth Street. Parking is generally prohibited south of West Fourth Street. Sidewalks are in good condition. There has been discussion of reopening the discontinued section of Dorchester Avenue for public travel should the USPS facility site be redeveloped.

3.2.2 Existing Intersection Conditions

Harrison Avenue/Traveler Street is a signalized intersection with three approaches. Traveler Street westbound consists of a 10-foot left-turn/through lane and a 10-foot exclusive right-turn lane. West of the intersection, Traveler Street is one-way westbound. Harrison Avenue northbound consists of a 12-foot left-turn/through lane and a 20-foot through/right-turn lane. Parking is permitted along the right side of this approach to the intersection. Southbound Harrison Avenue consists of a 12-foot left-turn/through lane and a 20-foot through/right-turn lane. Parking is permitted along the right side of this approach to the intersection. Both Harrison Avenue approaches are separated from oncoming traffic on Harrison Avenue by a 15-foot median. Crosswalks with handicapped-accessible ramps are provided across all approaches to this intersection. Pavement markings are in fair to poor condition.

Albany Street/Traveler Street is a signalized intersection with two approaches. Traveler Street eastbound consists of a 16-foot shared through/right-turn lane. East of the intersection, Traveler Street is one-way eastbound. Albany Street is one-way southbound and consists of a 12-foot, exclusive left-turn lane; a 12-foot, shared left-turn/through lane; and a 12-foot through/right-turn lane. Crosswalks with handicapped-accessible ramps are provided across the Traveler Street approach and Albany Street immediately south of the intersection. Pavement markings at this intersection are in fair condition.

Broadway Bridge/Frontage Road/Traveler Street is a signalized intersection with three approaches. Traveler Street is one-way eastbound and consists of a 17-foot, channelized, exclusive left-turn lane leading to I-90; a 14-foot, exclusive left-turn lane leading to I-93; and two 12-foot through lanes leading to the Broadway Bridge. Broadway Bridge westbound consists of two 13-foot right-turn lanes leading to I-93 and I-90. Frontage Road is one-way northbound and consists of a 13-foot, exclusive through lane and a 12-foot, exclusive through lane leading to I-90. These two lanes are separated from the other three lanes of northbound Frontage Road by a 7-foot median. The rest of Frontage Road northbound consists of two 12-foot, exclusive through lanes leading to I-93 and a 12-foot right-turn lane leading to the Broadway Bridge. Parking is not permitted on any approach to this intersection. A crosswalk with handicapped-accessible ramps is provided across the northbound approach of Frontage Road. Pavement markings at this intersection are in good condition.

East Berkeley Street/Washington Street is a signalized intersection with three approaches. East Berkeley Street is one-way westbound and consists of an 11-foot, shared left-turn/through lane; a 10-foot, exclusive through lane; and a 10-foot through/right-turn lane. Parking is permitted on the south side of the East Berkeley Street approach. An MBTA bus stop occupies the north side of this road immediately before the intersection with Washington Street. Washington Street northbound consists of an 11-foot, exclusive left-turn lane; a 12-foot through lane; and a 13-foot, exclusive bus lane used by the MBTA Silver Line. The southbound approach of Washington Street consists of an 11-foot, exclusive bus lane used by the MBTA Silver Line. General traffic is not allowed to travel in bus lanes. Parking is not allowed on either Washington Street approach. Crosswalks with handicapped-accessible ramps are provided across all approaches to this intersection. Pavement markings at this intersection range from good to poor condition.

East Berkeley Street/Harrison Avenue is a signalized intersection with three approaches. East Berkeley Street westbound consists of a 22-foot left-turn/through lane, a 12-foot through lane, and a 13-foot through/right-turn lane. Parking is permitted on the south side of this approach. Harrison Avenue northbound consists of a 20-foot left-turn/through lane. Parking is permitted on the east side of this approach. The southbound approach of Harrison Avenue consists of a 21-foot right-turn lane and an 11-foot through lane. Traffic on this approach is separated from northbound traffic on Harrison Avenue by a 14-foot median. Parking is not allowed along this approach. Crosswalks with handicapped-accessible ramps are provided across all approaches to this intersection, with the exception of the westbound lanes of East Berkeley Street leading away from the intersection. Pavement markings at this intersection are in fair condition.

Albany Street/East Berkeley Street is a signalized intersection with two approaches. East Berkeley Street is one-way westbound and consists of a 15-foot through lane, a 12-foot through lane, and a 15-foot through/right-turn lane. Albany Street is one-way southbound and consists of two 12-foot through lanes and a 14-foot through/right-turn lane. Parking is not permitted on any approach to this intersection. Crosswalks with handicapped-accessible ramps are provided across East Berkeley Street to the west of the intersection and Albany Street to the south of the intersection. Pavement markings at this intersection are in good condition.

Frontage Road/West Fourth Street/East Berkeley Street is a signalized intersection with two approaches. West Fourth Street westbound consists of an 11-foot through lane, a 12-foot through lane, and a 12-foot through/right-turn lane. Frontage Road northbound consists of a

12-foot left-turn lane, an 11-foot through lane, and a 13-foot through/right-turn lane. This is the only approach for which a crosswalk and handicapped-accessible ramps are provided. Parking is not allowed on any approach to this intersection.

Dorchester Avenue/West Fourth Street is a signalized intersection with four approaches. The eastbound West Fourth Street approach consists of a single, 24-foot lane but operates as a left-turn/through lane and a right-turn lane. The westbound approach consists of a 12-foot, left-turn/through/right-turn lane and an eight-foot parking lane. The northbound Dorchester Avenue approach consists of a 12-foot left-turn lane, two 10-foot through lanes, and an 11-foot right-turn lane. The southbound approach consists of a 10-foot, left-turn/ through lane, an 11-foot through lane, and a 10-foot right-turn lane. Wheelchair ramps and crosswalks are located across all approaches.

3.2.3 Existing Traffic Conditions

The study team collected vehicle and pedestrian counts at the study area intersections in June 2007 and December 2008. All counts were taken between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. From the turning movement counts, peak traffic hours were identified as 8:00 to 9:00 a.m. and 5:00 to 6:00 p.m. To account for growth in traffic volumes since the original counts, the data were escalated to 2009 volumes by applying a 1% annual growth rate.

Figure 3-3 and Figure 3-4 show the turning movement counts for Year 2009 a.m. and p.m. peak hours. The count data used to generate these figures are provided in Appendix B of this report.

3.2.4 Existing Traffic Operations

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. The study team calculated average delay and associated LOS at study area intersections using Trafficware's Synchro 6 software, which also evaluates the impact on traffic operations from closely spaced intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM).

Level of service and delay (in seconds) are based on intersection geometry and available traffic data for each intersection. BTD provided the intersection signal timing and phasing used in this analysis.

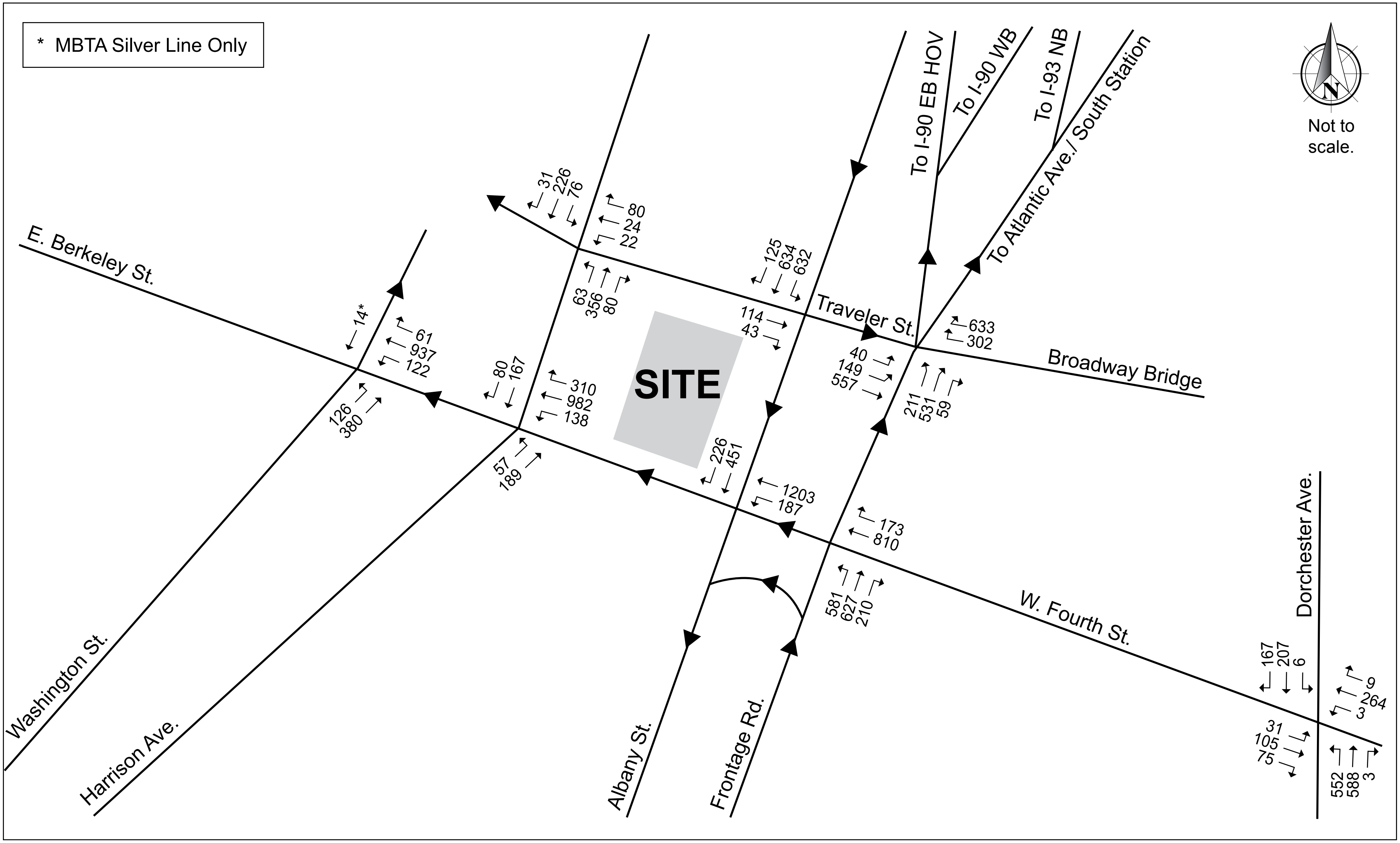

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Figure 3-3

Existing Conditions (2009) Turning Movement Volumes, a.m. Peak-hour (8:00-9:00 a.m.)

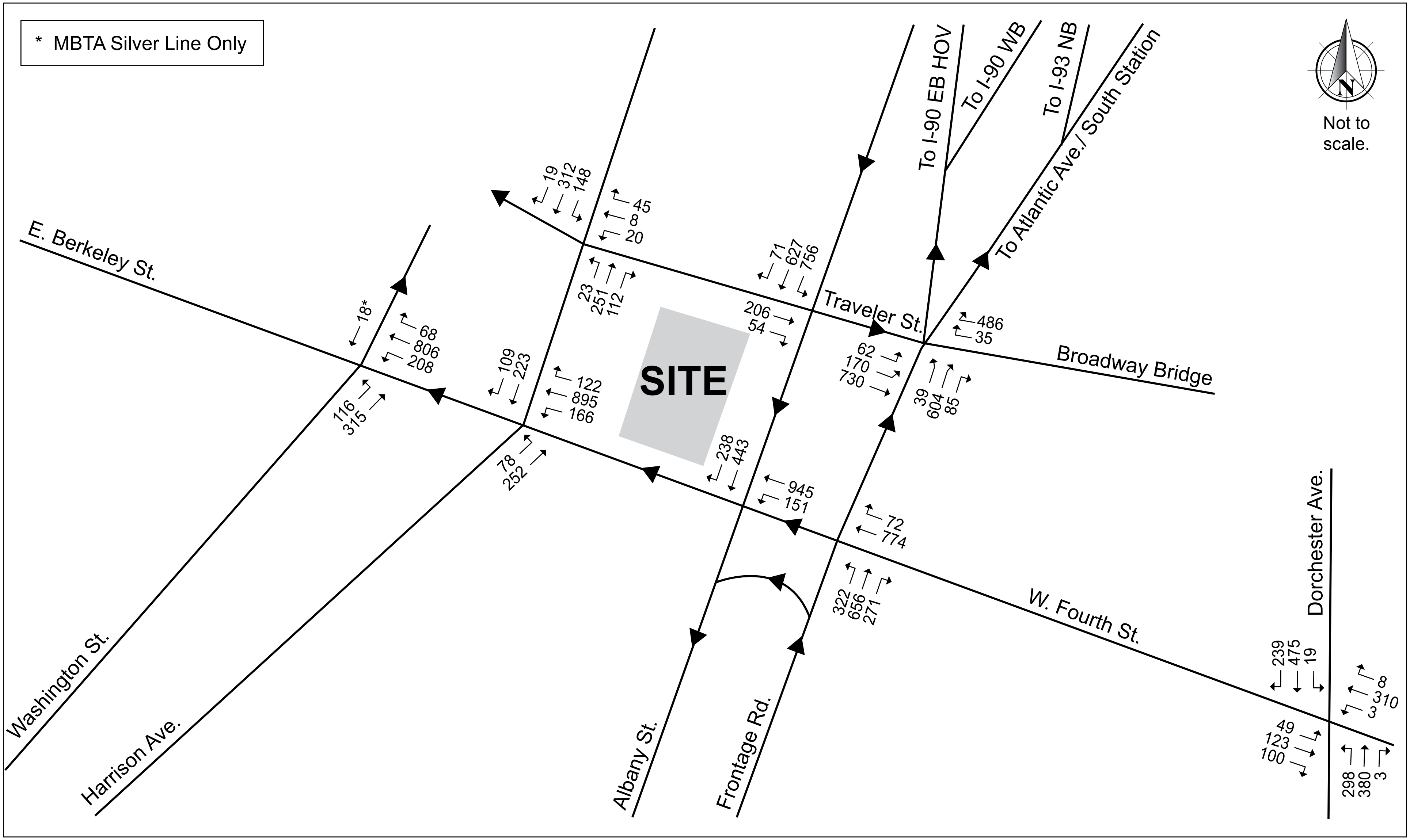

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Figure 3-4

Existing Conditions (2009) Turning Movement Volumes, p.m. Peak-hour (5:00-6:00 p.m.)

Table 3-2 summarizes the delay and LOS thresholds for signalized and unsignalized intersections, as defined in the HCM. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition (unacceptable), with significant traffic delay. The threshold at LOS E/LOS F indicates that the intersection, or intersection approach, is theoretically at capacity. LOS D is generally considered acceptable in an urban environment, such as the Project study area, and below theoretical operating capacity.

Table 3-2 Intersection Level of Service Criteria (HCM excerpt)

Level of Service	Average Stopped Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
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

Table 3-3 and **Table 3-4** present Existing Conditions levels of service for study area intersections for the a.m. and p.m. peak hours, respectively. Detailed Synchro reports are provided in **Appendix B**.

Table 3-3 Existing Conditions (2009) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Signalized Intersections				
Harrison Avenue/Traveler Street	B	**18.5**		
Traveler WB left/thru	D	43.5	0.53	43
Traveler WB right	B	11.9	0.42	24
Harrison NB left/thru | thru/right	A	6.0	0.29	123
Harrison SB left/thru | thru/right	C	31.7	0.69	126
Albany Street/Traveler Street	B	**14.2**		
Traveler EB thru/right	E	57.2	0.70	190
Albany SB left	B	10.6	0.51	391
Albany SB left/thru | thru/right	A	8.8	0.52	378

Table 3-3 Existing Conditions (2009) Level of Service Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Broadway Bridge/Frontage Road/Traveler Street	**E**	**57.6**		
Traveler EB hard left to I-90	D	39.4	0.14	m51
Traveler EB left to I-93	D	51.2	0.61	151
Traveler EB thru | thru	A	6.9	0.32	43
Broadway WB right to I-90 | hard right to I-93	C	33.2	0.66	328
Broadway WB hard right to I-93	F	>80.0	1.20	#866
Frontage NB thru to I-90 | thru to I-90	D	36.9	0.35	m123
Frontage NB thru to I-93 |thru to I-93| thru/right	D	40.8	0.68	m127
East Berkeley Street/Washington Street	**B**	**15.9**		
E. Berkeley WB left/thru | thru | thru/right	A	7.4	0.60	m322
Washington NB left	C	22.8	0.31	105
Washington NB thru | bus-only thru	D	36.1	0.77	329
Washington SB bus-only thru	B	19.2	0.06	18
East Berkeley Street/Harrison Avenue	**C**	**33.0**		
E. Berkeley WB left/thru | thru | thru/right	D	38.8	0.93	#439
Harrison NB left/thru	C	21.7	0.46	257
Harrison SB thru	B	17.7	0.26	146
Harrison SB right	A	4.8	0.14	26
Albany Street/East Berkeley Street	**C**	**21.0**		
E. Berkeley WB left/thru | thru | thru	C	21.5	0.66	179
Harrison SB thru | thru |thru/right	C	20.1	0.47	63
Frontage Road/West Fourth Street/ East Berkeley Street	**D**	**38.0**		
W. Fourth WB thru | thru | thru/right	E	60.1	0.88	#363
Frontage NB left	C	24.0	0.65	#659
Frontage NB thru |thru/right	C	21.3	0.65	#549
Dorchester Avenue/West Fourth Street	**C**	**32.6**		
W. Fourth EB left/thru	C	32.3	0.45	133
W. Fourth EB right	A	6.8	0.23	19
W. Fourth WB left/thru/right	D	45.6	0.78	#292
Dorchester NB left	E	62.8	1.03	#439
Dorchester NB thru |thru	A	6.7	0.18	51
Dorchester NB right	A	3.0	0.02	0
Dorchester SB left/thru |thru/right	B	11.2	0.47	72

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

Table 3-4 Existing Conditions (2009) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Signalized Intersections				
Harrison Avenue/Traveler Street	C	20.9		
Traveler WB left/thru	D	51.4	0.35	36
Traveler WB right	B	17.4	0.43	7
Harrison NB left/thru | thru/right	A	5.0	0.21	m106
Harrison SB left/thru | thru/right	C	32.3	0.72	219
Albany Street/Traveler Street	B	16.0		
Traveler EB thru/right	D	52.6	0.79	245
Albany SB left	A	4.9	0.60	181
Albany SB left/thru | thru/right	B	11.9	0.50	306
Broadway Bridge/Frontage Road/Traveler Street	D	37.4		
Traveler EB hard left to I-90	D	37.8	0.37	62
Traveler EB left to I-93	D	41.7	0.52	m160
Traveler EB thru| thru	A	8.2	0.41	88
Broadway WB right to I-90 | hard right to I-93	C	21.3	0.08	44
Broadway WB hard right to I-93	E	77.9	1.02	#585
Frontage NB thru to I-90 | thru to I-90	C	23.2	0.05	m12
Frontage NB thru to I-93 |thru to I-93| thru/right	D	39.3	0.85	277
East Berkeley Street/Washington Street	B	19.4		
E. Berkeley WB left/thru | thru | thru/right	B	14.8	0.75	m#512
Washington NB left	C	24.2	0.28	102
Washington NB thru | bus-only thru	C	32.1	0.63	277
Washington SB bus-only thru	C	21.6	0.08	22
East Berkeley Street/Harrison Avenue	D	42.8		
E. Berkeley WB left	C	26.0	0.33	139
E. Berkeley WB thru | thru/right	E	67.7	0.94	#467
Harrison NB left/thru	C	25.4	0.64	#403
Harrison SB thru	A	6.8	0.30	m186
Harrison SB right	A	1.8	0.22	26
Albany Street/East Berkeley Street	B	12.1		
E. Berkeley WB left/thru | thru | thru	A	4.7	0.48	40
Harrison SB thru | thru |thru/right	C	21.7	0.50	217
Frontage Road/West Fourth Street/ East Berkeley Street	C	24.3		
W. Fourth WB thru | thru | thru/right	D	41.1	0.77	278
Frontage NB left	A	2.9	0.37	47
Frontage NB thru |thru/right	B	16.8	0.60	414

Table 3-4 Existing Conditions (2009) Level of Service Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Dorchester Avenue/West Fourth Street	**D**	**41.4**		
W. Fourth EB left/thru	C	30.1	0.53	156
W. Fourth EB right	A	5.1	0.28	8
W. Fourth WB left/thru/right	C	33.8	0.68	265
Dorchester NB left	F	> 80.0	1.19	#255
Dorchester NB thru |thru	A	9.8	0.24	81
Dorchester NB right	A	4.3	0.02	0
Dorchester SB left/thru |thru/right	C	30.2	0.87	#314

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

During the a.m. peak hour, only the intersection of Broadway Bridge/Frontage Road/Traveler Street has overall operation below LOS D. The intersection as a whole operates at LOS E. The only move that operates poorly is the right turn from the Broadway Bridge onto I-90 and I-93 ramps, which operates at LOS F.

During the p.m. peak hour, all intersections operate with overall LOS D or better.

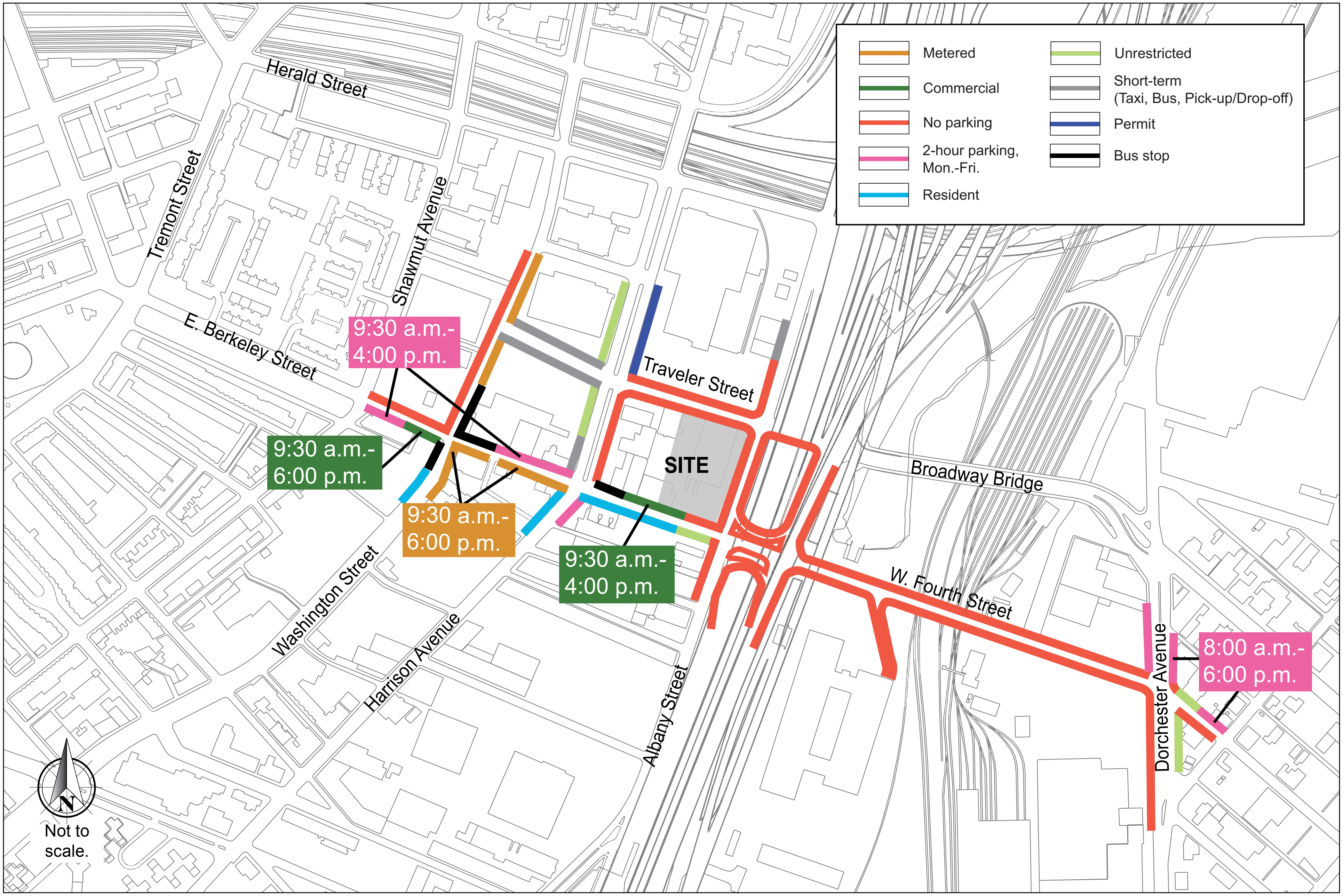
3.2.5 Existing Parking

Within a quarter-mile radius of the site, only one off-street public parking facility exists. The surface lot, with 89 spaces, is located on the northern side of East Berkeley, between Washington Street and Shawmut Avenue.

Limited on-street public parking is available in the study area. **Figure 3-5** illustrates the on-street parking regulations for spaces adjacent to the study area intersections. No parking is permitted along Albany Street, Frontage Road, the Broadway Bridge, or the West Fourth Street Bridge. Along East Berkeley Street, parking is generally restricted during the peak hours. Between 9:30 a.m. and 4:00 p.m., parking is available in metered spaces and for commercial vehicles. Along Traveler Street, parking is not allowed between Albany Street and Harrison Street. Farther west on Traveler Street, short-term parking for buses is allowed.

3.2.6 Existing Public Transportation

As shown in **Figure 3-6,** the Project site is near several public transportation options providing service to downtown Boston, the Back Bay, and Cambridge. Three MBTA bus routes, #9, #11, and #47, have stops near the Project site. The MBTA Silver Line on Washington Street, located two blocks from the Project site, provides service to the Downtown Crossing area of Boston. The MBTA Red Line Broadway Station is about a quarter-



275 Albany Street   Boston, Massachusetts

Figure 3-5

On-street Parking in the Study Area

275 Albany Street **Boston, Massachusetts**

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Figure 3-6
Public Transportation

mile from the Project and provides service between Ashmont and Braintree in the south and Cambridge in the north via downtown Boston. In the downtown, the Red Line connects to the Silver, Orange, and Green lines, and to regional commuter rail and intercity bus services at South Station. Public transportation service summaries and frequencies are shown in **Table 3-5.**

Table 3-5 Existing MBTA Service in the Study Area

Route	Route Description	Rush-hour Headway (minutes)
9	City Point Copley Square via Broadway Station	6
11	City Point Downtown Bay View	7
47	Central Square–Cambridge Broadway Station via B.U. Medical Center, Dudley Station, and Longwood Medical Area	15
Silver Line	Dudley Station–Downtown Crossing at Temple Place	4
Red Line	Ashmont/Braintree–Alewife Station	5

3.2.7 Existing Pedestrian and Bicycle Conditions

Sidewalks are provided along all streets within the study area and are generally in fair to good condition. With the adjacent elevated I-93 highway and the nearby commercial land with plentiful off-street private parking, pedestrian activity in the immediate area is fairly minor. West of the Project, along Washington Street, pedestrian volumes are higher because of the higher density of retail and commercial businesses and Silver Line service activity.

East of the study area, Dorchester Avenue, Southampton Street, Preble Street, and Boston Street serve as on-street bicycle routes, according to *Boston's Bikemap*, published by Rubel Bike Maps of Cambridge, Massachusetts. In the future, the proposed South Bay Harbor Trail will provide recreational bicycle access, progressing from South Boston across the Broadway Bridge, along Frontage Road, through the Boston University Medical Center area, and into Roxbury and the South End.

3.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No-Build Conditions (without the proposed project) and Build Conditions (if the project is built). Typically, these conditions are projected to a future date five years from the Existing Conditions year. For this evaluation of this Project, Year 2014 was designated as the future year.

This section presents a description of 2014 future conditions and includes transportation impact analysis of the No-Build and Build conditions.

3.3.1 No-Build Conditions

No-Build traffic conditions are independent of the proposed Project and include existing traffic and new traffic resulting from general background growth and other development projects in the area. Typically, any known roadway improvements are incorporated into the No-Build Conditions.

3.3.1.1 No-Build Background Growth

The general background growth rate accounts for changes in demographics, auto usage, and auto ownership. A 1% annual growth rate was applied to the existing intersection volumes to account for background growth. The intersection volumes attributable to the background growth are shown in **Appendix B.**

The study team also incorporated future traffic increases anticipated from the following projects (see **Figure 3-7):**

11 West Broadway – This project consists of 64 residential units, 4,700 square feet of retail, and 69 parking spaces located underneath the building. The Boston Redevelopment Authority (BRA) Board has approved this project.

50 West Broadway – This proposed, mixed-use/residential development comprises approximately 139 residential units, approximately 3,546 square feet of commercial space, and structured parking for approximately 152 parking spaces. This project has been approved by the BRA Board and is under construction.

Parcel 24 – This residential development will have 325 units located on a 58,000-square-foot vacant site bounded by Hudson Street, Kneeland Street, and Albany Street. This project has been approved by the BRA Board.

601 Albany Street – This project, currently under construction, includes 40 condominium units in a six-story building with 28 parking spaces. This project has been approved by the BRA Board and is under construction.

BioSquare II – Boston Medical Center (BMC) and Boston University have engaged in a joint development project at BioSquare for research and business that will facilitate collaboration between researchers and clinicians. BioSquare currently consists of three biomedical research buildings plus two parking garages and some retail spaces. The biomedical research park in the South End may ultimately include up to 1.2 million square feet of research, laboratory, and office space. To account for near-term development within the Bio Square area, 530,000 square feet of new medical office space was added into the No-Build Conditions for 275 Albany Street.

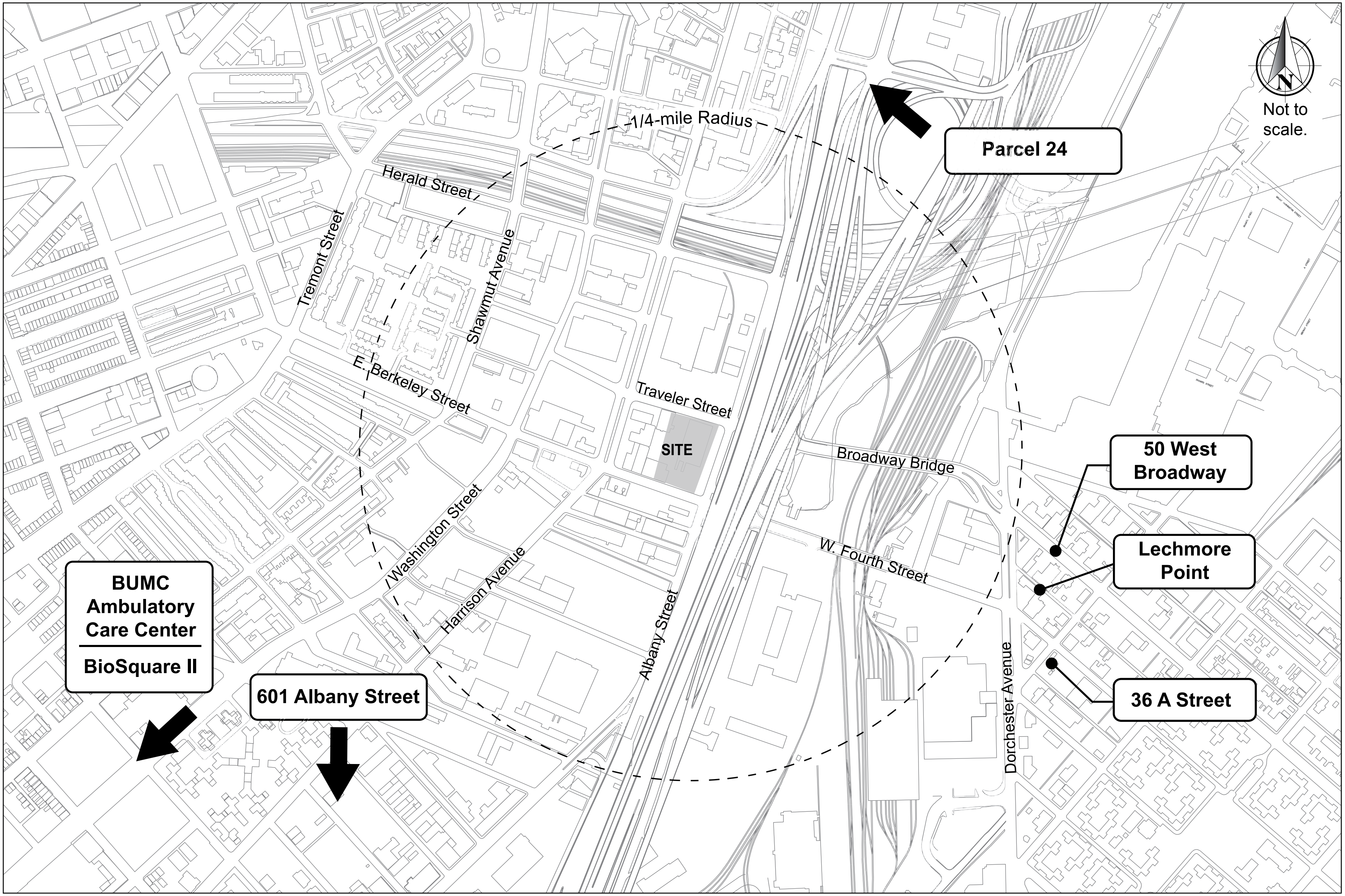

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Figure 3-7
No-Build Projects

Boston University Ambulatory Care Facility – This 245,000-square-foot building will allow the relocation and consolidation of several outpatient services currently located in BMC's Doctor's Office Building, Dowling, Yawkey, and other BMC campus outpatient buildings. This project has been approved by the BRA Board.

Boston Medical Institutional Master Plan (IMP) – Distinct from BioSquare, BUMC submitted a new 10-year Institutional Master Plan and Project Notification Form for a new 48,000-square-foot energy facility, administration/clinical building, and new inpatient building. To account for partial completion of this master plan by 2014, a 160,000-square-foot medical office building was incorporated into the No-Build Conditions for 275 Albany Street.

Future No-Build traffic volumes appear in **Figure 3-8** and **Figure 3-9** for the a.m. and p.m. peak hours, respectively.

3.3.1.2 No-Build Traffic Operations

The 2014 Future Conditions analysis for both the No-Build and the Build scenarios uses the methodology described in the Existing Conditions analysis. The resulting intersection operations results are shown in **Table 3-6** and **Table 3-7.** Complete Synchro reports are provided in **Appendix B.**

Table 3-6 No-Build Conditions (2014) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
		Signalized Intersections		
Harrison Avenue/Traveler Street	C	**22.7**		
Traveler WB left/thru	D	44.1	0.55	45
Traveler WB right	B	11.6	0.43	24
Harrison NB left/thru | thru/right	A	6.5	0.32	135
Harrison SB left/thru | thru/right	D	40.9	0.84	#159
Albany Street/Traveler Street	B	**15.4**		
Traveler EB thru/right	E	57.5	0.71	202
Albany SB left	B	12.2	0.56	457
Albany SB left/thru | thru/right	A	10.0	0.57	445
Broadway Bridge/Frontage Road/Traveler Street	E	**65.3**		
Traveler EB hard left to I-90	D	40.3	0.15	m52
Traveler EB left to I-93	D	52.6	0.62	166
Traveler EB thru	A	6.7	0.34	44
Broadway WB right to I-90 | hard right to I-93	C	35.0	0.70	354
Broadway WB hard right to I-93	F	>80.0	1.27	#932
Frontage NB thru to I-90 | thru to I-90	D	38.2	0.38	m128
Frontage NB thru to I-93 |thru to I-93| thru/right	D	42.8	0.74	m285

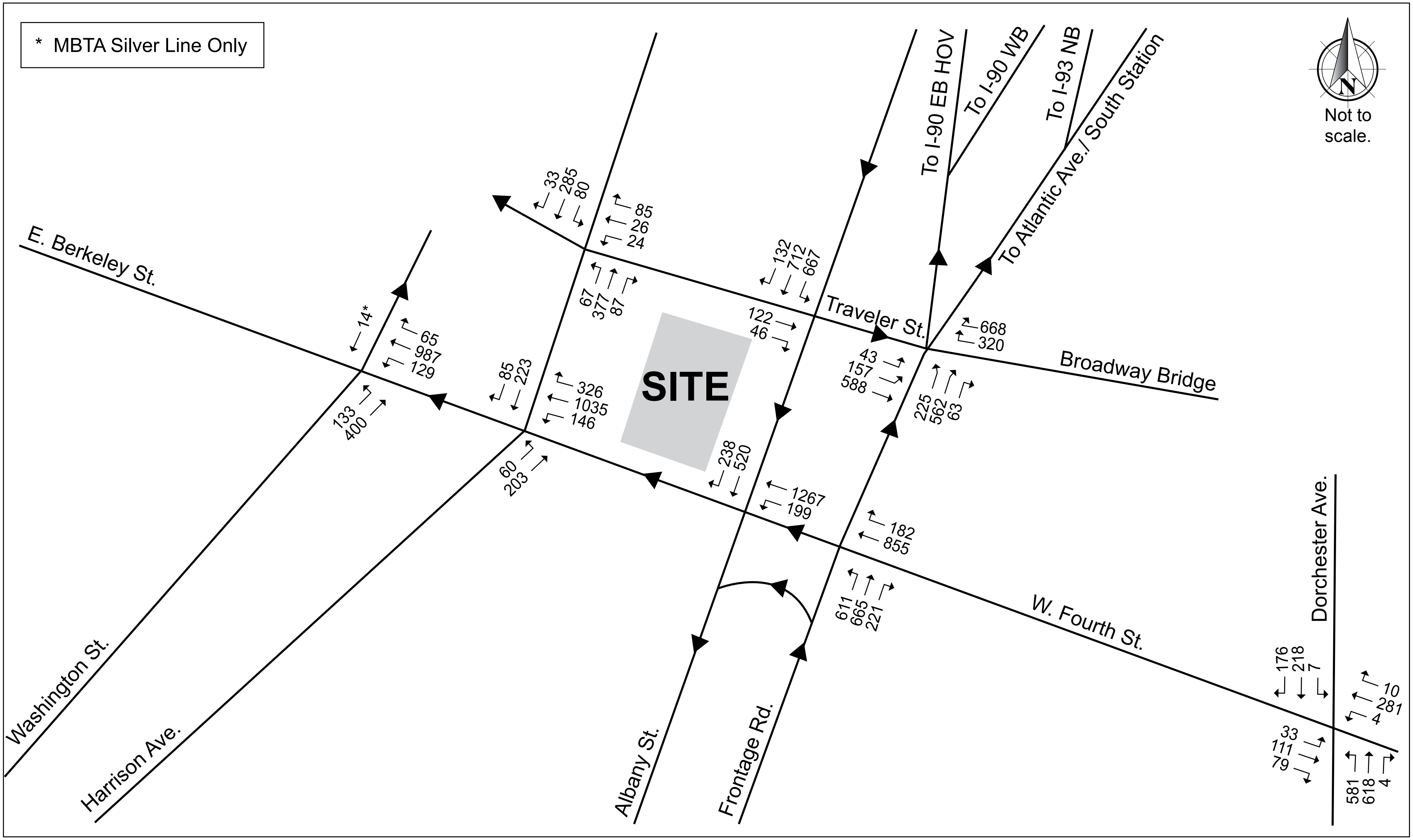

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Figure 3-8

No-Build Conditions (2014) Turning Movement Volumes, a.m. Peak-hour (8:00-9:00 a.m.)

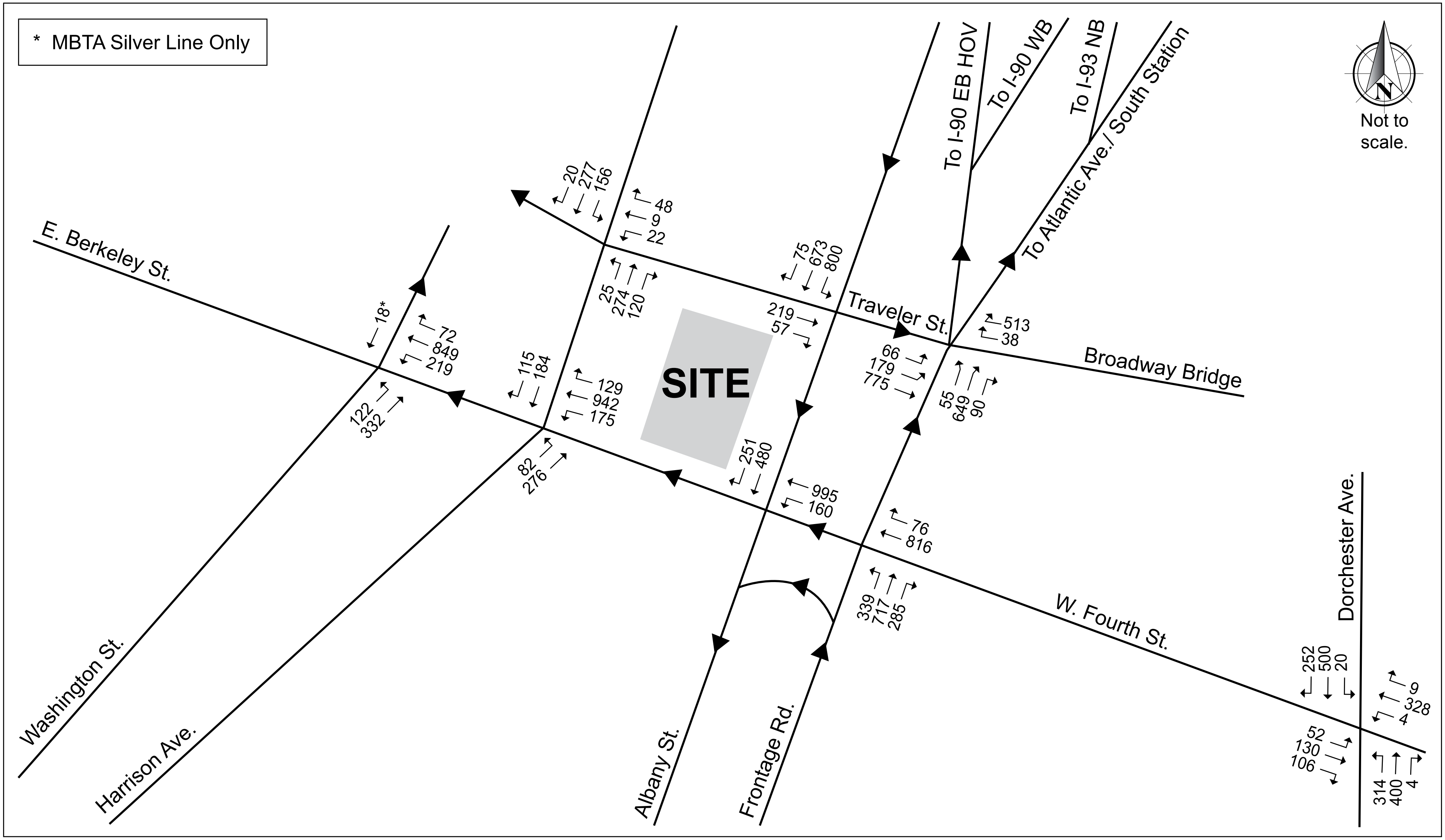

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Figure 3-9

No-Build Conditions (2014) Turning Movement Volumes, p.m. Peak-hour (5:00-6:00 p.m.)

Table 3-6 No-Build Conditions (2014) Level of Service Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
East Berkeley Street/Washington Street	B	**16.9**		
E. Berkeley WB left/thru | thru | thru/right	A	7.9	0.63	m331
Washington NB left	C	32.1	0.33	111
Washington NB thru | bus-only thru	D	38.9	0.81	352
Washington SB bus-only thru	B	19.2	0.06	18
East Berkeley Street/Harrison Avenue	D	**39.0**		
E. Berkeley WB left/thru | thru | thru/right	D	46.8	0.98	#483
Harrison NB left/thru	C	25.6	0.56	#337
Harrison SB thru	B	19.7	0.34	194
Harrison SB right	A	4.7	0.15	27
Albany Street/East Berkeley Street	C	**31.9**		
E. Berkeley WB left/thru | thru | thru	D	37.4	0.69	m206
Harrison SB thru | thru |thru/right	C	22.1	0.52	87
Frontage Road/West Fourth Street/ East Berkeley Street	D	**53.3**		
W. Fourth WB thru | thru | thru/right	F	>80.0	0.93	#413
Frontage NB left	C	25.2	0.69	#716
Frontage NB thru |thru/right	C	22.2	0.69	#601
Dorchester Avenue/West Fourth Street	D	**37.0**		
W. Fourth EB left/thru	C	34.0	0.50	144
W. Fourth EB right	A	6.8	0.24	20
W. Fourth WB left/thru/right	D	50.9	0.84	#322
Dorchester NB left	F	>80.0	1.11	#516
Dorchester NB thru |thru	A	8.3	0.39	118
Dorchester NB right	A	2.8	0.02	0
Dorchester SB left/thru |thru/right	B	11.7	0.50	77

\# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Cell shading indicates a change in LOS from the previous condition.

Table 3-7 No-Build Conditions (2014) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Signalized Intersections				
Harrison Avenue/Traveler Street	C	**20.2**		
Traveler WB left/thru	D	51.7	0.36	38
Traveler WB right	B	17.2	0.45	6
Harrison NB left/thru | thru/right	A	5.2	0.23	m116
Harrison SB left/thru | thru/right	C	32.3	0.71	210

Table 3-7 No-Build Conditions (2014) Level of Service Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Albany Street/Traveler Street	B	17.1		
Traveler EB thru/right	D	53.1	0.80	261
Albany SB left	A	6.3	0.65	262
Albany SB left/thru | thru/right	B	13.0	0.54	336
Broadway Bridge/Frontage Road/Traveler Street	D	44.1		
Traveler EB hard left to I-90	D	38.2	0.38	66
Traveler EB left to I-93	D	42.4	0.52	m171
Traveler EB thru	A	8.4	0.43	108
Broadway WB right to I-90 | hard right to I-93	C	21.4	0.09	47
Broadway WB hard right to I-93	F	> 80.0	> 1.0	#634
Frontage NB thru to I-90 | thru to I-90	C	23.2	0.08	m15
Frontage NB thru to I-93 |thru to I-93| thru/right	D	48.9	0.95	#271
East Berkeley Street/Washington Street	C	20.4		
E. Berkeley WB left/thru | thru | thru/right	B	16.3	0.79	m#523
Washington NB left	C	24.5	0.29	107
Washington NB thru | bus-only thru	C	32.6	0.65	284
Washington SB bus-only thru	C	21.6	0.08	22
East Berkeley Street/Harrison Avenue	E	60.3		
E. Berkeley WB left	C	26.3	0.34	147
E. Berkeley WB thru | thru/right	F	>80.0	0.99	#508
Harrison NB left/thru	C	25.2	0.64	#403
Harrison SB thru	A	6.0	0.25	m135
Harrison SB right	A	1.8	0.23	25
Albany Street/East Berkeley Street	B	12.6		
E. Berkeley WB left/thru | thru | thru	A	4.7	0.51	42
Harrison SB thru | thru |thru/right	C	22.4	0.54	235
Frontage Road/West Fourth Street/ East Berkeley Street	C	25.5		
W. Fourth WB thru | thru | thru/right	D	42.9	0.81	296
Frontage NB left	A	3.1	0.39	51
Frontage NB thru |thru/right	B	18.0	0.65	#486
Dorchester Avenue/West Fourth Street	D	54.6		
W. Fourth EB left/thru	C	32.1	0.58	168
W. Fourth EB right	A	5.1	0.30	7
W. Fourth WB left/thru/right	D	36.2	0.73	#293
Dorchester NB left	F	>80.0	>1.0	#296
Dorchester NB thru |thru	A	9.9	0.26	85
Dorchester NB right	A	4.0	0.02	0
Dorchester SB left/thru |thru/right	D	40.5	0.95	#358

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Cell shading indicates a change in LOS from the previous condition.

In the tables above, shaded cells indicate a worsening of level of service as compared to Existing Conditions.

During the a.m. peak hour, three of the intersections will experience an overall change in level of service but remain operating at LOS D or better. Two locations will experience a level of service change on an individual approach only.

- ♦ At Harrison Avenue/Traveler Street, the overall operation will change from LOS B to LOS C, with the southbound Harrison Avenue approach degrading from LOS C to LOS D.
- ♦ At Albany Street/East Berkeley Street, the westbound East Berkeley Street approach degrades from LOS C to LOS D, while overall operations remain at LOS C.
- ♦ While the overall operation of Frontage Road/West Fourth Street/East Berkeley Street remains at LOS D, the westbound West Fourth Bridge approach deteriorates from LOS E to LOS F.
- ♦ At Dorchester Avenue/West Fourth Street, the overall operation deteriorates from LOS C to LOS D; the northbound left turn from Dorchester Avenue operates at LOS F.
- ♦ One location, Broadway Bridge/Frontage Road/Traveler Street, will operate at LOS E, as under Existing Conditions.

During the p.m. peak hour, two of the intersections will experience an overall change in level of service but remain operating at LOS D or better. Two locations will experience a level of service change on an individual approach only.

- ♦ At the Broadway Bridge/Frontage Road/Traveler Street, the westbound Broadway right turn will change from LOS E to LOS F. Overall operation remains at LOS D.
- ♦ The overall operation at East Berkeley Street/Washington changes from LOS B to LOS C.
- ♦ The overall operation at East Berkeley Street/Harrison Street deteriorates from LOS D to LOS E, with the westbound East Berkeley Street approach changing from LOS E to LOS F.
- ♦ While the overall operation of Dorchester Avenue/West Fourth Street remains at LOS D, the westbound West Fourth Street approach and the southbound Dorchester Avenue approach change from LOS C to LOS D.

3.3.1.3 No-Build Public Transportation

While no specific improvements are planned for the bus routes serving the study area, the MBTA plans the following improvements to increase service capacity within the larger transit system. While the improvements presented below may ultimately impact transit service in the study area, these improvements will not be completed by Year 2014.

Silver Line. The Silver Line is being completed in three phases, the first of which—Silver Line Washington Street—opened in July 2002. It travels as a bus rapid transit (BRT) route along Washington Street between Dudley Square and Downtown. The second phase, Silver Line Waterfront, opened in December 2004 and runs as a BRT underground from South Station to Silver Line Way. It then continues through the South Boston Waterfront above-ground to the Boston Convention & Exhibition Center, the Boston Marine Industrial Park, South Boston residential neighborhoods, and Logan International Airport. Silver Line Phase III, which is currently in design, is a tunnel linking Downtown and South Station via the Boylston Street and Chinatown stations; it will connect Silver Line Phase I (Dudley Square to Downtown) and Phase II (South Station to the South Boston Waterfront).

When the final phase has been completed, all three segments will connect to become the "Silver Line"—the MBTA's fifth rapid transit line, offering a seamless link between the communities of Roxbury, the South End, Chinatown, Downtown, and South Boston. This new transit line will connect passengers quickly and easily to the T's other rapid transit lines—the Orange, Green, and Red—to South Station, where they can board the south side commuter rail lines and Amtrak trains, and to Logan Airport. The MBTA expects the Silver Line to accommodate some existing commuters on the Green, Orange, and Red lines and to provide additional service to those who currently do not utilize the public transit system.

Urban Ring. In the long-term future, the Urban Ring is projected to expand MBTA service outside downtown Boston. This service will include East Boston and Logan International Airport, Charlestown, Longwood Medical and Academic Area, Mission Hill, the Dudley Square/Uphams Corners neighborhoods of Roxbury, the University of Massachusetts Boston campus at Columbia Point, and the Seaport/Convention Center area. MBTA expects this planned improvement to "substantially reduce Green Line congestion and commuter through-traffic." The Urban Ring will offer many commuters an alternate route to destinations surrounding the City without having to make connections downtown.

3.3.1.4 No-Build Pedestrian and Bicycle Conditions

The South Bay Harbor Trail, a 3.5-mile bicycle and pedestrian pathway, is scheduled to be completed in late 2010. The trail, being constructed with public and private funds, will connect the Seaport District at Fan Pier to the MBTA Ruggles Street Station in Roxbury. Near the 275 Albany Street site, the trail will traverse the Broadway Street Bridge and connect south along Albany Street toward Massachusetts Avenue.

3.3.2 Build Conditions

This section presents the Build Conditions for Year 2014 and evaluates the impacts from the proposed Project.

3.3.2.1 Site Access and Circulation

Each hotel will have a separate main entrance with associated drop-off/pick-up areas. The extended-stay hotel's main entrance will be located on East Berkeley Street, while the select-service hotel will have its main entrance on Traveler Street. The site plan is shown in **Figure 3-10.**

On East Berkeley, a sidewalk drop-off curb with capacity for about four vehicles will be provided for the extended-stay hotel. Automobiles and taxicabs can drop off and pick up passengers along this curb, but no parking will be allowed. Access to the parking garage will be located farther west on East Berkeley. No garage egress is provided onto East Berkeley Street. For the select-service hotel on Traveler Street, an off-street drop-off area with one-way circulation will be provided for automobiles and taxicabs. Vehicles exiting the drop-off area will share an egress lane with traffic exiting the garage.

Internal to the site, a ground-level driveway will run parallel to Albany Street and connect East Berkeley Street and Traveler Street. Vehicles can access the parking garage via both East Berkeley Street and Traveler Street, with egress provided onto Traveler Street only.

3.3.2.2 Trip Distribution

BTD has established guidelines for travel distribution patterns and mode shares for different areas of the City. The 275 Albany Street site is officially located in Area 15, which includes Chinatown and the Leather District. East Berkeley Street, however, is the southern boundary between Area 15 and the neighboring Area 3, which includes the South End. After examining data from both areas, the Project team concluded that the travel characteristics of the Project site are more similar to the South End than the Chinatown/Leather District area. Therefore, trip distribution patterns and mode shares (as presented in **Section 3.3.2.4** below) are based on Area 3 data.

Because automobile trips will generally use the parking garage and taxicab trips will use the drop-off areas, two trip distribution patterns for each of these vehicle types. The distribution for automobile trips generated by the Project is shown in **Figure 3-11.** Automobile trips are distributed into and out of the Project's parking garage.

The distribution of taxicab trips, as shown in **Figure 3-12,** is similar to the automobile pattern, although these trips will use the drop-off driveway on Traveler Street or the drop-off curb on East Berkeley.

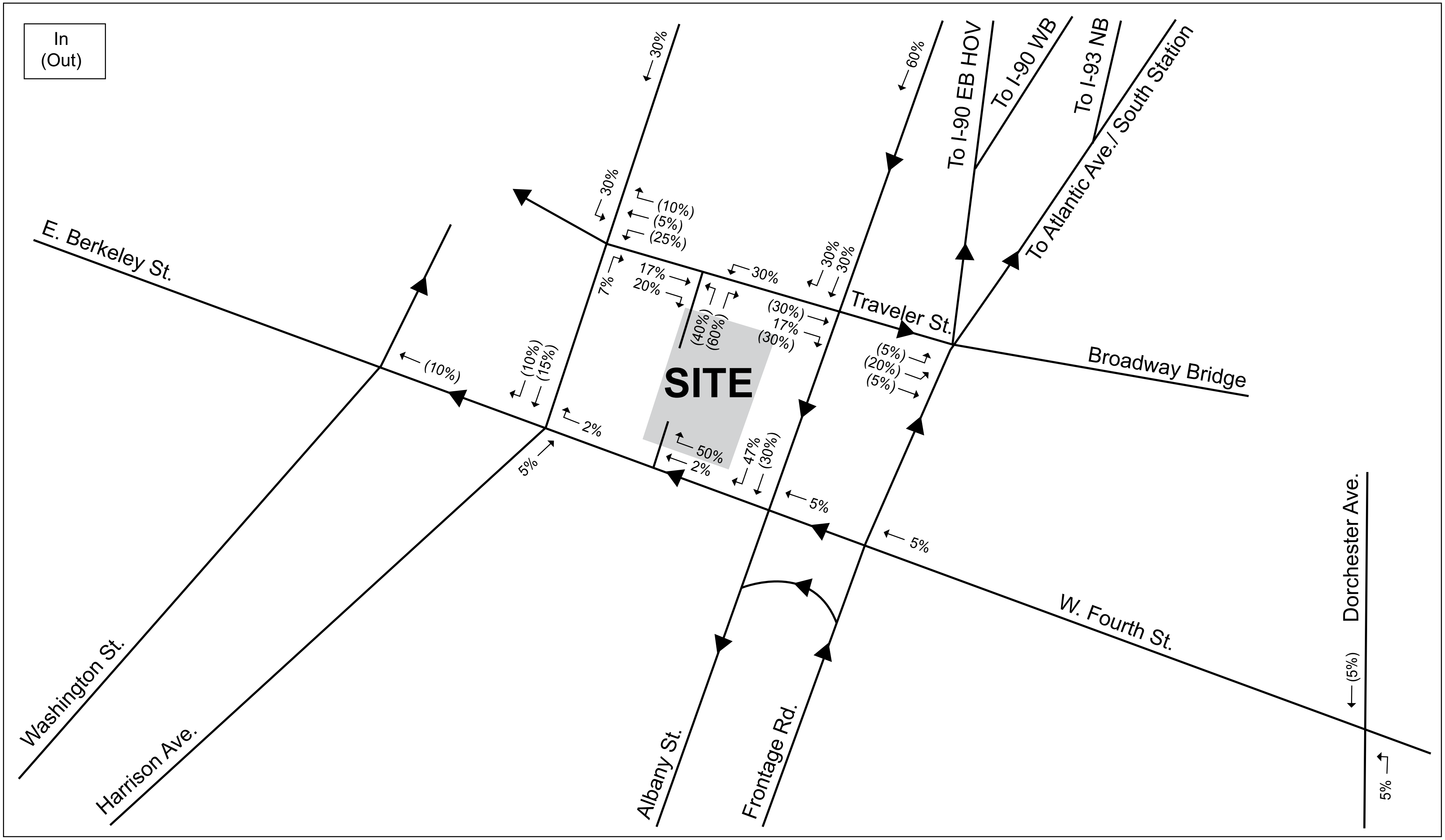

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Figure 3-10

Trip Distribution: Automobile Trips

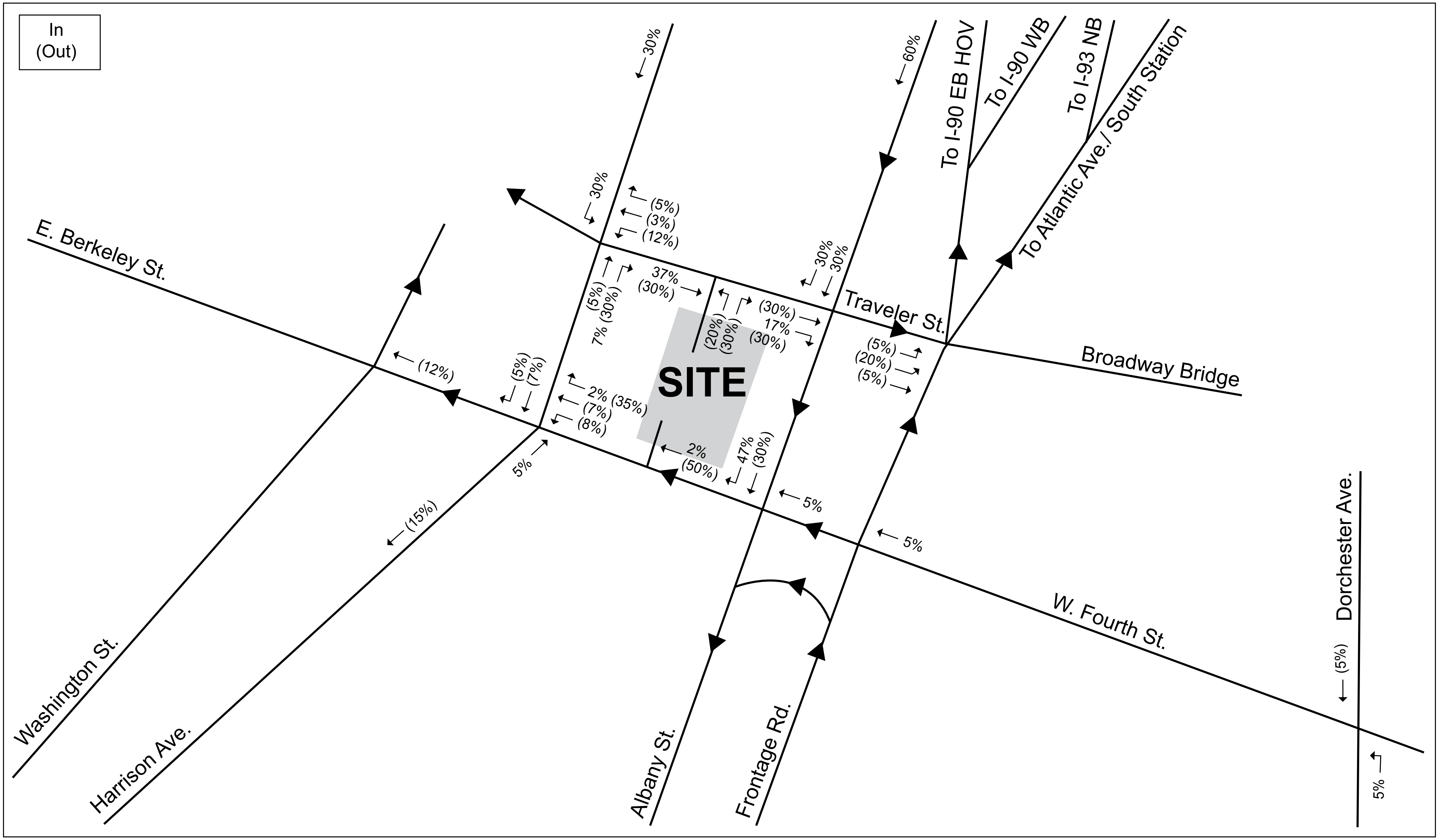

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Figure 3-11

Trip Distribution: Taxicab Trips

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Figure 3-12
Site Plan

3.3.2.3 Trip Generation

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

The Institute of Transportation Engineers (ITE) vehicle trip generation rates presented below produce the number of "unadjusted" vehicle trips associated with the Project. The "unadjusted" vehicle trips, however, are not the final vehicle trips generated by the 275 Albany Street Project. Several interim steps further refine the estimate to reflect the particular characteristics of the development program and building site.

Vehicle trip generation estimates for the Project use rates derived from ITE's *Trip Generation* (8th edition, 2008) average trip rates. The following ITE land use codes (LUCs) were used to develop the new Project-related vehicle trips:

LUC 310 — Hotel. The hotel land use is defined as a place of lodging that provides sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention centers, limited recreational facilities (e.g., pool, fitness room), and/or other retail services or shops. Calculation of the number of vehicle trips uses ITE's average rate per room.

LUC 312 — Business Hotel. Business hotels are places of lodging aimed toward the business traveler. These hotels provide sleeping accommodations and other limited facilities, such as a breakfast buffet bar and afternoon beverage bar. No lunch or dinner is served, nor are meeting facilities provided. Calculation of the number of vehicle trips uses ITE's average rate per room.

Trip generation is based on full occupancy of the two hotels.

3.3.2.4 Mode Share and Vehicle Occupancy Rates

Mode shares are defined as the percentage of people who travel to a project site via vehicle, transit, or bike/on foot. The study team adopted mode shares from BTD Area 3.

Because hotels also generate a significant amount of taxicab activity, the vehicle mode share was further disaggregated into automobiles and taxicabs. Based on analysis performed by the Central Transportation Planning Staff (CTPS)[1], 30% of vehicle trips generated by hotels are assumed to be by taxicab. Because taxicabs arrive and soon depart after

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[1] *Central Artery/Tunnel Project Detailed Travel Model Documentation,* prepared for Massachusetts Highway Department by Bechtel/ Parsons Brinckerhoff and Cambridge Systematics, September 1994.

picking up or discharging passengers, taxicabs generate two vehicle trips (one in and one out) within a short period of time. Conversely, an automobile arriving at the hotel proceeds to the garage to park and generates only one trip during that period.

It was assumed that half of the hotel taxicabs serve two hotel-related passenger trips: one entering and one exiting. The other half of the taxicabs was assumed to accommodate either an arriving hotel passenger or an exiting hotel passenger, but not both.

Vehicle occupancy rates (VOR) were derived from the 2001 National Household Travel Survey.

The peak-hour mode shares and VOR are summarized in **Table 3-8.**

Table 3-8 Peak-hour Mode Shares and Vehicle Occupancy Rates (VOR)

Mode of Travel	Hotel
Vehicle	42%
Automobile	29%
Taxicab	13%
Transit	21%
Walk/bike	37%
VOR	2.1

Based on the land use trip rates, mode share, and vehicle occupancy rate assumptions, the resulting Project-generated vehicle trips are presented in **Table 3-9.** These new trips are then added to the Year 2014 No-Build volumes to create the Year 2014 Build volumes.

Table 3-9 Project Vehicle Trips

Time of Day		Extended-stay Hotel (A)	Select-service Hotel (B)	Total (A+B)
Daily	Total	1,120	1,334	**2,454**
	In	560	667	1,227
	Out	560	667	1,227
a.m. Peak	Total	70	72	**142**
	In	38	40	78
	Out	32	32	64
p.m. Peak	Total	75	76	**151**
	In	41	39	81
	Out	34	37	71

Vehicle trips include automobile and taxicab trips.

The Project will generate 2,454 vehicle trips (1,227 in and 1,227 out) over the course of an average weekday. Because hotel trips are dispersed throughout the day and not concentrated during peak hours (as office trips are), the traffic impact during typical commuter travel times will be relatively minor. During the a.m. and p.m. peak hours, the Project is expected to generate 142 and 151 new vehicle trips, respectively.

The a.m. and p.m. peak-hour Project trips are shown in **Figure 3-13** and **Figure 3-14.** The automobile and taxicab access and egress routes are shown in **Figure 3-15.**

3.3.2.5 Build Conditions Traffic Operations

Year 2014 Build Conditions turning movement volumes are shown in **Figure 3-16** and **Figure 317.** The associated Build traffic operations are presented in **Table 3-10** and **Table 3-11** for the a.m. and p.m. peak hours, respectively. Complete Synchro reports are provided in **Appendix B.**

Table 3-10 Build Conditions (2014) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Signalized Intersections				
Harrison Avenue/Traveler Street	C	**31.6**		
Traveler WB left/thru	D	45.5	0.63	52
Traveler WB right	B	10.4	0.42	23
Harrison NB left/thru | thru/right	A	7.8	0.36	147
Harrison SB left/thru | thru/right	E	61.8	0.97	#196
Albany Street/Traveler Street	B	**19.2**		
Traveler EB thru/right	E	56.5	0.77	249
Albany SB left	B	15.7	0.61	543
Albany SB left/thru | thru/right	B	13.1	0.62	527
Broadway Bridge/Frontage Road/Traveler Street	E	**65.9**		
Traveler EB hard left to I-90	D	44.1	0.16	m54
Traveler EB left to I-93	E	59.5	0.67	m192
Traveler EB thru	A	6.5	0.34	37
Broadway WB right to I-90 | hard right to I-93	C	35.0	0.70	354
Broadway WB hard right to I-93	F	>80.0	>1.0	#932
Frontage NB thru to I-90 | thru to I-90	D	39.1	0.38	m132
Frontage NB thru to I-93 |thru to I-93| thru/right	D	43.8	0.73	m288
East Berkeley Street/Washington Street	B	**17.0**		
E. Berkeley WB left/thru | thru | thru/right	A	8.0	0.63	m326
Washington NB left	C	23.1	0.33	111
Washington NB thru | bus-only thru	D	38.9	0.81	352
Washington SB bus-only thru	B	19.2	0.06	18

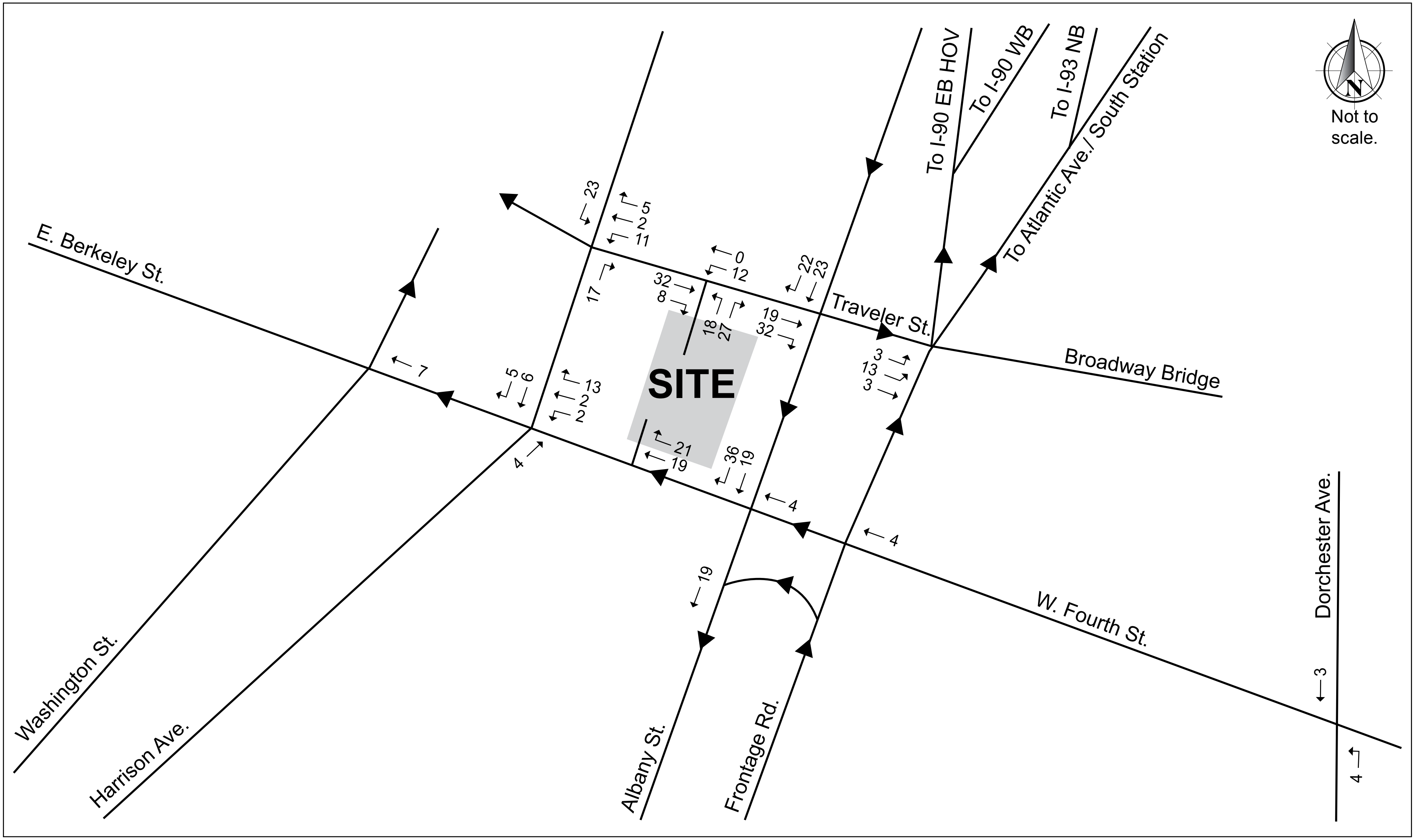

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Figure 3-13
Project Vehicle Trips (2014) a.m. Peak-hour (8:00-9:00 a.m.)

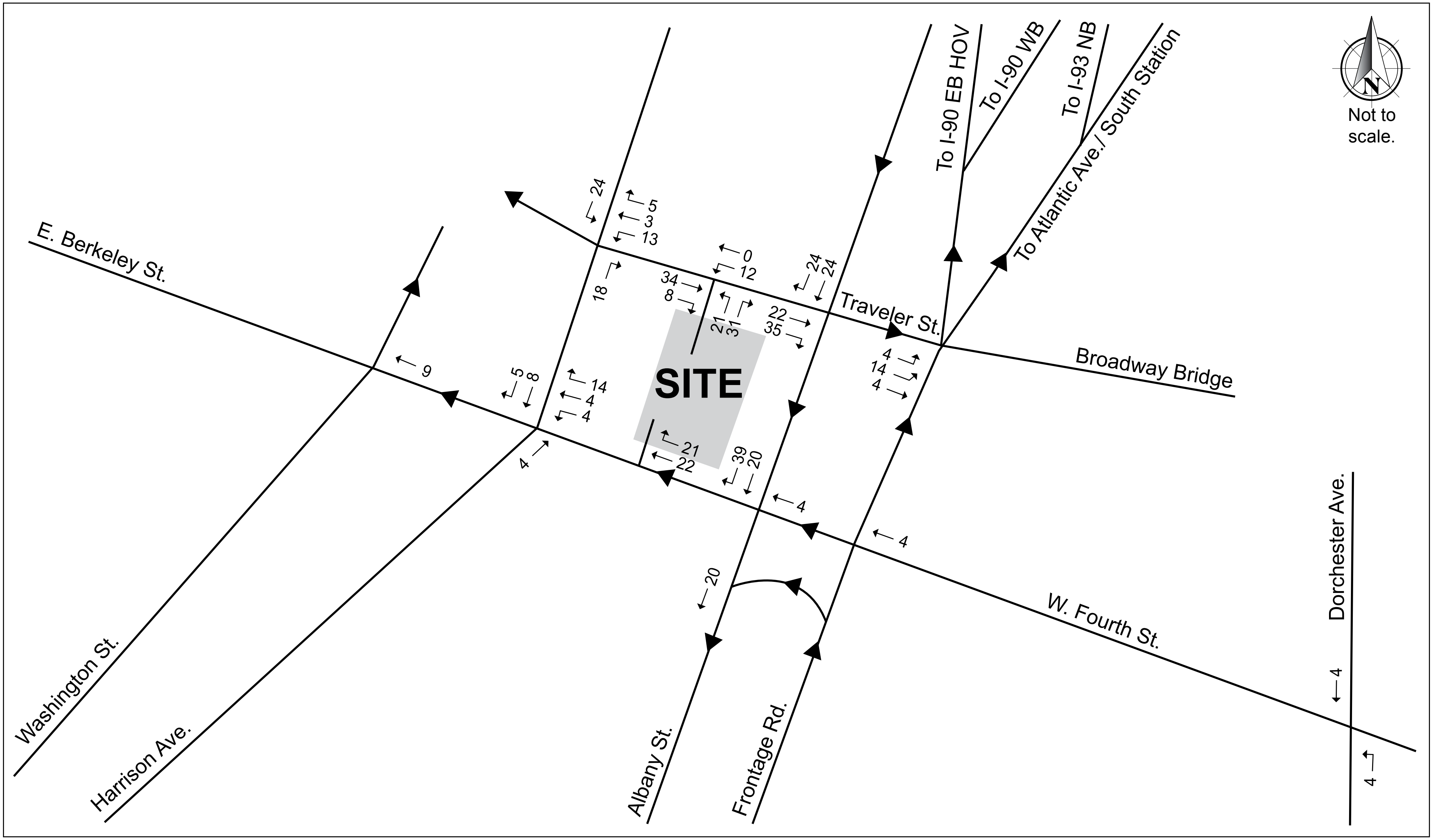

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Figure 3-14

Project Vehicle Trips (2014) p.m. Peak-hour (5:00-6:00 p.m.)

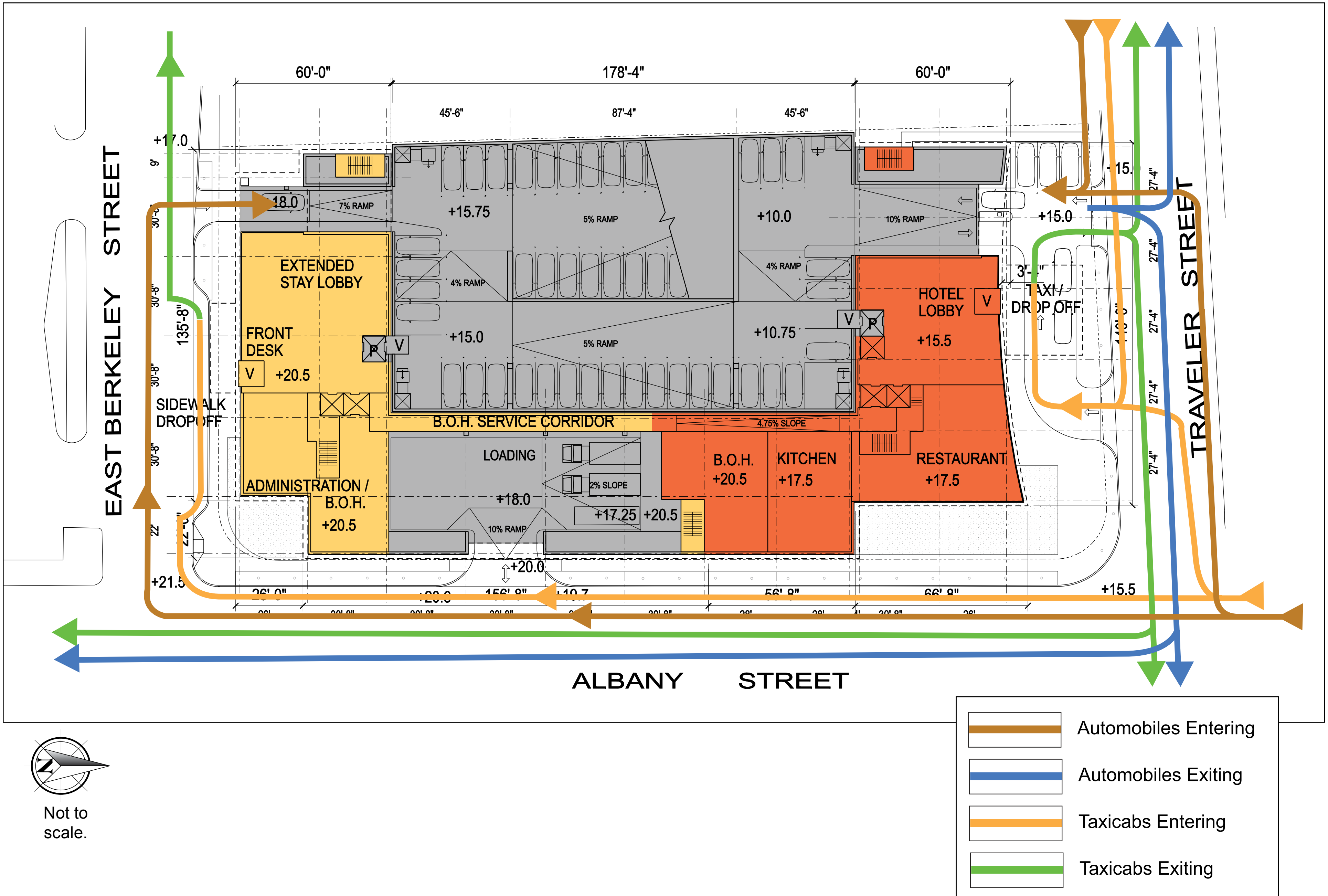

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Figure 3-15

Automobile and Taxicab Access and Egress

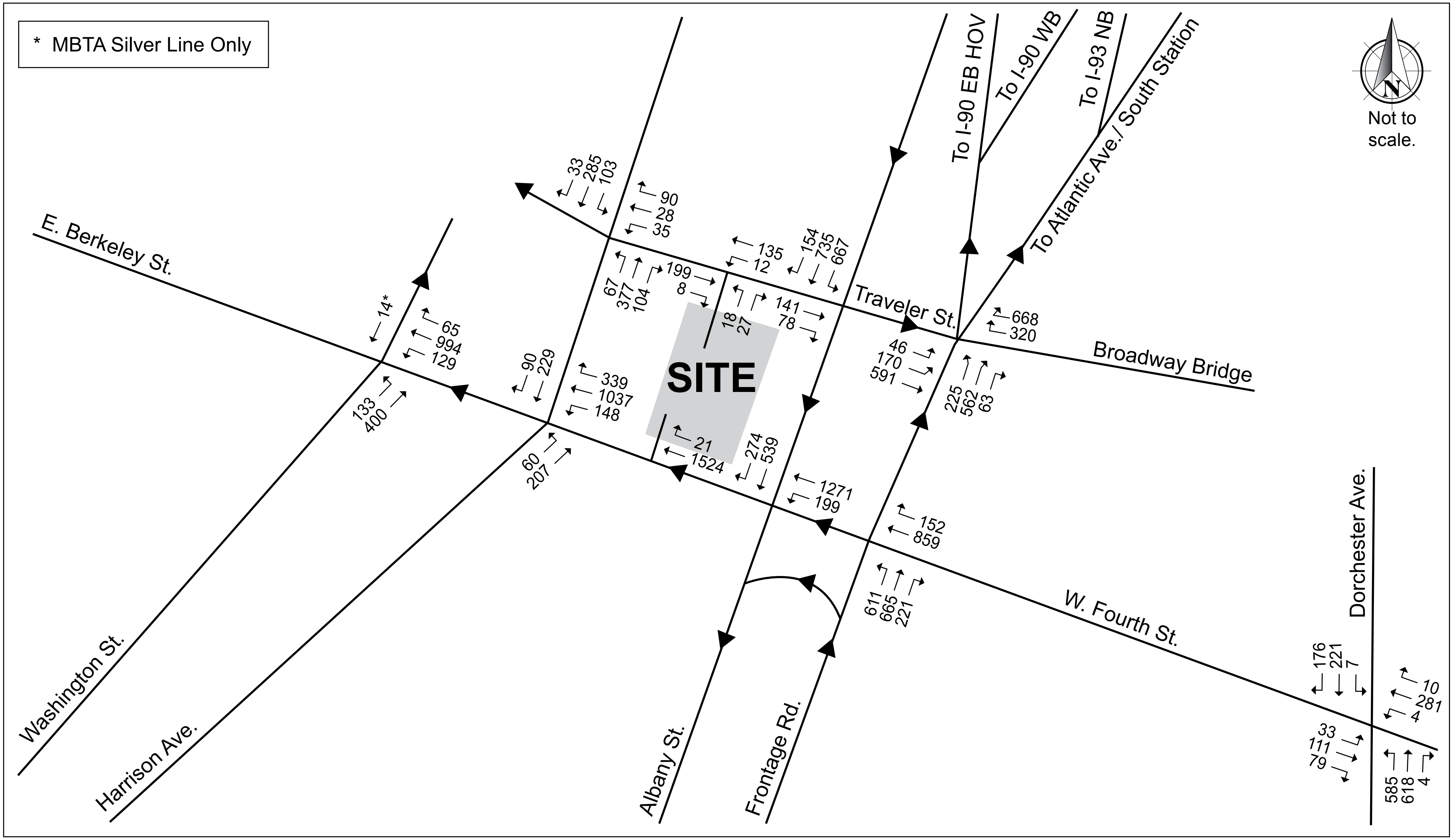

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Figure 3-16

Build Conditions (2014) Turning Movement Volumes, a.m. Peak-hour (8:00-9:00 a.m.)

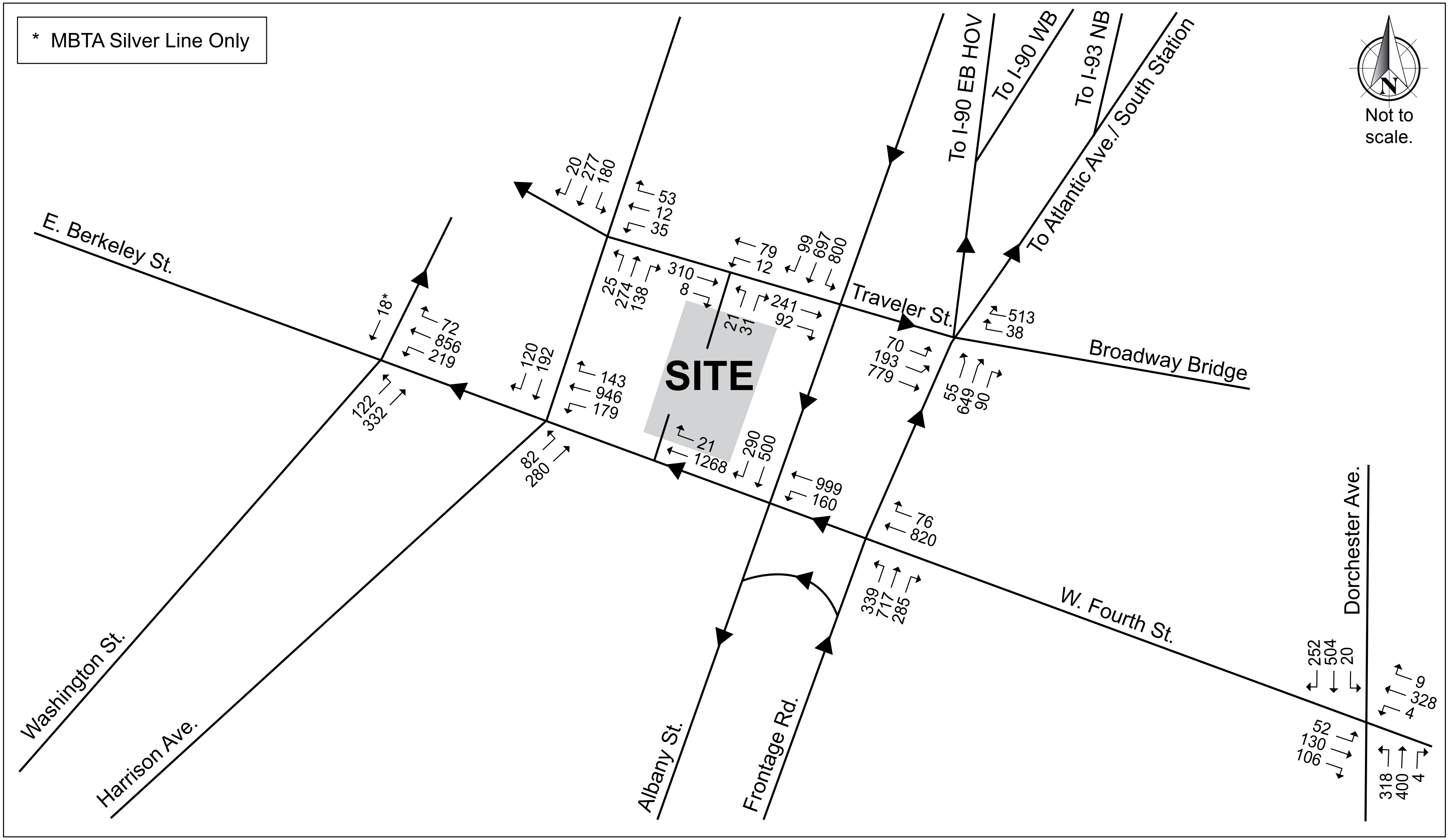

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Figure 3-17

Build Conditions (2014) Turning Movement Volumes, p.m. Peak-hour (5:00-6:00 p.m.)

Table 3-10 Build Conditions (2014) Level of Service Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
East Berkeley Street/Harrison Avenue	D	**40.6**		
E. Berkeley WB left/thru | thru | thru/right	D	49.1	0.99	#491
Harrison NB left/thru	C	26.1	0.58	#347
Harrison SB thru	B	19.9	0.35	200
Harrison SB right	A	4.6	0.16	27
Albany Street/East Berkeley Street	C	**29.6**		
E. Berkeley WB left/thru | thru | thru	C	32.5	0.39	216
Harrison SB thru | thru |thru/right	C	24.7	0.56	128
Frontage Road/West Fourth Street/ East Berkeley Street	D	**47.1**		
W. Fourth WB thru | thru | thru/right	F	>80.0	0.90	#392
Frontage NB left	C	25.2	0.69	#716
Frontage NB thru |thru/right	C	22.2	0.69	#601
Dorchester Avenue/West Fourth Street	D	**37.9**		
W. Fourth EB left/thru	C	34.0	0.50	144
W. Fourth EB right	A	6.8	0.24	20
W. Fourth WB left/thru/right	D	50.9	0.84	#322
Dorchester NB left	F	>80.0	>1.0	#531
Dorchester NB thru |thru	A	8.3	0.39	118
Dorchester NB right	A	2.8	0.02	0
Dorchester SB left/thru |thru/right	B	11.8	0.50	78

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Cell shading indicates a change in LOS from the previous condition.

Table 3-11 Build Conditions (2014) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Signalized Intersections				
Harrison Avenue/Traveler Street	C	**22.4**		
Traveler WB left/thru	E	55.7	0.51	51
Traveler WB right	B	15.4	0.44	6
Harrison NB left/thru | thru/right	A	5.5	0.24	m114
Harrison SB left/thru | thru/right	D	35.5	0.97	230
Albany Street/Traveler Street	C	**20.1**		
Traveler EB thru/right	E	56.2	0.86	317
Albany SB left	A	7.9	0.68	327
Albany SB left/thru | thru/right	B	14.9	0.59	356

Table 3-11 Build Conditions (2014) Level of Service Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	95th Percentile Queue (feet)
Broadway Bridge/Frontage Road/Traveler Street	**D**	**43.4**		
Traveler EB hard left to I-90	D	40.9	0.42	70
Traveler EB left to I-93	D	46.8	0.58	m185
Traveler EB thru	A	9.2	0.43	114
Broadway WB right to I-90 | hard right to I-93	C	21.4	0.09	47
Broadway WB hard right to I-93	F	>80.0	>1.0	#634
Frontage NB thru to I-90 | thru to I-90	C	22.9	0.07	m15
Frontage NB thru to I-93 |thru to I-93| thru/right	D	44.6	0.92	#271
East Berkeley Street/Washington Street	**C**	**20.8**		
E. Berkeley WB left/thru | thru | thru/right	B	16.5	0.80	m#515
Washington NB left	C	24.5	0.29	107
Washington NB thru | bus-only thru	C	33.4	0.67	296
Washington SB bus-only thru	C	21.6	0.08	22
East Berkeley Street/Harrison Avenue	**E**	**65.1**		
E. Berkeley WB left	C	26.4	0.35	150
E. Berkeley WB thru | thru/right	F	>80.0	1.00	#522
Harrison NB left/thru	C	25.8	0.66	#441
Harrison SB thru	A	6.4	0.26	m132
Harrison SB right	A	1.8	0.24	22
Albany Street/East Berkeley Street	**B**	**13.1**		
E. Berkeley WB left/thru | thru | thru	A	4.9	0.51	42
Harrison SB thru | thru |thru/right	C	23.0	0.59	250
Frontage Road/West Fourth Street/ East Berkeley Street	**C**	**25.6**		
W. Fourth WB thru | thru | thru/right	D	43.0	0.81	298
Frontage NB left	A	3.1	0.39	51
Frontage NB thru |thru/right	B	18.0	0.65	#486
Dorchester Avenue/W. Fourth Street	**E**	**56.7**		
W. Fourth EB left/thru	C	32.1	0.58	168
W. Fourth EB right	A	5.1	0.30	7
W. Fourth WB left/thru/right	D	36.2	0.73	#293
Dorchester NB left	F	>80.0	>1.0	#303
Dorchester NB thru |thru	A	9.9	0.26	85
Dorchester NB right	A	4.0	0.02	0
Dorchester SB left/thru |thru/right	D	41.8	0.95	#362

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Cell shading indicates a change in LOS from the previous condition

In the tables above, shaded cells indicate a worsening of level of service from No-Build Conditions.

During the a.m. peak hour, no intersection will experience an overall change in level of service, but will remain at the same levels projected for No-Build Conditions. Three locations will experience a level of service change on an individual approach only:

- At Harrison Avenue/Traveler Street, the southbound Harrison Street approach will worsen from LOS D to LOS E.
- At Albany Street/Traveler Street, the southbound Albany Street approach will worsen from LOS A to LOS B.
- At Broadway Bridge/Frontage Road/Traveler Street, the eastbound Traveler Street left turn will worsen from LOS D to LOS E.

During the p.m. peak hour, one intersection will experience an overall change in level of service, while another will experience a level of service change on an individual approach only:

- At Harrison Avenue/Traveler Street, the westbound Traveler Street approach will worsen from LOS D to LOS E. The overall intersection remains unchanged at LOS C.
- While the overall intersection operation of Albany Street/Traveler Street will worsen from LOS B to LOS C, the Traveler Street eastbound approach worsens from LOS D to LOS E.

Under Build Conditions, only one intersection will experience an overall decrease in level of service (from LOS B to LOS C). All other intersections continue to operate as under No-Build Conditions. While six individual approaches at various intersections will experience a decrease in level of service, the changes are not large enough to affect overall level of service. Therefore, the overall traffic impacts of the Project are considered insignificant.

3.3.2.6 Build Conditions Parking

On-site parking will be provided for hotel guests. Hotel guest parking will be available on the basement and ground levels for approximately 137 vehicles.

BTD has established parking space guidelines throughout the City to ensure that the proper parking capacity is provided with new buildings. **Table 3-12** shows the number of proposed parking spaces by land use, the recommended BTD parking ratio, and the estimated Project parking ratio.

Table 3-12 Parking Space Allotment by Land Use

Land Use	Spaces	BTD Guidelines Parking Rate	Project Parking Rate
Hotels (408 rooms total)	137	0.40 spaces/room	0.34 spaces/room

The proposed parking rate is slightly below the BTD recommended guidelines, but given the Project's estimated taxicab activity and the close proximity to MBTA bus stops at East Berkeley Street/Harrison Street (Route #9 and Route #11) and at East Berkeley Street/Washington Street (Silver Line), the parking supply should be adequate.

3.3.2.7 Build Conditions Public Transportation

Based on the transit mode shares presented in **Section 3.3.2.4**, the future transit trips associated with the Project were estimated. As shown in **Table 3-13,** about 794 new transit trips will occur over the course of an average weekday. The Project will generate 104 new transit trips during the a.m. peak hour and 109 new transit trips during the p.m. peak hour.

Table 3-13 Project Transit Trips

Time of Day		Extended-stay Hotel	Select-service Hotel	Total
		(A)	(B)	(A+B)
Daily	Total	362	432	**794**
	In	181	216	**398**
	Out	181	216	**398**
a.m. Peak	Total	51	52	**104**
	In	30	32	**62**
	Out	21	20	**41**
p.m. Peak	Total	54	55	**109**
	In	32	29	**61**
	Out	22	26	**48**

3.3.2.8 Build Conditions Pedestrian and Bicycle Conditions

Based on the walk mode shares presented in **Section 3.3.2.4**, the future walk trips were estimated and are summarized in **Table 3-14.**

Table 3-14 Project Pedestrian Trips

Time of Day		Extended-stay Hotel (A)	Select-service Hotel (B)	Total (A + B)
Daily	Total	1,058	1,262	2,320
	In	529	631	1,160
	Out	529	631	1,160
a.m. Peak	Total	90	92	182
	In	53	56	109
	Out	37	36	73
p.m. Peak	Total	95	96	191
	In	57	51	108
	Out	38	45	83

Over the course of the day, the Project will generate 2,320 new walk trips per day. With the Project, there will be about 182 new pedestrian trips into and out of the site during the a.m. peak hour and about 191 new pedestrian during the p.m. peak hour. This level of activity averages to about three additional pedestrian trips every minute during the peak hours and will not impact the pedestrian environment in the study area.

Most pedestrian trips will probably be oriented toward South End businesses along Harrison Avenue and Washington Street. While some pedestrians will also travel over the Broadway Bridge and the West Fourth Street Bridge to South Boston destinations along Dorchester Avenue and West Broadway, the need to cross under the I-93 elevated highway and over the bridges may discourage pedestrian activity toward the South Boston neighborhood. It should be noted, however, that public presentations on the *Harrison-Albany Corridor Strategic Plan* by the City have emphasized the need to improve and beautify the pedestrian connections between the South End and South Boston, specifically along the West Fourth Street/East Berkeley Street corridor and the Broadway Bridge/Traveler Street corridor. The forthcoming Plan is likely to include specific actions to improve the environment under the I-93 highway. Such improvements to the connectivity between the Project and destinations in South Boston are likely to increase pedestrian activity.

As discussed under No-Build Conditions in **Section 3.3.1.4,** the South Bay Harbor Trail is scheduled to be completed in late 2010. The trail, being constructed with public and private funds, will connect bicyclists in the Seaport District at Fan Pier to the MBTA Ruggles Street Station in Roxbury. Near the 275 Albany Street site, the trail will traverse the Broadway Street Bridge and connect south along Albany Street toward Massachusetts Avenue.

While the South Bay Trail will travel on Albany Street adjacent to the Project site, it is anticipated that no hotel guests will generate bicycle trips. Hotel employees will be encouraged to use bicycles to commute to work, as outlined in below in **Section 0**, Transportation Demand Management.

3.3.2.9 Build Conditions Loading and Service Accommodations

Loading and service operations will occur at an internal loading dock, with an access/egress curb cut provided on Albany Street, between Berkeley Street and Traveler Street. As shown in the site plan (see **Figure 3-10,** above), the loading dock will include two truck bays. Trucks will turn into the loading dock area and have sufficient area to maneuver and back into the loading dock. When leaving, trucks will turn right onto Albany Street. Given the traffic signal at Albany Street/Traveler Street, there will be sufficient breaks in Albany Street traffic for trucks to safely exit and turn right onto Albany Street. Because pedestrian activity along Albany Street near the loading dock curb cut will continue to be limited in the future, conflicts between truck maneuvers and pedestrian should be minimal.

Hotel deliveries include primarily linens and food. Truck trip estimates were based on National Cooperative Highway Research Program (NCHRP)[2] data for Boston. **Table 3-15** shows the characteristics of truck activity.

Table 3-15 Future Daily Truck Activity

Use	Daily Project Truck Trips	General Delivery Times
Hotel	14	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.

The Project will generate about 14 daily truck trips. Most deliveries are expected to occur between 7:00 a.m. and 1:00 p.m., or, on average, about one to two trucks per hour during this period. The two proposed loading docks will be sufficient to handle the loading demands of the Project.

Permanent "No Idling" signs will be posted in the loading and parking areas.

[2] *Truck Trip Generation Data—Synthesis 298.* National Cooperative Highway Research Program (NCHRP) and Transportation Research Board. 2001.

3.4 Transportation Demand Management

The Project Proponent is committed to implementing Travel Demand Management ("TDM") measures to reduce parking demand and dependence on autos. TDM will be facilitated by the nature and location of the proposed uses within the proposed Project.

On-site management will keep a supply of transit information (schedules, maps, fare information) in the building available upon request by hotel guests and visitors.

The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact. TDM measures for the Project may include, but are not limited to, the following:

Transportation Coordinator. The Proponent will require the Hotel Operator to designate a full-time, on-site employee as the Development's transportation coordinator. The transportation coordinator will oversee all transportation issues. This includes managing vehicular operations, service and loading, parking, and TDM programs.

Ridesharing/Carpooling. The Proponent will require the Hotel Operator to facilitate ridesharing for employees through geographic matching, parking fee discounts, and preferential parking for carpools/vanpools in the off-site parking garage.

Guaranteed Ride Home Program. The Proponent will require the Hotel Operator to offer a "guaranteed ride home" for employees in order to remove an obstacle to transit use and ridesharing.

Transit Pass Programs. The Proponent will require the Hotel Operator to encourage employees to use transit through the following measures:

- ♦ Offering on-site transit pass sales or participation in the MBTA Corporate T-Pass Program.
- ♦ Offering T-pass subsidies to full-time employees and, on a *pro rata* basis, to part-time employees.
- ♦ Investigating the potential of offering federal "Commuter Choice" programs, including pre-tax deductions for transit passes and subsidized transit passes.

Information and Promotion of Travel Alternatives. The Developer will encourage the Hotel Operator to:

- ♦ Provide employees and visitors with public transit system maps, schedules, and other information on transit services in the area and provide such information in a prominent location within the Hotel, as well as on the Hotel's Web site.

- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options.

- Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby.

- Provide information on travel alternatives to new employees.

3.5 Evaluation of Short-term Construction Impacts

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

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

- Limited construction worker parking on-site;

- Encouragement of worker carpooling;

- Consideration of a subsidy for MBTA passes for full-time employees; and

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

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

Section 4.0

Environmental Protection Component

4.0 ENVIRONMENTAL PROTECTION COMPONENT

This chapter describes the Project's anticipated environmental impacts and the proposed mitigation measures that will be used to minimize impacts.

4.1 Wind

4.1.1 Introduction and Background

Pedestrian Level Wind analyses are performed to estimate the relative change in wind conditions that may result from new construction. Epsilon Associates, with the assistance of Rowan Williams Davies and Irwin Inc. (RWDI), has undertaken an assessment (including a computer simulation and professional analysis) of pedestrian level winds (PLW) for the proposed Project. The results indicate that the proposed Project will not significantly adversely affect wind patterns. Wind speeds at the majority of locations that were studied at and surrounding the Project site are expected to be within a "comfortable" range based upon BRA criteria. Some locations may experience slightly increased wind speeds on an annual basis and shift from a comfortable to uncomfortable category. The Project is not, however, expected to cause any dangerous PLW.

PLW assessments consider both the local wind climate as well as the physical nature of a project and its surroundings. Average wind speeds increase with height. The placement of large structures, such as buildings, affects higher level winds and produces wind flow accelerations on the windward (upwind) and parallel sides of the building as wind is deflected up and over, and around the sides of a building. On the lee (downwind) side, the difference in wind speed produces a pressure gradient, causing the air immediately adjacent to the building to move from higher to lower pressure (*i.e.*, up). Depending on the relative locations of buildings, wind can also undergo a Venturi effect, in which the wind velocity increases as the street width between buildings (*i.e.*, cross sectional area) decreases (*i.e.*, a tunneling effect).

The PWL assessment for 275 Albany Street used the current 3D-model and design drawings for the Project as presented in this PNF. The analysis was based on the following:

- a review of drawings and aerial photographs of the Project site and the surrounding area;
- a review of local long-term meteorological data and information;
- engineering judgment and knowledge of wind flows around buildings;
- extensive experience (of more than 1,500 projects) of wind tunnel modeling of various building projects;

- a review of quantitative wind tunnel testing results for other projects nearby the Project site;

- use of a numerical analysis software Windestimator[1] developed by RWDI for estimating the potential wind comfort conditions around generalized building forms; and,

- use of Computational Fluid Dynamics (CFD) software Virtualwind, for visualizing wind flow patterns.

Issues relating to door pressures, stack effect, exhaust re-entrainment, and loading were not considered in the scope of the assessment. In the absence of wind tunnel testing, the numerical approach that was followed provides a screening-level estimation of potential wind comfort conditions.

4.1.2 Description of No Build and Build Conditions

No-Build

The Project site is currently vacant with no structures on it. Albany Street and the elevated Southeast Expressway (I-93) are directly east of the site. There are a number of commercial buildings (e.g., Medieval Manor, Quinzani's Bakery, and Planet Self Storage) and related parking directly west of the site. To the north, on the opposite side of Traveler Street is the Boston Herald and its associated parking. To the south, on the opposite side of East Berkeley Street, is the Pine Street Inn.

Build Conditions

The proposed Project includes a 16-story select-service hotel on the northern edge of the site and a 9- story extended-stay hotel on the southern and eastern edges of the site, with a 3-level aboveground parking garage on the western edge of the property.

The tallest element of the Project will be the Select-service hotel which will be approximately 200 feet high (199'-8").

4.1.3 City of Boston Wind Criteria

The BRA is interested in preventing proposed projects from causing wind velocities that exceed what it considers to be acceptable levels. The BRA has defined a guideline effective gust velocity of 31 miles per hour (13.9 meters/second) not to be exceeded more than one

[1] 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.

percent of the time.[2] The effective gust is defined as the average wind speed plus a constant (λ) times the root mean square of the variation about the average. For $\lambda = 1.5$, the effective gust is typically the fastest 1-minute gust occurring in an hour.

In general, PLW are qualitatively described as being in one of the following five categories with Category 1 having the lowest wind speeds and Category 5 the highest:

- Category 1 Comfortable for long periods of standing or sitting;
- Category 2 Comfortable for short periods of standing or sitting;
- Category 3 Comfortable for walking;
- Category 4 Uncomfortable for walking; or
- Category 5 Dangerous or unacceptable

4.1.4 Methodology

Review of Local Wind Climate Data

Two sets of data were evaluated to estimate the local wind climate in the Project area. Thirty years of climate data, from 1951-1980, as published by Gale Research, show prevailing winds from the SW at 12.5 mph.[3] On a monthly basis, the winds are primarily from the southwest at 10-13 mph during the May-November period and from the west-northwest/northwest at 13-14 mph during the December to April period.

Thirty years (1974-1995 and 2001-2008) of hourly meteorological data observed at Boston Logan International Airport were also evaluated. The mean wind speed over this period is 12.0 mph (5.36 meters/second) and the predominant direction is from the west (277°). The effective gust can be calculated from the Airport data (using $\lambda = 1.5$) to be 19.7 mph (8.8 meters/second) which is less than the BRA wind criterion. In general, the wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph.

A seasonal breakdown of the 30 years of hourly data shows the variation between the summer and winter months. The mean wind speed over the summer months is 10.8 mph (4.82 meters per second) from the southwest (235°) while the mean wind speed over the winter months is 13.1 mph (5.84 meters per second) from the west northwest (289°).

Wind roses for the 30-year spring, summer, fall, winter, and annual periods are shown in Figures 4.1-1 through 4.1-5

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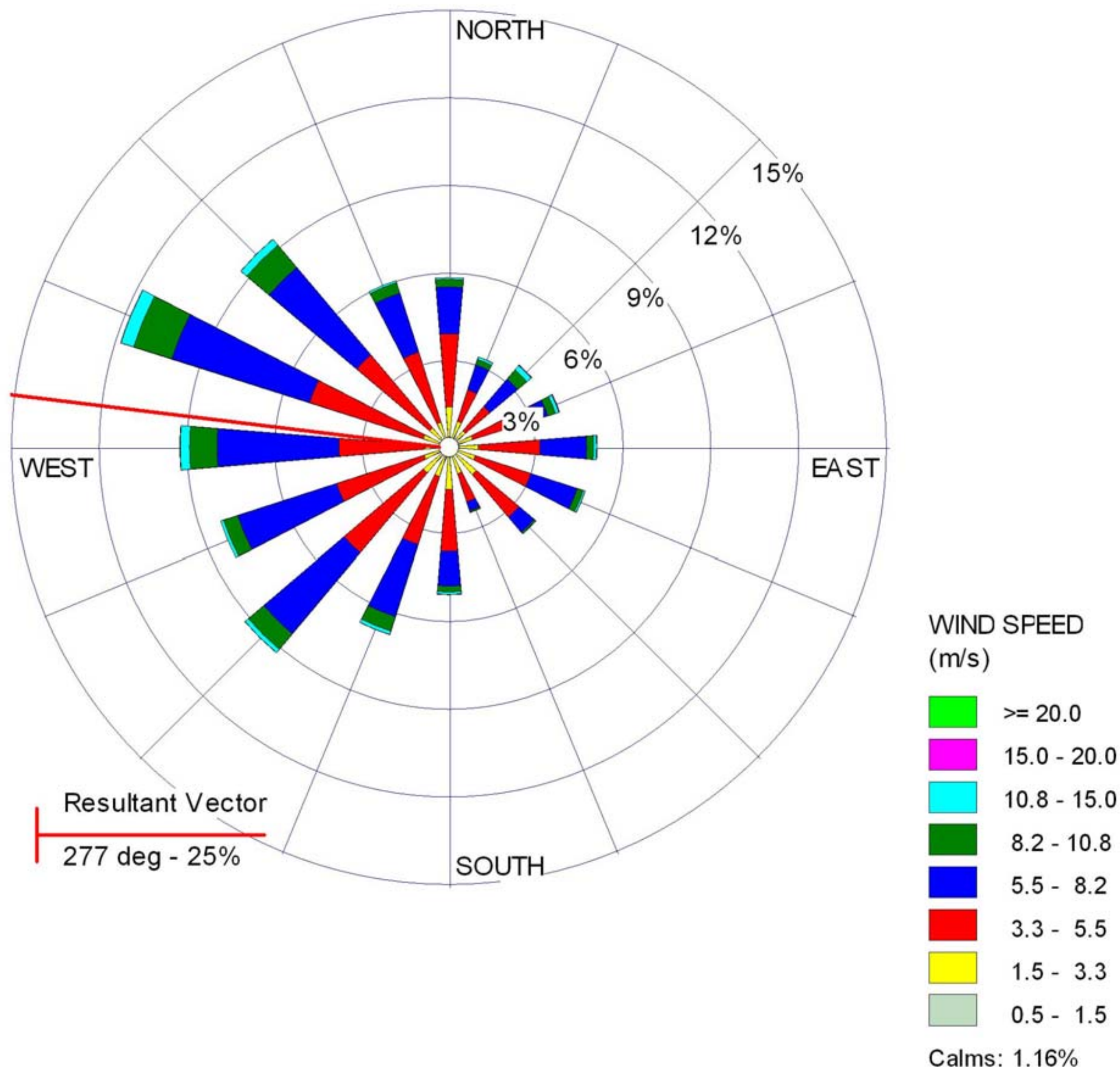
2 Boston Redevelopment Authority, Development Review Guidelines, 2006

3 Gale Research Company, Climate of the States Volume 1, Third Ed. 1985.



275 Albany Street, Boston, MA

Figure 4.1-1

Annual Wind Rose for Boston, MA (30 yrs)

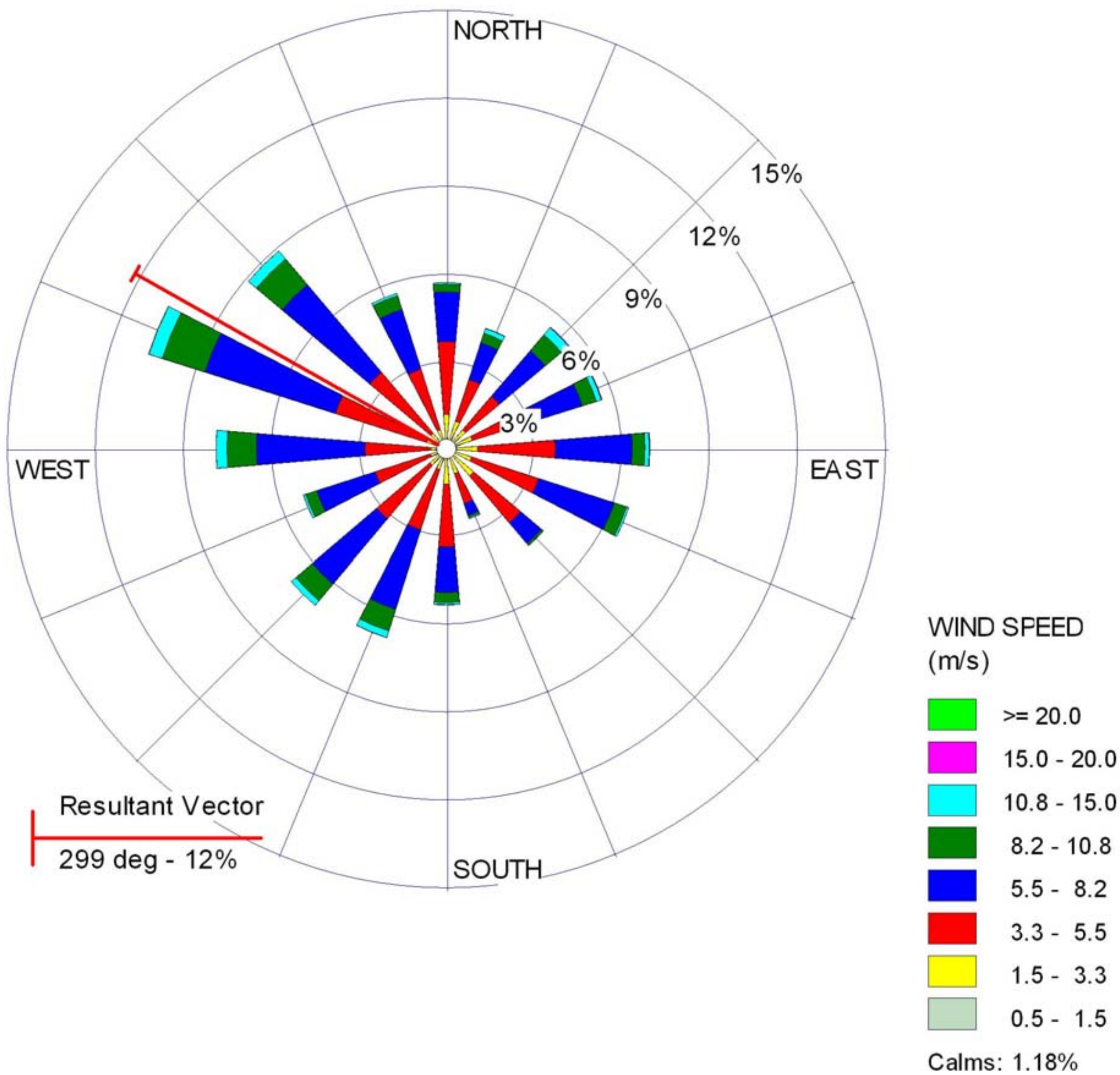
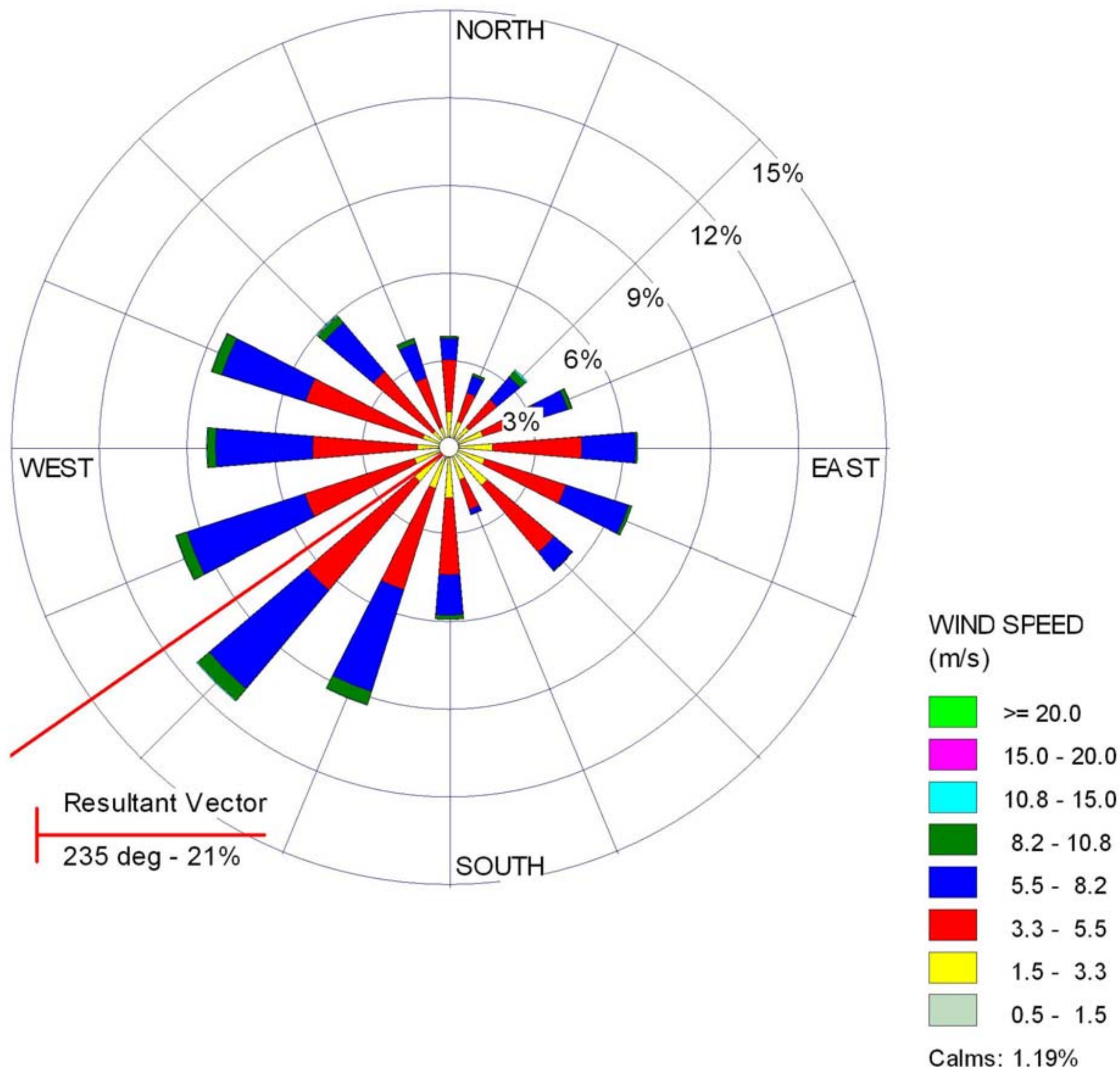


Figure 4.1-2

Spring Wind Rose for Boston, MA (30 yrs)



275 Albany Street, Boston, MA

Epsilon ASSOCIATES INC.

Figure 4.1-3

Summer Wind Rose for Boston, MA (30 yrs)

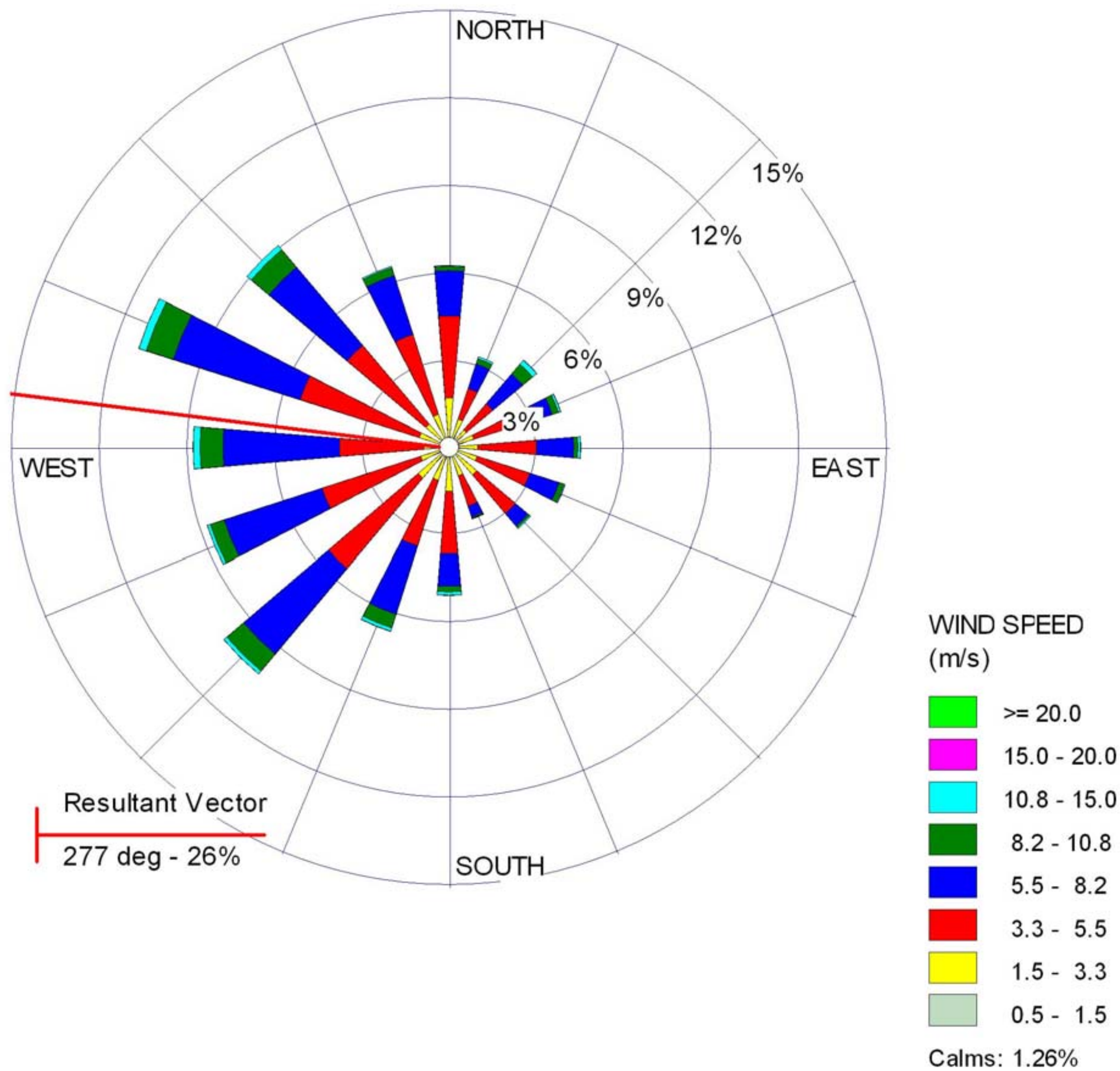


Figure 4.1-4

Fall Wind Rose for Boston, MA (30 yrs)

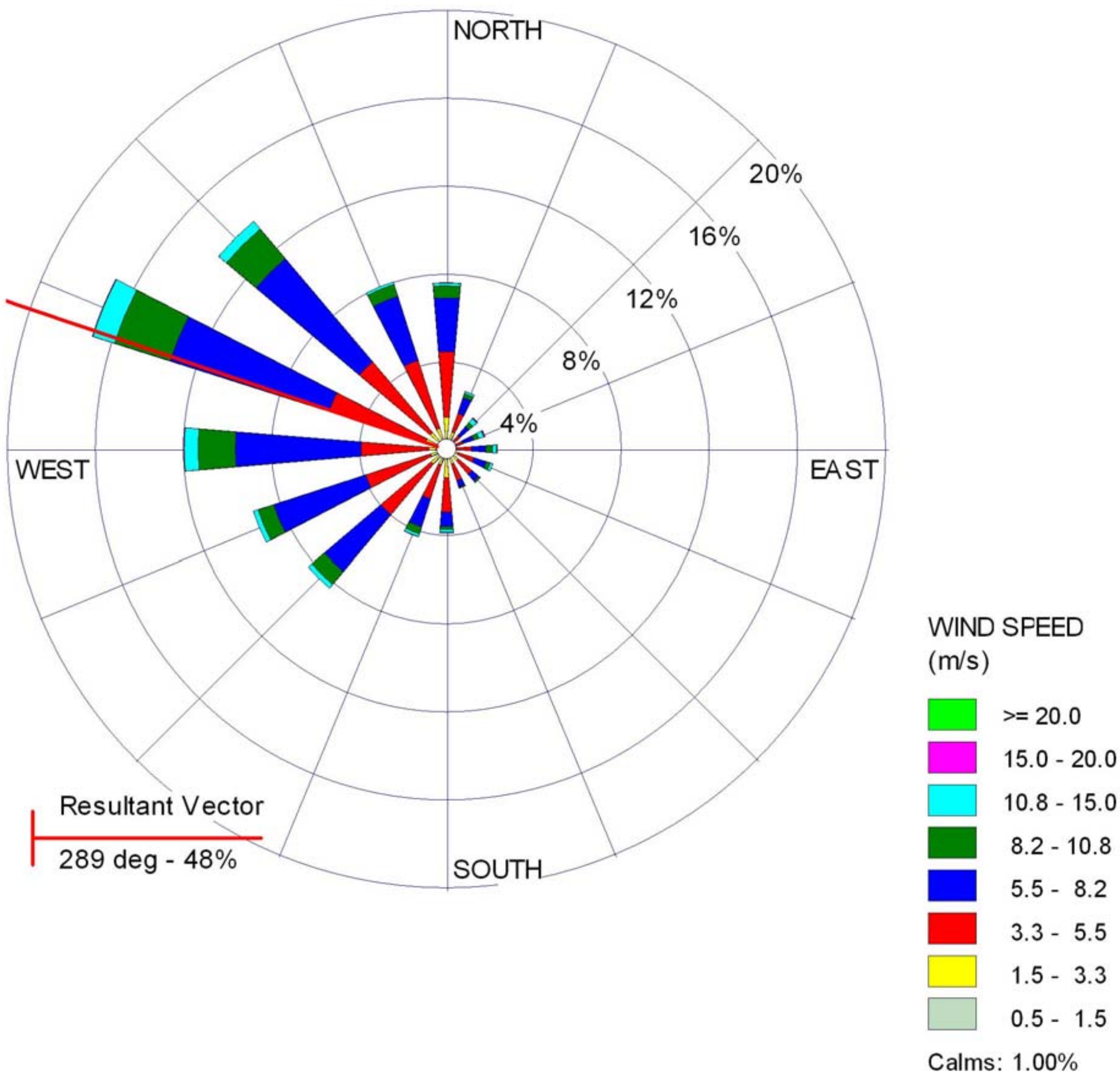


Figure 4.1-5

Winter Wind Rose for Boston, MA (30 yrs)

Computer simulation using VirtualWind®

VirtualWind® is an advanced 3-dimensional wind flow modeling and visualization software package developed by VirtualWind, Inc. VirtualWind can be used to predict and understand wind and microclimate in environments ranging from urban and suburban areas to rural terrain. The model uses an input wind speed and direction and incorporates building features to assess the wind field in a domain. The software allows the user to load a project file created in Google Sketchup™ which simplifies the modeling process. The goal of the analysis is to determine if a proposed structure will create new unacceptable wind conditions at ground locations under average atmospheric wind conditions.

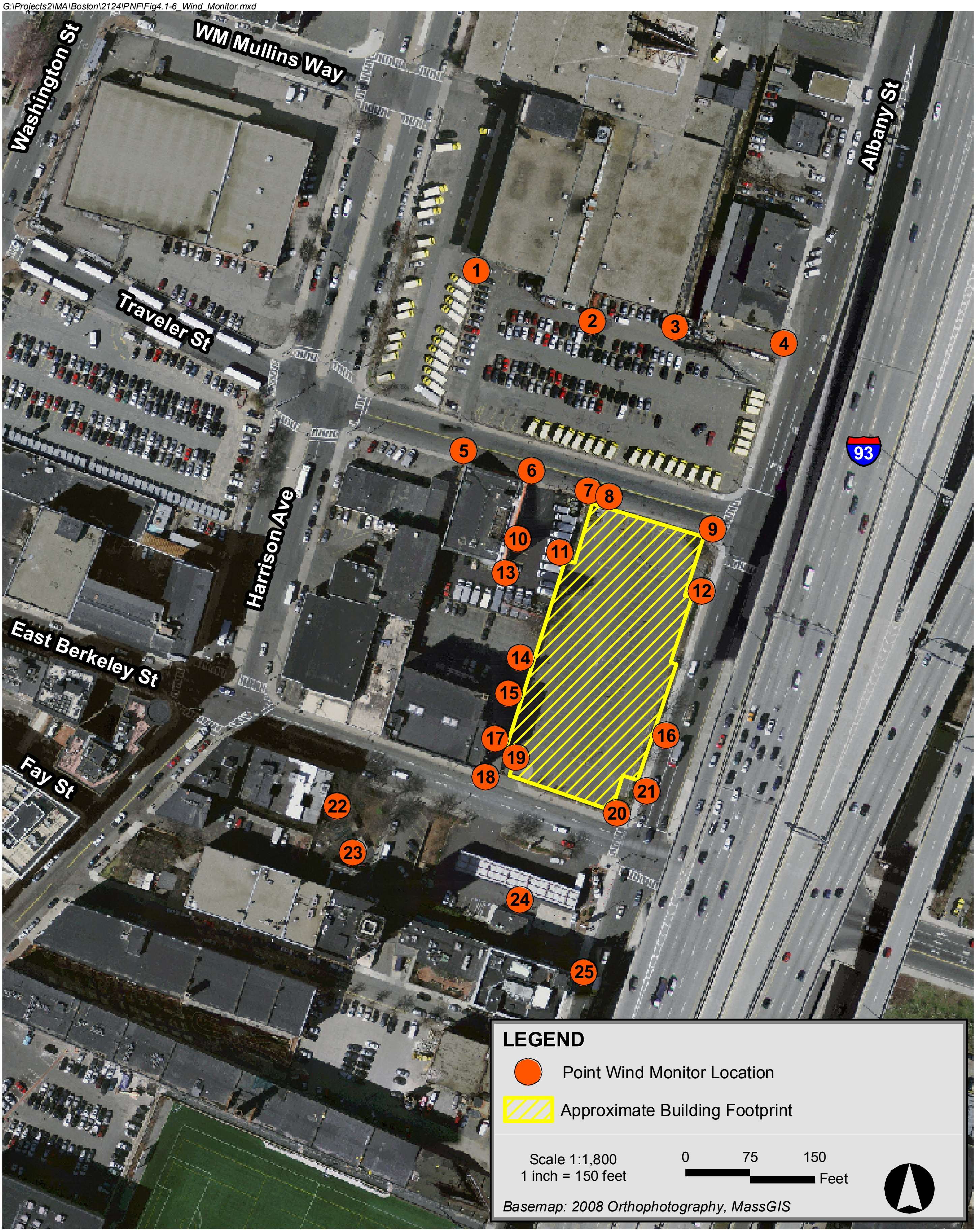
Based on the local wind climate evaluation, the equivalent average wind speed from three compass directions (southwest, northwest, and east) was evaluated. The southwesterly and northwest directions correspond to the predominant wind directions found in the 30-year dataset. The easterly direction was chosen because of the project's location and the relatively open area directly east of the Project.

The VirtualWind software extended approximately 350 meters upwind, 350 meters downwind, and 700 meters wide of the Project. Simulations were run for 100 seconds at a time step of 0.02 seconds to ensure that a parcel of air completed movement from one end of the simulation domain to the other. Both the existing and build conditions were evaluated.

Wind speeds were modeled by the software at a height of 1.37 meters (4.5 feet approximately chest height) at 25 representative locations around the proposed Project, where pedestrians would most likely be affected by wind conditions. Examples include entries, corners, sidewalks, etc. These same locations were also included in the model of existing conditions. Figure 4.1-6 shows the locations of the point wind monitors. The structures input to VirtualWind for the existing scenario are shown in Figure 4.1-7. Likewise, the build scenario structures input to VitualWind are shown in Figure 4.1-8.

4.1.5 Results

Based upon the results of the VirtualWind analysis as well as the other factors listed at the conclusion of Section 4.1.1, the PLW analysis estimated the BRA Wind Categories for each of the 25 locations shown on Figure 4.1.6 for annual northwest, southwest, and easterly winds. Table 4.1-1 presents the "before" and "after" pedestrian wind conditions at each location. Categories 1 through 3 are comfortable conditions; Category 4 is considered uncomfortable for walking. There are no Category 5 dangerous winds predicted for the Project.

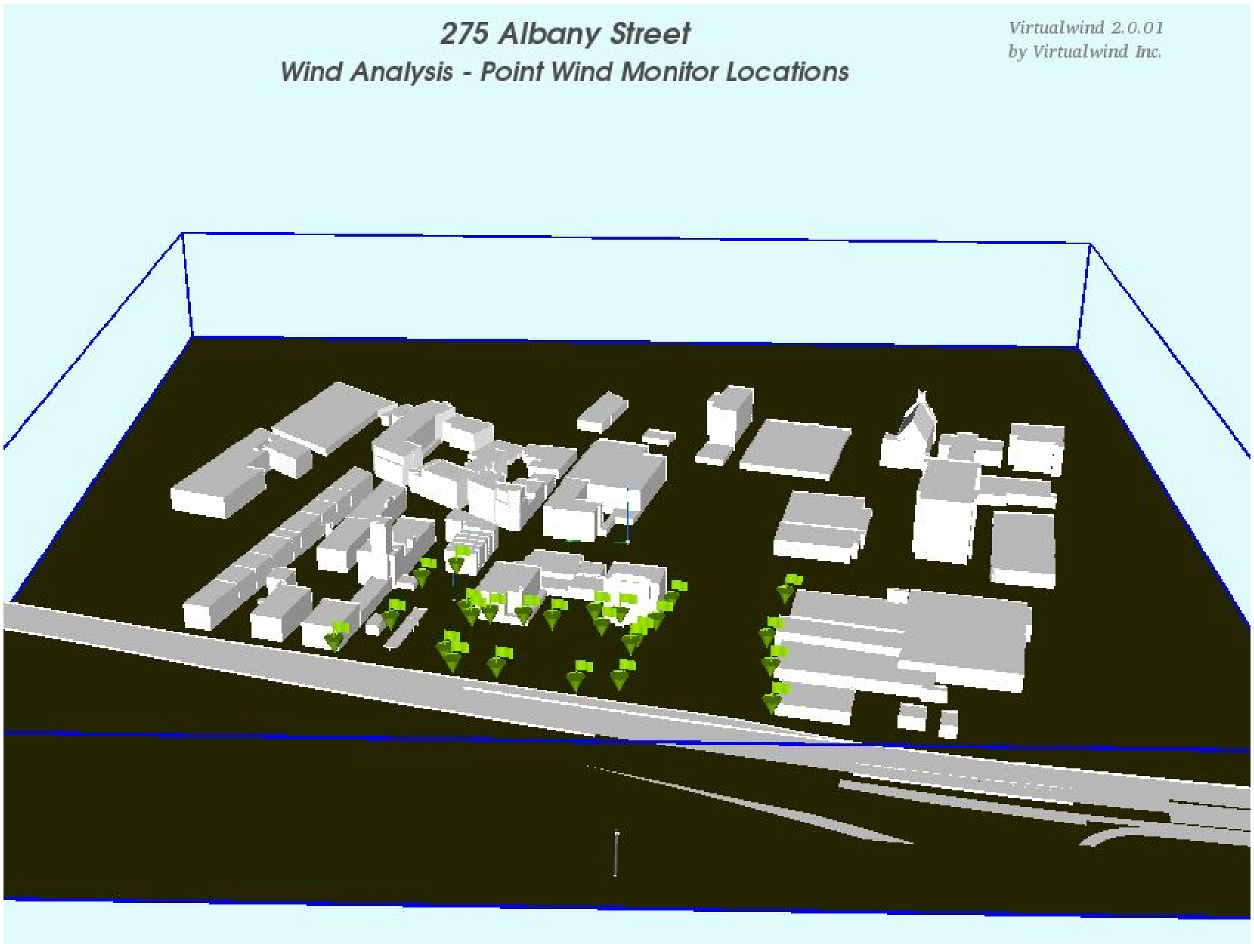


275 Albany Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 4.1-6

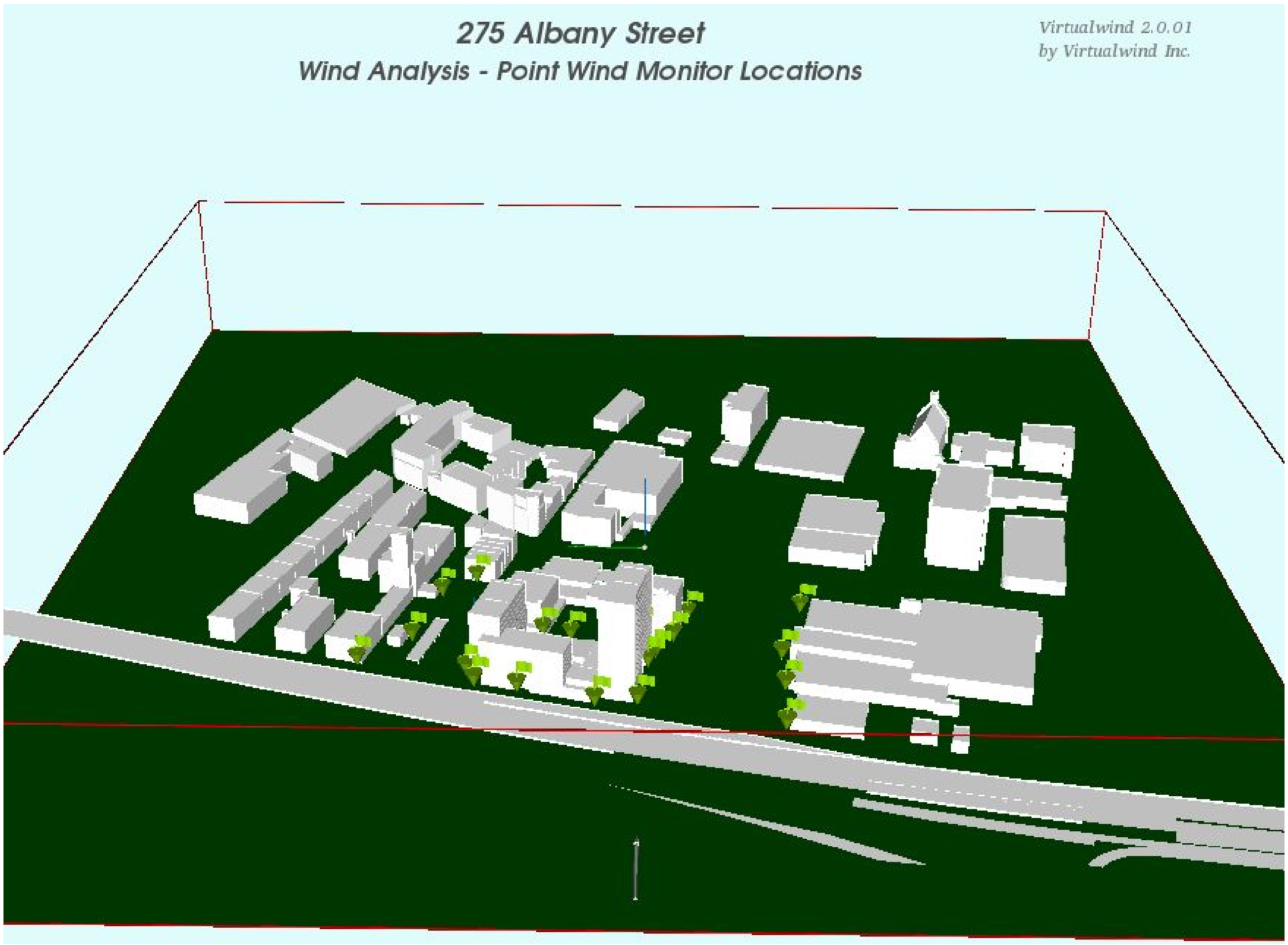
Point Wind Monitor Locations



Building configuration is shown so that all monitors are visible in this view.

Figure 4.1-7

Existing Scenario Buildings Input To VirtualWind)



View of some monitors may be blocked by buildings.

Table 4.1-1 Estimated BRA Wind Categories

	NW Wind		SW Wind		E Wind	
Location # Shown on Figure 4.1-6	Existing	Build	Existing	Build	Existing	Build
1	3	3	2	2	2	2
2	2	2	2	2	2	2
3	2	2	2	2	2	2
4	2	2	2	3	3	3
5	3	3	2	2	3	3
6	4	4	2	2	3	3
7	3	3	2	2	3	4
8	3	3	2	1	3	3
9	3	4	2	2	3	3
10	2	2	2	2	3	4
11	3	4	3	3	3	2
12	3	2	2	1	3	3
13	2	3	2	2	3	4
14	3	2	2	2	3	2
15	3	3	2	2	3	2
16	3	2	2	1	3	3
17	2	4	2	3	3	2
18	3	4	2	3	3	2
19	3	3	2	2	3	2
20	3	2	2	3	3	4
21	3	2	2	3	3	4
22	2	2	1	1	2	2
23	2	2	1	1	2	2
24	2	2	2	2	2	2
25	3	3	2	2	3	3
Key		= Wind speed category decreases			= Wind speed category increases	

Table 4.1-1 has been shaded to indicate which locations the wind speed category is expected to change. Locations where the wind speed is expected to decrease by one category (*i.e.,* improve) are shaded green. Locations where the wind speed is predicted to increase by one or two a categories (*i.e.*, worsen) are shaded blue. Locations that are expected to remain within the same category are unshaded. It should be kept in mind that the categories reported represent annual estimates. Wind speeds will typically be lower in the summer and fall, higher in the winter and spring.

Table 4.1-2 summarizes the number of category changes predicted for each of the NW, SW and E winds. For each wind direction, the wind speed category remains unchanged or improves to a more beneficial category at the majority of the monitors. However at some locations, the wind speed category is predicted to increase by one category. At one location (Location 17 in the driveway entrance to the parking area west of the Project site under NW winds) it is expected to increase two categories. It should be kept in mind that the categories are defined as a range of wind speeds, so although a category may not change, it does not mean that the predicted wind speed at that location has not changed, only that it has not changed enough to be classified in another category.

Table 4.1-2 Number of Locations Expected to Change BRA Wind Categories

Category Change	NW Wind	SW Wind	E Wind
Up 2 Categories (*i.e.*, wind speeds increased)	1	0	0
Up 1 Category (*i.e.*, wind speeds increased)	4	5	5
No Change	15	17	14
Down 1 Category (*i.e.*, wind speeds decreased)	5	3	6

Under the No-Build Condition, PLW at the Project site as well as at the Boston Herald's parking lot across Traveler Street are comfortable for walking because their open exposure. Slightly elevated wind speeds are likely to occur at the corners of the existing buildings along Traveler Street (e.g., Planet Storage), while lower wind speeds are expected in the more sheltered areas around the Pine Street Inn.

The proposed Project incorporates a number of positive design features that will have a beneficial impact on PLW. The long axis of the 16-story select-service hotel is aligned with the prevailing WNW winds and the entire development is designed on a large podium. Both these features will tend to provide shelter from the prevailing cold winter winds.

There may be some increased wind speeds near the northern corners of the proposed Project on Traveler Street that could cause uncomfortable conditions especially in the winter and spring. In general, however, the analysis indicates that the proposed Project will not have any significant adverse impacts either on the Project site itself or to the surrounding area. As the design progresses, the Proponent will continue to evaluate potential wind impacts and consider the incorporation of mitigation measures as needed. Such measures would likely include installing canopies, wind screens, and landscaping.

4.2 Shadow

4.2.1 Introduction and Methodology

A shadow impact analysis was conducted for the hours of 9:00 am, 12:00 noon, and 3:00 pm during the summer solstice (June 21), autumnal equinox (September 21), and the winter solstice (December 21). The vernal equinox shadow impacts were studied as if March 21 were still in Standard Time, meaning they are studied during the time periods of 10:00 am, 1:00 pm, and 4:00 pm. Impacts at 6:00 pm during the summer and autumn were also examined. The study used the applicable Altitude and Azimuth data for Boston presented in Appendix B of the BRA's 2006 Development Review Guidelines.

The analysis focuses in particular on major pedestrian areas, as well as the sidewalks, plazas and public open space adjacent to and in the vicinity of the Project site. The shadow analysis presents existing shadow as well as net new shadow from the Project to illustrate the incremental impact of the Project. For the purposes of clarity, new shadow is shown in a dark gray tone while existing shadow is shown in light gray. Results of the shadow impact study are discussed in the following sections, and are supported by Figures 4.2-1 through 4.2-14.

4.2.2 Results

In general, new shadow from the Project will largely be limited to the immediate surrounding public ways and sidewalks of Albany, East Berkeley, and Traveler Streets, Harrison Avenue, and portions of the adjacent I-93. Some additional new shadow will be cast on portions of adjacent properties immediately to the west of the Project. No new shadow from the Project is anticipated to fall on any of the area's existing open spaces. Results for each of the 14 times studied are presented below.

Vernal Equinox (March 21)

At 10:00 am during the vernal equinox, shadow from the Project will be cast in a northwesterly direction. New shadow will be cast onto portions of the adjacent properties at 240-246 East Berkeley Street ("Medieval Manor Building") and the Planet Self Storage facility. Some new shadow from the 16-story hotel component will also be cast across a portion of Traveler Street and a minor portion of the surface parking lot at the adjacent Boston Herald property.

As the day progresses, the shadows become shorter, falling to the north. At 1:00 pm, new shadow from the Project will be cast onto minor portions of the Medieval Manor Building and the Planet Self Storage facility. New shadow from the service hotel component will be cast across a portion of Traveler Street, including the roadway and sidewalks, and a portion of the surface parking lot on the Boston Herald property.

In the afternoon (4:00 pm), shadow will extend to the northeast. New shadow from the Project will be cast across portions of Albany and Traveler Streets and sidewalks, and onto I-93. Some shadow will be cast onto the Boston Herald's parking lot as well.

Summer Solstice (June 21)

At 9:00 am during the summer solstice, shadow will be cast in a westerly direction. New shadow from the Project will be cast onto the Medieval Manor Building, Planet Self Storage, and Quinzani's Bakery. A sliver of new shadow cast by the Project's nine-story extended stay component will be cast on East Berkeley Street.

As the day progresses, the shadows become shorter and swing to the north. At noon, shadow from the Project will largely fall within the Project site, with just some very minor new shadow reaching the Medieval Manor, the Planet Self Storage parking lot, and Traveler Street.

At 3:00 pm, shadow will extend to the northeast. Net new shadow from the Project will fall on portions of Albany and Traveler Streets, with some minimal shadow reaching I-93.

At 6:00 pm, shadow will be cast to the east. New shadow from the Project will be cast across Albany Street and onto the I-93 mainline and ramps.

Autumnal Equinox (September 21)

At 9:00 am during the autumnal equinox, shadow will be cast northwest across portions of adjacent properties immediately to the west of the Project site. Some narrow shadow cast by the select-service hotel component will reach the intersection of Traveler Street and Harrison Avenue and result in some minor new shadow on the parking lot operated by Tufts Medical Center.

At noon, new shadow from the Project will be cast across small portions of the adjacent properties immediately to the west of the Project. New shadow from the select-service hotel component will extend over Traveler Street and reach the Boston Herald's parking lot.

In the afternoon (3:00 pm), new shadow will extend to the northeast. New shadow from the Project will be cast across portions of Albany and Traveler Streets and sidewalks and just reach the I-93 right-of-way. Some new shadow will extend onto the Boston Herald parking lot.

By 6:00 pm, much of the area is in existing shadow. New shadow from the Project will be cast to the east, across portions of Albany Street, I-93, and across portions of the adjacent MBTA rail yard. Some narrow shadow from the 16-story select-service hotel will also fall across West Broadway and Dorchester Avenue.

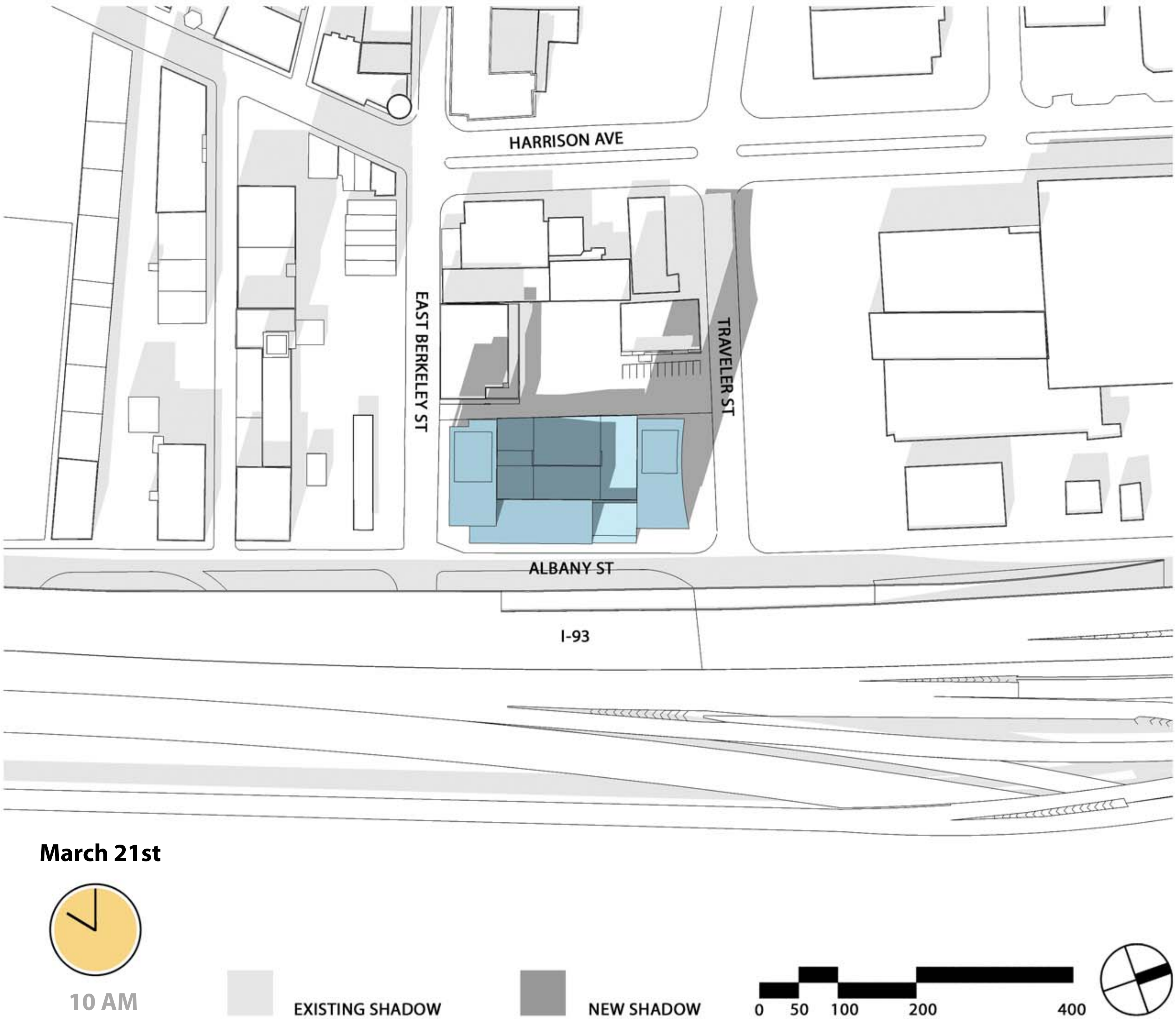
Winter Solstice (December 21)

The winter solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season, causing shadows to elongate.

At 9:00 am, the morning sun will cast new shadow from the Project to the northwest and will fall across the abutting properties to the west (Medieval Manor, Quinzani's Bakery and Planet Self Storage), Harrison Avenue, a parking lot north of Harrison Avenue, the Boston Herald, Graybar Electric, William E. Mullins Way, and the office building at 1000 Washington Street.

At noon, shadow will extend directly to the north. New shadow will extend across Traveler Street and onto the Boston Herald parking lot and building..

At 3:00 pm, shadows elongate and extend northeast. New shadow will be cast diagonally, across portions of Albany and Traveler Streets, the Boston Herald's surface parking lot, and I-93 toward the Fort Point Channel.



275 ALBANY ST

IN THE SOUTH END

Figure 4.2-1

Shadow Studies
3/21 - 10am

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-2

Shadow Studies
3/21 - 1pm

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

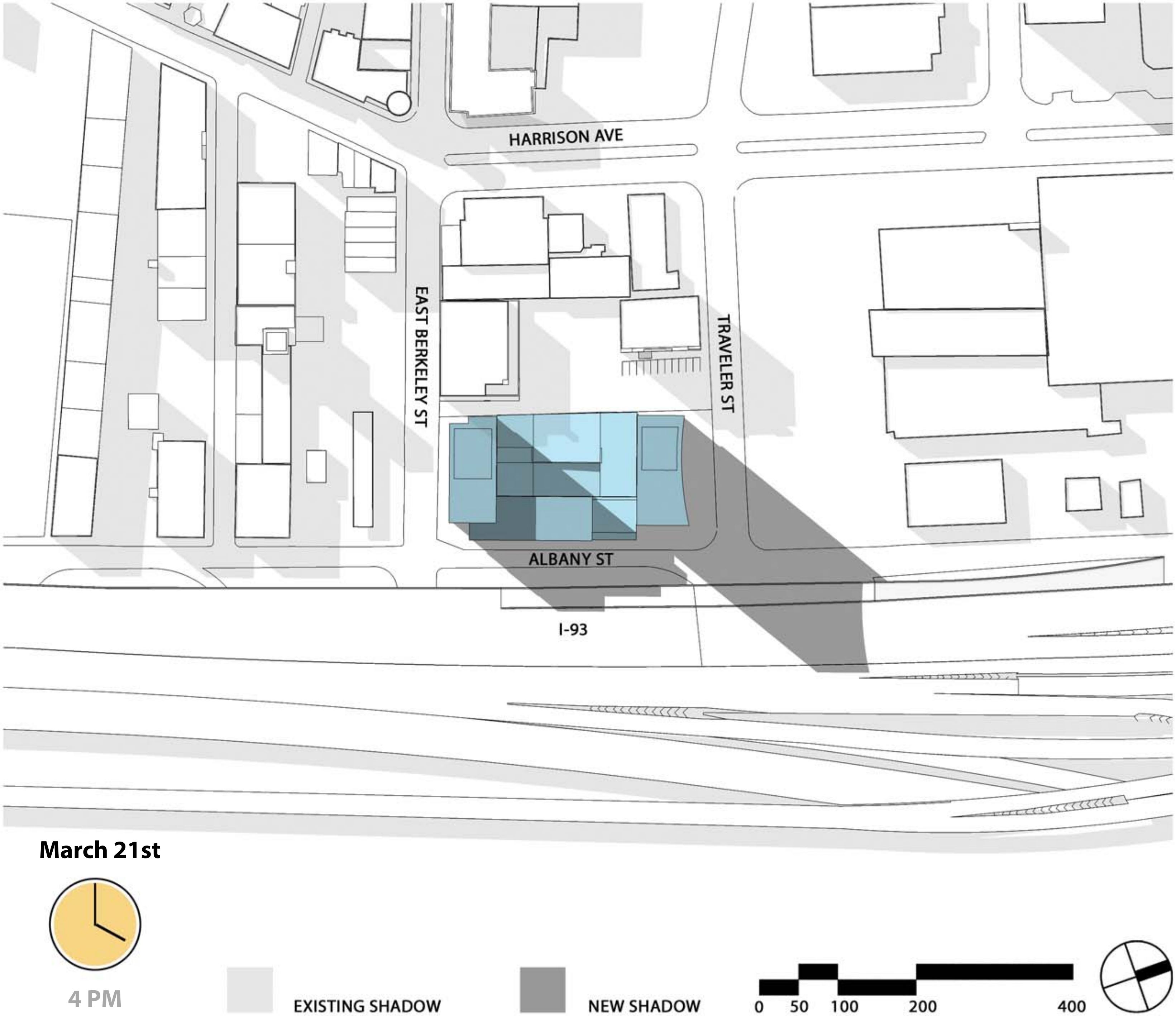
EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST
IN THE SOUTH END

Figure 4.2-3

Shadow Studies 3/21 - 4pm



NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

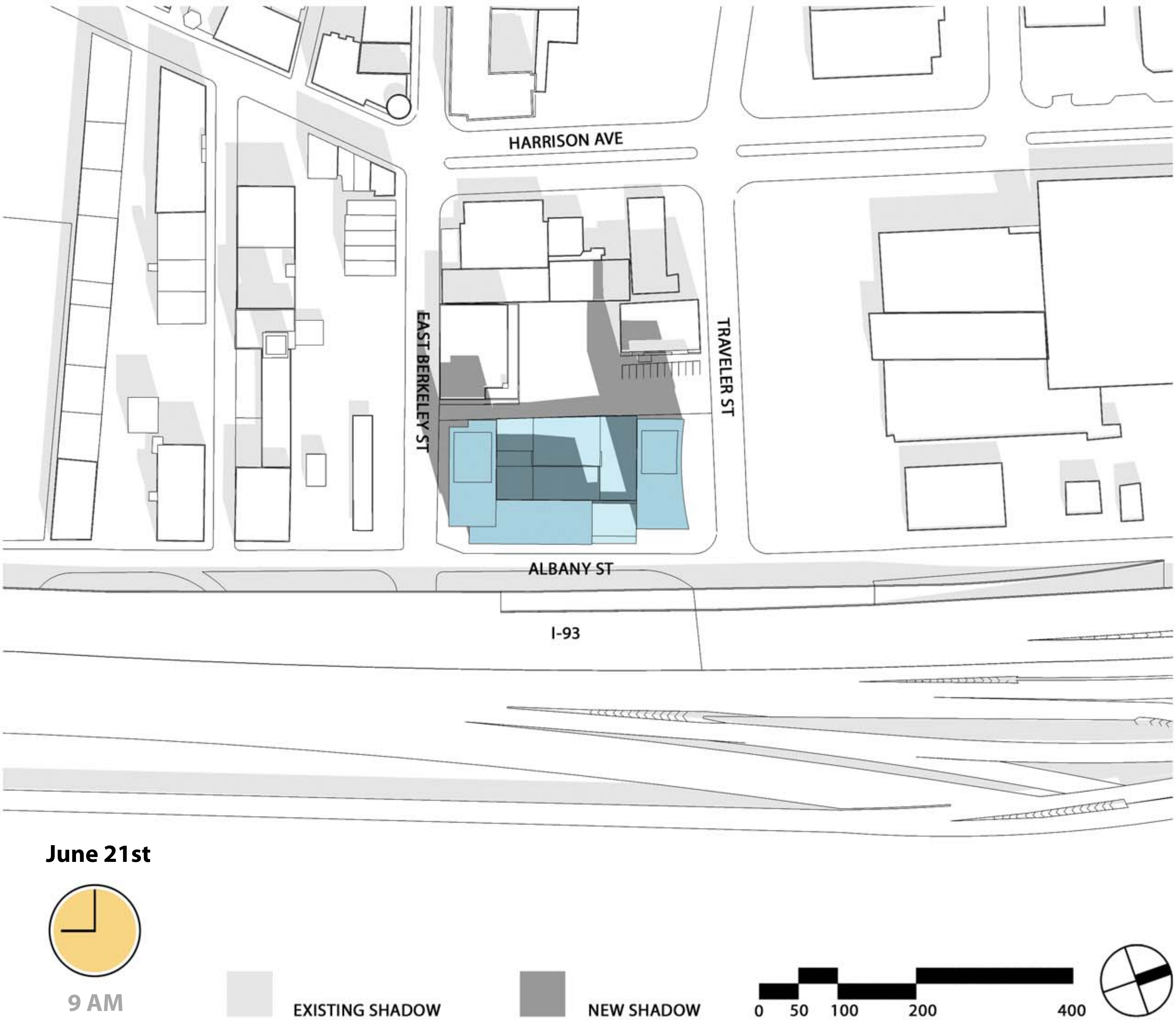
prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-4

Shadow Studies 6/21 - 9am

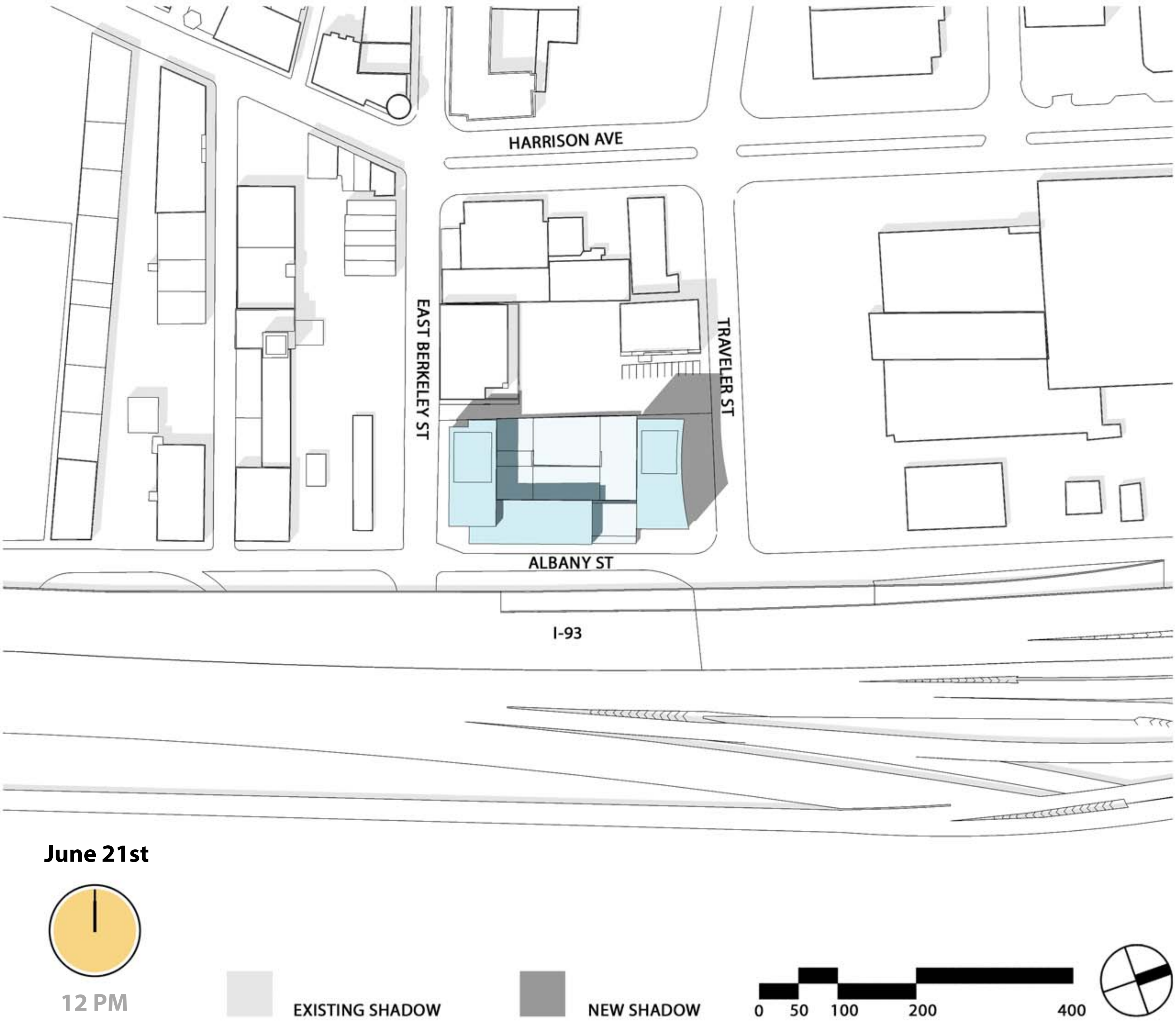


NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST

IN THE SOUTH END

Figure 4.2-5

**Shadow Studies
6/21 - 12pm**

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-6

Shadow Studies 6/21 - 3pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-7

Shadow Studies 6/21 - 6pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

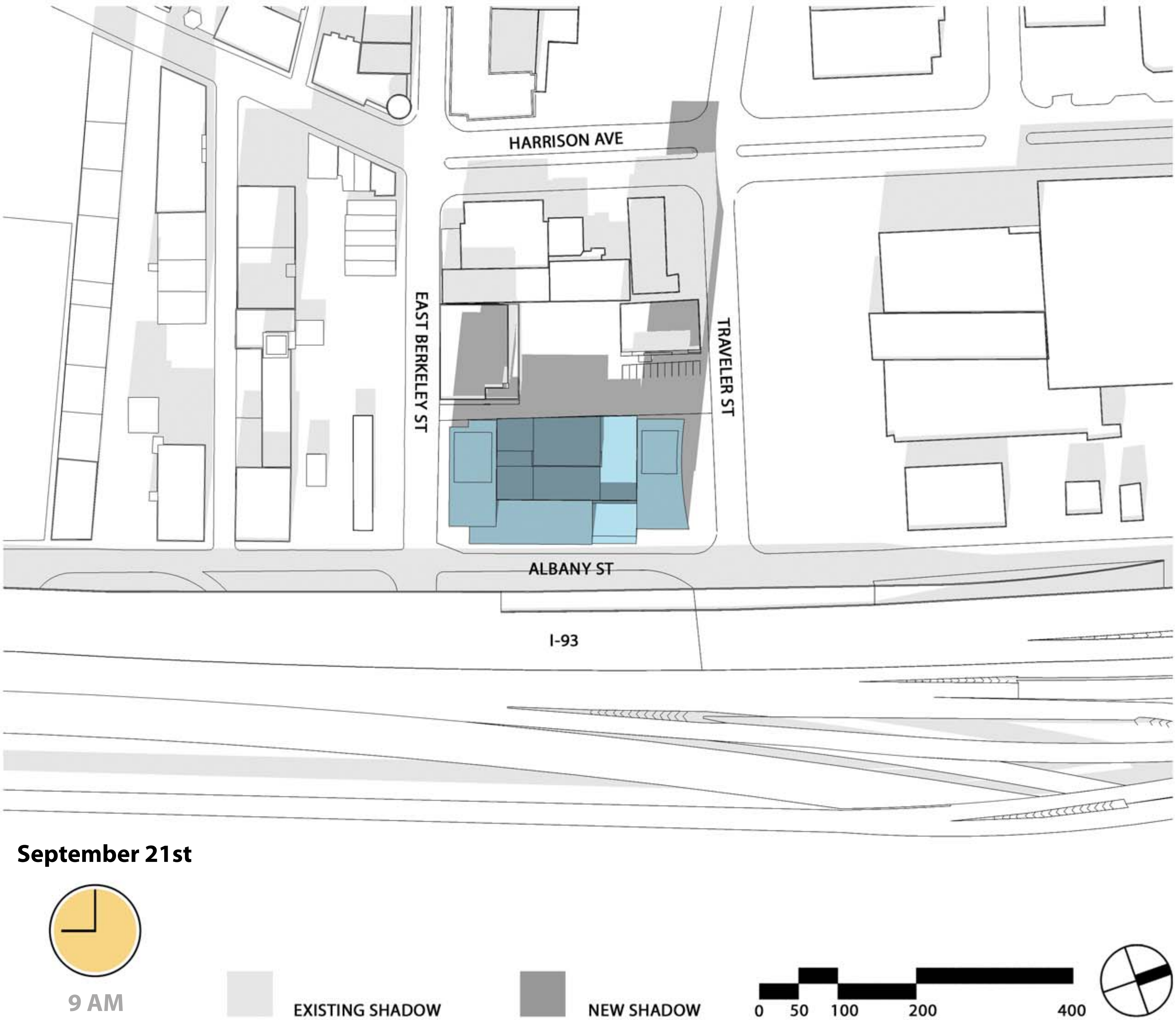
prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-8

Shadow Studies
9/21 - 9am



NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST
IN THE SOUTH END

Figure 4.2-9

Shadow Studies
9/21 - 12pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-10

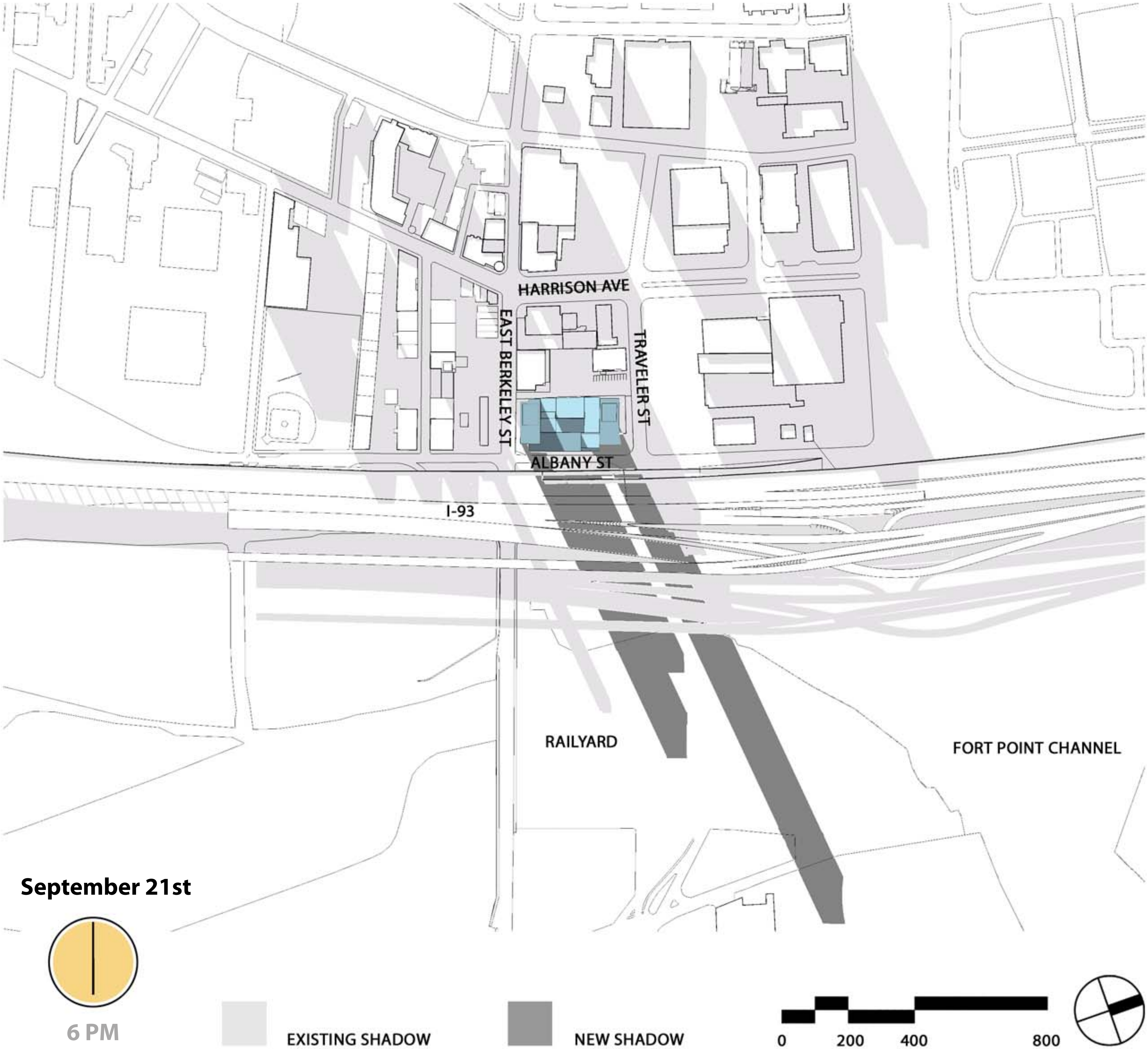
Shadow Studies
9/21 - 3pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST

IN THE SOUTH END

Figure 4.2-11

Shadow Studies
9/21 - 6pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

275 ALBANY ST

IN THE SOUTH END

Figure 4.2-12

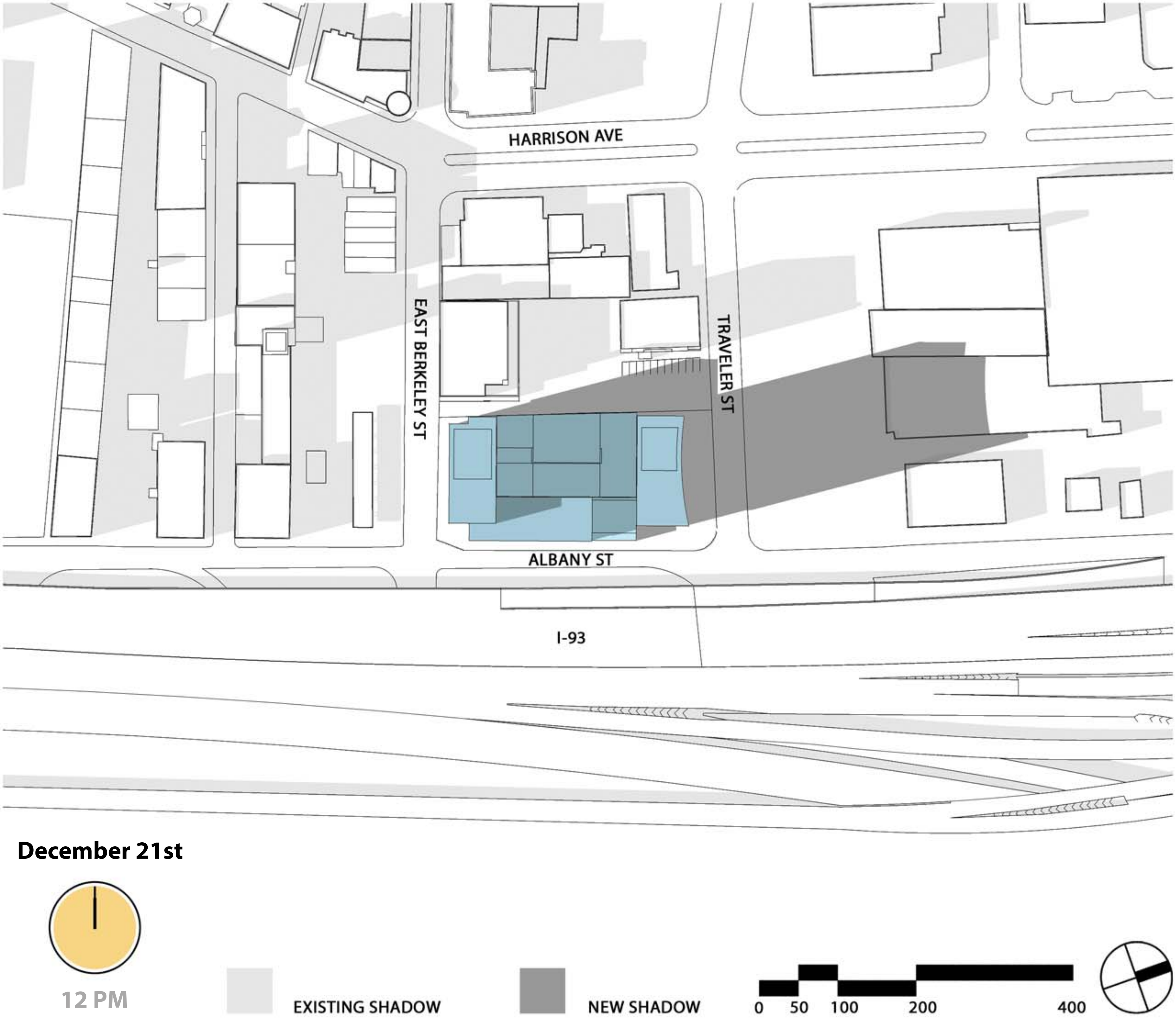
Shadow Studies 12/21 - 9am

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST

IN THE SOUTH END

Figure 4.2-13

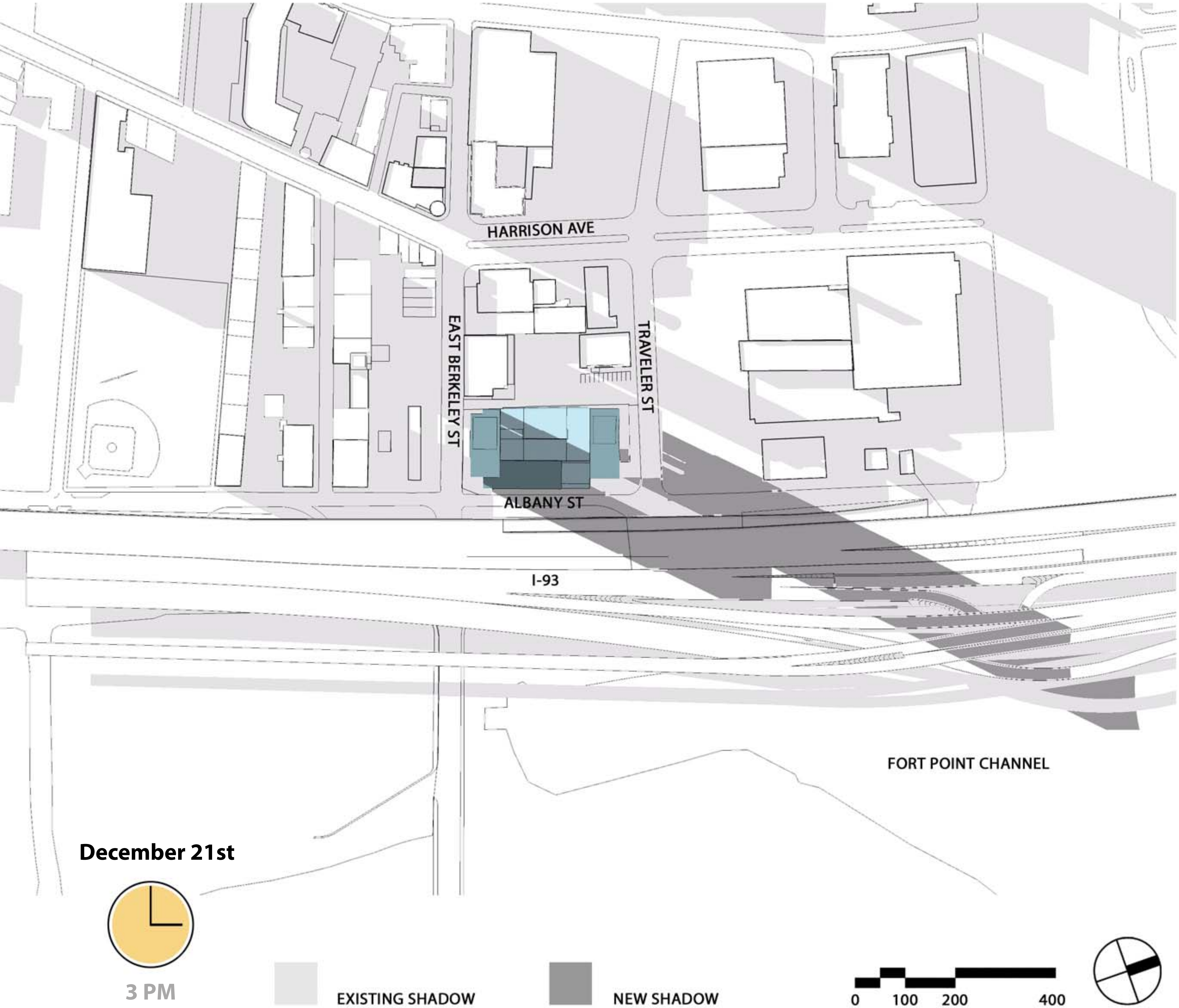
Shadow Studies 12/21 - 12pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST
IN THE SOUTH END

Figure 4.2-14

Shadow Studies 12/21 - 3pm

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc

4.3 Daylight

4.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of the project site. The daylight analysis for the Project considers the existing, as-of-right and proposed conditions, and typical daylight obstruction values of the surrounding area.

The results of the daylight analysis indicate that while the Project will result in increased daylight obstruction at the Project site compared to existing conditions, the resulting conditions will be typical of a densely developed area, and within the range of existing daylight obstruction values of other tall buildings in the Project's vicinity.

4.3.2 Methodology

The daylight analysis was performed utilizing the Boston Redevelopment Authority Daylight Analysis ("BRADA") computer program[4]. This program measures the percentage of sky-dome that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares four conditions: Existing Conditions; As-of-right Conditions; Proposed Conditions; and the context of the area.

Viewpoints were chosen along East Berkeley Street (Viewpoint 1), Albany Street (Viewpoint 2), and Traveler Street (Viewpoint 3). The daylight analysis examined daylight obstruction from these three locations for the existing, as-of-right, and proposed conditions. The as-of-right scenario was assumed to be that of a 110-foot high building per the requirements set by Article 64 of the Zoning Code. Additionally, this study considered area

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

context points in order to provide a basis of comparison to existing conditions in the surrounding area. These viewpoints were taken in the following locations and are shown on Figure 4.3-1:

- **Viewpoint AC1 -** along East Berkeley Street, looking northeast at 240-246 East Berkeley Street;
- **Viewpoint AC2-** along East Berkeley Street, looking southwest at 209-225 East Berkeley Street;
- **Viewpoint AC3 -** at the intersection of East Berkeley Street and Harrison Avenue looking northwest at 160 East Berkeley Street;
- **Viewpoint AC4 –** On Harrison Avenue looking northwest at the building at 40 Fay Street;
- **Viewpoint AC5 -**Traveler Street looking southwest at the Planet Self Storage facility at 33 Traveler Street (AC5); and
- **Viewpoint AC6 -** William E. Mullins Way looking northeast at 1000 Washington Street (formerly the headquarters building of Teradyne, Inc.) and adjacent parking garage (AC6). These viewpoints are all illustrated on Figure 4.3-1.

4.3.3 Results

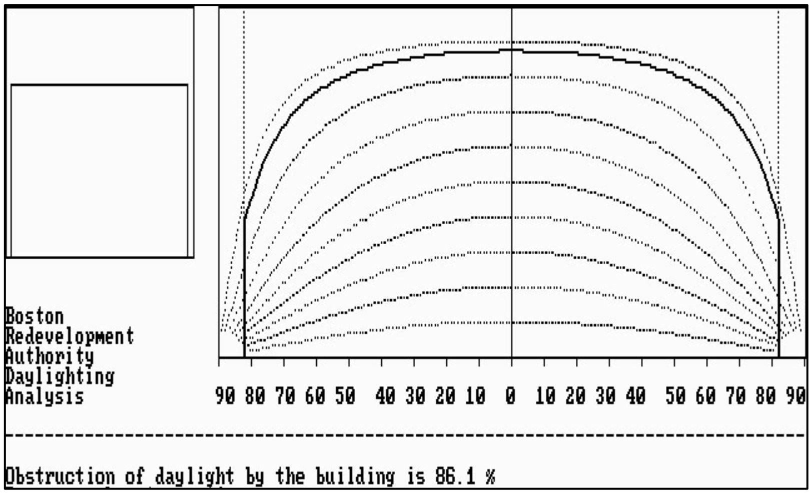
The results for each viewpoint under each alternative condition are described in Table 4.3-1. Figures 4.3-2 through 4.3-6 illustrate the BRADA results for each analysis and are located at the end of this section.

G:\Projects2\MA\Boston\2124\PNF\Fig4.3-1_Viewpoint_Locations.mxd

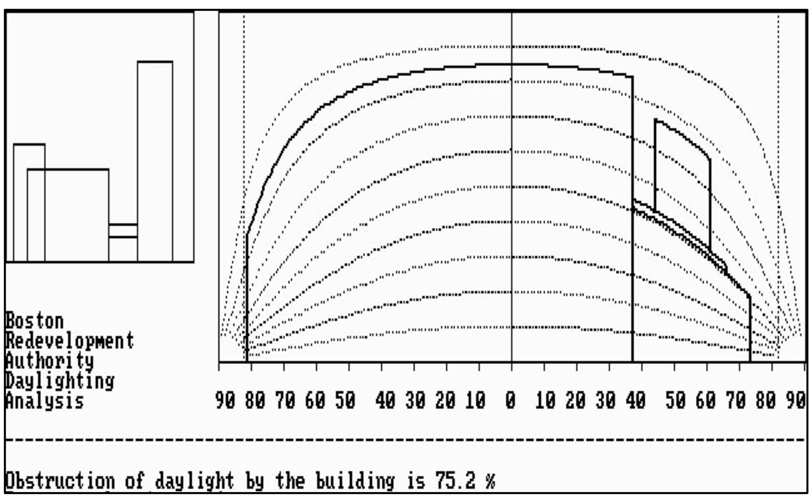
275 Albany Street **Boston, Massachusetts**

Figure 4.3-1

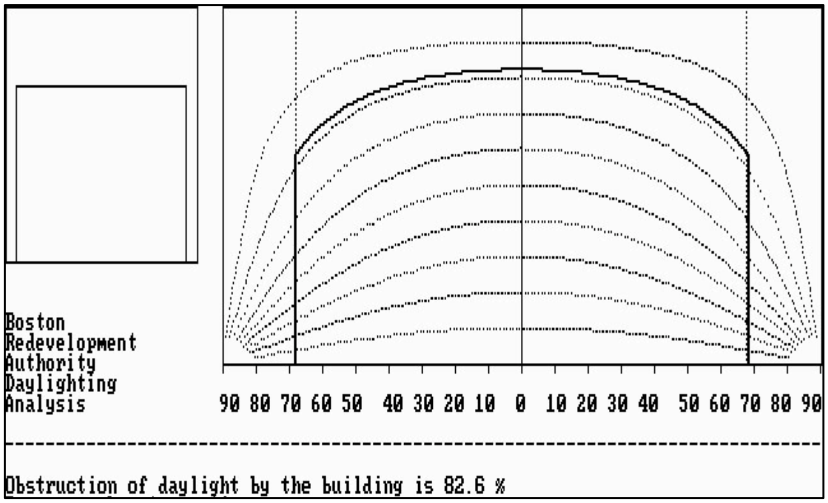
Viewpoint Locations



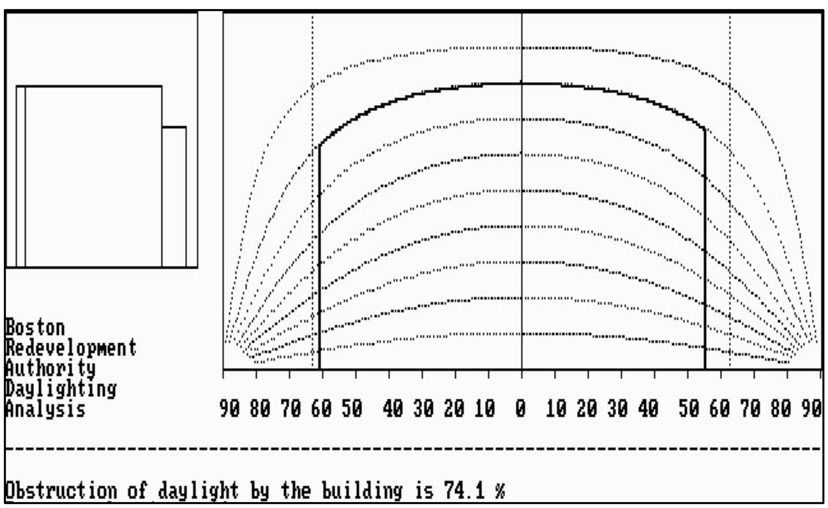
Viewpoint 1 –
As-of-Right Conditions:
Albany Street looking
Northwest at the Project site



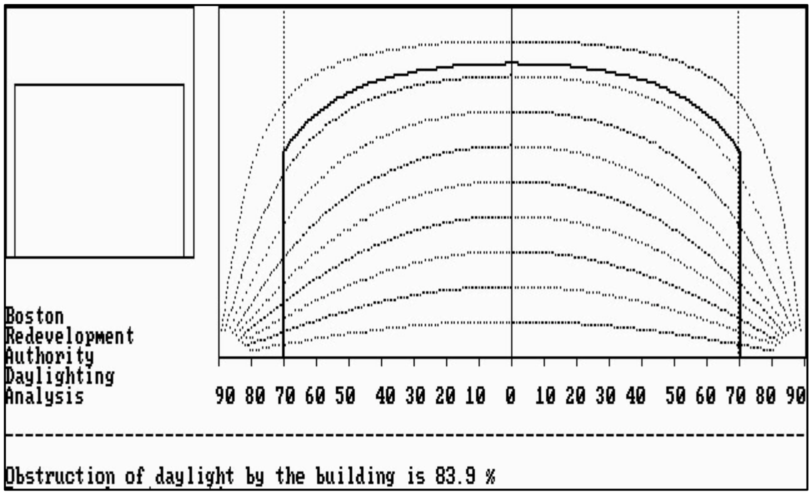
Viewpoint 1 –
Proposed Conditions:
Albany Street looking
Northwest at the Project site



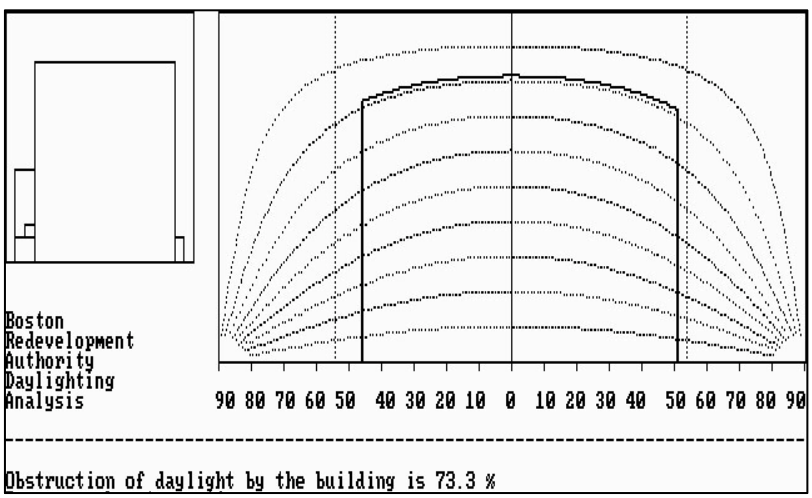
Viewpoint 2 –
As-of-Right Conditions:
East Berkeley Street looking
Northeast at the Project site



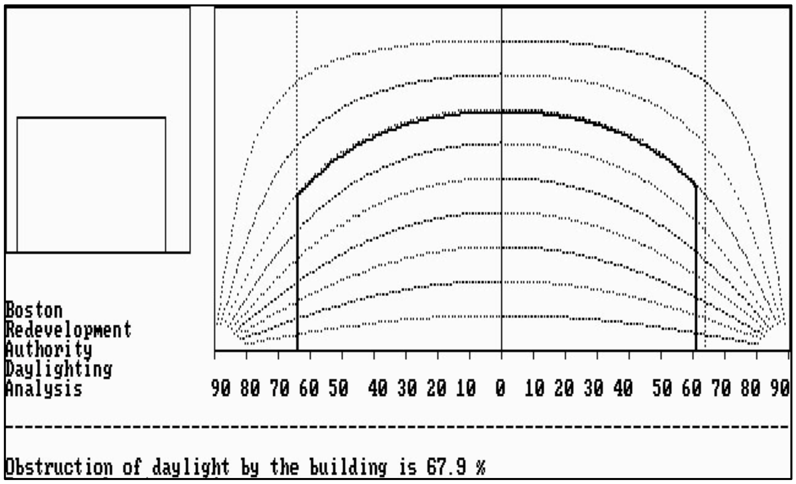
Viewpoint 2 –
Proposed Conditions:
East Berkeley Street looking
Northeast at the Project site



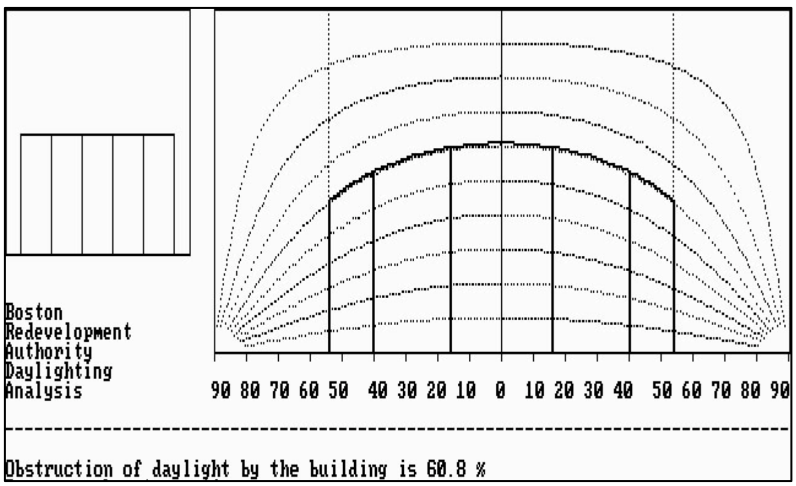
Viewpoint 3 –
As-of-Right Conditions:
Traveler Street looking
Southwest at the Project site



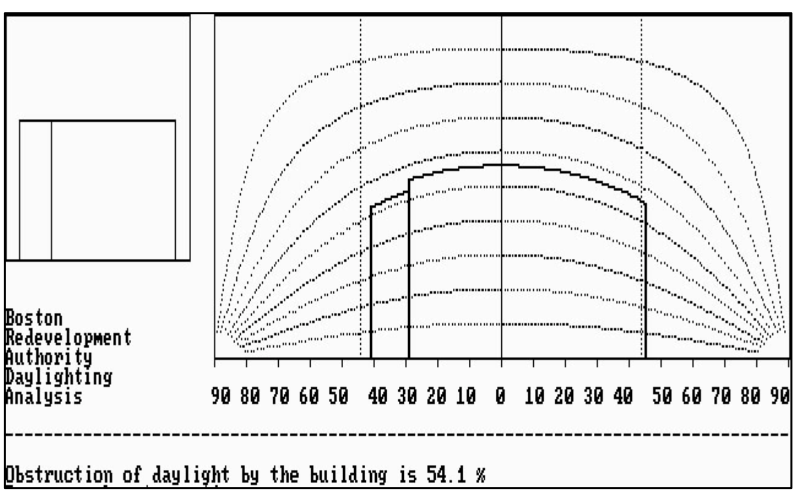
Viewpoint 3 –
Proposed Conditions:
Traveler Street looking
Southwest at the Project site



Viewpoint AC1 –
East Berkeley Street looking Northeast at 240-246 East Berkeley Street

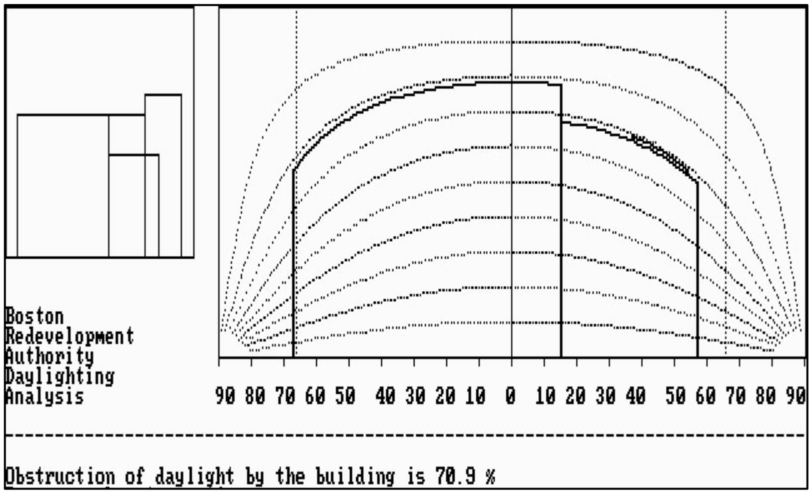


Viewpoint AC2 –
East Berkeley Street looking Southwest at 209-225 East Berkeley Street

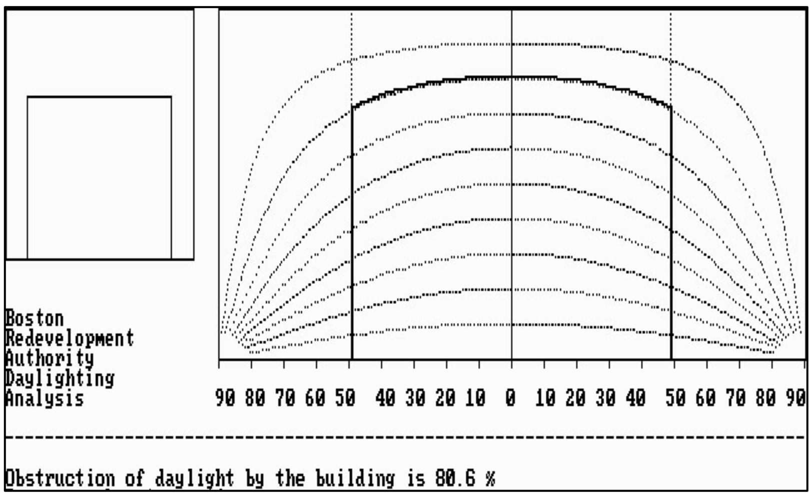


Viewpoint AC3 –
Intersection of East Berkeley Street and Harrison Avenue looking Northwest at 160 East Berkeley Street

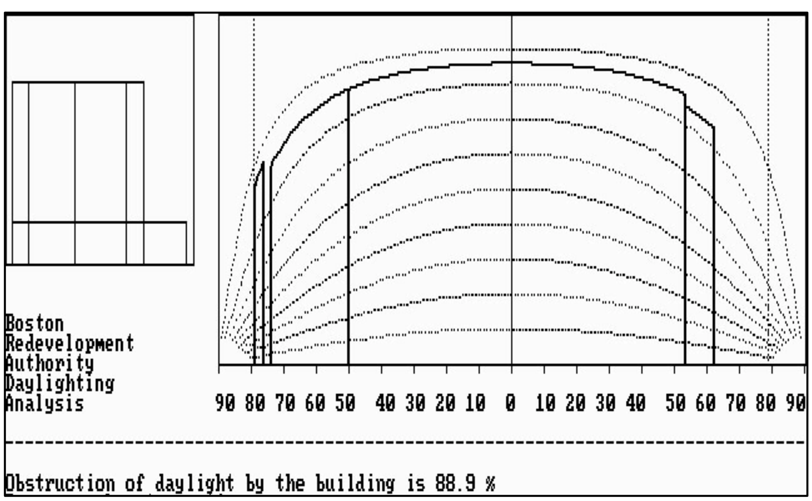
Figure 4.3-5



Viewpoint AC4 –
Harrison Avenue looking
Northwest at 40 Fay Street



Viewpoint AC5 –
Traveler Street looking
Southwest at 33 Traveler street



Viewpoint AC6 –
William E. Mullins Way looking
Northeast at 1000 Washington
Street (formerly the headquarters
of Teradyne, Inc.) and adjacent
Parking Garage

Table 4.3-1 Daylight Obstruction Values

Viewpoint Locations		Existing Conditions	As-of-Right	Proposed
Viewpoint 1	Albany Street looking Northwest at the Project site	0.0%	86.1%	75.2%
Viewpoint 2	East Berkeley Street looking Northeast at the Project site	0.0%	82.6%	74.1%
Viewpoint 3	Traveler Street looking Southwest at the Project site	0.0%	83.9%	73.3%
Area Context Points				
AC1	East Berkeley Street looking Northeast at 240-246 East Berkeley Street (Medieval Manor Building)	67.9%	N/A	N/A
AC2	East Berkeley Street looking Southwest at 209-225 East Berkeley Street	60.8%	N/A	N/A
AC3	Intersection of East Berkeley Street and Harrison Avenue looking Northwest at 160 East Berkeley Street	54.1%	N/A	N/A
AC4	Harrison Avenue looking Northwest at 40 Fay Street	70.9%	N/A	N/A
AC5	Traveler Street looking Southwest at the Planet Self Storage facility at 33 Traveler Street	80.6%	N/A	N/A
AC6	William E. Mullins Way looking Northeast at 1000 Washington Street and adjacent parking garage	88.9%	N/A	N/A

Albany Street – Viewpoint 1

Albany Street runs along the eastern edge of the Project site. Viewpoint 1 was taken from the center of Albany Street, looking northwest at the Project site. The Project site is currently a parking lot and has an existing daylight obstruction value of zero. The development of the Project will increase daylight obstruction values to 75.2%. While this is an increase over existing conditions, the daylight obstruction value for the Project is consistent with the as-of-right scenario (86.1%). Furthermore, the daylight obstruction values are within the daylight obstruction range of other buildings in the Project vicinity, including Planet Self Storage (Viewpoint AC5) and the Teradyne Building at 321 Harrison Avenue (Viewpoint AC6), which have daylight obstruction values of 80.6% and 88.9%, respectively.

East Berkeley Street – Viewpoint 2

East Berkeley Street runs along the southern edge of the Project site. Viewpoint 2 was taken from the center of East Berkeley Street, looking northeast at the Project site. The Project site is currently a parking lot and has an existing daylight obstruction value of zero. The development of the Project will increase daylight obstruction values to 74.1% which is consistent with the as-of-right scenario (82.6%).

Traveler Street – Viewpoint 3

Traveler Street runs along the northern edge of the Project site. Viewpoint 3 was taken from the center of Traveler Street looking southwest at the Project site. The Project will increase the daylight obstruction value at the site from Viewpoint 3 from zero under existing conditions to 73.3%, which is again consistent with the as-of-right scenario of 83.9%.

Area Context Views

The Project area is densely populated. The Project area is characterized by a mix of uses, including retail, residential, commercial, institutional and light industrial. The buildings in the Project vicinity are predominantly low-rise, ranging between one and eleven stories. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the six Area Context Points listed in Table 3.3-1. The daylight obstruction values ranged from 54.1% at the intersection East Berkeley Street and Harrison Avenue (AC3) to 88.9% on William E. Mullins Way (AC6) adjacent 1000 Washington Street. Daylight obstruction values for the Project, which range from 73.3% to 75.2%, are fully consistent with the Area Context values.

4.3.4 Conclusions

The daylight analysis conducted for the Project describes existing, as-of-right, and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to the daylight obstruction values within the surrounding area and typical of densely built urban areas.

4.4 Air Quality

4.4.1 Introduction

An air quality analysis was conducted to determine the impact of pollutant emissions from combustion and mobile source emissions generated by the Project. A mesoscale analysis has been performed to determine whether and to what extent the Project will increase the amount of ozone precursors in the area, as well as to determine if the Project is consistent with the Massachusetts State Implementation Plan (SIP). A microscale analysis has been performed to evaluate the potential air quality impacts of carbon monoxide (CO) due to traffic flow around the Project area. In addition, for stationary sources (i.e. combustion stacks, and garage vents), United States Environmental Protection Agency (EPA) approved air dispersion models were used to estimate ambient concentrations of nitrogen oxides (NOx), particulate matter (PM-10 and PM-2.5), and sulfur dioxide (SO_2), in addition to CO.

The impacts were added to monitored background values and compared to the Federal National Ambient Air Quality Standards (NAAQS). The standards were developed by EPA to protect the human health against adverse health effects with a margin of safety.

The modeling methodology was developed in accordance with the latest Massachusetts Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[5] The air quality analysis results show that CO, NOx, PM-10, PM-2.5, and SO_2 concentrations at all receptors studied are well under NAAQS thresholds.

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

4.4.2 Methodology

4.4.2.1 Mesoscale Analysis

A mesoscale analysis is required to assure that the proposed Project will not negatively impact the existing State Implementation Plan (SIP). The SIP is created to track how the state intends to maintain compliance with the NAAQS, or to plan for reductions in emissions to attain compliance in the future.

A mesoscale analysis is generally done when a project will generate greater than 3,000 trips per day. The mesoscale analysis estimates the total hydrocarbon emissions associated with all project-related vehicle trips. The analysis includes a comparison of the future build condition to the no-build condition. If emissions are greater for the build condition,

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

reasonable and feasible mitigation measures will be evaluated. The methodology and parameters for the mesoscale analysis follow methodology approved by the BRA and Massachusetts Department of Environmental Protection.

The EPA's MOBILE6.2 computer program was used to estimate motor vehicle emission factors of VOC and NOx on the roadway network. Conservatively, emission factors derived from MOBILE6.2 for VOC and NOx are based on the worst case of either wintertime or summertime conditions. Using the vehicle count data, the mileage between intersections, modeled signalized intersection delay times, and the emission factors, per day and per year emission estimates were calculated. MOBILE6.2 outputs are provided in Appendix C.

The traffic volumes provided in Chapter 3.0 form the basis of the mesoscale study. Seventeen roadway links were included in the mesoscale analysis. Peak hour traffic volumes were provided by the transportation consultant. Estimates of average daily traffic (ADT) were made from the peak hour volumes assuming a 10 percent K-Factor. An average speed of 30 mph was used for all links. Distances for the links were estimated with mapping software.

Average per vehicle idle times were based on SYNCHRO output reports provided by the transportation consultant. Idling vehicle emissions, at signalized intersections only, were calculated. If required, peak delay times at signalized intersections with LOS of "F" were capped at 80 seconds and assumed to persist all day. The cap of 80 seconds was implemented to remove any bias from extremely poor LOS intersections.

4.4.2.2 Microscale Analysis

The BRA typically requires the analysis of the effect on air quality of the increase in traffic generated by a project. The Proponent is required to analyze local effects of the potential increase in traffic on ambient air quality near specific intersections. This "microscale" analysis is required for a project at intersections where the project has the potential to cause deterioration in Level of Service (LOS) to "D" or lower, and which causes an increase in traffic of 10 percent or more. A microscale analysis is also required for intersections, which currently experience a LOS of "E" or "F" which the project will cause an increase in traffic. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through both signalized and unsignalized intersections. Predicted ambient concentrations of CO for the build and no-build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. NAAQS have been established by the EPA for CO to protect the public health (known as primary standards). These standards do not allow ambient CO concentrations to exceed

35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on late-model vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analyses followed the procedure outlined in U.S. EPA's intersection modeling guidance.[6]

The microscale analysis has been conducted using the latest versions of EPA MOBILE6.2, CAL3QHC, and AERMOD to estimate CO concentrations at sidewalk receptor locations.

Baseline (2009) and future year (2014) emission factor data calculated from the MOBILE6.2 model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections. AERMOD was used to estimate potential ground- level impacts due to emissions from the parking garage and combustion sources.

CAL3QHC and AERMOD results were then added to background CO values of 3.5 ppm (1-hour) and 2.1 ppm (8-hour), as provided by the U.S. EPA, to determine total air quality impacts due to the Project. This value was compared to the NAAQS for CO of 35 ppm (1-hour) and 9 ppm (8-hour).

Intersection Selection

Intersection selection criteria for a microscale analysis are typically based on a Level of Service (LOS) D where the project increases traffic volumes by ten percent or greater, or if the signalized intersection operates at LOS E or F and the project degrades conditions at the location. An analysis of the eight intersections from the traffic study for the Build Condition was conducted (See Section 3, Transportation). Although no intersections specifically met the microscale selection criteria, microscale modeling was performed for what were determined to be the four worst intersections:

1. Broadway Bridge, Frontage Road, and Traveler Street;
2. Harrison Avenue and East Berkeley Street;
3. Frontage Road, West Fourth Street, and East Berkeley Street; and
4. Dorchester Avenue and West Fourth Street.

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

The traffic volumes and LOS calculations provided in Chapter 3.0 form the basis of evaluating the traffic data versus the microscale thresholds.

Emissions Calculations (MOBILE6.2)

The EPA MOBILE6.2 computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOBILE6.2 model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the state specific vehicle age registration distribution. The input files for MOBILE6.2 for the existing (2009) and build year (2014) are provided by MADEP[7]. As is typical, minor edits to the files were necessary to allow the program to output emission factors for the various speeds used in the analyses.

The current version of MOBILE6.2 does not explicitly calculate idle emissions. However, idle emissions can be obtained from a vehicle speed of 2.5 mph (the lowest speed MOBILE6 will model). The resulting emission rate given in (grams/mile) is then multiplied by 2.5 mph to estimate idle emissions (in grams/hour). Moving emissions are calculated based on actual speeds at which free-flowing vehicles travel through the intersections. A speed of 30 mph is used for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns) and left turns, respectively.

Winter CO emission factors are typically higher than summer for CO. Therefore winter vehicular emission factors were conservatively used in the microscale analyses.

Receptors & Meteorology Inputs

Sets of up to 85 receptors were placed in the vicinity of each of the modeled intersections. Receptors extended approximately 150 to 200 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of each modeled intersection are presented in Figure 4.4-1 through Figure 4.4-4.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[8], a wind speed of 1 m/s, stability class D (4), and a mixing height of 1000 meters was used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 cm corresponding to "City Land Use – Central Business District" was selected.[9]

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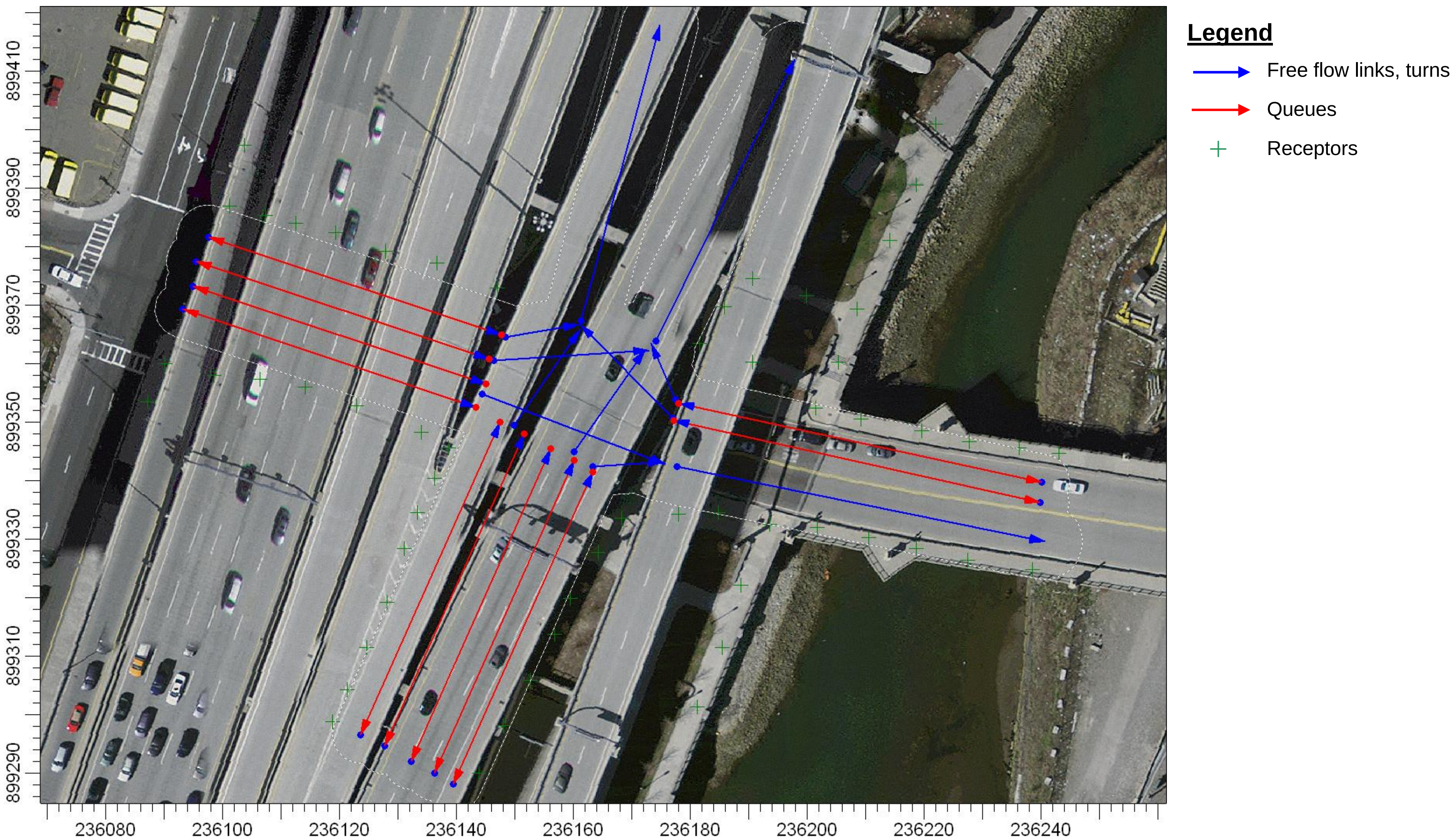
7 Latest input files for MOBILE6.2 were provided by Marc Bennett of MADEP, May 4, 2009.

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

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



275 Albany Street Boston, Massachusetts

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Figure 4.4-1

Receptor Locations for CAL3QHC modeling of Intersection 1. Broadway Bridge, Frontage Rd., Traveler St.

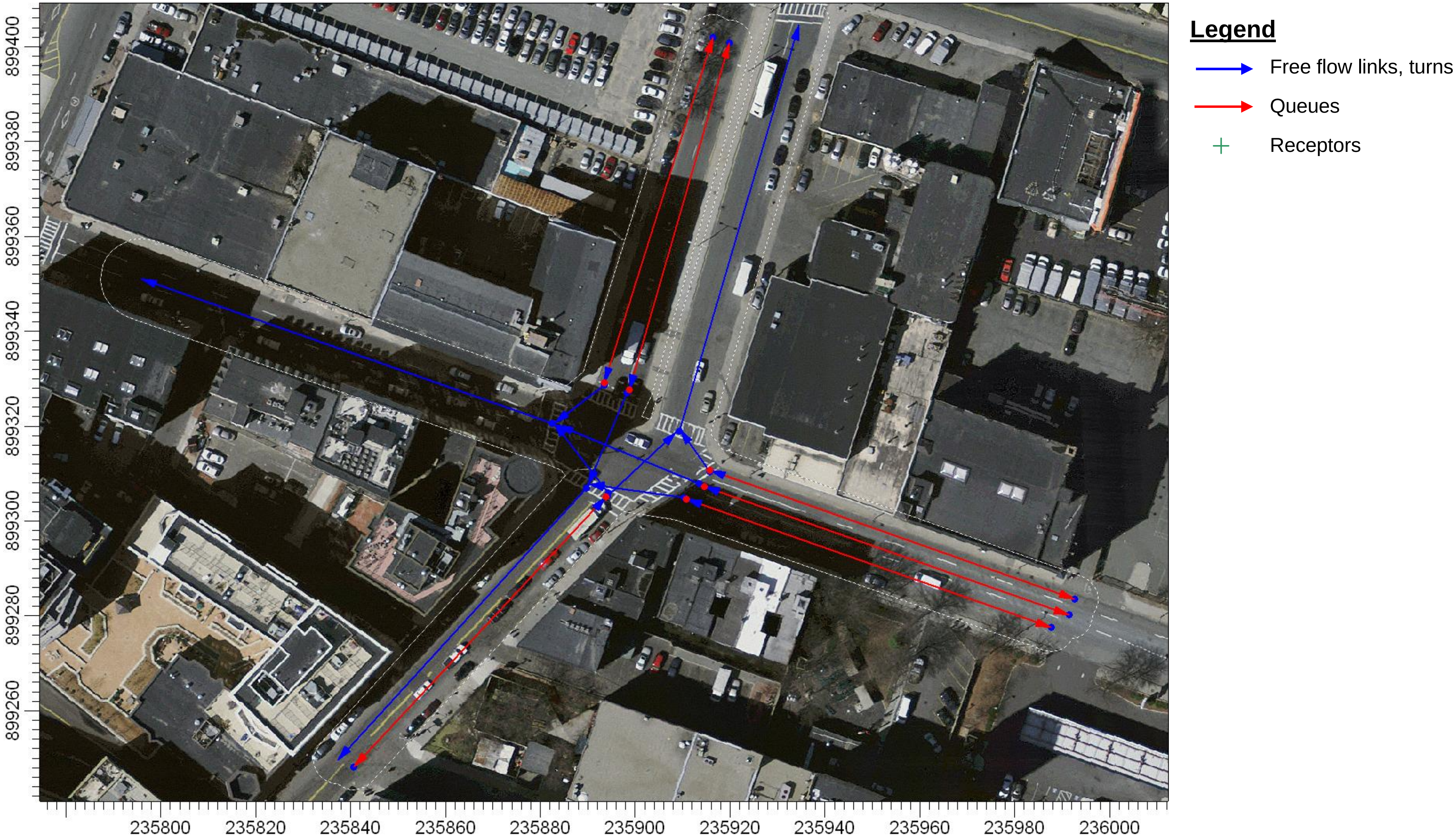

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Figure 4.4-2

Receptor Locations for CAL3QHC modeling of Intersection 2. Harrison Ave. and E. Berkeley St.

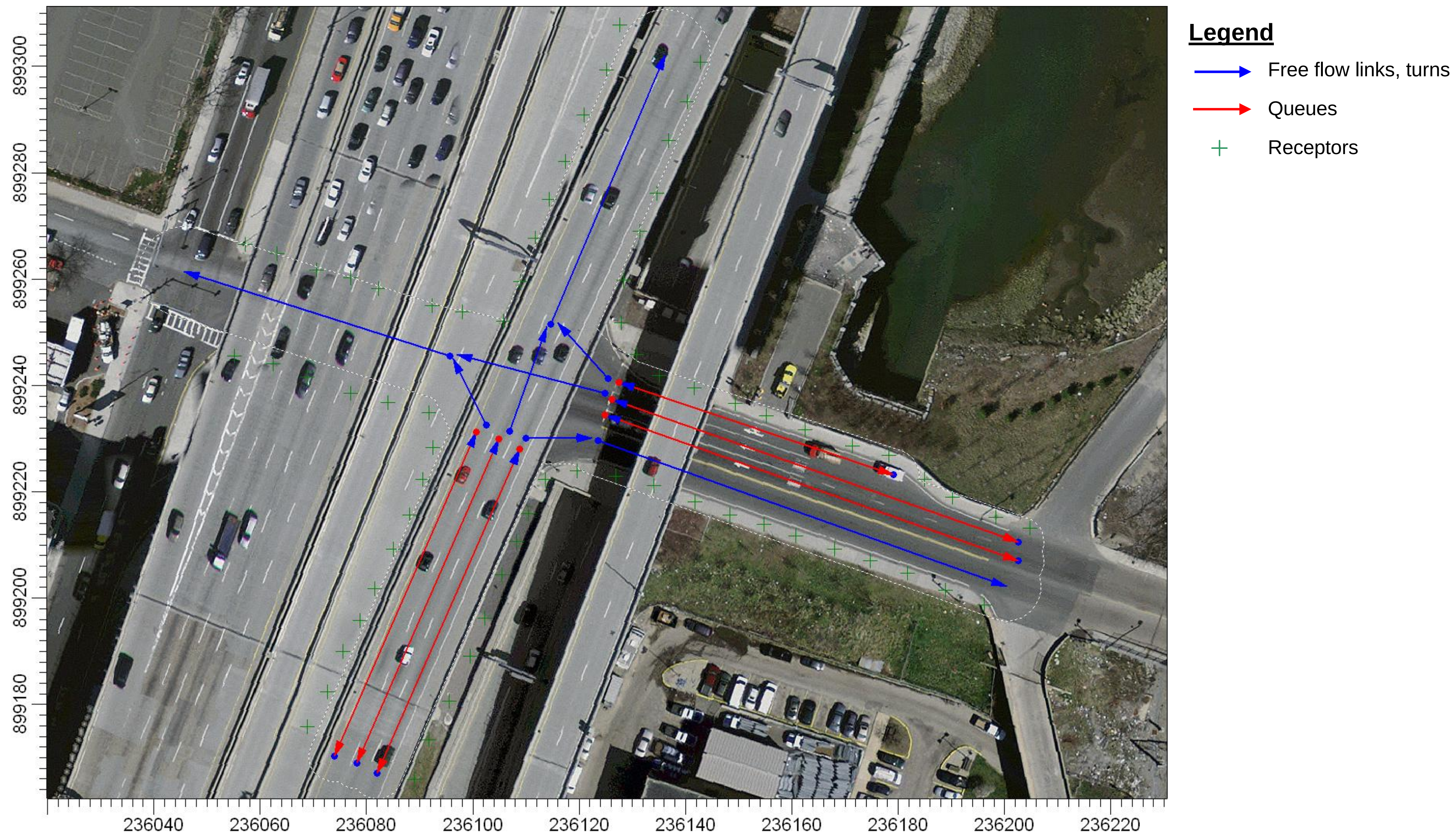

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Figure 4.4-3

Receptor Locations for CAL3QHC modeling of Intersection 3. Frontage Rd., W. Fourth St., E. Berkeley St.

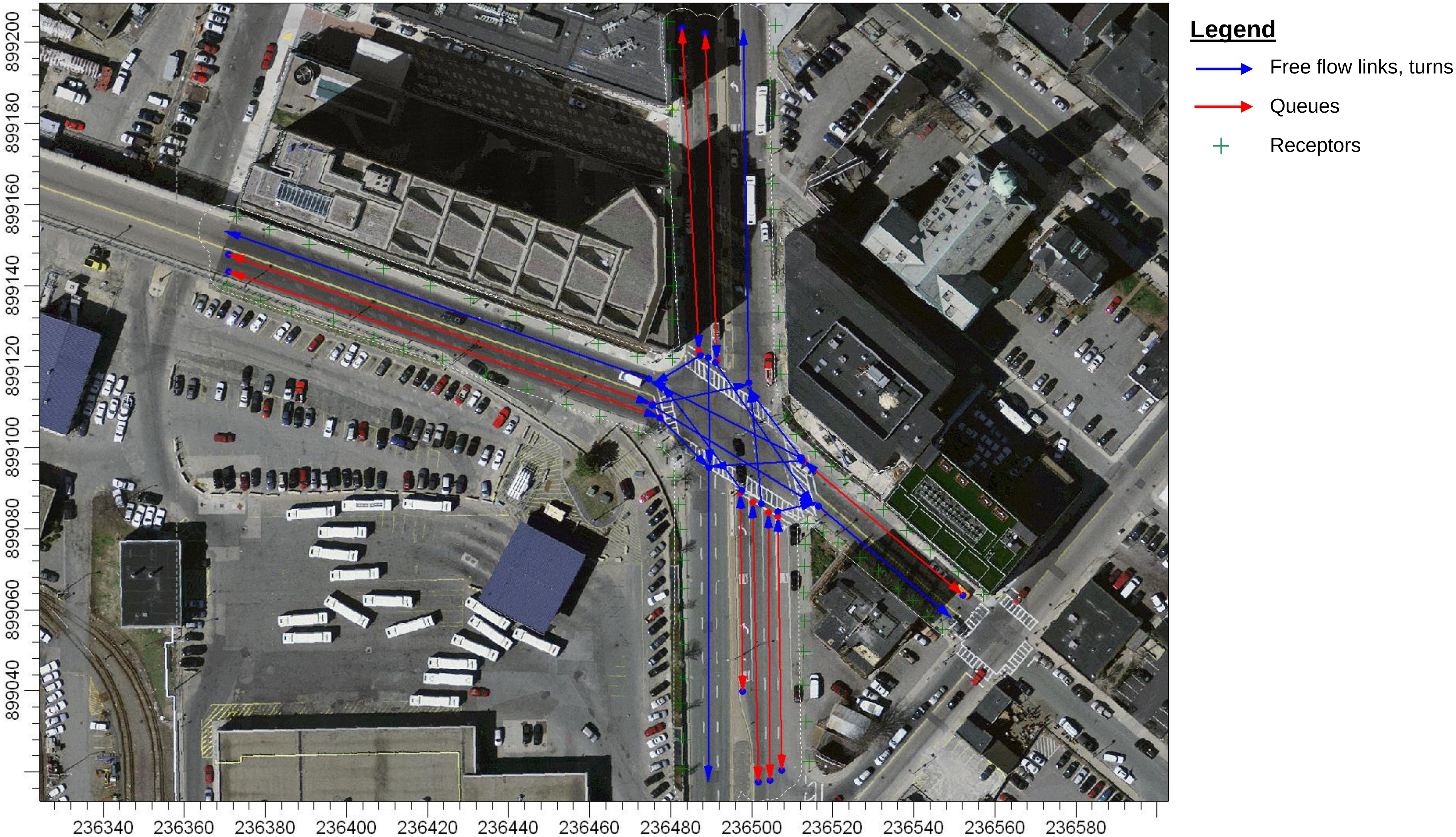

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Figure 4.4-4

Receptor Locations for CAL3QHC modeling of Intersection 4. Dorchester Ave. and W. Fourth St.

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at intersections based on worst-case meteorological conditions and traffic input data. The one-hour concentrations were scaled by a factor of 0.7 to estimate 8-hour concentrations.[10] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling runs. Travel speeds were estimated based on field observations, traffic data, and queue links at the intersections. The CAL3QHC input parameters are listed in Appendix C.

4.4.2.3 Stationary Source Analysis

AERMOD Modeling Methodology

The most recent version of the U.S. EPA AERMOD refined dispersion model (Version 09292) was selected to predict concentrations from the stationary sources related to the project. AERMOD is the U.S. EPA's preferred model for regulatory applications. The use of AERMOD provides the benefits of using the most current algorithms available for steady state dispersion modeling.

The ISC-AERMOD View graphical user interface (GUI) Version 6.2, created by Lakes Environmental, was used to facilitate model setup and post-processing of data. The AERMOD model was selected for this analysis because it:

- is the required U.S. EPA model for all refined regulatory analyses for receptors within 50 km of a source;
- is a refined model for facilities with multiple sources, source types, and building-induced downwash;
- uses actual representative hourly meteorological data;
- incorporates direction-specific building parameters which can be used to predict impacts within the wake region of nearby structures;
- allows the modeling of multiple sources together to predict cumulative downwind impacts;
- provides for variable emission rates;

10 U.S. EPA, Screening Procedures for Estimating the Air Quality Impact of Stationary Sources; EPA-454/R-92-019, October 1992

- provides options to select multiple averaging periods between one-hour and one year (scaling factors can be applied to adjust the one-hour impact to a peak impact less than one-hour); and,

- allows the use of large Cartesian and polar receptor grids, as well as discrete receptor locations.

Regulatory default options adopted for the model include:

- *Use stack-tip downwash (except for building downwash).* Stack-tip downwash is an adjustment of the actual stack release height for conditions when the gas exit velocity is less than 1.5 times the wind speed. For these conditions, the effective release height is reduced a bit, based on the diameter of the stack and the wind and gas exit velocity. This option applies to point sources only, such as emergency generators, cooling towers, boiler units and garage vents.

- *Use the missing data and calms processing routines*. The model treats missing meteorological data in the same way as the calms processing routine, i.e., it sets the concentration values to zero for that hour, and calculates the short term averages according to U.S. EPA's calms policy, as set forth in the Guideline. Since only 1-hour averages are being used, concentrations predicted with calm or missing data would not affect model results.

The AERMOD model is able to assign sources to a rural or urban category to allow specified urban sources to use the effects of increased surface heating under stable atmospheric conditions. The urban dispersion classification was selected based on a visual inspection of the area within a three kilometer radius of the Project site. A population estimate of 609,023 was obtained from the U.S. Census website (www.census.gov) and is used in the AERMOD model to estimate the urban boundary layer height.

The regional meteorology in Boston is best approximated with meteorological data collected by the nearby Boston Logan International Airport in East Boston, MA. The station is located approximately five miles (8.0 km) to the east-northeast of the Project site at an elevation of 15 feet (4.6 m) above mean sea level. This station is the closest site for which extensive meteorological data are available which are representative of similar topographic influences that affect the proposed site. Five years (2001-2005) of hourly surface data collected at the station include wind speed and direction, temperature, cloud cover and ceiling height. Upper air data from Gray, Maine was processed along with the surface data. The processed meteorological files for use in AERMOD were provided by the MassDEP. These files have been used on other AERMOD applications in the area for review by MassDEP and are presumed to be of sufficient quality for regulatory applications.

A network of 1,713 receptors was used for the refined AERMOD modeling analysis. A nested grid of Cartesian receptors centered on the project was used. The Project area bounded by an area 100 meters by 60 meters was laden with receptors spaced every 20 meters. From this area to 200 meters beyond, receptors were spaced every 20 meters; every 50 meters, from 100 meters to 1 kilometer; and every 200 meters from 1 kilometer to two kilometers. Receptors, spaced 10 meters apart, were also placed around the perimeter of the project site.

Terrain data were obtained from the U.S.G.S National Map Seamless Server (www.seamless.usgs.gov) according to guidance set forth by EPA.[11] Source, building, and receptor elevations were processed using the AERMAP processor by way of the Lakes AERMOD View interface. Figure 4.4-5 presents the source and receptor locations, as well as the buildings used in the GEP stack height/downwash analysis described below.

Stationary Sources

Parking Garage Exhaust Vents

A three-level parking garage adjacent to the buildings totaling 137 spaces is part of the Project. Carbon monoxide monitors will be installed within the garages to insure that levels of CO do not exceed health standards and will be used to control abatement ventilation when necessary.

Emissions from the parking garage were calculated using MOBILE6.2 and an estimate of the total miles traveled within the garages during the AM and PM peak hours. Estimates of vehicle turnover by usage were provided by the transportation consultant. The total vehicle miles traveled (VMT) are calculated by multiplying the average distance a car would travel in the garage by the number of cars entering and leaving the garage.

To provide a conservative assumption for emissions from the garages, an emission rate from MOBILE6.2 of 10 miles per hour was assumed for the 2014 conditions. The higher of the summer or winter factors were used, depending on pollutant. Additionally, emission factors were weighted such that only factors for light duty gasoline and diesel vehicle classes (MOBILE6.2 designations LDGV, LDGT, LDDV, and MCY) were used for garage emissions.

Therefore, the emission rates from the garage vents can be calculated as follows:

> Mobile 6.2 emission factor in grams/mile
> x garage VMT/hour
> x 1 hour/3600 seconds
> = grams/second

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11 U.S. EPA, AERMOD Implementation Guide, March 19, 2009.

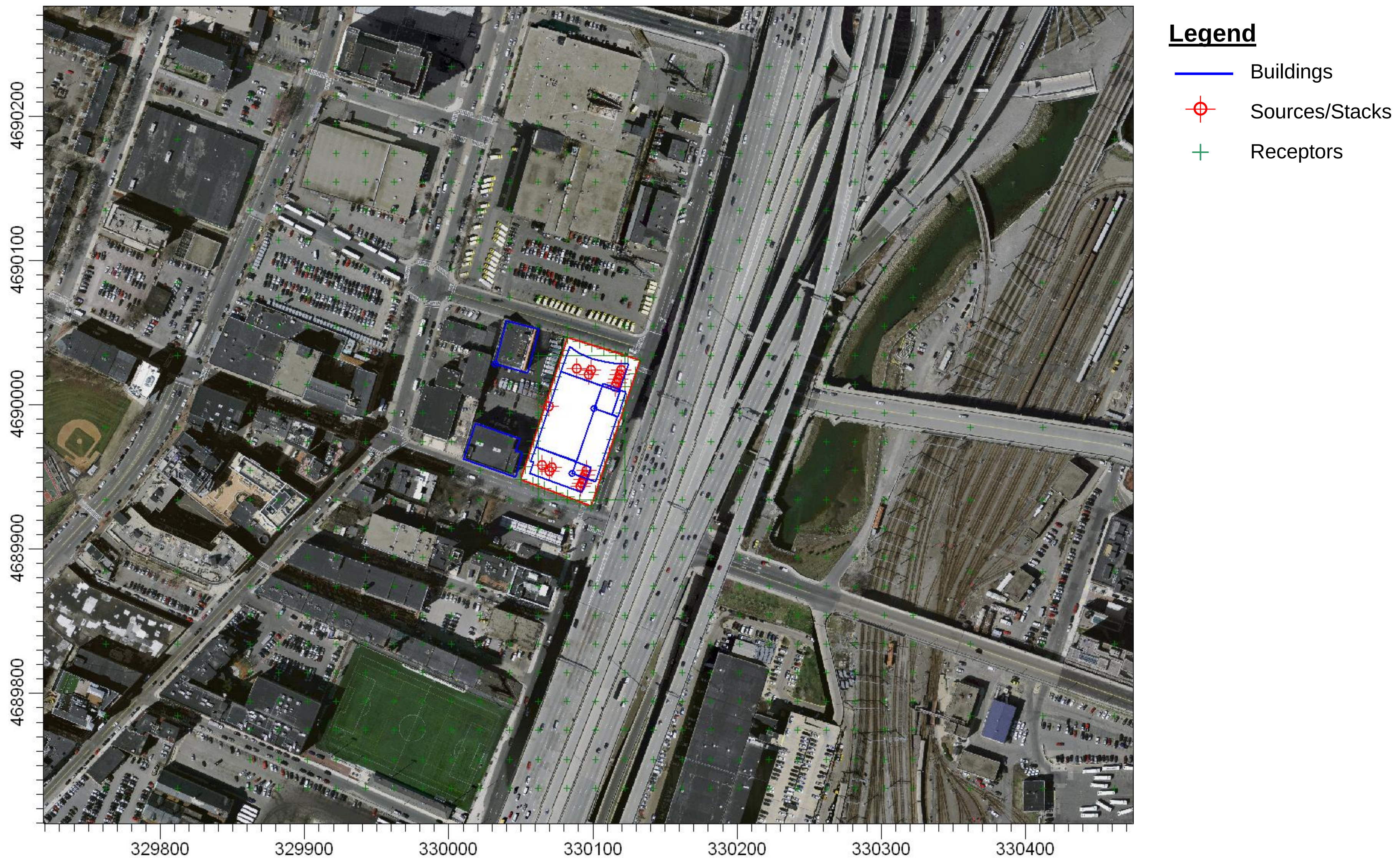

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Figure 4.4-5

AERMOD Stationary Source, Receptor, and Building Locations

High velocity air intake louvers and the main garage entry will supply make-up air for the garage's ventilation systems. A total ventilation air requirement of 280,000 cubic feet and two exhaust vents were used. The vents are expected to be louvered penthouse gravity ventilators which are assumed to be the largest available size of the model provided by the architect, approximately 60" x 60" rectangular (50 sf).

Although the garage exhaust vents would be controlled using CO monitors, the garage vents are assumed to emit at 100% for the AM and PM rush hours (6AM-8AM and 5PM-7PM), 50% for the daytime hours (9AM-4PM), and 25% overnight (8PM-5AM). Detailed calculations, assumptions, and exhaust parameters are presented in Appendix C.

Heating Equipment

Current design plans are for three heating boilers and two hot water boilers to be installed on each of the Hotel and Extended Stay hotel buildings. All units will be natural gas-fired and located in a mechanical area on the roof of the building.

The select-service hotel is planned to have three small (2.0 mmBtu/hr heat input) boilers for heat and two small (2.01 mmBtu/hr) boilers for hot water provided to the building. All units will be natural gas-fired and exhaust to the roof of the building.

The extended-stay hotel is expected to have three small (2.0 mmBtu/hr heat input) boilers for heat and two small (2.8 mmBtu/hr) boilers for hot water provided to the building. All units will be natural gas-fired and exhaust to the roof of the building.

The boilers will be either within or well below the requirements of the MassDEP's Environmental Results Program (ERP) since individual estimated heat inputs are within or below the 10 to 40 mmBtu/hour ERP range. However, emissions were conservatively estimated for each boiler based on the MassDEP Boiler ERP program emission limits. Dispersion modeled impacts from the heating units were estimated from exhaust stacks ten feet above the individual building roof heights above ground level, or as determined by the architect. For short term impacts, the heating equipment is assumed to be in operation 24 hours per day. For annual impacts, a 15 percent capacity factor is assumed. Detailed calculations and stack parameters are presented in Appendix C.

All boilers are expected to be below the ERP limits of 10 mmBtu/hour. Therefore, registration with MassDEP would not be required.

Emergency Generators

Current design plans are two 1,000-kilowatt emergency generators to be installed on the two hotel buildings. These units will provide life safety and standby emergency power to the buildings. All units will be diesel-fired and located either in a mechanical area on the roofs of the buildings, or in a mechanical room on a lower level. The generators are assumed to be designed such that their exhaust stacks extend 10 feet above the individual building roof heights above ground level.

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

Emissions were estimated for the emergency generators based on vendor supplied data. Comparable equipment was assumed where not provided by the architects. The generators are assumed to operate 300 of 8,760 hours per year in the modeling for annual averaging times. Detailed calculations and stack parameters are presented in Appendix C.

Cooling Towers

Current design plans are for two cooling towers to be installed on each of the hotel buildings. The select-service hotel is planned to have two 177-ton cooling towers while the extended-stay hotel is planned to have two smaller 162-ton cooling towers. These units will remove the excess heat generated by the building's mechanical equipment. All units will be located on the roofs of the buildings.

Only emissions of particulate matter are assumed to be produced by the cooling tower cells. The cooling towers are assumed to operate at 100 percent capacity for 8,760 hours per year. Emissions of all other pollutants from the cooling towers are expected to be negligible.

Emissions and exhaust parameters were based on vendor supplied data and/or engineering judgment. Detailed calculations are presented in Appendix C.

GEP Stack Height Analysis

The Good Engineering Practice (GEP) stack height evaluation of the facility has been conducted in accordance with the EPA revised Guidelines for Determination of Good Engineering Practice Stack Height (EPA, 1985). A GEP stack is sufficiently high to avoid aerodynamic downwash effects from nearby buildings or structures. As defined by the EPA guidelines, the formula for computing GEP stack height is:

$$H_{GEP} = H_b + 1.5L$$

where H_{GEP} = GEP stack height,

H_b = Height of adjacent or nearby structures,

L = Lesser of height or maximum projected width of adjacent or nearby building (*i.e.*, the critical dimension), and nearby is within 5L of the stack from downwind (trailing edge) of the building.

The GEP formula was applied to each Project building. Facility grade is approximately at mean sea level. The EPA's Building Profile Input Program Prime Version (BPIP-Prime) was run to confirm the GEP height and to calculate building dimensions for use in AERMOD.

The point sources subject to building influences are the boiler stacks, garage vents, the cooling towers, and the emergency generator stacks.

The proposed boiler stacks, the cooling towers, garage vents, and emergency generator stacks are all below GEP height; therefore, building downwash effects were considered in the air quality modeling. The AERMOD model determines when and if to include downwash in its calculations. In addition, if downwash applies, the AERMOD downwash algorithm will be used to estimate concentrations in the building cavity areas.

4.4.3 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported on the U.S. EPA's AIRData website (http://www.epa.gov/air/data) was obtained for 2006 to 2008. MassDEP guidance specifies the use of the latest three years of available monitoring data from within 10 km of the project site.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM2.5 averages, the average of the highest yearly observations was used as the background concentration.

Background concentrations were determined from the closest available monitoring stations to the proposed development. The closest monitors are 1.26 miles away at 531a East First Street and 1.40 miles away at Harrison Avenue. A summary of the background air quality concentrations are presented in Table 4.4-1.

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 3.5 ppm for 1-hour and 2.1 ppm for 8-hour CO.

Table 4.4-1 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	Averaging Period	Station[6]	2006	2007	2008	Background	NAAQS
SO_2[1] ($\mu g/m^3$)	3-Hour	E1ST	70.2	239.2	114.4	239.2	1,300
	24-Hour	E1ST	36.4	140.4	41.6	140.4	365
	Annual	E1ST	10.4	15.6	10.4	15.6	80
PM-10 ($\mu g/m^3$)	24-Hour	HARR	38	40	28	40	150
	Annual	HARR	16	14	14	16	50
PM-2.5 ($\mu g/m^3$)	24-Hour [4]	HARR	27.3	31.5	28	28.9	35
	Annual [5]	HARR	9.69	10.48	10.08	10.1	15
NO_2 [3] ($\mu g/m^3$)	Annual	E1ST	26.32	37.6	30.08	37.6	100
CO [2] ($\mu g/m^3$)	1-Hour	HARR	3990	2280	1710	3990	40,000
	8-Hour	HARR	2394	1482	1254	2394	10,000

Notes: [1] SO_2 reported in PPM. Converted to $\mu g/m^3$ using factor of 1 ppm = 2600 $\mu g/m^3$.
[2] CO reported in PPM. Converted to $\mu g/m^3$ using factor of 1 ppm = 1140 $\mu g/m^3$.
[3] NO_2 reported in PPM. Converted to $\mu g/m^3$ using factor of 1 ppm = 1880 $\mu g/m^3$.
[4] Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.
[5] Background level for annual PM-2.5 is the average for three years.
[6] E1ST = 531a E. First St., S. Boston; HARR = Harrison Ave., Boston.

4.4.4 Air Quality Results

4.4.4.1 Mesoscale Analysis

Results of the mesoscale analysis are presented in Table 4.4-2. The 2014 Build Condition results in less than a 1.5 percent increase in NOx and VOC emissions compared to the 2014 No-Build condition. All increases are far less than 1 ton per year of pollutant, and on the order of 0.1 tpy, within the accuracy of the calculations and assumptions used in the analysis.

The 2014 Build condition when compared to the Existing conditions shows a reduction of about 52 percent of NOx and 42 percent of VOC emissions. This is primarily due to improved vehicle technology, which translates to improved future vehicular emission rates.

4.4.4.2 Mitigation Measures and Conclusions

The Proponent has identified and reviewed reasonable and feasible reduction and mitigation measures to address traffic congestion and the resulting slight increase in emissions associated with the 2014 Build scenario over the No-Build. Chapter 3 provides a description of the Transportation Demand Management (TDM) program that will be implemented to reduce Project-related vehicle trips. The Proponent is committed to implementing infrastructure and management improvements to minimize impact on the transportation system. These measures include alternative means of travel, rideshare programs and telecommuting and are already included in the 2014 Build scenario.

In addition, any future mitigation measures not yet determined or discussed in Chapter 3 may be implemented resulting in further reductions in emissions. It is anticipated that further mitigation measures will be implemented on an as-needed basis to alleviate traffic congestion in the area and further reduce emissions.

Further reductions in delay can be achieved by optimizing signal phasing and/or lane configurations as needed in the future. Reductions in delay correlate to reductions in vehicle idle time. Since VOC emissions are highest at low engine RPM, further reductions in idle time would result in further reductions of VOC emissions. Slight decreases in NOx emissions would also be realized.

The reduction in delay times would also result in a general increase in traffic speed along roadway links. In general, emission rates of NOx decrease from idle to 30 miles per hour. Therefore any increase in speeds to approach the speed limit would result in decreases of NOx emissions. Since future changes in traffic speeds are speculative, exact reductions in emissions are not quantified.

Calculation details for the mesoscale analysis are presented in Appendix C.

Table 4.4-2 Mesoscale Analysis Summary

Pollutant	VOC lbs/day	VOC tons/yr	NOx lbs/day	NOx tons/yr
2009 Existing	58.6	7.6	125.8	16.4
2014 No-Build	33.7	4.4	59.7	7.8
2014 Build	34.2	4.4	60.4	7.8
Difference	0.5	0.1	0.7	0.1
Difference (%)	1.44	1.44	1.18	1.18

4.4.4.3 Microscale Analysis

The results of the maximum one-hour predicted CO concentrations from CAL3QHC at each intersection are provided in Tables 4.4-3, 4.4-4, and 4.4-5 for the Existing, No-Build, and Build scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.7.[12]

[12] U.S. EPA, Screening Procedures for Estimating the Air Quality Impact of Stationary Sources; EPA-454/R-92-019, October 1992

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at each intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentrations predicted in the area of the Project for the modeled conditions (2.2 ppm) plus background (3.5 ppm) is 5.7 ppm for the future Build case (at W. Fourth and Frontage). The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (1.5 ppm) plus background (2.1 ppm) is 3.6 ppm for the future Build case. Both concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

When adding the high-second highest AERMOD-predicted one-hour CO concentrations from the stationary sources for the future build case (200.2 $\mu g/m^3$, 0.2 ppm), the one-hour modeled concentration (2.2 ppm) plus background (3.5 ppm) is 5.9 ppm. The total future build concentration includes the highest second-high predicted concentrations from AERMOD for the parking exhaust vents, the heating boilers, and the emergency generators. This combined value is also well below the one-hour NAAQS standard of 35 ppm.

Similarly, when adding the high-second highest AERMOD-predicted eight-hour CO concentrations from the stationary sources for the future build case (113.8 $\mu g/m^3$, 0.1 ppm), the eight-hour modeled concentration (1.5 ppm) plus background (2.1 ppm) is 3.7 ppm. These values are also well below the eight-hour NAAQS standard of 9.0 ppm.

This is a highly conservative estimate, since the added values are irrespective of time and space (*i.e.*, the modeled and background concentrations occur at different times and at different locations).

It would be expected that any mitigation measures implemented to improve traffic flow at any of the modeled intersections would result in improved air quality impacts. Since there are no modeled exceedances of the NAAQS for the Build conditions, it is inferred that there would be no exceedances of the NAAQS for the Build with Mitigation conditions.

4.4.4.4 Stationary Source Analysis

In addition to the microscale analysis, a cumulative impact analysis was also conducted for comparison to the NAAQS for SO_2, NOx, PM-10, and PM-2.5. This analysis addresses emissions from the Project's heating boilers, emergency generators, cooling towers, and the garage vents.

Worst case maximum predicted impacts from these sources were added to monitored background values obtained from the EPA AIRData website for 2006 to 2008 and compared to the NAAQS.

Table 4.4-6 presents the cumulative modeling results for the stationary sources plus monitored background values. The total impacts when combined with background are below the NAAQS for all pollutants and averaging periods.

4.4.5 Conclusions

Using conservative estimates, the CO concentrations at the nearest receptors for impacts from the intersection, the heating boilers, and emergency generator units, plus monitored background values, are well under the CO NAAQS thresholds. In addition, maximum cumulative impacts from the heating boilers, garage vents, cooling towers, and emergency generators plus monitored background values are also below the NAAQS thresholds for SO_2, NOx, PM-10, and PM-2.5.

Table 4.4-3 Summary of Microscale Modeling Analysis (Existing 2009)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	2.7	3.5	6.2	35
	PM	2.6	3.5	6.1	35
W. Fourth St. & Dorchester Ave.	AM	1.9	3.5	5.4	35
	PM	2.5	3.5	6.0	35
E. Berkeley St. & Harrison Ave.	AM	3.0	3.5	6.5	35
	PM	2.7	3.5	6.2	35
W. Fourth St. & Frontage Rd.	AM	2.6	3.5	6.1	35
	PM	2.6	3.5	6.1	35
8-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	1.9	2.1	4.0	9
	PM	1.8	2.1	3.9	9
W. Fourth St. & Dorchester Ave.	AM	1.3	2.1	3.4	9
	PM	1.8	2.1	3.9	9
E. Berkeley St. & Harrison Ave.	AM	2.1	2.1	4.2	9
	PM	1.9	2.1	4.0	9
W. Fourth St. & Frontage Rd.	AM	1.8	2.1	3.9	9
	PM	1.8	2.1	3.9	9

Notes:
CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

Table 4.4-4 Summary of Microscale Modeling Analysis (No-Build 2014)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	1.6	3.5	5.1	35
	PM	1.5	3.5	5.0	35
W. Fourth St. & Dorchester Ave.	AM	1.8	3.5	5.3	35
	PM	1.5	3.5	5.0	35
E. Berkeley St. & Harrison Ave.	AM	1.7	3.5	5.2	35
	PM	1.6	3.5	5.1	35
W. Fourth St. & Frontage Rd.	AM	1.7	3.5	5.2	35
	PM	1.7	3.5	5.2	35
8-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	1.1	2.1	3.2	9
	PM	1.1	2.1	3.2	9
W. Fourth St. & Dorchester Ave.	AM	1.3	2.1	3.4	9
	PM	1.1	2.1	3.2	9
E. Berkeley St. & Harrison Ave.	AM	1.2	2.1	3.3	9
	PM	1.1	2.1	3.2	9
W. Fourth St. & Frontage Rd.	AM	1.2	2.1	3.3	9
	PM	1.2	2.1	3.3	9

Notes:
CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

Table 4.4-5 Summary of Microscale Modeling Analysis (Full Build 2014)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	1.6	3.5	5.1	35
	PM	1.5	3.5	5.0	35
W. Fourth St. & Dorchester Ave.	AM	1.8	3.5	5.3	35
	PM	1.5	3.5	5.0	35
E. Berkeley St. & Harrison Ave.	AM	1.8	3.5	5.3	35
	PM	1.7	3.5	5.2	35
W. Fourth St. & Frontage Rd.	AM	1.7	3.5	5.2	35
	PM	2.2	3.5	5.7	35
8-Hour					
Broadway Bridge, Frontage Rd., I-93	AM	1.1	2.1	3.2	9
	PM	1.1	2.1	3.2	9
W. Fourth St. & Dorchester Ave.	AM	1.3	2.1	3.4	9
	PM	1.1	2.1	3.2	9

Table 4.4-5 Summary of Microscale Modeling Analysis (Full Build 2014) (Continued)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
E. Berkeley St. & Harrison Ave.	AM	1.3	2.1	3.4	9
	PM	1.2	2.1	3.3	9
W. Fourth St. & Frontage Rd.	AM	1.2	2.1	3.3	9
	PM	1.5	2.1	3.6	9

Notes:
CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

Table 4.4-6 Summary of NAAQS Stationary Source Modeling Analysis

Pollutant	Period	Stationary Source Total Modeled Concentration ($\mu g/m^3$)	Monitored Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NOx	Annual High	2.1	37.6	39.7	100
SO_2	3-Hour H2H	0.4	239.2	239.6	1300
	24-Hour H2H	0.3	140.4	140.7	365
	Annual High	0.001	15.6	15.6	80
PM-10	24-Hour H2H	3.3	40	43.3	150
	Annual High	0.1	16	16.1	50
PM-2.5	24-Hour H8H	2.9	28.9	31.8	35
	Annual High	0.1	10.1	10.2	15
CO	1-Hour H2H	59.1	3990	4049.1	40000
	8-Hour H2H	30.6	2394	2424.6	10000
Hours of Operation Emergency Generator: 300 hrs per year, 24 hrs per day for short term.					
Hours of Boiler Operation Heating: 15% for annual, 24 hrs per day for short-term.					

4.5 Noise

New development has the potential to introduce unwanted noise to a project's surroundings. For the type of project being considered (*i.e.*, a new building in an urban setting), noise can be caused by its mechanical equipment, such as chillers, exhaust fans, and emergency generators. Whether the noise created by a project becomes a nuisance depends on a number of factors, including the ambient noise levels in the project area, the amount of noise generated, and what mitigation measures are taken to reduce potential noise impacts. The Proponent has undertaken a *simplified quantitative* analysis of the proposed Project's potential noise impacts. Based upon the results of this simplified quantitative analysis and the existing very high noise levels in the Project vicinity and the types and location of proposed mechanical equipment combined with the equipment reference sound levels, the Proponents concluded that there will be minimal or no increase in existing ambient noise levels, and therefore, no noise impact from the Project.

4.5.1 Existing Noise Environment

Sound level measurements were taken for 20 minutes per location during daytime (10:00 a.m. to 12:00 p.m.) on October 29, 2009, and during the nighttime (12:00 a.m. to 1:50 a.m.) on October 30, 2009. Since noise impacts are greatest at night when existing noise levels are lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to include off-peak traffic conditions. The sound levels were measured at publicly accessible locations at a height of five feet above the ground and at locations where there were no large reflective surfaces to affect the measured levels. The measurements were made under low wind conditions and with dry roadway surfaces.

The selection of the sound monitoring receptor locations was based upon a review of the current and anticipated land use in the area surrounding the Project. Four noise-monitoring locations were selected in representative locations to obtain a sampling of the ambient baseline noise environment. These locations are shown on Figure 4.5-1 and described below:

- **Location 1 -** the southwest corner of the Project site on East Berkeley Street;
- **Location 2 -** in front of 160 East Berkeley Street at the intersection of East Berkeley Street and Harrison Avenue
- **Location 3 -** at the corner of the Pine Street Inn on Albany Street; and
- **Location 4 -** northwest of the Project on Traveler Street.

275 Albany Street **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 4.5-1

Noise Monitoring Locations

The existing ambient noise environment is quite loud due primarily to the traffic on the nearby Southeast Expressway and local streets. Baseline sound level monitoring results are presented in Table 4.5-1. The daytime residual background (L_{90}) measurements ranged from 63 to 70 dBA while the nighttime residual background measurements ranged from 57 to 61 dBA. The daytime equivalent level (L_{eq}) measurements ranged from 70 to 76 dBA while the nighttime equivalent level measurements ranged from 64 to 70 dBA.

Table 4.5-1 Baseline Ambient Sound Level Measurements – 275 Albany Street, Boston, MA (dBA)

Location	Daytime		Nighttime	
	L_{eq}	L_{90}	L_{eq}	L_{90}
1	70	66	66	61
2	70	63	70	59
3	76	70	69	61
4	70	66	64	57

4.5.2 Proposed Mechanical Equipment

The proposed Project will include mechanical equipment typical for a project of its size and type, including cooling towers, boilers, exhaust fans, etc. The equipment is listed in Table 4.5-2 and shown on Figure 4.5-2.

Table 4.5-2 Proposed Mechanical Equipment

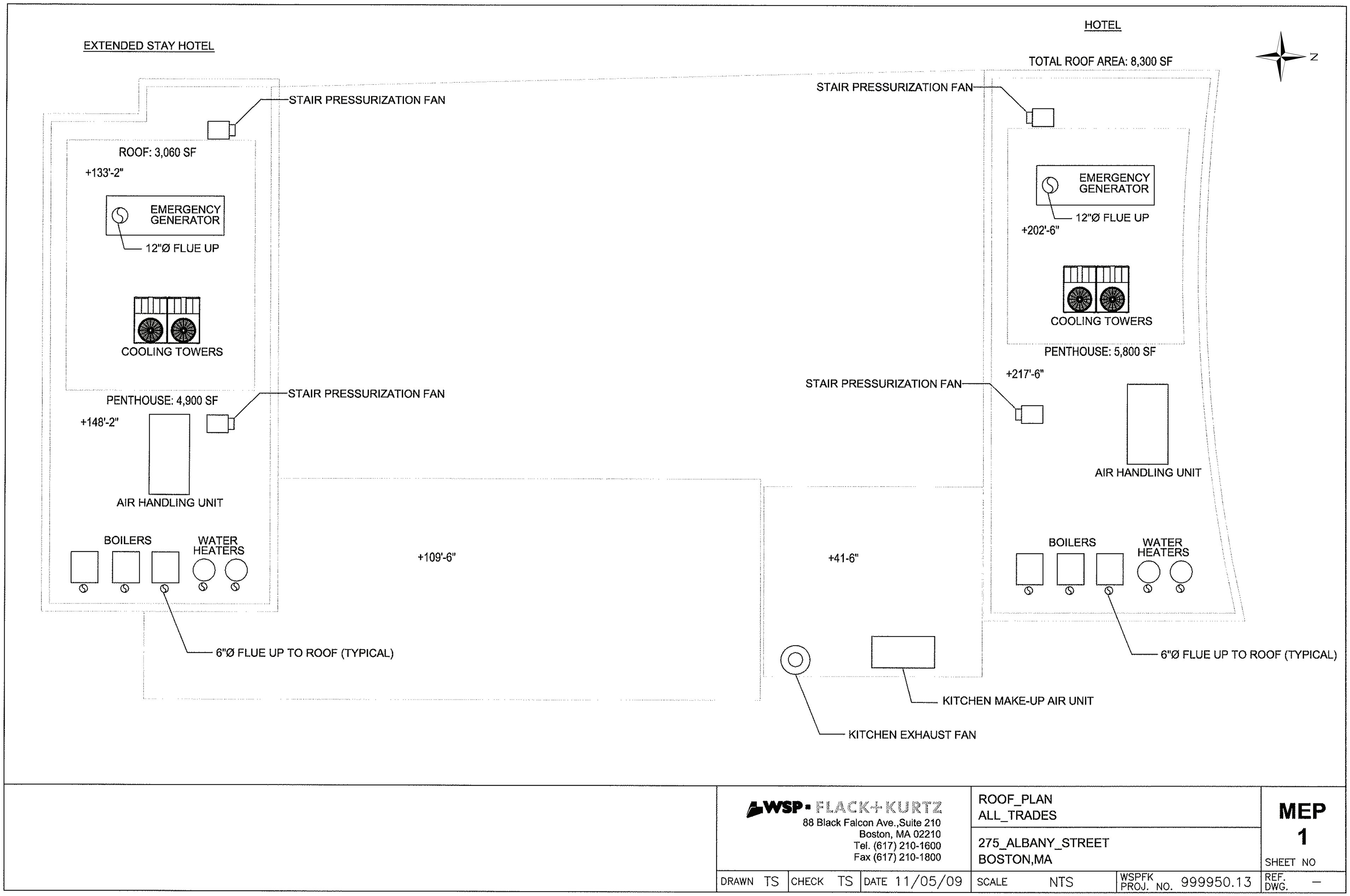
Extended Stay Hotel Equipment	(Number) and Size	Make/Model	Location
Cooling Tower	(2) 162 tons	Baltimore Air Coil 15162	S. Penthouse Well
Boilers	(3) 2,000 MBH	Hydrotherm KN-20	South Penthouses
Loading Dock Exhaust Fan	(1) 8,000 cfm	Loren Cook 245 QMX	Loading Dock
Garage Fans	(8) 15,000 cfm	Loren Cook 300 QMX	Garage
Stair Pressurization Fans	(2) 20,000 cfm	Loren Cook 402CPA	South Penthouses
Electric Vault Exhaust Fan	(1) 5,300 cfm	Loren Cook 225CPA	TBD
Air Handling Unit #3	(1) 15,000 cfm	Carrier 50 BVV	South Penthouses
Emergency Generators	(2) 1,000kW/ 1,250kVA	Caterpillar C32ATAAC	South Penthouses

Table 4.5-2 Proposed Mechanical Equipment (Continued)

Extended Stay Hotel Equipment	(Number) and Size	Make/Model	Location
Cooling Tower	(2) 177 tons	Baltimore Air Coil 15177	N. Penthouse Well
Boilers	(3) 2,000 MBH	Hydrotherm KN-20	North Penthouse
Kitchen Exhaust Fan	(1) 5,000 cfm	Loren Cook 300VX11B	Low Roof
Kitchen Make-up Air Handling Unit	(1)5,000 cfm	Carrier 39MW Size 12	Low Roof
Stair Pressurization Fans	(2) 20,000 cfm	Loren Cook 402CPA	North Penthouse
Electric Vault Exhaust Fan	(1) 5,300 cfm	Loren Cook 225CPA	TBD
Air Handling Unit #2	(1) 15,000 cfm	Carrier 50BVV	North Penthouse
Emergency Generators	(2) 1,000kW/1,250kVA	Caterpillar C32ATAAC	North Penthouses

4.5.3 Expected project sound pressure levels

A simple spreadsheet model using distance attenuation and shielding/barriers was prepared to estimate project sound pressure levels at the four receptor locations. Reference sound power levels and reference sound pressure levels were obtained for the major mechanical equipment and used in the spreadsheet model. The emergency generators will be housed in an acoustical enclosure that reduces the sound pressure levels by approximately 25 dBA. The generator will also have silencer on the exhaust. Without the emergency generator operations, the Project only L_{eq} sound pressure levels will be approximately 50 dBA or less at each of the four monitoring locations. With the emergency generator operation (which will occur only during scheduled daytime testing of the generators or during a power outage), the project only L_{eq} sound pressure levels will be approximately 56 dBA or less at the four locations. The combined sound levels from both the Project and existing ambient will increase by less than one dBA; the difference is insignificant and the combined levels are not measurably different from the existing ambient sound levels.



275 Albany Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 4.5-2
Rooftop Equipment Plan

4.6 Flood Zones/Wetland Resource Areas

The Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map ("FIRM") indicates the FEMA Flood Zone Designations for the site areas (City of Boston, Community-Panel Number, 2502860010C, April 1, 1982). The map for the Project site shows the Project is located in a Zone C, Area of Minimal Flooding; therefore flooding is not a concern.

The site is completely developed and does not contain any wetland resources.

4.7 Water Quality and Stormwater Management

Because the proposed Project will be built on what is now a parking lot, the amount of impervious area covering the site will not increase. Post construction peak storm water run-off rates for the 2-, 10-, 25-, and 100-year storm events will not exceed the existing pre-construction peak rates. The Project will incorporate storm water Best Management Practices (BMPs) recommended by the Department of Environmental Protection (DEP) to reduce Total Suspended Solids (TSS) in stormwater runoff before connecting to the BWSC system. Mitigation measures to be incorporated include catch basins with hoods and deep sumps, oil/grease separators, groundwater recharge, and the implementation of an Operations and Maintenance Plan.

4.7.1 DEP Stormwater Management Policy Standards

The design objective for the storm water management system proposed for the site is to meet the DEP Stormwater Management Standards to the greatest extent possible. These standards have been specifically addressed in the Project design in the following manner:

Standard #1: No new untreated storm water will discharge into, or cause erosion to wetlands or waters.

Compliance: The proposed design will comply with this Standard. There will be no untreated storm water discharge. All discharges will be treated prior to connection to the BWSC system.

Standard #2: Post-development peak discharge rates do not exceed pre-development rates on the site either at the point of discharge or down-gradient of the property boundary for the 2- and 10-year 24-hour design storms. The project's storm water design will not increase flooding impacts offsite for the 100-year design storm.

Compliance: The proposed design will not increase peak discharge rates for all storm events.

Standard #3: The annual groundwater recharge for the post-development site must approximate the annual recharge from existing site conditions, based on soil type.

Compliance: The current amount of groundwater recharge is negligible given that the site is completely paved and located in an urban setting. The proposed landscaped areas and stormwater recharge system will provide a substantial increase compared with existing conditions and will comply with the Article 32 of the City's Zoning Code, which requires that the project provide infiltration in an amount equal to or greater than one inch over the area of the portion of the lot to be occupied.

Standard #4: For new development, the proposed storm water management system must achieve an 80 percent removal rate for the site's average annual load of TSS.

Compliance: The proposed Project is a Redevelopment Project, not a "New Development." To the extent possible, the Project's storm water management system will remove 80 percent of the post-development site's average annual TSS load. Runoff from the site will be routed through deep sump catch basins with hooded outlets and mechanical separators.

Standard #5: If the site contains an area with Higher Potential Pollutant Loads (as prescribed by the Policy), BMPs must be used to prevent the recharge of untreated stormwater.

Compliance: The project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-8). This project complies with this standard.

Standard #6: If the site contains areas of Sensitive Resources (as defined by the Policy), such as rare/endangered wildlife habitats, ACECs, etc., a larger volume of runoff from the "first flush" must be treated (1 inch of runoff from impervious area vs. the standard ½ inch).

Compliance: The Project will not discharge untreated storm water to any sensitive areas.

Standard #7: Redevelopment of previously developed sites must meet the Storm Water Management Standards to the maximum extent practicable.

Compliance: The Project will meet or exceed all standards.

Standard #8: Erosion and sediment controls must be designed into the project to minimize adverse environmental effects.

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

Standard #9: A long-term BMP operation and maintenance plan is required to ensure proper maintenance and functioning of the SWM system.

Compliance: An Operations and Maintenance Plan including long-term BMP operation requirements will be prepared and will ensure proper maintenance and functioning of the system. The Operations and Maintenance Plan will be implemented for this facility in order to ensure that this facility adequately provides preventative maintenance to minimize damage to the drainage infrastructure and makes necessary repairs accordingly during and after construction. A typical maintenance schedule is described in the sections below.

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

Compliance: No illicit discharges, including wastewater, process wastes, toxic pollutants and hazardous substances will be introduced into the stormwater management system. An Illicit Discharge Compliance Statement will be filed with the Boston Conservation Commission prior to receiving a Certificate of Compliance for the Project.

4.7.2 Maintenance Program

The proposed Project will include a maintenance program both during and after construction to ensure the continued proper functioning of the stormwater management system.

During Construction

1. Site inspections will be performed weekly by a Professional Engineer during the construction of the site improvements to check on erosion control devices and the storm water runoff conditions. Corrective measures will be recommended to the Project Superintendent when warranted. A field report of the Project Engineer's findings will be kept.

2. Efforts to control erosion and sediment will be made by the following:

   - compaction of disturbed earth on slopes;
   - placement and maintenance of hay bales and silt fence as directed by the Engineer and construction documents (including around new and existing drainage structures); and
   - earth stock piling at proper locations and in a manner to minimize erosion.

3. The contractor shall make every effort to sequence and complete the construction of drainage facilities to ensure that uncontrolled runoff is kept to a minimum.

4. A Professional Engineer will conduct an inspection of the storm water management system upon completion of its installation.

5. Records will be kept by a Professional Engineer and will be available for inspection by the Boston Water and Sewer Commission.

Maintenance Program After Construction

1. Sweepings will be disposed offsite in compliance with all applicable codes.

2. Catch basins on the site will be inspected each May and November. The catch basin will be cleaned if sediment is within 24 inches of the outlet. All sediment will be deposited offsite and in compliance with all codes.

3. Storm water treatment systems will be inspected and maintained in compliance with the manufacturers' recommendations.

4. A Maintenance Log shall be kept by the Maintenance Superintendent and will be available for inspection by the Boston Water and Sewer Commission and the City of Boston DPW.

4.8 Geotechnical Resources/Groundwater

Based upon previous investigations on the site, the subsurface conditions across the Project site are anticipated to include a 2- to 16-foot thick layer of fill material overlying a thin layer of hydraulic fill and a natural, silty clay, with some interbedded layers of fine sand. Regional geologic information indicates that the silty clay may extend to depths of 100 to 120 feet below ground surface. Underlying the marine clay deposit, a natural stratum of dense to very dense glacial till, consisting of a well graded mixture of sand, silt, and gravel, with cobbles and boulders, is anticipated to be present, which is underlain by the bedrock surface. Groundwater is anticipated at depths ranging from approximately 6 to 10 feet below the existing ground surface. A program of shallow soil borings has already been completed and additional deeper soil test borings will be performed to define the subsurface conditions at the Project site.

Based upon our review of the Boston Groundwater Trust ("BGwT") 2006 Reading Zones, revised January 24, 2006, the site lies inside of a Reading Zone, and is located in Zone 11 (Four Corners at Massachusetts Avenue). There are wells located for water level measurements on East Brookline Street and between Washington Street and Harrison Avenue (Source: Bostongroundwater.org). The Proponent will coordinate with the Groundwater Trust to solicit their input on the Project and the need for any additional wells at or adjacent to the site.

Based upon the anticipated subsurface conditions at the site, foundation support for the building will likely be provided by a deep foundation system, consisting of end-bearing piles advanced into the glacial till or bedrock deposits that underlie the marine deposit. An earth retention system will be proposed for portions of the site where stable excavation slopes cannot be created. The earth retention system may extend below the proposed bottom of excavation into the marine deposit or otherwise be internally braced. A program of instrumentation will be implemented to monitor the performance of the earth retention system.

Construction dewatering will be necessary to remove groundwater within the excavation and to remove rainwater following periods of precipitation. Measures will be implemented to maintain groundwater levels outside the property limits. Construction dewatering will be performed in accordance with applicable MWRA, EPA, BWSC and Massachusetts DEP regulations and permits. In addition, waterproofing will be provided against the exterior face of the portions of the garage which extend below observed and predicted groundwater levels as a permanent groundwater cut-off measure.

Groundwater observation wells will be installed in the vicinity of the Project prior to commencement of any site excavation or dewatering to monitor the groundwater levels prior to, during, and following construction.

During excavation, all soils necessary for export will be managed for off-site disposal in accordance with the current regulations and policies of the Massachusetts DEP.

4.9 Hazardous Materials/Solid Waste

4.9.1 Hazardous Materials

The Project site was historically used for a period of time as a service garage and fueling station. A hydraulic lift was reportedly removed in 1990 and some contaminated soil was removed with it as well. A gasoline Underground Storage Tank (UST) was removed in 1996 and a release of petroleum was reported to DEP. Monitoring wells were installed on-site and one was found to be contaminated near the former UST. A plan was submitted in 1996 to remove up to 200 cubic yards (cy) of contaminated soil and 1,500 gallons of contaminated groundwater from this area. In 1997 a Class A-3 "Response Action Outcome" (RAO) Report was submitted to DEP and an "Activity and Use Limitation" (AUL) recorded against the Project site. The RAO Report indicated that the site was clean enough for use as a commercial property and parking lot, and restricted certain activities to parking/maintenance only and prohibited residential use with the AUL. Another environmental investigation was conducted in 1999 and its findings were consistent with that previously reported.

In 2000, a "Release Abatement Measure" (RAM) Plan was submitted to DEP contemplating demolition of the existing Federal Express building and converting the site to a parking lot. Twenty-four additional borings were installed on the site to address the UST area and another area on the northeast part of the site. An additional 400 cy of contaminated soil were removed from the site as stated in the RAM Completion Report. Also, the original AUL was removed and two separate AULs were filed to address residuals in the two areas on site.

In November 2006, LFR completed a supplemental investigation of the property to identify appropriate off-site disposal facilities for soil that may be exported from the Project site. Twelve additional borings were installed. This soil characterization program will be completed as part of the development to finalize off-site disposal locations once the final design is completed. There are some residuals remaining to depths of up to 20 feet on the site that will be addressed to ensure the property is safe for residential and commercial use. All remediation activities will be undertaken in accordance with all applicable environmental laws. The existing AULs will be removed so there will not be any environmental restrictions on the property.

4.9.2 Operational Solid Waste

The Project will generate solid waste typical of hotel use. Operation of the Project is not expected to generate any significant amount of hazardous wastes. Solid waste generated by the Project is conservatively estimated to be approximately 300 tons per year, based on a generation rate of four pounds of waste per room per day. Solid waste will be collected and stored completely inside the building in clean secure areas, and will be hauled away to licensed facilities for proper disposal. Recycling will be encouraged throughout the Project as a key part of its overall sustainability program.

4.10 Construction Impacts

A Construction Management Plan in compliance with the City's Construction Management Program (CMP) will be submitted to the Boston Transportation Department (BTD) once final plans are developed and the construction schedule is determined. The CMP will include detailed information on construction activities, specific construction mitigation measures, and construction materials, access and staging area plans to minimize impacts to abutters and the local community. The construction contractor will be required to comply with the details and conditions of the approved CMP.

4.10.1 Air Quality

During the construction period of the project, temporary affects on ambient air quality adjacent to the construction site may occur. Impacts associated with construction activities will generate fugitive dust which may result in localized increases in particulate levels.

The construction contract will provide for a number of strictly enforced measures to be utilized by contractors to reduce potential emissions and minimize impacts. These are expected to include:

- Using wetting agents on area of exposed soil on a scheduled basis;
- Using covered trucks;
- Providing a wheel wash at all site exits;
- Minimizing storage of debris on-site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

The Proponent will also specify that contractor's off-road diesel equipment greater than 50hp be diesel retrofitted with an EPA-approved diesel retrofit device, or have similar emissions control technology, to reduce particulate emissions. The Project will also place signs at appropriate locations to alert motorists regarding compliance with Massachusetts Idling regulations (310 CMR 7.11).

4.10.2 Noise

The proponent is committed to mitigate noise impacts from the construction of the Project. Increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston noise ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures are expected to include:

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

- Turning off idling equipment; and

- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

4.10.3 Staging and Construction Worker Parking

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

The number of workers required during the construction period will vary, depending on the phase of construction. Because the construction workers will arrive and depart prior to peak traffic periods, the construction trips are not expected to impact local traffic conditions.

To reduce vehicle trips to and from the construction site, all workers will be strongly encouraged to use public transportation. Space on-site will be made available for workers' supplies and tools so they do not have to be brought to the site each day.

Specific delivery truck access routes will be established in consultation with the BTD through its approval of the CMP required for the project. Construction contracts will include clauses restricting truck travel to primary roads. Enforcement of truck routes will be accomplished through clauses in the subcontractors' agreements.

4.10.4 Schedule

Construction is expected to begin in mid-2011 and take approximately 24 months to complete.

The City of Boston allows construction work from 7:00 AM to 6:00 PM Monday through Friday. Construction outside of those hours requires a permit. Typical construction hours for the Project will be in compliance with the City's regulations. In the event that weekend work is necessary, the proponent will obtain required City approvals.

Proper pre-planning with the City, neighborhood and developers of other projects under construction in the area will be essential to the successful construction of the Project. The construction contractor will be responsible for coordinating construction activities during all phases of construction with City of Boston agencies in order to minimize potential scheduling and construction conflicts with other ongoing construction projects in the area.

4.10.5 Traffic

Because the construction workers will arrive and depart prior to peak traffic periods, the construction trips are not expected to impact local traffic conditions. To reduce vehicle trips to and from the construction Project site, no construction worker parking will be permitted on the site and all workers will be strongly encouraged to use public transportation. The contractor will establish a designated drop-off area for workers, tools, and equipment. The established time frame for the drop-off area will be 6:00 AM to 7:00 AM. The drop-off area will include posted "No Idling" signs.

Trucks will approach the site from Albany Street. Unloading and loading areas will be set up within the Project site.

4.10.6 Methodology

Section 4.8, Geotechnical Impacts, provides details regarding foundation methodology and plans to protect adjacent infrastructure, buildings and underground tunnels during construction.

4.10.7 Solid Waste

The proponent will reuse or recycle construction materials to the extent feasible. Construction procedures will allow for the segregation, reuse, and recycling of materials. Materials that cannot be reused or recycled will be transported in covered trucks by a contract hauler to a licensed facility, per the DEP regulations for Solid Waste Facilities, 310 CMR 16.00.

4.10.8 National Pollutant Discharge Elimination System

The proposed project involves the disturbance of over one acre, therefore a National Pollutant Discharge Elimination System permit is required from the Environmental Protection Agency. The proponent will apply for this permit and prepare a Stormwater Pollution Prevention Plan for the Project.

4.10.9 Rodent Control

A rodent examination certificate will be filed with the building permit application to the City. Rodent inspection and monitoring and treatment will be carried out during and at the completion of all construction work for the proposed Project, in compliance with the City's requirements. Rodent extermination prior to work start-up consists of treatment areas throughout the Project site. During the construction process, regular service visits will be made.

4.10.10 Public Safety

To minimize transportation impacts during the construction period, the CMP will include detailed construction trucking routes to and from the site. Trucks will approach the site from Albany Street and primary staging will be on-site. The proposed construction staging plan will be designed to isolate the construction while providing safe access for pedestrians and vehicles during normal day-to-day activities and emergencies. The staging areas will be secured by chain-link fencing to protect pedestrians from entering these areas.

Although specific construction and staging details have not been finalized, the proponent will work with the construction contractor and the City of Boston to ensure that staging areas will be located to minimize impact to pedestrian and vehicular flow. Secure fencing and barricades will be used to isolate construction areas from pedestrian traffic. In addition, public safety for pedestrians on abutting sidewalks will also include covered pedestrian walkways when appropriate and, as required, the suspension of the use of certain sidewalks during the most hazardous periods of overhead work activity during the construction of the superstructure. As required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. The Project will include debris nets on various levels of the building elevations to protect the public and the abutters. All construction procedures will be designed to meet all OSHA safety standards for specific site construction activities.

Section 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Project Location

The Project site is a parking lot at the northeastern edge of the South End beside the elevated portion of the Southeast Expressway (I-93). It is an exciting, albeit gritty, location for a mixed use project that includes two hotels, one a select service hotel and the other an extended stay hotel, a restaurant and a parking garage.

The site has terrific visibility as well as proximity to the Boston Convention Center, downtown Boston, Chinatown, South Boston, hospitals, and the South End itself. (see Figures 5-1, 5-2, 5-3) (All Chapter 5 Graphics are included at the end of the chapter.) It is easily accessible from I-93, the Massachusetts Turnpike (I-90), and local roads including Albany, East Berkeley, and Traveler Streets. The Silver Line and several bus lines are within a five-minute walk. Yet for all that, many empty parking lots in the district lie fallow, awaiting transformation.

5.2 New York Streets: Inspired by History

The Project site and surrounding area has a rich history of different uses, notably including rail sidings for trains whose destinations included Oswego, Troy, Seneca, and Oneida, New York. Those sidings eventually became the names for the narrow streets and alleys running east to west, hence the name of the New York Streets sub-district (see 1880 Boston Proper Bromley Map, Figure 5-4). Over time, the streets and residential uses of these blocks disappeared, combined into larger parcels with a wide mix of uses from warehouses to offices. Presently much of the former New York Streets neighborhood is unfortunately devoted to surface parking lots, creating an empty, primarily vehicular environment around the project site.

The proposed Project will reinstate the primary east-west grain of the area by placing the two hotel entrances and higher massing elements along East Berkeley and Traveler Streets. This concentrates the energy of the hotel lobbies and drop-offs toward the South End streets having the most potential (and need) for a positive pedestrian environment. A lower mass with a large open ‘window’ at the hotel pool and green roof will connect the two masses along Albany Street, parallel to the Southeast Expressway.

5.3 Immediate Site Context

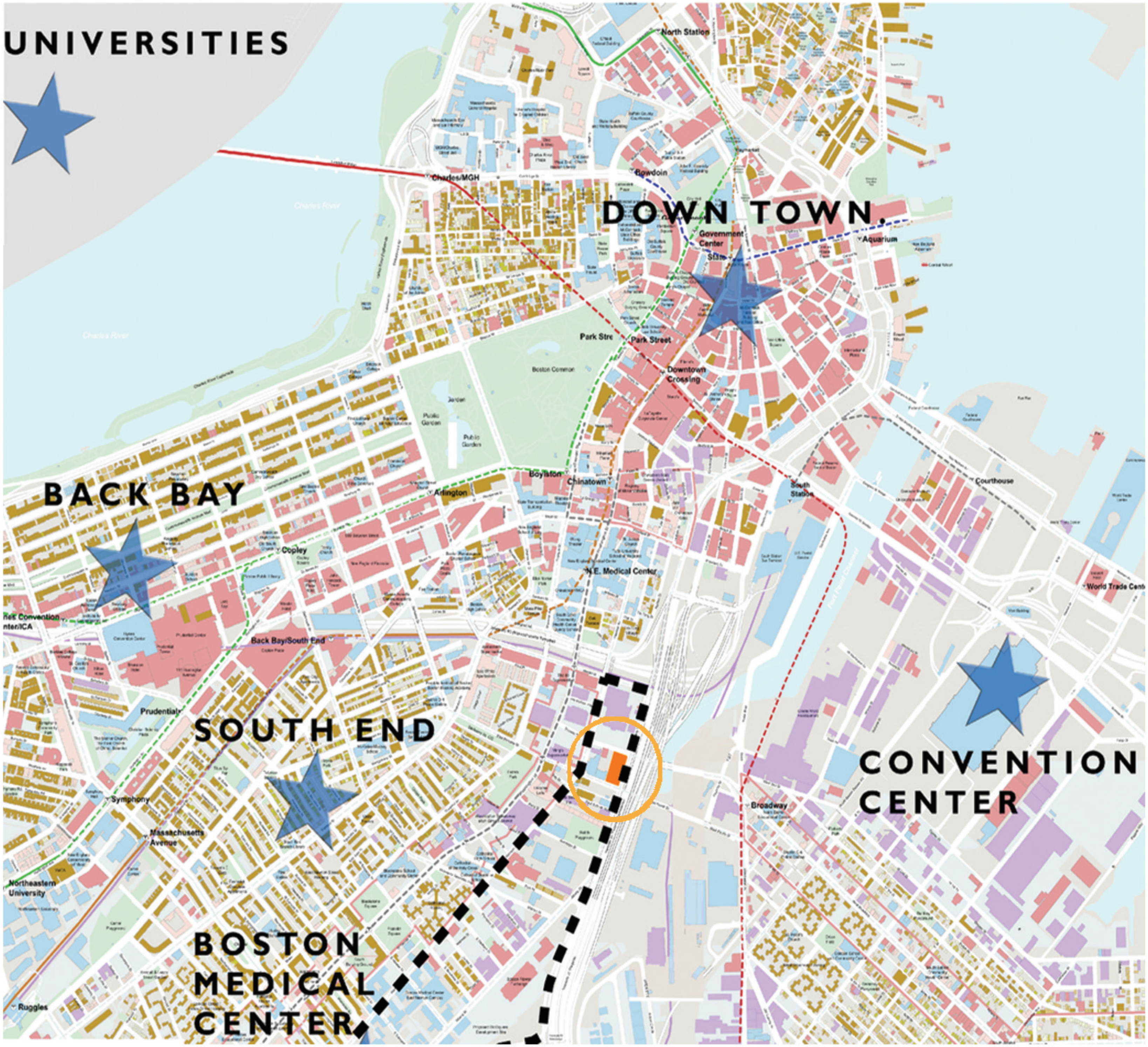
The Project is situated between the Boston Herald site, the Medieval Manor, the Pine Street Inn, a gas station, a windowless storage facility (Planet Self Storage), and I-93, which is elevated some 35 feet above grade (see Figures 5-5 and 5-6). Of these, the Pine Street Inn is architecturally noteworthy for its garden courtyard along East Berkeley Street and its yellow brick spire. The other surrounding buildings are typical of the rough and intriguing juxtapositions that South-Enders are accustomed to: haphazard brick facades, on-street loading docks, a bakery warehouse, and even a bean sprout factory. Far from being a context to ignore, the project seeks to carry on in the fine South End tradition of warehouse blocks that have a complexity of scale, texture, and material.

In terms of the pedestrian experience, the current site context is challenging, with dark, underused areas under I-93 and a lack of active uses along Traveler Street. Adding two hotels and a small restaurant here will bring 18- to 24-hour activity, enlivening and improving the neighborhood with new and wider paved sidewalks, street trees, lighting, hotel guests coming and going, concierge and valet movement, cars, and taxis. It is the proponent's hope that other initiatives to improve the area beneath I-93, such as the harbor trail, art and lighting projects, and parking could help the area improve in the future as well.

5.4 Magnet Diagram and Massing Diagram

Several urban forces influenced the layout of the program elements on the site, and these are described in Figure 5-7 in a 'magnet diagram'. Magnets illustrate forces pushing and pulling programs on the site, and are represented by their program colors (see figure key). The best views are along Traveler Street looking toward downtown, so that is where the select service hotel is located. The lower masses of the extended stay hotel are placed along Berkeley and Albany Streets to form a gradual lowering in scale toward the South End residential neighborhoods beyond (see Figure 5-8).

The Project takes advantage of the thousands of eyes passing by on the highway by placing a shared amenity between the two hotels - the swimming pool, hot tubs and green roof - inside a voyeuristic, glowing 'window'. This is intended to entice passersby to look and wish they could be staying there.



275 ALBANY ST

IN THE SOUTH END

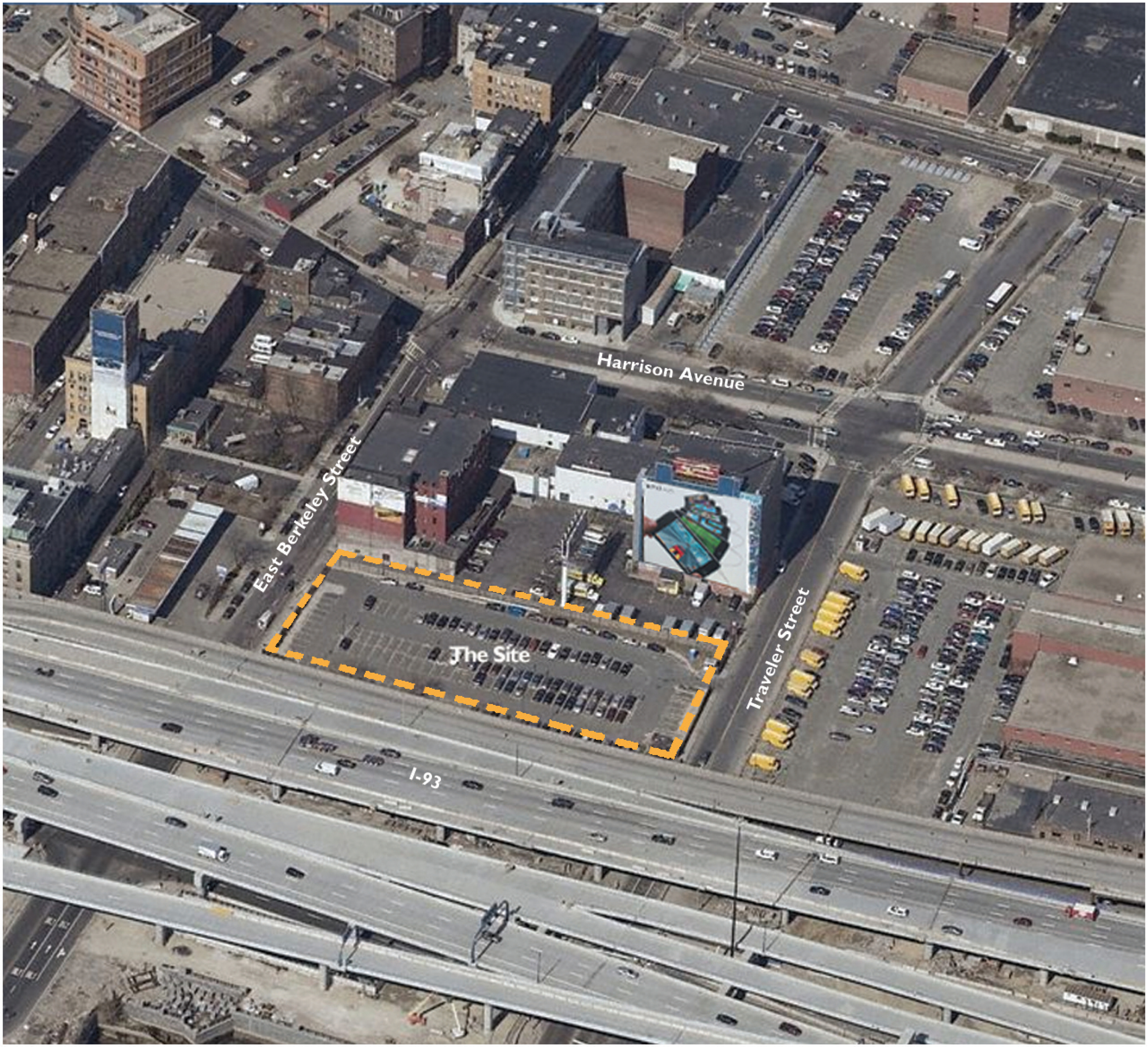
Figure 5-1
Location Map
Urban Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST

IN THE SOUTH END

Figure 5-2

Aerial View

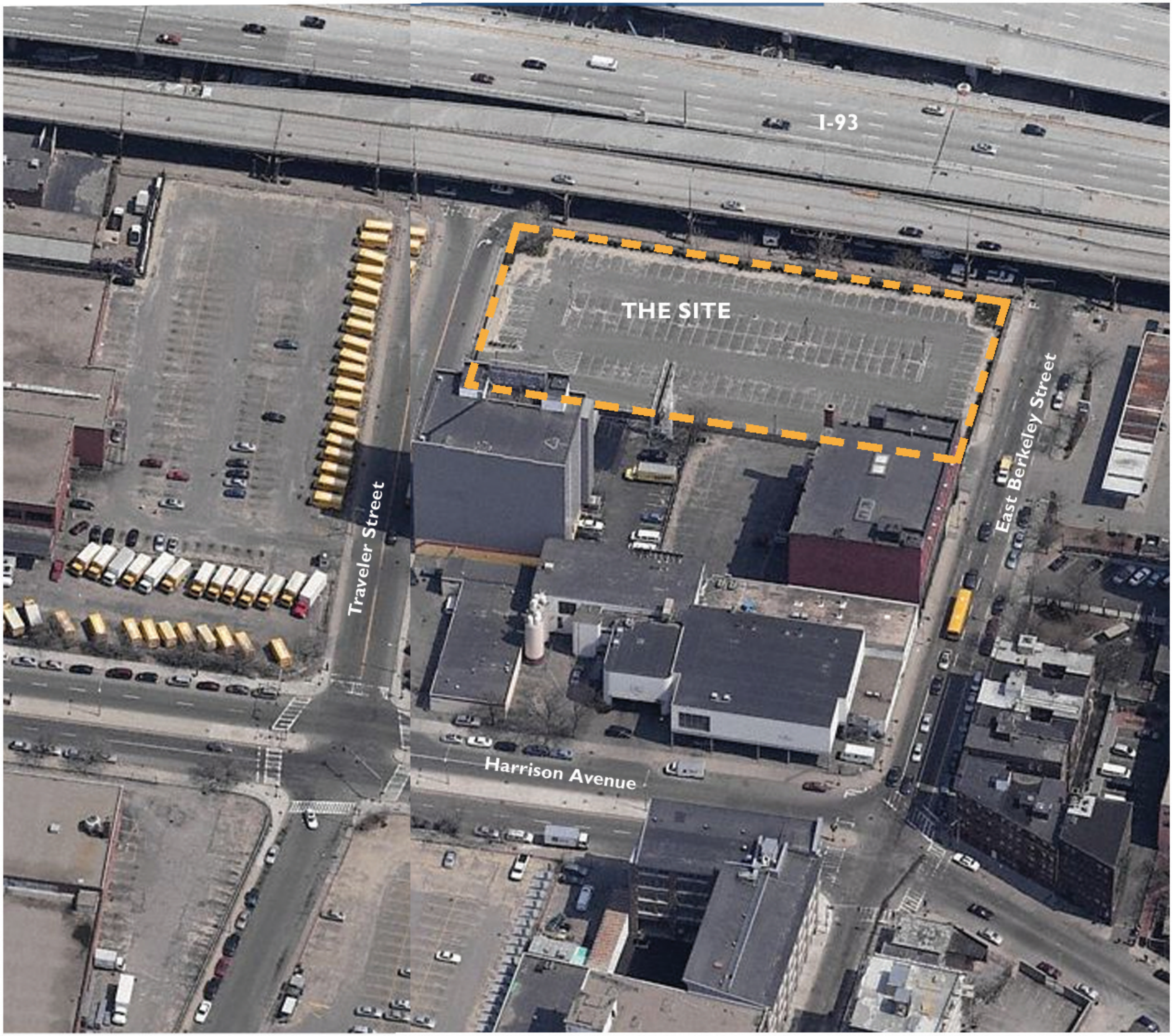
Urban Design

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

prepared by : ADD Inc



275 ALBANY ST

IN THE SOUTH END

Figure 5-3
Aerial View

Urban Design

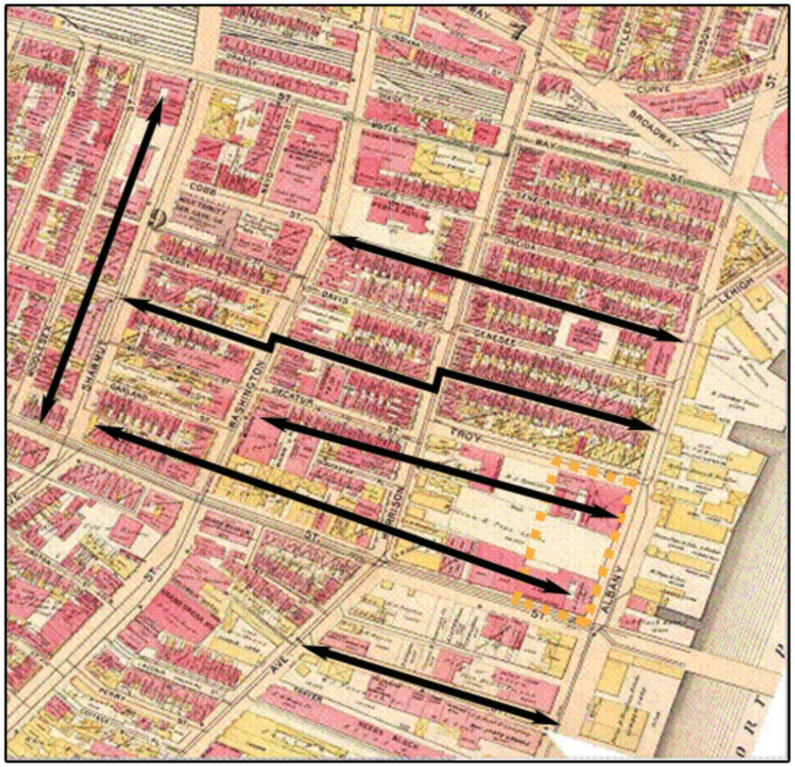
NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

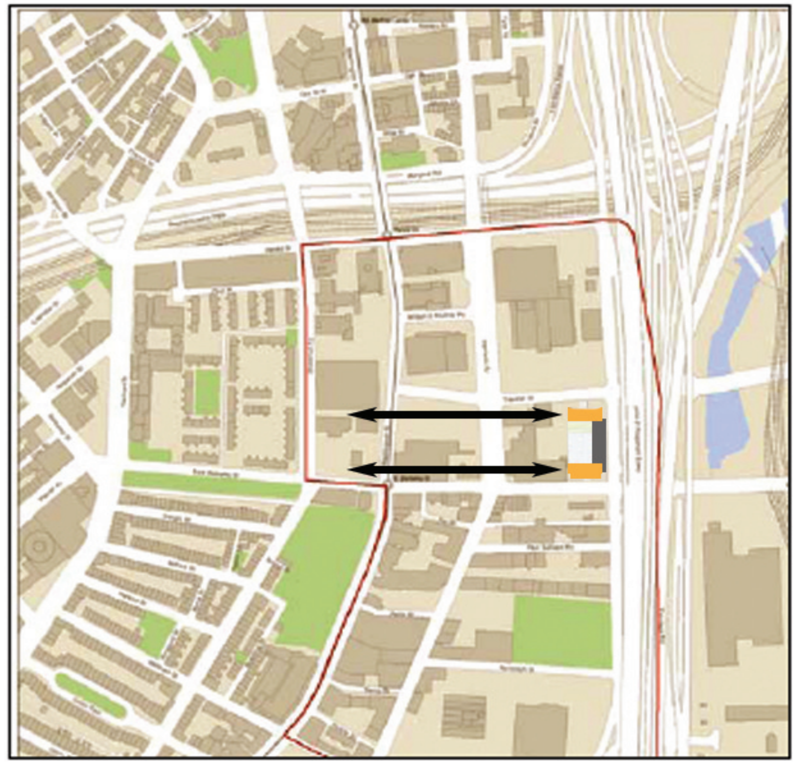
EPSILON ASSOCIATES INC.

prepared by : ADD Inc

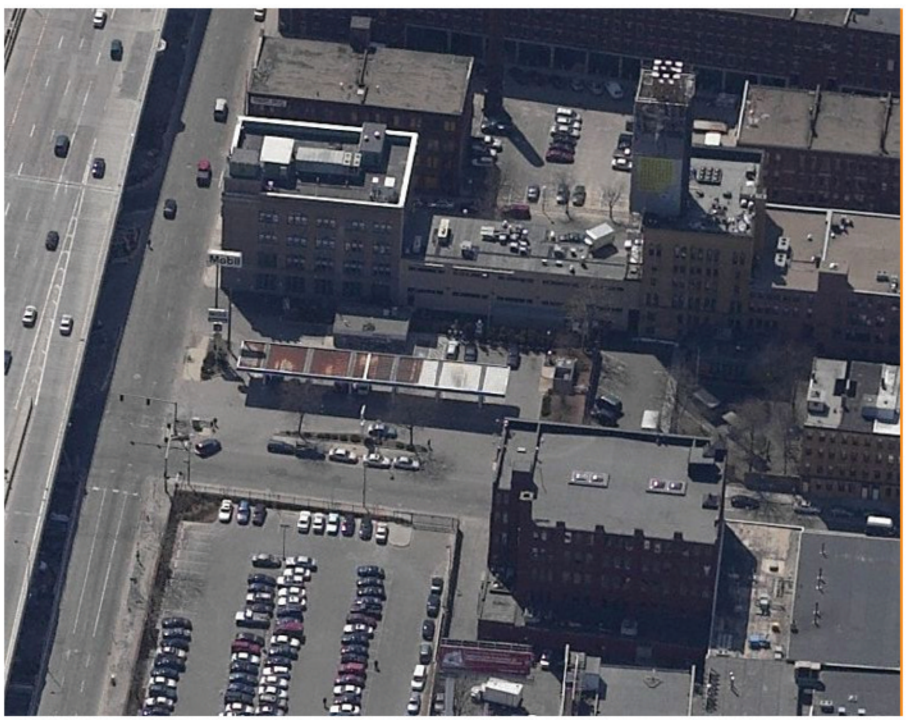
Figure 5-4
S. End Historic Grain
Urban Design



1888 Boston Proper Bromley Base Map
Arrows show predominant direction of urban grain.



2009 New York Streets Area of the South End
Proposed hotel massing reinstates direction of urban grain from the 1880's.



275 ALBANY ST
IN THE SOUTH END

Figure 5-5
Neighboring Buildings
Urban Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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275 ALBANY ST

IN THE SOUTH END

Figure 5-6
View from South
Urban Design

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REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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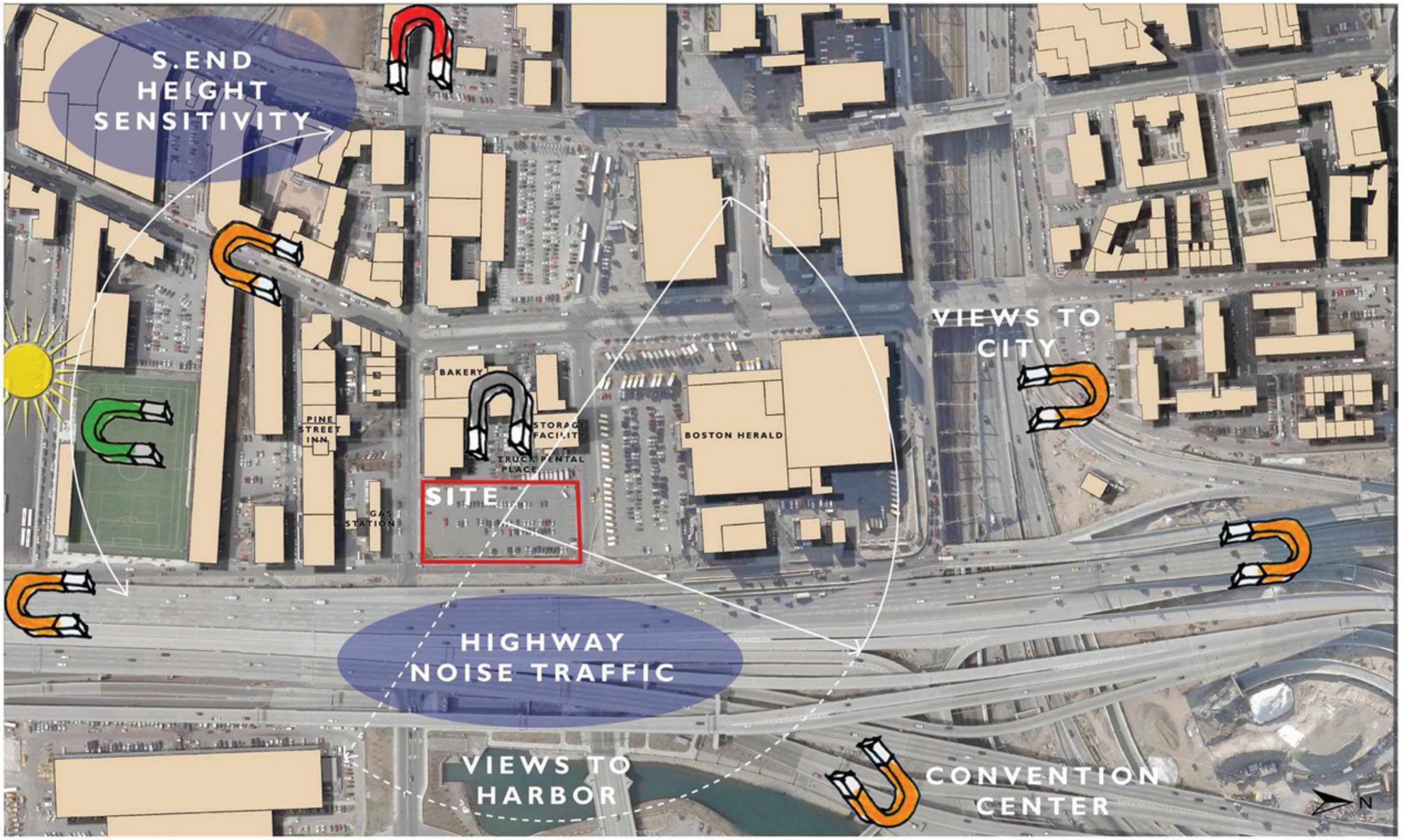
prepared by : ADD Inc

275 ALBANY ST
IN THE SOUTH END

Figure 5-7
Magnet Diagram
Urban Design



LEGEND:

- RETAIL
- HOTEL
- OPEN SPACE
- PARKING & SERVICE

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275 ALBANY ST

IN THE SOUTH END

Figure 5-8
Program Model
Building Design

Extended Stay
Select Service
Restaurant + Event Space
Back of House, Parking, MEP

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Section 6.0

Building Design

6.0 BUILDING DESIGN

6.1 Concept: Intertwine

The concept behind the design of the two hotels on this site is to intertwine (see Figure 6-1) (All Chapter 6 Figures are included at the end of the Chapter). From an urban scale, this means to mix, and mediate between, three separate scales:

- **Low** - the highway, a two-story high corridor stretching as a horizon to the east, north, and south of the project;
- **Middle** - the South End, with its midrise blocks and warehouse/loft character; and
- **High** - downtown Boston, i.e. the high rise development just north across the Massachusetts Turnpike.

The building design also relies on the notion of intertwining in its functional layout and in its material choices, as illustrated below.

6.2 Program Model, Plans, and Section

At the building scale, the project seeks to programmatically intertwine the two hotels by positioning areas they can share within the lower volume between the two higher masses and then blurring the spatial boundaries. This includes such amenities as the pool and green roof, as well as guest parking, back-of-house functions, loading and trash areas. By intermingling these functions, the project promotes synergy between the two hotels and avoids redundancy (see Figure 6-2).

The Ground Floor Plan shows the extended stay hotel lobby along East Berkeley Street in gold (see Figure 6-3). A sidewalk drop off area has been created to facilitate movement of cars and taxis while allowing through traffic to continue. Past the lobby is an entrance into the covered parking. A three-level parking garage is hidden behind the hotels, with another entrance and exit to the garage along Travelers Street. At the select service hotel, shown in orange, there is a dedicated off-street drop off for cars and taxis to circulate clockwise past the new hotel lobby and restaurant. Along Albany Street are the shared back-of-house functions that include off-street loading and trash pickup. The sidewalks along all sides of the project will be widened and new street trees and lighting added.

Above the Ground Floor, there is a second floor of parking, and above that, the top of the parking deck (see Figure 6-4). This brings the project up to the approximate height of the highway overpass, thus positioning most hotel rooms and amenities with views over the obstruction. The green roof terrace is at the level of the shared hotel pool(s). Above that, hotel rooms continue up to varying heights (see Figure 6-5). At the top of the select service hotel is an event space, used for receptions and parties. The top of the buildings contain concealed mechanical equipment.

6.3 Perspectives and Elevations

The exterior design of the two hotels speaks to their intertwining as well. Materials such as zinc, precast concrete, wood, glass, and stone appear around the project in varying proportions to adjust to the scale of the surroundings and the varying identities of the two hotels. The extended stay hotel is more of a background statement with zinc and precast concrete to connect to the masonry loft buildings of the South End. Its short ends are kept fairly solid to recall traditional party walls. The select service hotel aims to be hipper, curving, with more metal, glass, and wood to draw progressive tourists looking for contemporary design (see Figure 6-6 through 6-11).

The zinc wraps around the building masses like a ribbon, sometimes having large openings, sometimes small, and other times protecting precious materials such as the wood in the opening around the pool.

6.4 Inspiration

Local and international buildings serve as inspiration for this project. The pool and green roof is an oasis that should present a unique experience to the Boston tourist. The metal portion of the project is inspired by some of the newer buildings in the South End that creatively mix copper, zinc, and aluminum with masonry in their façade designs (see Figure 6-12).

6.5 Renderings

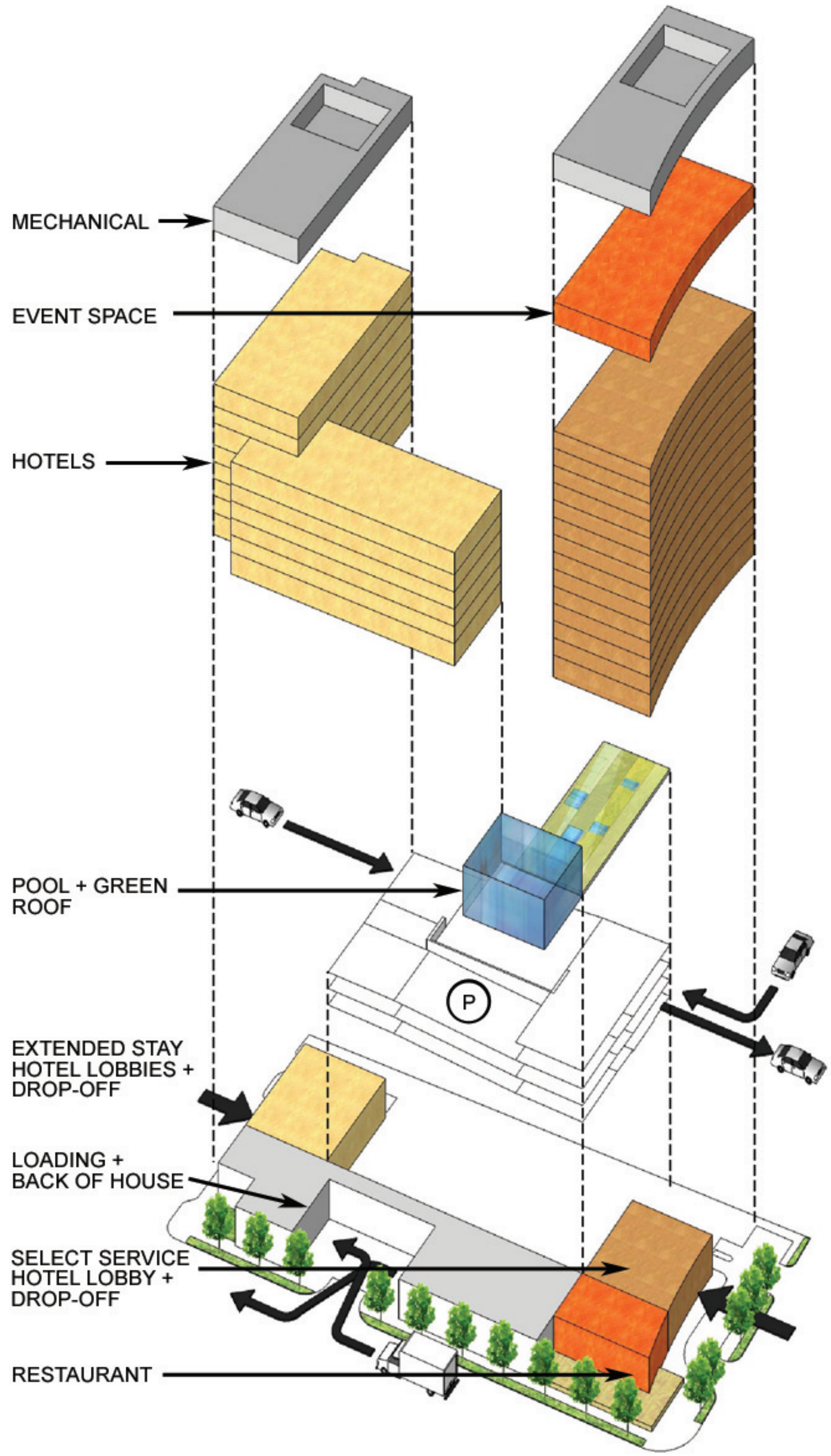
Two renderings have been done to illustrate the design intentions of the project, one showing the East Berkeley side of the development and the extended stay hotel entrance (see Figure 6-13), and the other a view from I-93 South and the select service hotel entrance (see Figure 6-14).

The first rendering depicts the extended stay portion of the proposed project across from the gas station. The building has a traditional organization of three parts vertically, *i.e.*,. Base, middle, and top, yet it is designed with contemporary materials and details. The 20+ foot high base is clad with wood and glass, providing warmth and transparency at the ground level. A zinc and wood canopy marks the entrance with signage and downlights. Eight stories of hotel rooms above are framed in two story increments with yellow/gold textured precast concrete infilled with gray metal spandrels and large windows. The top is finished with one story of gray metal panels and louvers to conceal the mechanical equipment. Wood at the underside of the simple, modern zinc cornice will be lit at night.

The second perspective is a view from the north of the site. The curving façade of the select service hotel provides a special moment where the building faces the skyline of Boston. It is intended as a gateway element to the site and the South End as it is approached from Route 93 South and Albany Street. Having a bustling entrance lobby with its brightly lit canopy and hotel drop off will transform the corner of Travelers and Albany Streets from a truck boulevard to a vibrant city street. Reinforced with wide sidewalks, street trees, colored paving and umbrellas in front of the restaurant, this area will no longer seem like an empty edge.

Also visible in the rendering is the event space on the upper occupiable floor of the hotel, glowing at night for receptions and parties. The pool enclosure and large ‘window’ facing the highway can also be discerned as a beacon to travelers on those cold, Boston nights.

Figure 6-1
Concept
Building Design



275 ALBANY ST

IN THE SOUTH END

Figure 6-2
Program Model
Building Design

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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prepared by : ADD Inc

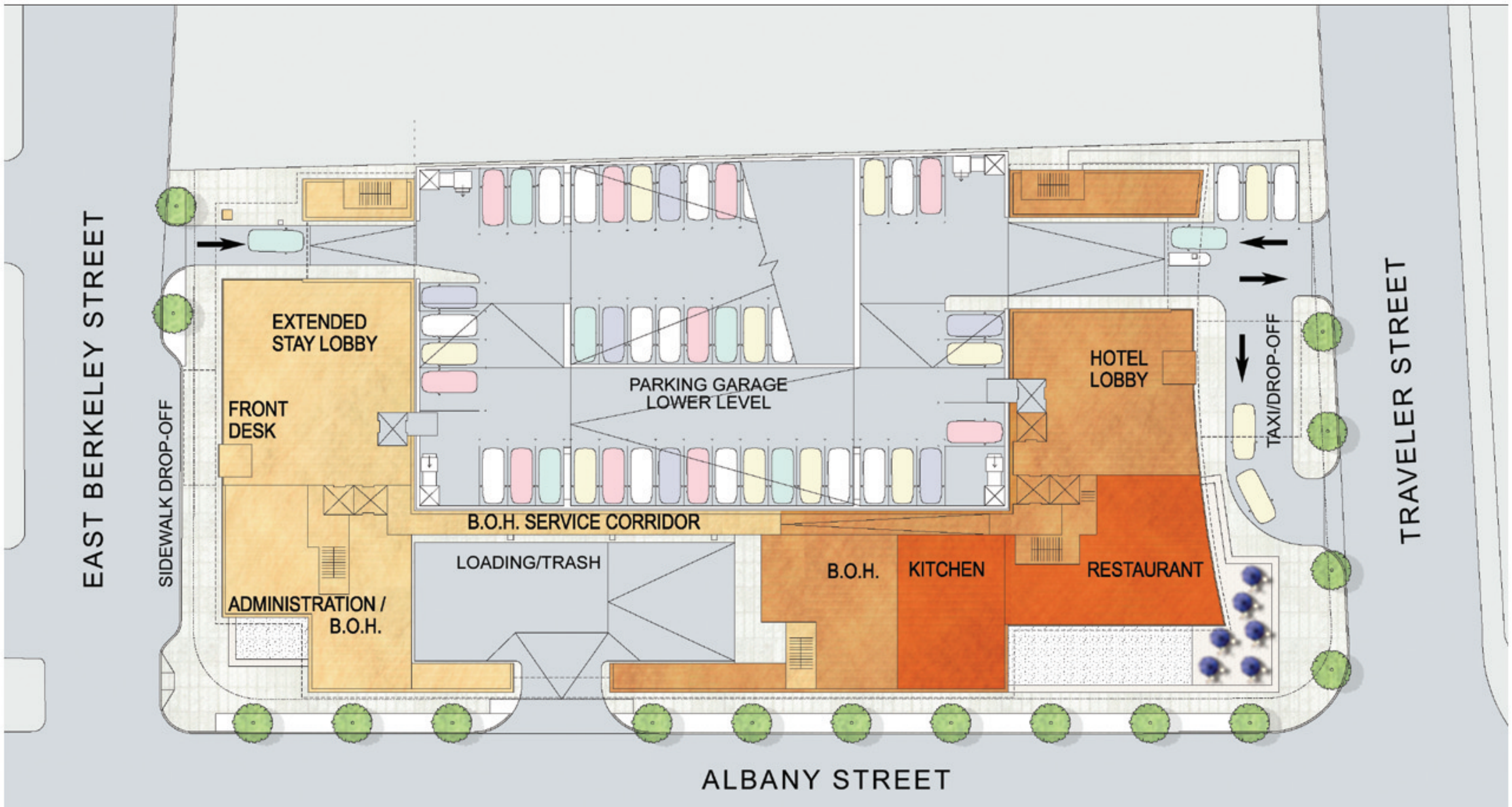
275 ALBANY ST

IN THE SOUTH END

Figure 6-3

Ground Floor Plan

Building Design



NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

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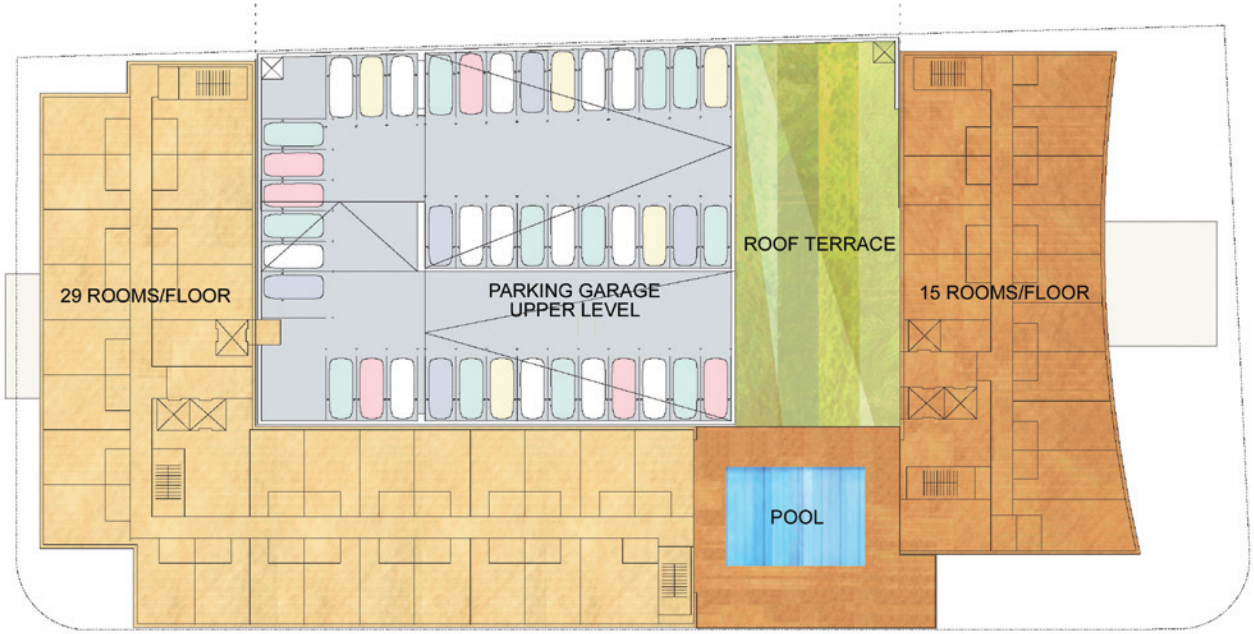
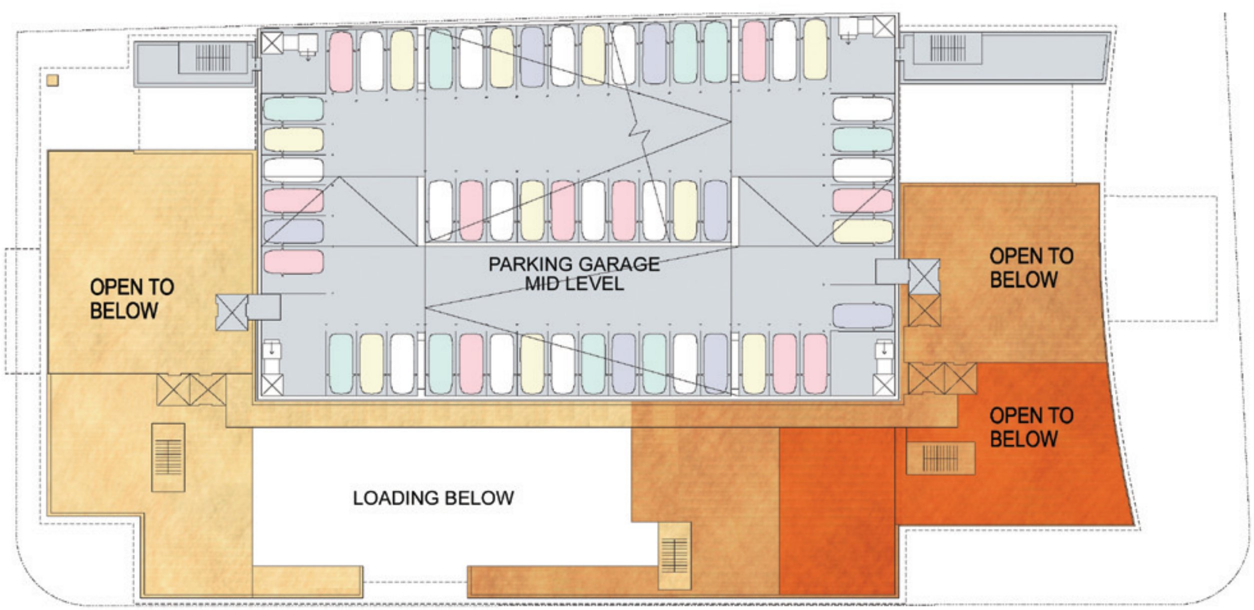


AMENITY LEVEL FLOOR PLAN



SECOND FLOOR PLAN

275 ALBANY ST

IN THE SOUTH END

Figure 6-4

Floor Plans

Building Design

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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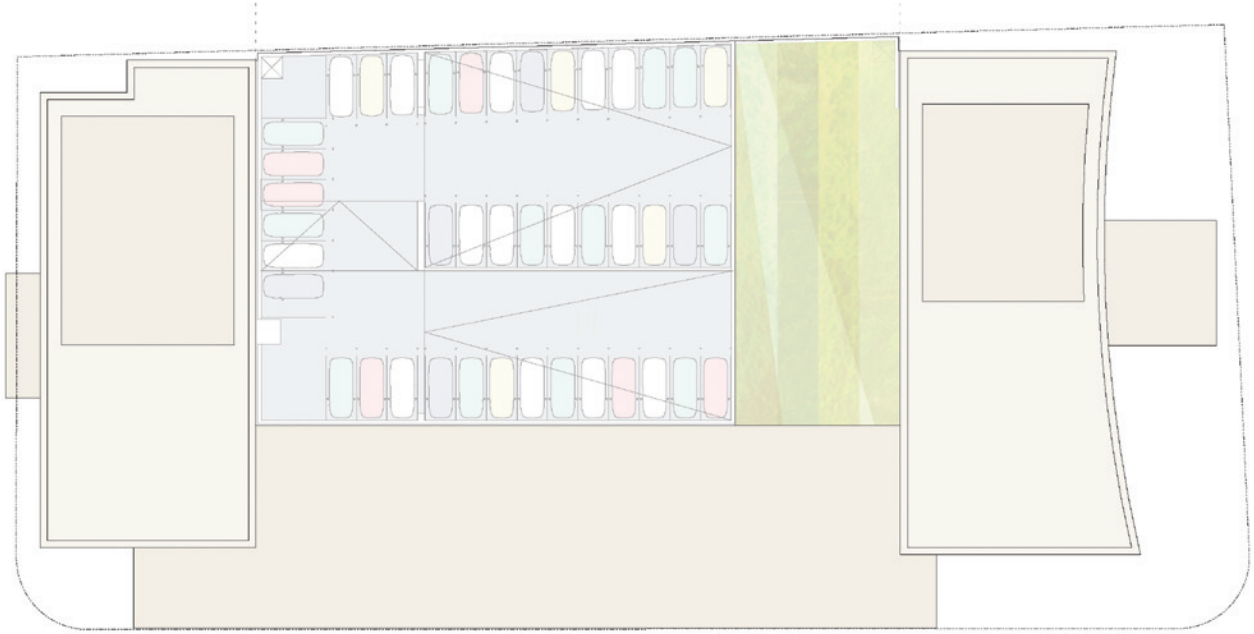

ROOF PLAN

UPPER LEVELS FLOOR PLAN

275 ALBANY ST

IN THE SOUTH END

Figure 6-5

Floor Plans

Building Design

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

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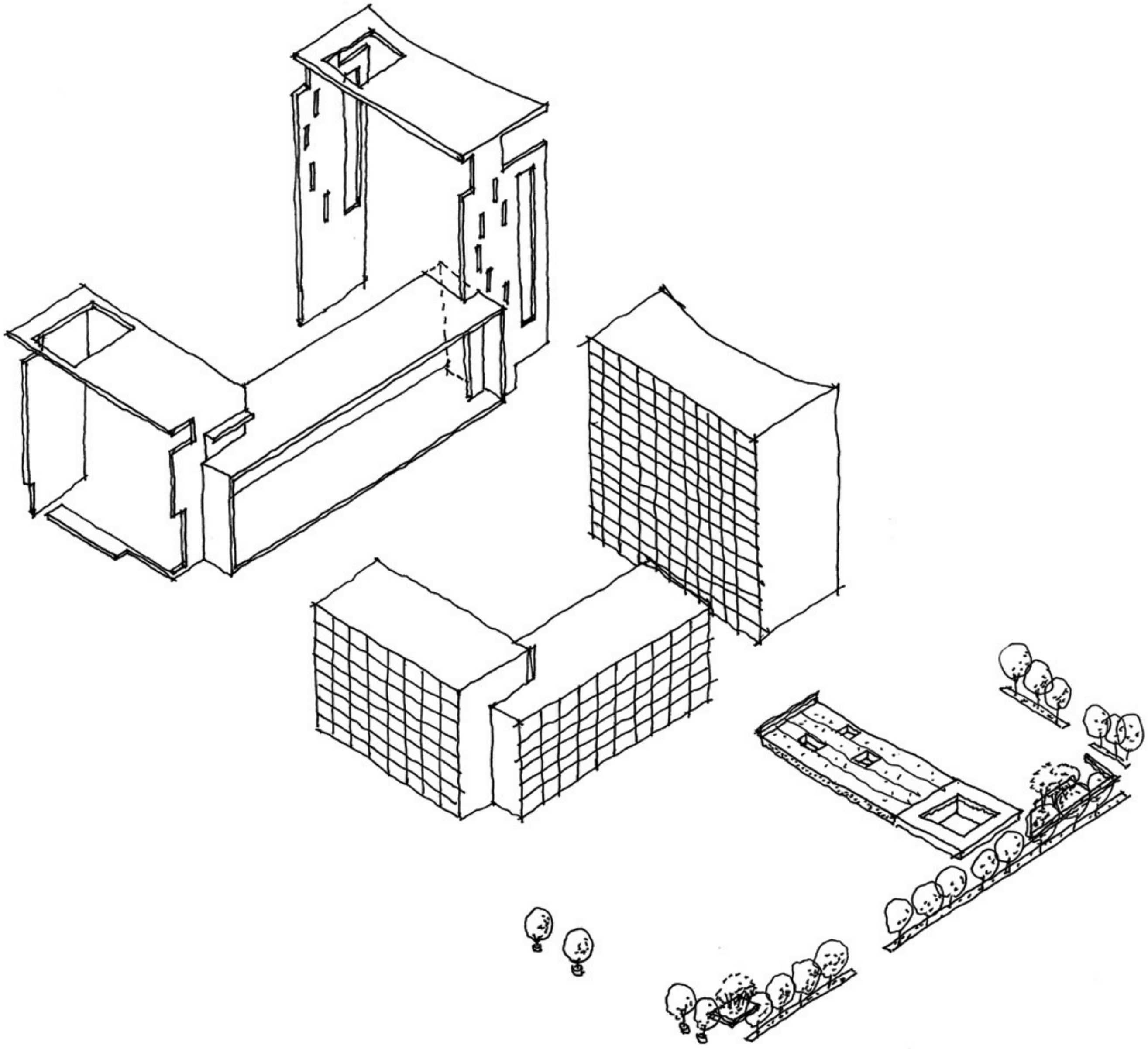

275 ALBANY ST
IN THE SOUTH END

Figure 6-6
Concept Sketches
Building Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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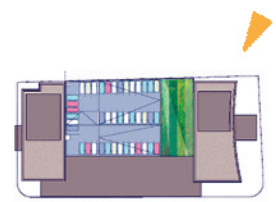
275 ALBANY ST
IN THE SOUTH END

Figure 6-7
Perspective from North
Building Design



NORMANDY
REAL ESTATE PARTNERS

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275 ALBANY ST
IN THE SOUTH END

Figure 6-8
Albany St. View
Building Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

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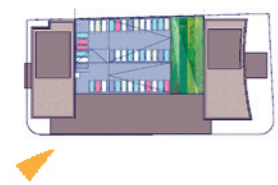
Figure 6-9
Perspective from South
Building Design



NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

EPSILON ASSOCIATES INC.

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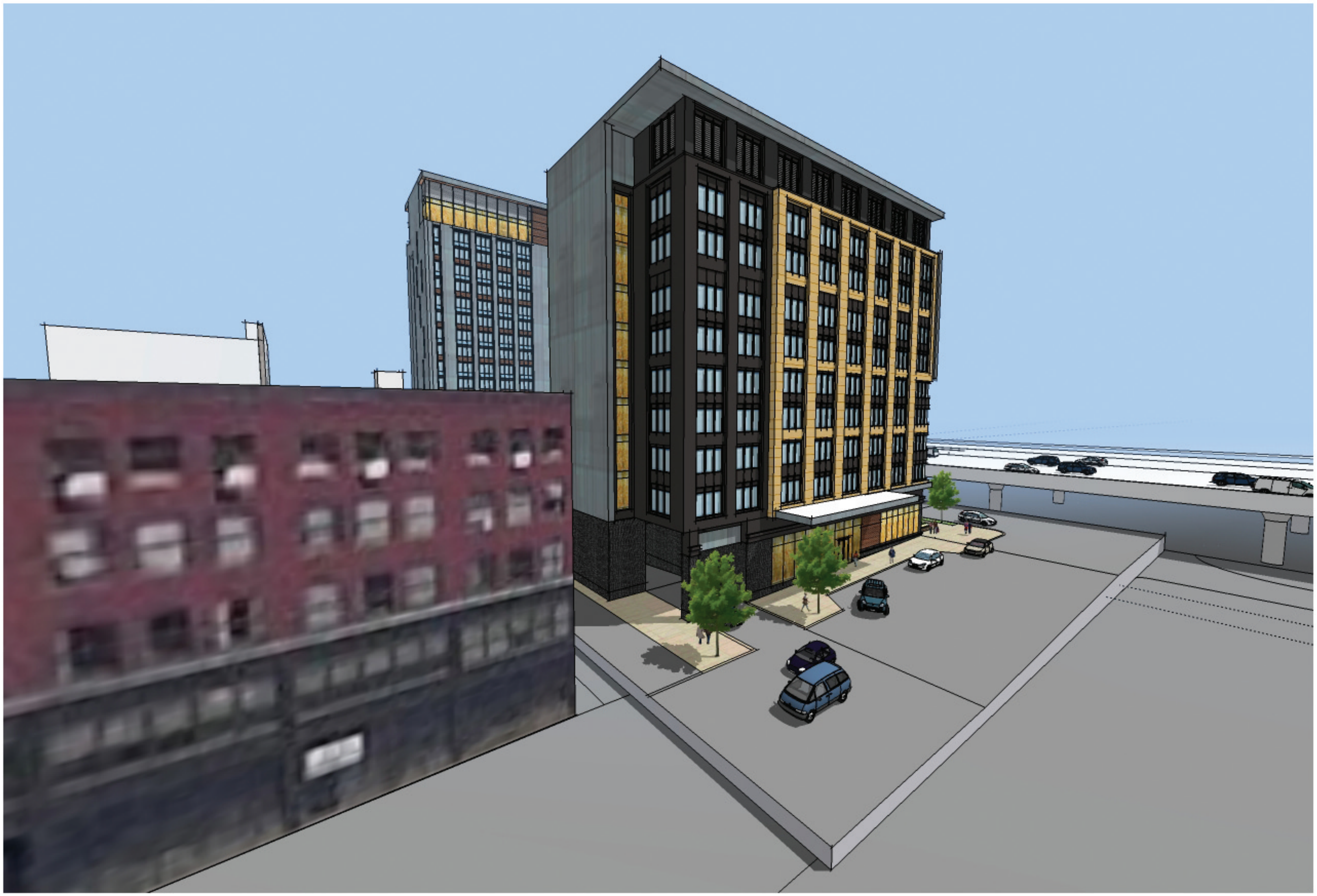
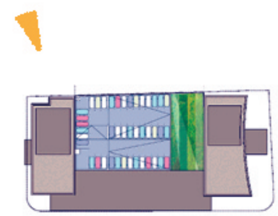


275 ALBANY ST
IN THE SOUTH END

Figure 6-10
Perspective from South
Building Design



NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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275 ALBANY ST
IN THE SOUTH END

Figure 6-11
Parking Garage View
Building Design

NORMANDY
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BLUE HAWK INVESTMENTS

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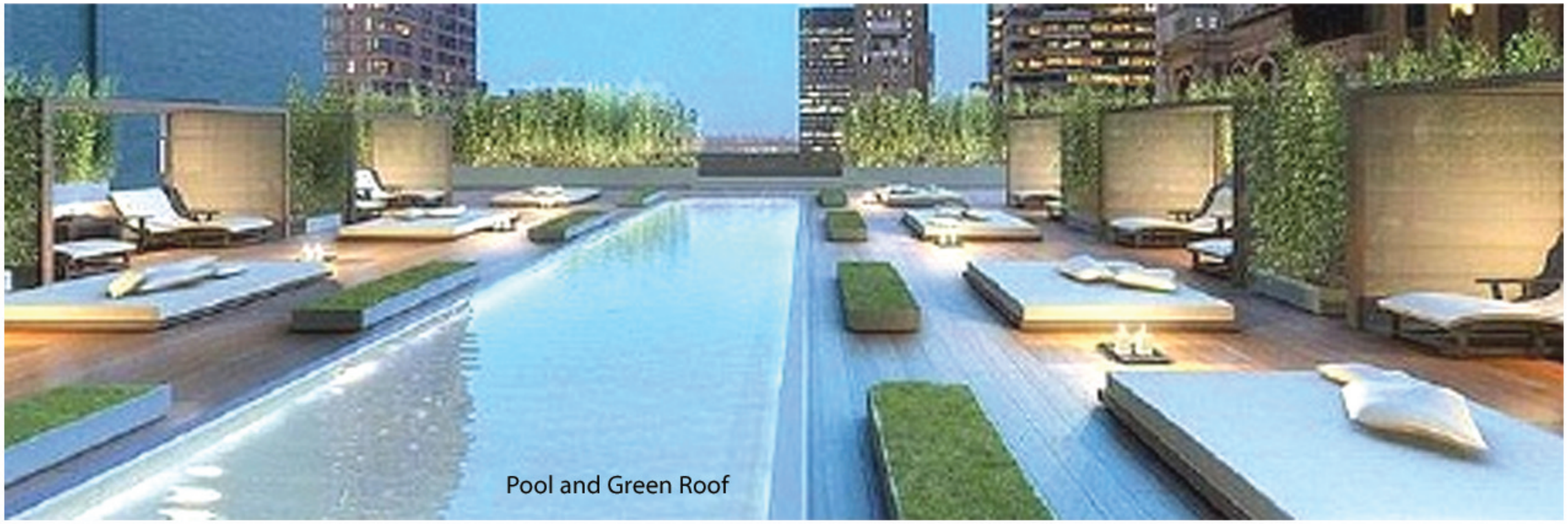

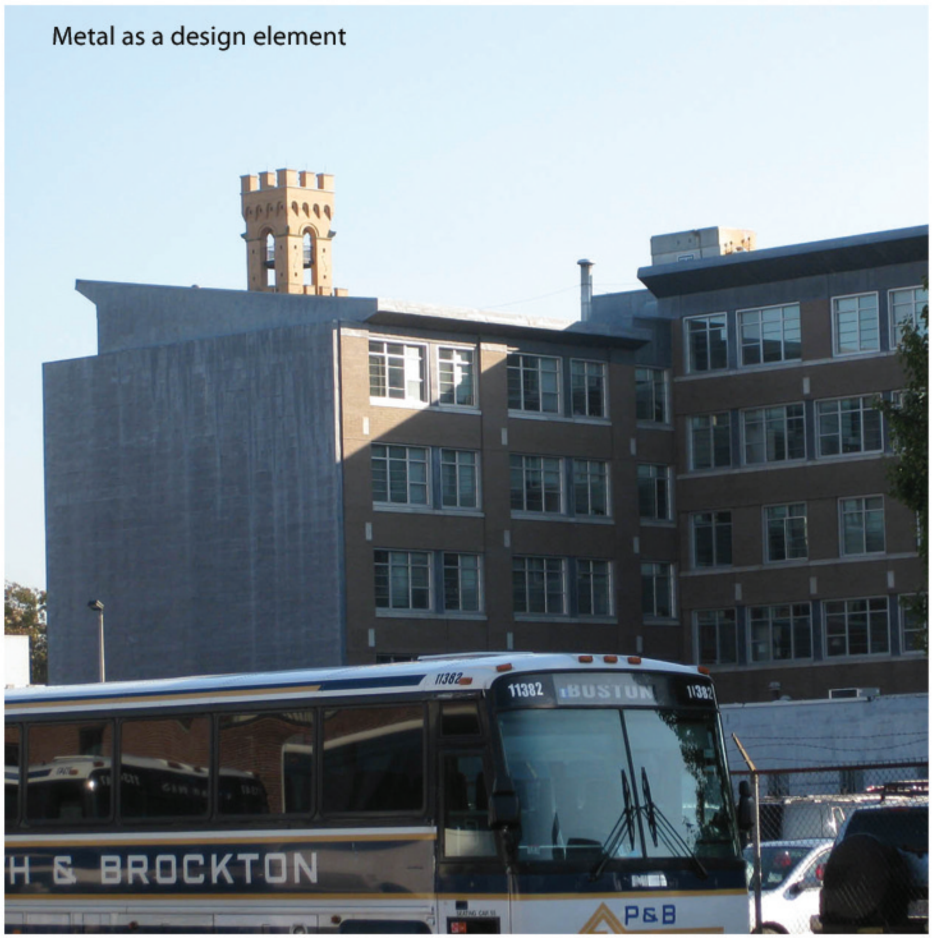

275 ALBANY ST
IN THE SOUTH END

Figure 6-12
References
Building Design

NORMANDY REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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275 ALBANY ST

IN THE SOUTH END

Figure 6-13
Rendering
Building Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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275 ALBANY ST

IN THE SOUTH END

Figure 6-14
Rendering
Building Design

NORMANDY
REAL ESTATE PARTNERS

BLUE HAWK INVESTMENTS

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Section 7.0

Sustainability

7.0 SUSTAINABILITY

The Project will comply with the requirements of Article 37 of the Boston Zoning Code for a 'LEED Certifiable' status. The Project team will use the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Rating System as a model for incorporating sustainable design features into the Project. A LEED NC 2009 checklist is provided at the end of this Chapter to identify the green design goals for this Project. For each credit identified as a 'yes' on the checklist, we have provided a brief description of the implementation measures to the extent that they are defined at this stage of design.

The LEED for New Construction 2009 version was launched in April and was updated to include a total of 110 possible points. This Project has the goal of achieving enough points for the Certified level which has a minimum of 40 points.

7.1 Sustainable Sites

SUSTAINABLE SITES, Prerequisite 1, Construction Activity Pollution Prevention:

The Project will implement a full erosion and sedimentation control program. This program will include a Stormwater Pollution Prevention Plan that describes how to protect the existing storm water collection system during construction. All existing catch basins will be protected with hay bales and silt sacks to prevent sediment from entering the systems. Sediment ponds and truck mud traps will be used as necessary during construction to prevent sedimentation from being tracked onto adjacent roadways.

SUSTAINABLE SITES, Credit 1.0, Site Selection:

The site is currently a bituminous concrete paved parking lot and meets all the criteria for site selection. The site is not prime farmland, it is not undeveloped land with an elevation lower than 5 feet above the flood plain, does not have any endangered species habitat, is not within 100 feet of a wetland, was not undeveloped land within 50 feet of a water body, and was not a public park.

SUSTAINABLE SITES, Credit 2.0, Development Density & Community Connectivity:

The Project is located in the South End neighborhood of Boston which is a dense urban area with a mix of residential and commercial uses. For LEED certification, the Project will pursue the compliance path for Option 2, Community Connectivity. Within a 0.50 mile radius of the building's main entrance, there are several residential areas with a density of 10 units per acre or more including the Eva White Apartments and Oak Terrace. Within the same radius, there are also many basic services with pedestrian access including banks, grocery stores, dry cleaners, parks and playgrounds, restaurants, fitness centers, several schools, a police station and a fire station.

SUSTAINABLE SITES, Credit 4.1, Alternative Transportation - Public Transportation Access:

The Project is located within 0.25 mile walking distance of public transportation. There are two bus stops directly adjacent to the Project site which provide service on three bus lines- the 9, 11, and 275. There are at least three additional bus stops within a 0.25-mile radius. In addition, there are two Silver Line subway stops within a 0.25-mile radius: the East Berkeley Street stop and the Herald Street stop. The proximity of the Project to several forms of public transportation fulfills the LEED credit requirements and helps to prevent pollution from automobile usage.

SUSTAINABLE SITES, Credit 4.4, Alternative Transportation - Parking Capacity:

The Project includes 137 parking spaces that will be provided in a structured garage on three above-ground levels. This parking serves approximately 400 hotel rooms and will not exceed the local zoning requirements for parking.

SUSTAINABLE SITES, Credit 7.2, Heat Island Effect - Roof:

The roofing material will be selected to comply with the LEED credit guidelines for a solar reflectance index (SRI) equal to or greater than 78 for a low-sloped roof. A white TPO membrane roofing system will be specified on all building roofs. Light gray concrete will be used for the top surface of the parking garage.

7.2 Water Efficiency

WATER EFFICIENCY, Prerequisite 1, Water Use Reduction 20 percent:

The Project will specify plumbing fixtures that meet the minimum of a 20 percent reduction in water use compared to the baseline for the building. To achieve a 20 percent reduction, the hotels will include low-flow toilets, lavatories, and shower heads.

WATER EFFICIENCY, Credit 1, Water Efficient Landscaping:

The Project will achieve a 50 percent reduction in water use for landscaping. The area of landscaping on the site is minimal and will be planted with species that require little to no irrigation.

7.3 Energy & Atmosphere

ENERGY & ATMOSPHERE, Prerequisite 1, Fundamental Commissioning of the Building Energy Systems:

Building systems will be commissioned in accordance with the USGBC LEED requirements. The commissioning services provided will include the Owner's Project Requirements (OPR) and Basis of Design (BOD) documents, development of a commissioning plan, incorporation of a commissioning specification section into the construction documents and verification through startup observation and functional testing that the installed systems are operating in accordance with the OPR, BOD, and construction documents. The previous services apply to the following commissioned systems: HVAC, lighting controls, and domestic hot water systems.

ENERGY & ATMOSPHERE, Prerequisite 2, Minimum Energy Performance:

The Project will be designed to demonstrate a 10 percent improvement in the proposed building performance rating compared with the baseline rating which is determined by complying with the ASHRAE 90.1-2007 Energy Standard as per the newest version of LEED 2009.

ENERGY & ATMOSPHERE, Prerequisite 3, Fundamental Refrigerant Management:

The Project will specify equipment and systems with no chlorofluorocarbon (CFC)-based refrigerants.

ENERGY & ATMOSPHERE, Credit 1, Optimize Energy Performance:

The Project will be designed with the goal of exceeding the baseline building standard by 16 percent over ASHRAE 90.1-2007. This will be demonstrated with a whole building energy model. The Project will have an efficient cooling tower, and high-efficiency boilers, roof-top units and motors. The Project will include energy-efficient lighting, elevators and Energy Star appliances.

ENERGY & ATMOSPHERE, Credit 3, Enhanced Commissioning:

In addition to the commissioning practices that will be implemented per the Prerequisite, all requirements for the enhanced commissioning per the USGBC LEED 2009 requirements will be followed. An independent, third-party commissioning agent will perform the services.

ENERGY & ATMOSPHERE, Credit 4, Enhanced Refrigerant Management:

Refrigerants for the HVAC equipment will be selected based on their capacity to minimize the impacts of ozone depletion and global warming. In addition, fire suppression systems will not contain CFC's, HCFC's or Halons.

7.4 Materials & Resources

MATERIALS & RESOURCES, Prerequisite 1, Storage and Collection of Recyclables:

The Project will provide recycling areas that serve the entire building for paper, corrugated cardboard, glass, plastics, and metals. Each hotel room will have a designated recycling bin which will be collected and sorted appropriately for recycling.

MATERIALS & RESOURCES, Credit 2, Construction Waste Management:

The Project will implement a Construction Waste Management Plan as a means to ensure that a minimal amount of waste debris is disposed of in a landfill. The Project goal is to recycle and/or salvage at least 75 percent of the construction waste.

MATERIALS & RESOURCES, Credit 4.1, Recycled Content:

The Project will specify materials and products with recycled content. For credit compliance, the goal will be to specify materials with recycled content such that the sum of postconsumer recycled content plus 1/2 of the preconsumer content constitutes at least 10 percent, based on cost, of the total value of the materials in the Project. Some of the likely materials and products that contain recycled content for this Project will include structural steel, drywall, carpet, flooring and acoustical ceiling tile.

MATERIALS & RESOURCES, Credit 4.2, Regional Materials:

The Project will specify materials and products that have been extracted, harvested or recovered, as well as manufactured within 500 miles of the Project site. The goal will be to achieve at least 10 percent, based on cost, of the total materials value. Some of the likely materials and products that will qualify for regional materials include structural steel, precast concrete, and furniture.

7.5 Indoor Environmental Quality

INDOOR ENVIRONMENTAL QUALITY, Prerequisite 1, Minimum Indoor Air Quality Performance:

The Project will be designed to comply with the requirements of Sections 4-7 of the ASHRAE 62.1-2007 Ventilation Standard as per the newest version of LEED 2009.

INDOOR ENVIRONMENTAL QUALITY, Prerequisite 2, Environmental Tobacco Smoke (ETS) Control:

For a residential or hospitality Project, in order to comply with this Prerequisite, the Project must implement all of the following:

- Prohibit smoking in all common areas of the building.

- Locate any exterior designated smoking areas, at least 25 feet from entries, outdoor air intakes and operable windows opening to common areas.

- Prohibit on-property smoking within 25 feet of entries, outdoor air intakes and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas or prohibit smoking on the entire property.

- Weather-strip all exterior doors and operable windows in the hotel rooms to minimize leakage from outdoors.

- Minimize uncontrolled pathways for ETS transfer between individual hotel rooms by sealing penetrations in walls, ceilings and floors in the units and by sealing vertical chases adjacent to the units.

- Weather-strip all doors in the hotel rooms leading to common hallways to minimize air leakage into the hallway.

- Demonstrate acceptable sealing of units by a blower door test conducted in accordance with ANSI/ ASTM-E779-03, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization.

- Use the progressive sampling methodology defined in Chapter 4 (Compliance Through Quality Construction) of the Residential Manual for Compliance with California's 2001 Energy Efficiency Standards (http://www.energy.ca.gov/title24/residential_manual). Hotel rooms must demonstrate less than 1.25 square inches leakage area per 100 square feet of enclosure area (i.e., sum of all wall, ceiling and floor areas).

INDOOR ENVIRONMENTAL QUALITY, Credit 3.1, Construction IAQ Management Plan – During Construction:

The Project will implement a Construction Indoor Air Quality Management Plan (CIAQMP) per the USGBC requirements in order to improve the indoor air quality during construction.

INDOOR ENVIRONMENTAL QUALITY, Credit 4.1, Low-Emitting Materials – Adhesives & Sealants:

The Project will specify adhesives and sealants that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 and Green Seal Standard. The VOC limits stated in these standards will not be exceeded for all of the adhesives and sealants used on the interior of the building envelope.

INDOOR ENVIRONMENTAL QUALITY, Credit 4.2, Low-Emitting Materials – Paints & Coatings:

The Project will specify that all paints and coatings applied inside the building envelope will comply with the Green Seal Standard GS-11 for paints and primers; Green Seal Standard GS-03 for anti-corrosive paints; and the South Coast Air Quality Management District (SCAQMD) Rule #1113 for wood finishes, stains, and sealers.

INDOOR ENVIRONMENTAL QUALITY, Credit 4.3, Low-Emitting Materials – Flooring Systems:

The Project will specify that all flooring systems must comply with the appropriate standard per LEED 2009 for carpet, carpet cushion, carpet adhesive, hard surface flooring, floor sealers, stains and finishes, and tile setting adhesives and grout.

INDOOR ENVIRONMENTAL QUALITY, Credit 4.4, Low-Emitting Materials – Composite Wood & Agrifiber Products:

The Project will not specify composite wood and agrifiber products inside the building envelope that contain urea-formaldehyde resins.

INDOOR ENVIRONMENTAL QUALITY, Credit 6.1, Controllability of Systems - Lighting:

The Project will provide individual lighting controls for 90 percent of the building occupants as well as lighting controls for all shared multi-occupant spaces.

INDOOR ENVIRONMENTAL QUALITY, Credit 6.2, Controllability of Systems – Thermal Comfort:

The Project will provide individual thermal comfort controls for at least 50 percent of the building occupants as well as thermal comfort controls for all shared multi-occupant spaces.

INDOOR ENVIRONMENTAL QUALITY, Credit 8.1, Daylight & Views – Daylight for 75 percent of Spaces:

The Project will be designed to maximize interior daylighting in regularly occupied spaces. The goal will be to achieve daylight illuminance levels between 25 and 500 foot-candles in 75 percent of the regularly occupied spaces.

INDOOR ENVIRONMENTAL QUALITY, Credit 8.2, Daylight & Views - Views for 90 percent of Spaces:

The Project will be designed such that building occupants in 90 percent of the regularly occupied areas will have a direct line of sight to the outdoors.

7.6 Innovation and Design Process

INNOVATION IN DESIGN, Credits 1.1-1.5

Specific Innovation Credits have not yet been identified at this stage of the Project, but the goal will be to achieve at least two credits. Some potential innovations that may be pursued include a green housekeeping program, and a laundry water use reduction program for hotel linens.

INNOVATION IN DESIGN, Credit 2.0, LEED Accredited Professional:

The Project team will include at least one LEED AP.

7.7 Regional Priority Credits

REGIONAL PRIORITY, Credits 1.1-1.4

Specific Regional Priority Credits have not yet been identified at this stage of the Project, but the goal will be to achieve at least two credits. The following are the six Regional Priority Credits available for Boston:

- Sustainable Sites Credit 3: Brownfield Redevelopment
- Sustainable Sites Credit 6.1: Stormwater Design- Quantity Control
- Sustainable Sites Credit 7.1: Heat Island Effect- Nonroof
- Sustainable Sites Credit 7.2: Heat Island Effect- Roof
- Energy and Atmosphere Credit 2: On-Site Renewable Energy, 1 percent
- Materials and Resources Credit 1.1: Building Reuse- Maintain Existing Walls, Floors and Roof, 75 percent

LEED 2009 for New Construction and Major Renovation

Project Checklist

275 Albany Street, Boston

#######

Sustainable Sites — Possible Points: 26

Y	N	?			
15	9	2		**Sustainable Sites**	**Possible Points: 26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
	1		Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	3		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
		1	Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

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

Energy and Atmosphere — Possible Points: 35

Y	N	?			
7	3	25		**Energy and Atmosphere**	**Possible Points: 35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
3		16	Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
		2	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	N	?			
4	7	3		**Materials and Resources**	**Possible Points: 14**
Y			Prereq 1	Storage and Collection of Recyclables	
	3		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	1		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	2		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	N	?			
1		1	Credit 4	Recycled Content	1 to 2
1		1	Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
		1	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	N	?			
9		6		**Indoor Environmental Quality**	**Possible Points: 15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
		1	Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
		1	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
		1	Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
		1	Credit 7.1	Thermal Comfort—Design	1
		1	Credit 7.2	Thermal Comfort—Verification	1
1			Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	N	?			
3	1	1		**Innovation and Design Process**	**Possible Points: 6**
1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
		1	Credit 1.3	Innovation in Design: Specific Title	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	N	?			
2		2		**Regional Priority Credits**	**Possible Points: 4**
1			Credit 1.1	Regional Priority: Specific Credit	1
1			Credit 1.2	Regional Priority: Specific Credit	1
		1	Credit 1.3	Regional Priority: Specific Credit	1
		1	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

Y	N	?		
42	22	43	**Total**	**Possible Points: 110**

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

Section 8.0

Historic Resources

8.0 HISTORIC RESOURCES

This chapter discusses the historic resources in the Project vicinity and the anticipated impacts to them. It also discusses the historic review process by the Boston Landmarks Commission and the Massachusetts Historical Commission.

8.1 Nearby Historic Resources

The proposed project site is a vacant 1.27-acre parcel, most recently utilized for surface parking. The site is located well east of the South End Landmark District (District), which is significant as the largest intact Victorian row house district in the country. The site is located at the easterly edge of the South End Harrison/Albany Protection Area (Protection Area), an area that was established to protect views of the adjacent South End Landmark District, to ensure that new development or major alterations adjacent to the District are architecturally compatible in massing, setback, and height, and to protect light and air circulation within the District. Building demolitions, the height and setback of new construction, and changes to topography and landscaping within the Protection Area are subject to review by the South End Landmark District Commission (SELDC).

The property is also located within the South End Industrial District, a grouping of late nineteenth- to early twentieth-century brick industrial buildings with related tenement and worker housing. The South End Industrial District is included in the Inventory of Historic and Archaeological Assets, maintained by the Massachusetts Historical Commission (MHC). The district was surveyed by the Boston Landmarks Commission (BLC) in 1997 and was recommended as potentially eligible for listing in the National Register of Historic Places.

Figure 8-1 depicts historic resources in the vicinity of the proposed project site.

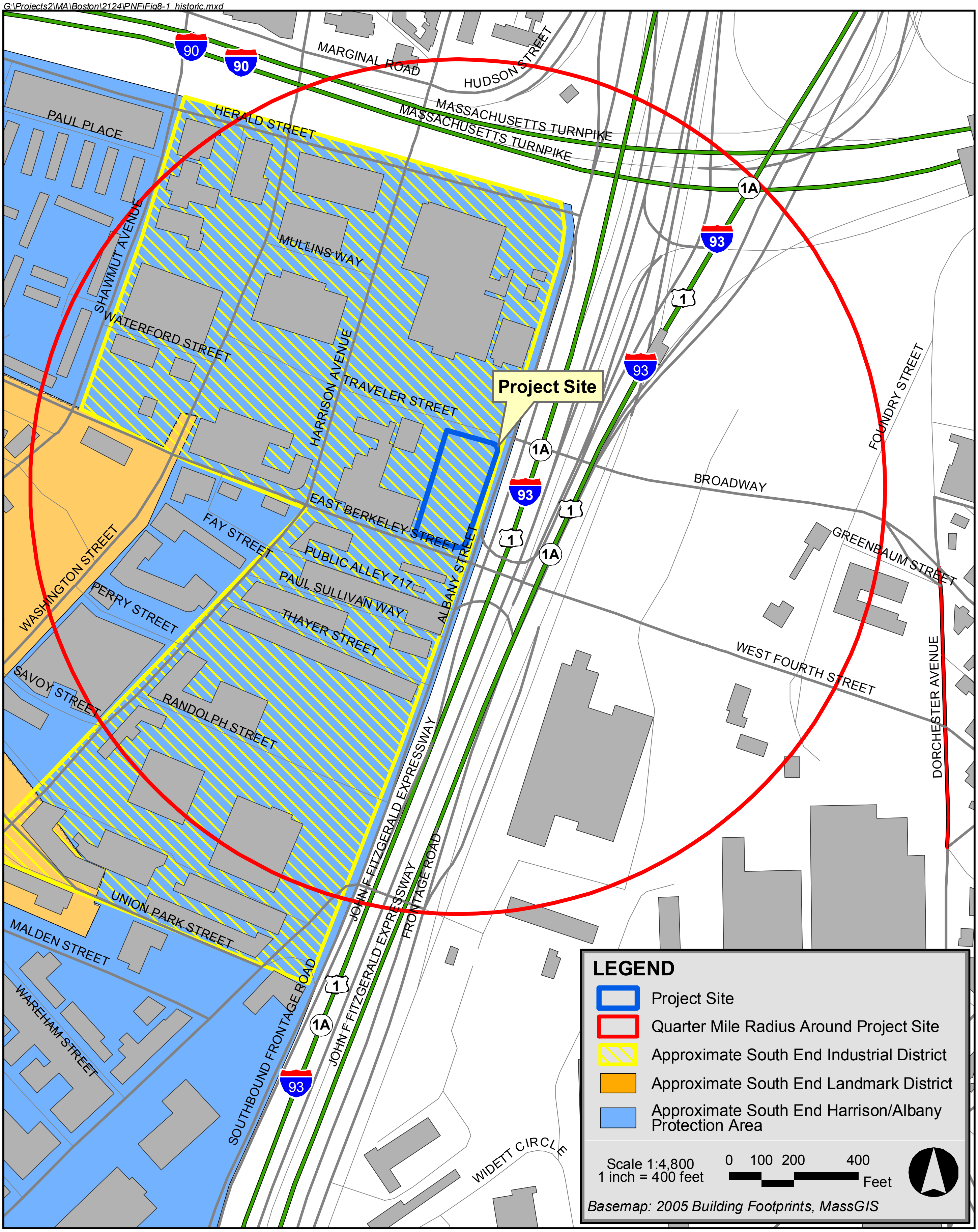
8.2 Impacts to Historic Resources

The proposed project will introduce new construction within the Protection Area. The site is surrounded by Albany Street to the east, Traveler Street to the north, and East Berkeley Street to the south (See Figures 1-1 and 1-2). Immediately west of the project site are the Planet Self Storage Warehouse and a five-story brick building that houses a restaurant (the Medieval Manor) and offices. Further to the west is Harrison Avenue. Directly to the east of the site on the opposite side of Albany Street is the elevated Southeast Expressway (I-93), which rises approximately 35 feet above grade.

The adjacent buildings to the west serve to obstruct views of the site from the remainder of the Protection Area and from the South End Landmark District further to the west.

Potential project impacts to the adjacent South End Landmark District are limited to shadow and visual impacts. These are discussed below and in more detail in Section 4.2 Shadow, Section 5.0 Urban Design, and Section 6.0 Building Design.

G:\Projects2\MA\Boston\2124\PNF\Fig8-1_historic.mxd



275 Albany Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 8-1
Historic Resources

8.2.1 Shadow

A shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 am, 12:00 noon, and 3:00 pm) during the summer solstice (June 21), autumnal equinox (September 21), and the winter solstice (December 21). The analysis focused in particular on major pedestrian areas, as well as the sidewalks, plazas, and public open space adjacent to and in the vicinity of the Project site. The shadow analysis described in Section 4.2 presents existing shadow as well as net new shadow from the Project to illustrate the incremental impact of the Project.

Results of the shadow analysis indicate that the Project will not cause substantial impacts to the Protection Area and no impacts to the South End Landmark District (see Figures 4.2-1 through 4.2-14). In general, new shadow from the Project will largely be limited to the immediate surrounding public ways and sidewalks of Albany, East Berkeley, and Traveler Streets, Harrison Avenue, and portions of the adjacent Southeast Expressway. Some additional new shadow will be cast on portions of adjacent properties immediately to the west of the Project. No new shadow from the Project is anticipated to fall on any of the area's existing open spaces.

8.2.2 Urban and Building Design

As described in Section 5.0 Urban Design, the project site is on the eastern periphery of the Protection area, adjacent to the Southeast Expressway. The area in the vicinity of the site is devoted to surface parking lots which create an empty, primarily vehicular environment in the area. In terms of the pedestrian experience, the current site context is challenging, with dark, underused areas under the Southeast Expressway and a lack of active uses along Traveler Street. The proposed project will add two hotels and a restaurant, bringing 18- to 24-hour activity and enlivening the neighborhood and improving the area with new sidewalks, street trees, and lighting.

The concept behind the design of the two buildings is to mix and blend three prevailing contextual scales: a low scale responding to the pedestrian experience at grade; a middle scale in reference to the South End with its midrise blocks and warehouse/loft character; and a high scale addressing downtown Boston to the north across the Massachusetts Turnpike.

As described in Section 6.0 Building Design, the rectilinear buildings have been designed to recall the historic masonry warehouse buildings found in the adjacent blocks. The proposed large, punched window openings have been drawn from the pier and spandrel motif prevalent throughout the South End. The building's materials have been chosen in response to the site's varied contexts. Materials including zinc, precast concrete, wood, glass, and stone are utilized to adjust to the scale of the surroundings and the varying identities of the two hotels. The extended stay hotel is more of a background statement with metal and precast concrete to connect to the simple masonry loft buildings of the South End. The building's short ends are kept fairly solid to recall traditional party walls. The select service hotel aims to be more contemporary with more metal, glass, and wood elements (see Figures 6-7 through 6-11).

8.3 Archaeological Resources

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

8.4 Coordination of Historic Resource Reviews

8.4.1 Boston Landmarks Commission Article 80 Review

The submission of this Expanded PNF initiates review of the Project by the BLC under the City's Article 80 review process.

8.4.2 South End Landmark District Commission

The project is located within the South End Harrison/Albany Protection Area, which is administered by the SELDC. The proponent anticipates submitting an application for a SELDC advisory opinion during the Article 80 review process to ensure that the project is consistent with the standards and criteria established for the Protection Area. It is anticipated that the proponent will file a formal application for design review by the SELDC following completion of the Article 80 Large Project review.

As noted above, SELDC review of projects within the Protection Area focuses on demolition, land coverage, height of structures, landscape, and topography, as follows:

- Demolition - the proposed project does not involve demolition, so this review standard is not relevant to the Project.

- Land Coverage - the standards and criteria prohibit setbacks exceeding ten feet back from the sidewalk line, unless approved by the SELDC. Setbacks greater than ten feet may be allowed if the setback is consistent with adjacent setbacks or if the site is adequately landscaped. The proposed project will be designed to fill the block and the structures will be built to the sidewalk line (except on Traveler Street to allow for the needed taxi drop-off).

- Height of Structures – the standards and criteria for new construction within this portion of the Protection Area allow for structures that are not lower than 30 feet and not taller than 120 feet. A portion of the development is proposed to be approximately 200 feet. The height of the proposed project has received extensive review and support by the BRA and an initial positive response by the Old Dover and Washington Gateway neighborhood community groups.

- Topography – the standards and criteria do not allow major changes to topography in the Protection Area. The site is a flat vacant parcel and the proposed project does not involve major topographical changes, so this standard is not relevant.

- Landscape - in general, landscape changes within the Protection Area must not obstruct view of the adjacent Landmark District. The site is not adjacent to the Landmark District and proposed landscaping will not obstruct views of the District, so this standard is not relevant.

8.4.3 Massachusetts Historical Commission State Register Review

The MHC has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places (M.G. L. Chapter 9, Sections 27-27c, as amended). MHC's review of the Project under the State Register Review process will be initiated through the filing of an Environmental Notification Form under the Massachusetts Environmental Policy Act (MEPA).

Section 9.0

Infrastructure Systems

9.0 INFRASTRUCTURE SYSTEMS

The following sections describe the capacity of the existing utility infrastructure surrounding the site and explain how these systems will service the proposed Project.

9.1 System Connections

The Proponent will coordinate with the Boston Water and Sewer Commission (BWSC) on the design of the proposed water, drainage, and sewer connections. All appropriate permits and approvals will be acquired prior to construction. Utility connections will be designed to minimize any effects within the surrounding area and existing business operations. Based on the analysis there is adequate sewage capacity in the area. The results of the pending BWSC flow tests will determine if there is sufficient water supply.

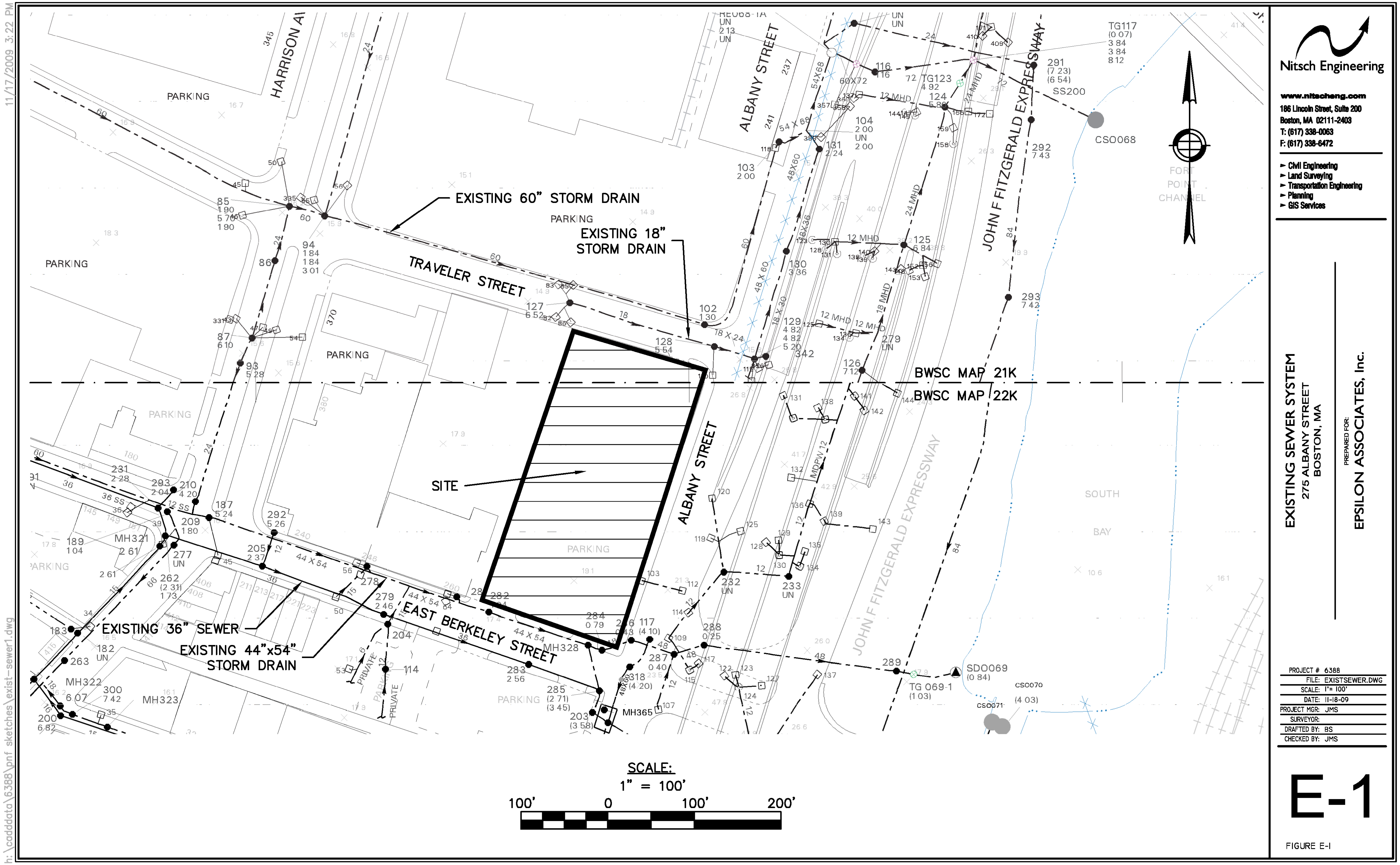
9.2 Sewage/Storm Water Systems

9.2.1 Existing Conditions

The existing sewer and drainage system infrastructure that services the Project site and surrounding area is owned and operated by the BWSC (see Figure 9-1). Within East Berkeley Street, a separate 36-inch sewer line and 44″x54″ drain line exists. The 36-inch sewer connects to a combined sewer immediately upon reaching Albany Street; the 44″x54″ drain line ultimately discharges to a storm outlet within the Fort Point Channel east of the site.

Within Traveler Street, an 18-inch drain line exists within the center of the roadway and a 60-inch drain line exists along the north end of the street right-of-way. Both of these drain lines ultimately discharge at a combined sewage overflow located south of the Broadway Bridge.

The 1.27-acre site is currently almost entirely paved with only small landscaped areas located along its perimeter. No water or sewer connections to the site are currently in service; however the parking lot drainage system appears to connect to the 44″x54″ drain line within Traveler Street via an18-inch storm drain.


EXISTING 60" STORM DRAIN
EXISTING 18" STORM DRAIN
TRAVELER STREET
HARRISON AV
ALBANY STREET
JOHN F FITZGERALD EXPRESSWAY
EAST BERKELEY STREET
SITE
BWSC MAP 21K
BWSC MAP 22K
EXISTING 36" SEWER
EXISTING 44"x54" STORM DRAIN
PARKING
FORT POINT CHANNEL
SOUTH BAY
SCALE:
1" = 100'
100' 0 100' 200'
Nitsch Engineering
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186 Lincoln Street, Suite 200
Boston, MA 02111-2403
T: (617) 338-0063
F: (617) 338-6472
► Civil Engineering
► Land Surveying
► Transportation Engineering
► Planning
► GIS Services
EXISTING SEWER SYSTEM
275 ALBANY STREET
BOSTON, MA
PREPARED FOR:
EPSILON ASSOCIATES, Inc.
PROJECT # 6388
FILE: EXISTSEWER.DWG
SCALE: 1"= 100'
DATE: 11-18-09
PROJECT MGR: JMS
SURVEYOR:
DRAFTED BY: BS
CHECKED BY: JMS
E-1
FIGURE E-I
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9.2.2 Proposed Sewage Generation

The Project's sewage generation rates were estimated using Massachusetts State Environmental Code (Title 5) 310 CMR 15.203. This reference lists typical generation values for the sources listed in Table 9-1.

Table 9-1 Sewage Generation

Use	Area (gsf)	Units	Sewage Generation Rate	Total gpd
Extended Stay Hotel	97,700	210 Bedrooms	110 gal/day/bedroom	23,100
Select Hotel	59,000	198 Bedrooms	110 gal/day/unit	21,780
Restaurant	4,000	267 Seats	35 gal/day/seat	9,345
Total				54,225

The Project is expected to increase the total effluent sewage discharge by 54,225 gpd. A Department of Environmental Protection (DEP) Sewer Connection Permit is anticipated as the proposed effluent discharge rate exceeds the 50,000 gpd permit threshold.

9.2.3 Sanitary Sewer System Capacity Analysis

An analysis was performed on the combined sanitary sewer lines the Project may utilize. Information on the combined sewer line that runs along East Berkeley Street was obtained for the analysis. Pipe diameters and inverts were taken from an electronic waste water system map purchased from the BWSC. The flow capacity for each segment was analyzed using the Manning equation.

Results indicate the minimum hydraulic capacity of the system is located along the 36-inch sewer main located on East Berkeley Street. This pipe has a capacity of 66.2 million gallons per day (mgd). Based on the peak flow estimate, the Project will not significantly burden the existing sewage system. Calculations are presented in Table 9-2.

Table 9-2 Sewer Hydraulic Capacity Analysis

Street	Size	Slope (ft/ft)	Manning's n	Exist Capacity mgd	Exist Capacity gpm	Prop. Peak flow (gpm)
East Berkeley	36	.02	0.012	66.2	46,000	*215+/-*

9.2.4 Sewer/Storm Water Connections

The Project's sewage and storm water flows will be kept separate per BWSC requirements, connecting to the appropriate mains respectively within East Berkeley Street and Traveler Street. Although the existing sewer line within East Berkeley Street ultimately flows to a combined system within Albany Street, the BWSC and the City of Boston are attempting to separate storm water and waste water over time to prevent periodic overflows of combined sewer and storm water into receiving waters and to reduce the sewage treatment burden at Deer Island.

9.2.5 Sewer/Storm Water Mitigation

In order to minimize sewage generation, the Project will meet all applicable code requirements for the installation of low-flow fixtures. Stormwater run-off rates will not exceed existing rates given that the amount of proposed impervious area will mimic existing conditions. The implementation of several Best Management Practices (*e.g.* deep sump catch basins, oil/water separators, and an operation and maintenance plan) onsite will significantly improve the quality of storm water run-off.

The Project will also be implementing a system of groundwater recharge as it falls within the Boston Groundwater Overlay District, (Article 32 Boston Zoning Code). This requires that one inch of stormwater over the entire impervious area of the site be recharged into the ground.

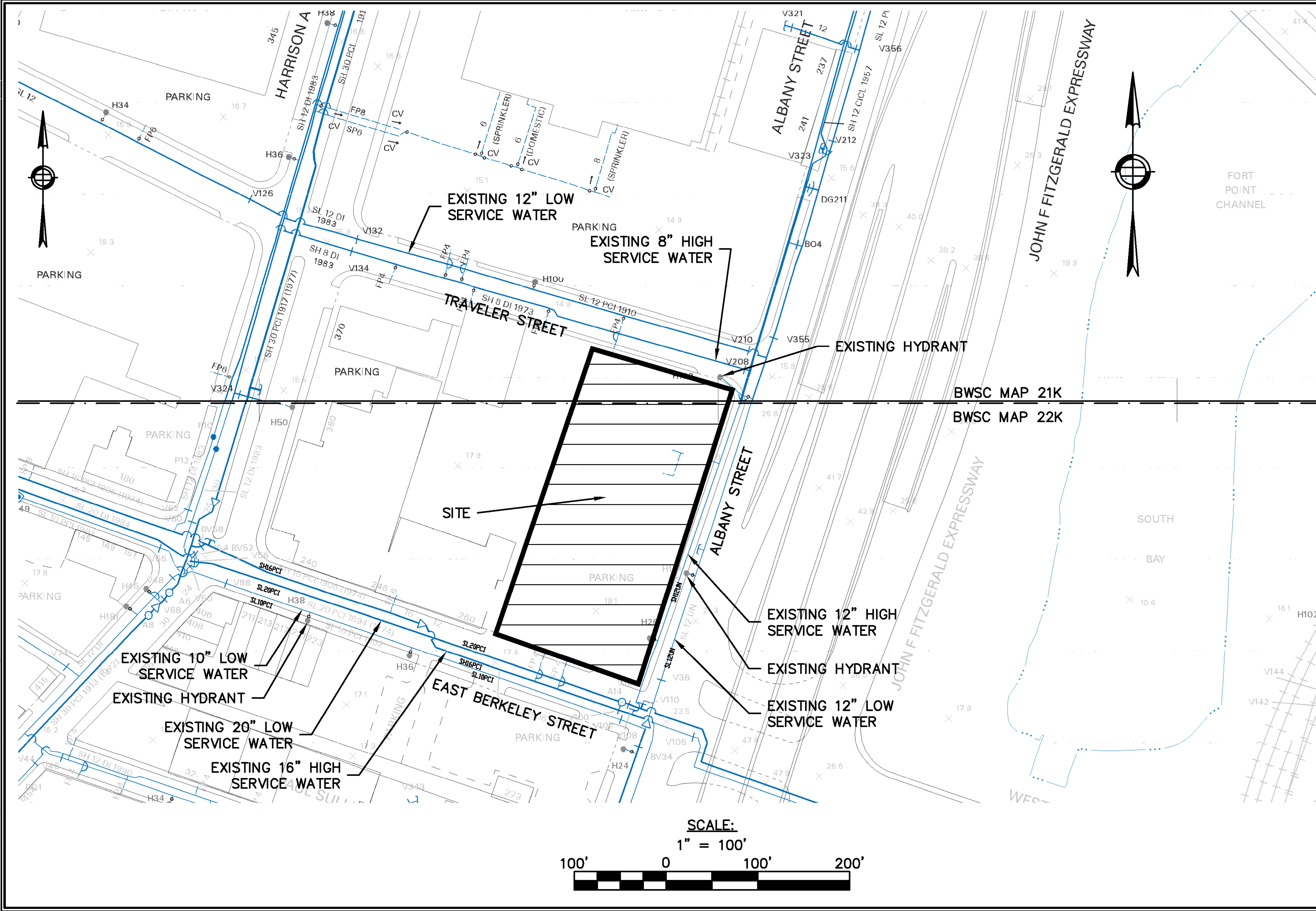
9.3 Water Supply System

9.3.1 Existing Conditions

Presently the site does not have a domestic or fire service connection. Water to this area is delivered through interconnected network water distribution systems, designated as Southern Low Service ("SLS") Systems and Southern High Service ("SHS") Systems. SLS systems are generally used to meet domestic water needs and street hydrant demand. SHS systems are generally used as the main supply to the low-pressure service system and supply water for building fire protection systems.

The SLS and SHS systems are integrally connected to form loops that allow major water demands to be fed from more than one direction. Looping allows each distribution system to function at optimum efficiency and provides a measure of safety and redundancy in the event of a water main break.

Adjacent to the site there is a 16-inch high, 20-inch low, and a 10-inch low service on East Berkeley Street; within Albany Street exists a 12-inch high and 12-inch low service; and within Traveler Street exists a 12-inch low and 8-inch high service (see Figure 9-2). Hydrant tests will be conducted as part of the Project design.



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- Civil Engineering
- Land Surveying
- Transportation Engineering
- Planning
- GIS Services

EXISTING WATER SYSTEM
275 ALBANY STREET
BOSTON, MA

PREPARED FOR:
EPSILON ASSOCIATES, Inc.

PROJECT #: 6388
FILE: EXISTWATER.DWG
SCALE: 1"= 100'
DATE: 5/07
PROJECT MGR: JMS
SURVEYOR:
DRAFTED BY: AD
CHECKED BY: JMS

E-2

FIGURE E-2

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9.3.2 *Anticipated Water Consumption*

The Project's water demand is estimated at 110 percent of the sewage generation; therefore the average potable water demand for the Project is estimated to be approximately 59,648 gpd.

9.3.3 *Water System Connections*

Proposed connections are expected to be to the low pressure system for domestic water and the high pressure system for fire protection. The Project will connect to any system adjacent to the site as recommended by the BWSC. All former water connections not utilized will be cut and capped at the main.

9.3.4 *Additional Utilities Connections*

The site is serviceable with electric, telephone, cable, and gas services within Albany, Traveler, and East Berkeley Streets. All proposed utility connections will be coordinated with each respective utility provider.

Appendix A

Parcel Description

APPENDIX A PARCEL DESCRIPTION

275 Albany Street
Boston, MA 02118

BOUNDARY DESCRIPTION FROM SURVEY:

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS, AS SHOWN ON A TAKING PLAN RECORDED IN THE SUFFOLK COUNTY REGISTRY OF DEEDS IN BOOK 7263, PAGE 345 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERLY SIDELINE OF ALBANY STREET, THENCE RUNNING S19°15'43"W, BY SAID WESTERLY LINE OF ALBANY STREET, A DISTANCE OF 302.99 FEET TO A POINT OF CURVATURE;

THENCE BY SAID WESTERLY LINE OF ALBANY STREET AND THE NORTHERLY LINE OF EAST BERKELEY STREET BY A CURVE TO THE RIGHT, HAVING A RADIUS OF 20.00 FEET AND AN ARC LENGTH OF 31.46 FEET TO A POINT OF TANGENCY;

THENCE N70°36'14"W, BY SAID NORTHERLY LINE OF EAST BERKELEY STREET, A DISTANCE OF 139.37 FEET TO A POINT;

THENCE N17°47'07"E, A DISTANCE OF 335.82 FEET TO A POINT ON THE SOUTHERLY SIDELINE OF TRAVELER STREET;

THENCE S73°26'07"E, BY SAID SOUTHERLY LINE OF TRAVELER STREET, A DISTANCE OF 147.30 FEET TO A POINT OF CURVATURE;

THENCE BY SAID SOUTHERLY LINE OF TRAVELER STREET AND THE WESTERLY LINE OF ALBANY STREET, BY A CURVE TO THE RIGHT, HAVING A RADIUS OF 20.00 FEET AND AN ARC LENGTH OF 32.36 FEET TO THE POINT OF BEGINNING.

CONTAINING APPROXIMATELY 55,485 SQUARE FEET OF LAND.

BEING THE SAME LAND AS DESCRIBED IN LANDAMERICA LAWYERS TITLE CASE NUMBER 14622, DATED JANUARY 25, 2008.

Appendix B

Transportation

Intersection Volumes

275 Albany Street

A.M. Peak

Yearly Growth Rate:	1.0%
Current Year	2009
Build Analysis Year	2014

Build Trips	TAXI CABS TRIPS	AUTO TRIPS
IN	37	41
OUT	37	27

	Existing	Existing	Background	Area Projects	No Build	PROJECT TAXI CABS				PROJECT AUTOS					Build
		1%/ yr	1%/ yr		2013	enter	exit	enter	exit	enter	exit	enter	exit	BALANCEDNew Project	
	2008	2009	Growth (5yrs)		No-Build	dist	dist	volume	volume	dist	dist	volume	volume	Trips	Volumes
East Berkeley Street/Washington Street															
East Berkeley WB left	120	122	7	0	129			0	0			0	0		129
East Berkeley WB thru	927	937	48	2	987		10%	0	4		10%	0	3	7	994
East Berkeley WB right	60	61	4	0	65			0	0			0	0		65
Washington NB left	124	126	7	0	133			0	0			0	0		133
Washington NB thru	376	380	20	0	400			0	0			0	0		400
Washington SB thru	13	14	0	0	14			0	0			0	0		14
Harrison Avenue/Traveler Street															
Traveler WB left	21	22	2	0	24		12%	0	4		25%	0	7	11	35
Traveler WB thru	23	24	2	0	26		3%	0	1		5%	0	1	2	28
Traveler WB right	79	80	5	0	85		5%	0	2		10%	0	3	5	90
Harrison NB left	62	63	4	0	67			0	0			0	0		67
Harrison NB thru	352	356	19	2	377			0	0			0	0		377
Harrison NB right	79	80	5	2	87	7%	30%	3	11	7%		3	0	17	104
Harrison SB left	75	76	4	0	80	30%		11	0	30%		12	0	23	103
Harrison SB thru	223	226	12	47	285			0	0			0	0		285
Harrison SB right	30	31	2	0	33			0	0			0	0		33
East Berkeley Street/Harrison Avenue															
East Berkeley WB left	136	138	8	0	146		8%	0	3			0	0	2	148
East Berkeley WB thru	972	982	51	2	1035		7%	0	3			0	0	2	1037
East Berkeley WB right	306	310	16	0	326	2%	35%	1	13	2%		1	0	13	339
Harrison NB left	56	57	3	0	60			0	0			0	0		60
Harrison NB thru	187	189	10	4	203	5%		2	0	5%		2	0	4	207
Harrison SB thru	165	167	9	47	223		7%	0	3		15%	0	4	6	229
Harrison SB right	79	80	5	0	85		5%	0	2		10%	0	3	5	90
Albany Street/Traveler Street															
Traveler EB thru	112	114	6	2	122		30%	0	11		30%	0	8	19	141
Traveler EB right	42	43	3	0	46	17%	30%	6	11	17%	30%	7	8	32	78
Albany SB left	625	632	33	2	667			0	0			0	0		667
Albany SB thru	627	634	33	45	712	30%		11	0	30%		12	0	23	735
Albany SB right	123	125	7	0	132	30%		11	0	30%		12	0	22	154
Albany Street/East Berkeley Street															
East Berkeley WB left	185	187	10	2	199			0	0			0	0	0	199
East Berkeley WB thru	1191	1203	62	2	1267	5%		2	0	5%		2	0	4	1271
Albany SB thru	446	451	24	45	520		30%	0	11		30%	0	8	19	539
Albany SB right	223	226	12	0	238	47%		17	0	47%		19	0	36	274
Broadway Bridge/Frontage Road/Traveler Street															
Traveler EB left to I-90	39	40	3	0	43		5%	0	2		5%	0	1	3	46
Traveler EB left to I-93	147	149	8	0	157		20%	0	7		20%	0	5	13	170
Traveler EB thru	551	557	29	2	588		5%	0	2		5%	0	1	3	591
Broadway Bridge WB right to I-90	299	302	16	2	320			0	0			0	0		320
Broadway Bridge WB right to I-93/South Station	626	633	33	2	668			0	0			0	0		668
Frontage NB thru to I-90	208	211	11	3	225			0	0			0	0		225
Frontage NB thru to I-93/South Station	525	531	28	3	562			0	0			0	0		562
Frontage NB right to Broadway Bridge	58	59	4	0	63			0	0			0	0		63
Frontage Road/W. Fourth Street															
W. Fourth WB thru	801	810	42	3	855	5%		2	0	5%		2	0	4	859
W. Fourth WB right	171	173	9	0	182			0	0			0	0		182
Frontage NB left	575	581	30	0	611			0	0			0	0		611
Frontage NB thru	620	627	32	6	665			0	0			0	0		665
Frontage NB right	207	210	11	0	221			0	0			0	0		221
Dorchester Avenue/W. Fourth Street															
W. Fourth EB left	30	31	2	0	33			0	0			0	0		33
W. Fourth EB thru	103	105	6	0	111			0	0			0	0		111
W. Fourth EB right	74	75	4	0	79			0	0			0	0		79
W. Fourth WB left	2	3	1	0	4			0	0			0	0		4
W. Fourth WB thru	261	264	14	3	281			0	0			0	0		281
W. Fourth WB right	8	9	1	0	10			0	0			0	0		10
Dorchester NB left	546	552	29	0	581	5%		2	0	5%		2	0	4	585
Dorchester NB thru	582	588	30	0	618			0	0			0	0		618
Dorchester NB right	2	3	1	0	4			0	0			0	0		4
Dorchester SB left	5	6	1	0	7			0	0			0	0		7
Dorchester SB thru	204	207	11	0	218		5%	0	2		5%	0	1	3	221
Dorchester SB right	165	167	9	0	176			0	0			0	0		176
Site Driveway North/Traveler Street															
Traveler EB thru	154	156	9	2	167	37%	30%	14	11	17%		7	0	32	199
Traveler EB right	0	0	0	0	0			0	0	20%		8	0	8	8
Traveler WB left	0	0	0	0	0			0	0	30%		12	0	12	12
Traveler WB thru	123	126	9	0	135			0	0			0	0	0	135
Site Driveway North NB left	0	0	0	0	0		20%	0	7		40%	0	11	18	18
Site Driveway North NB right	0	0	0	0	0		30%	0	11		60%	0	16	27	27
Site Driveway South/E. Berkeley Street															
E. Berkeley Street WB thru	1414	1429	74	2	1505	2%	50%	1	19	2%		1	0	19	1524
E. Berkeley Street WB right	0	0	0	0	0			0	0	50%		21	0	21	21

275 Albany Street

P.M. Peak

Yearly Growth Rate:	1.0%
Current Year	2009
Build Analysis Year	2014

Build Trips	ICABS TF	AUTO TRIPS
IN	40	41
OUT	40	32

	Existing	Existing	Background	Area Projects	No Build	PROJECT TAXI CABS				PROJECT AUTOS					Build
		1%/ yr	1%/ yr		2014	enter	exit	enter	exit	enter	exit	enter	exit	BALANCEDNew Project Trips	
	2008	2009	Growth (5yrs)		No-Build	dist	dist	volume	volume	dist	dist	volume	volume		Volumes
East Berkeley Street/Washington Street															
East Berkeley WB left	205	208	11	0	219			0	0			0	0		219
East Berkeley WB thru	798	806	42	1	849		10%	0	4		10%	0	3	9	858
East Berkeley WB right	67	68	4	0	72			0	0			0	0		72
Washington NB left	114	116	6	0	122			0	0			0	0		122
Washington NB thru	311	315	17	0	332			0	0			0	0		332
Washington SB thru	17	18	0	0	18			0	0			0	0		18
Harrison Avenue/Traveler Street															
Traveler WB left	19	20	2	0	22		12%	0	5		25%	0	8	13	35
Traveler WB thru	7	8	1	0	9		3%	0	1		5%	0	2	3	12
Traveler WB right	44	45	3	0	48		5%	0	2		10%	0	3	5	53
Harrison NB left	22	23	2	0	25			0	0			0	0		25
Harrison NB thru	248	251	13	10	274			0	0			0	0		274
Harrison NB right	110	112	6	2	120	7%	30%	3	12	7%		3	0	18	138
Harrison SB left	146	148	8	0	156	30%		12	0	30%		12	0	24	180
Harrison SB thru	308	312	16	-51	277			0	0			0	0		277
Harrison SB right	18	19	1	0	20			0	0			0	0		20
East Berkeley Street/Harrison Avenue															
East Berkeley WB left	164	166	9	0	175		8%	0	3			0	0	4	179
East Berkeley WB thru	886	895	46	1	942		7%	0	3			0	0	4	946
East Berkeley WB right	120	122	7	0	129	2%	35%	1	14	2%		1	0	14	143
Harrison NB left	77	78	4	0	82			0	0			0	0		82
Harrison NB thru	249	252	13	11	276	5%		2	0	5%		2	0	4	280
Harrison SB thru	220	223	12	-51	184		7%	0	3		15%	0	5	8	192
Harrison SB right	107	109	6	0	115		5%	0	2		10%	0	3	5	120
Albany Street/Traveler Street															
Traveler EB thru	203	206	11	2	219		30%	0	12		30%	0	10	22	241
Traveler EB right	53	54	3	0	57	17%	30%	7	12	17%	30%	7	10	35	92
Albany SB left	748	756	39	5	800			0	0			0	0		800
Albany SB thru	620	627	32	14	673	30%		12	0	30%		12	0	24.0	697
Albany SB right	70	71	4	0	75	30%		12	0	30%		12	0	24	99
Albany Street/East Berkeley Street															
East Berkeley WB left	149	151	8	1	160			0	0			0	0		160
East Berkeley WB thru	935	945	49	1	995	5%		2	0	5%		2	0	4	999
Albany SB thru	438	443	23	14	480		30%	0	12		30%	0	10	20	500
Albany SB right	235	238	13	0	251	47%		19	0	47%		19	0	39	290
Broadway Bridge/Frontage Road/Traveler Street															
Traveler EB left to I-90	61	62	4	0	66		5%	0	2		5%	0	2	4	70
Traveler EB left to I-93	168	170	9	0	179		20%	0	8		20%	0	6	14	193
Traveler EB thru	722	730	38	7	775		5%	0	2		5%	0	2	4	779
Broadway Bridge WB right to I-90	34	35	2	1	38			0	0			0	0		38
Broadway Bridge WB right to I-93/South Station	481	486	25	2	513			0	0			0	0		513
Frontage NB thru to I-90	38	39	2	14	55			0	0			0	0		55
Frontage NB thru to I-93/South Station	598	604	31	14	649			0	0			0	0		649
Frontage NB right to Broadway Bridge	84	85	5	0	90			0	0			0	0		90
Frontage Road/W. Fourth Street															
W. Fourth WB thru	766	774	40	2	816	5%		2	0	5%		2	0	4	820
W. Fourth WB right	71	72	4	0	76			0	0			0	0		76
Frontage NB left	318	322	17	0	339			0	0			0	0		339
Frontage NB thru	649	656	34	27	717			0	0			0	0		717
Frontage NB right	268	271	14	0	285			0	0			0	0		285
Dorchester Avenue/W. Fourth Street															
W. Fourth EB left	48	49	3	0	52			0	0			0	0		52
W. Fourth EB thru	121	123	7	0	130			0	0			0	0		130
W. Fourth EB right	99	100	6	0	106			0	0			0	0		106
W. Fourth WB left	2	3	1	0	4			0	0			0	0		4
W. Fourth WB thru	306	310	16	2	328			0	0			0	0		328
W. Fourth WB right	7	8	1	0	9			0	0			0	0		9
Dorchester NB left	295	298	16	0	314	5%		2	0	5%		2	0	4	318
Dorchester NB thru	376	380	20	0	400			0	0			0	0		400
Dorchester NB right	2	3	1	0	4			0	0			0	0		4
Dorchester SB left	18	19	1	0	20			0	0			0	0		20
Dorchester SB thru	470	475	25	0	500		5%	0	2		5%	0	2	4	504
Dorchester SB right	236	239	13	0	252			0	0			0	0		252
Site Driveway North/Traveler Street															
Traveler EB thru	256	260	14	2	276	37%	30%	15	12	17%		7	0	34	310
Traveler EB right	0	0	0	0	0			0	0	20%		8	0	8	8
Traveler WB left	0	0	0	0	0			0	0	30%		12	0	12	12
Traveler WB thru	70	73	6	0	79			0	0			0	0		79
Site Driveway North NB left	0	0	0	0	0		20%	0	8		40%	0	13	21	21
Site Driveway North NB right	0	0	0	0	0		30%	0	12		60%	0	19	31	31
Site Driveway South/E. Berkeley Street															
E. Berkeley Street WB thru	1170	1183	62	1	1246	2%	50%	1	20	2%		1	0	22	1268
E. Berkeley Street WB right	0	0	0	0	0			0	0	50%		21	0	21	21

Synchro Reports

Synchro Analysis
Exisiting 2009
AM Peak Hour

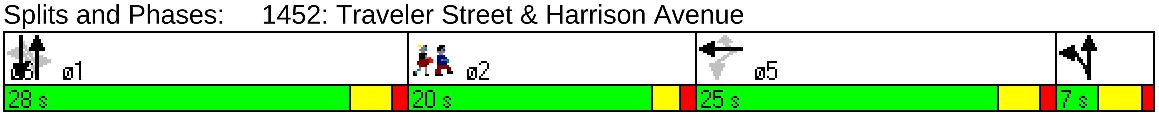
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.974			0.982	
Flt Protected					0.978			0.992			0.990	
Satd. Flow (prot)	0	0	0	0	1378	1292	0	2914	0	0	2829	0
Flt Permitted					0.978			0.808			0.697	
Satd. Flow (perm)	0	0	0	0	1378	1292	0	2373	0	0	1991	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						110		33				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	22	24	80	63	356	80	76	226	31
Peak Hour Factor	0.92	0.92	0.92	0.53	0.48	0.73	0.74	0.94	0.83	0.92	0.81	0.63
Heavy Vehicles (%)	0%	0%	0%	16%	11%	5%	4%	8%	10%	8%	5%	9%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	42	50	110	85	379	96	83	279	49
Lane Group Flow (vph)	0	0	0	0	92	110	0	560	0	0	411	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	25.0	25.0	25.0	7.0	35.0	0.0	28.0	28.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	31.3%	31.3%	31.3%	8.8%	43.8%	0.0%	35.0%	35.0%	0.0%
Maximum Green (s)				21.0	21.0	21.0	3.0			24.0	24.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					10.1	10.1		56.3			24.0	
Actuated g/C Ratio					0.13	0.13		0.70			0.30	
v/c Ratio					0.53	0.42		0.29			0.69	
Control Delay					43.5	11.9		6.0			31.7	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					43.5	11.9		6.0			31.7	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	25%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					D	B		A			C	
Approach Delay					26.3			6.0			31.7	
Approach LOS					C			A			C	
Queue Length 50th (ft)					44	0		26			94	
Queue Length 95th (ft)					43	24		123			126	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					362	420		1899			597	
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					0.25	0.26		0.29			0.69	

Intersection Summary	
Area Type: CBD	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 18 (23%), Referenced to phase 1:NBSB, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 43.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1452: Traveler Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.958									0.977	
Flt Protected										0.950	0.990	
Satd. Flow (prot)	0	1711	0	0	0	0	0	0	0	1369	2801	0
Flt Permitted										0.950	0.990	
Satd. Flow (perm)	0	1711	0	0	0	0	0	0	0	1369	2801	0
Right Turn on Red			Yes			Yes			Yes	No		Yes
Satd. Flow (RTOR)		18									24	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	114	43	0	0	0	0	0	0	632	634	125
Peak Hour Factor	0.92	0.90	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.84	0.89	0.74
Heavy Vehicles (%)	0%	6%	14%	0%	0%	0%	0%	0%	0%	8%	6%	13%
Adj. Flow (vph)	0	127	57	0	0	0	0	0	0	752	712	169
Lane Group Flow (vph)	0	184	0	0	0	0	0	0	0	531	1102	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	65.0	0.0
Total Split (%)	0.0%	30.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.2%	54.2%	0.0%
Maximum Green (s)		30.0								59.0	59.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		17.5								90.7	90.7	
Actuated g/C Ratio		0.15								0.76	0.76	
v/c Ratio		0.70								0.51	0.52	
Control Delay		57.2								10.6	8.8	
Queue Delay		0.0								0.0	0.0	
Total Delay		57.2								10.6	8.8	
LOS		E								B	A	

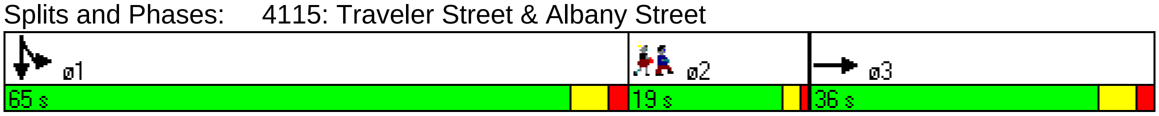
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	16%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		57.2									9.4	
Approach LOS		E									A	
Queue Length 50th (ft)		124								128	130	
Queue Length 95th (ft)		190								391	378	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		469								1035	2124	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		3								7	14	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.39								0.52	0.52	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 14.2 Intersection LOS: B
Intersection Capacity Utilization 45.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4115: Traveler Street & Albany Street



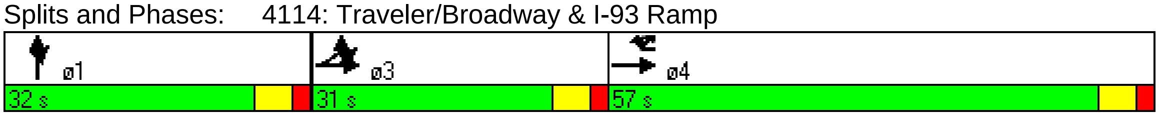
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1674	1590	3008	1271	1384	2777	3521	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1674	1590	3008	1271	1384	2777	3521	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	40	149	557	302	633	211	531	59
Peak Hour Factor	0.89	0.82	0.87	0.82	0.86	0.81	0.95	0.68
Heavy Vehicles (%)	10%	9%	8%	4%	5%	17%	11%	9%
Adj. Flow (vph)	45	182	640	368	736	260	559	87
Lane Group Flow (vph)	45	182	640	368	736	260	646	0
Turn Type	Prot	Prot		custom	custom		Prot	
Protected Phases	3	3	3 4	4	4	1	1	
Permitted Phases								
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		24.0	24.0	29.0	29.0	
Total Split (s)	31.0	31.0	88.0	57.0	57.0	32.0	32.0	0.0
Total Split (%)	25.8%	25.8%	73.3%	47.5%	47.5%	26.7%	26.7%	0.0%
Maximum Green (s)	25.0	25.0		51.0	51.0	26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	22.7	22.7	79.7	53.0	53.0	32.3	32.3	
Actuated g/C Ratio	0.19	0.19	0.66	0.44	0.44	0.27	0.27	
v/c Ratio	0.14	0.61	0.32	0.66	1.20	0.35	0.68	
Control Delay	39.4	49.0	6.3	33.2	138.6	36.9	40.8	
Queue Delay	0.0	2.2	0.5	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	39.4	51.2	6.9	33.2	138.6	36.9	40.8	
LOS	D	D	A	C	F	D	D	
Approach Delay			17.9			39.7		
Approach LOS			B			D		
Queue Length 50th (ft)	25	107	70	250	~694	63	138	
Queue Length 95th (ft)	m51	151	43	328	#866	m123	m271	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	377	358	1996	561	611	748	949	
Starvation Cap Reductn	0	83	890	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.66	0.58	0.66	1.20	0.35	0.68	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 74 (62%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 57.6 Intersection LOS: E
Intersection Capacity Utilization 75.3% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.991							
Flt Protected					0.993		0.950					
Satd. Flow (prot)	0	0	0	0	4251	0	1540	1509	0	0	827	0
Flt Permitted					0.993		0.744					
Satd. Flow (perm)	0	0	0	0	4251	0	1206	1509	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					11							
Headway Factor	1.14	1.14	1.14	1.19	1.21	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	122	937	61	126	380	0	0	14	0
Peak Hour Factor	0.92	0.92	0.92	0.71	0.95	0.84	0.84	0.82	0.92	0.92	0.71	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	3%	4%	2%	2%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)								0	0			
Adj. Flow (vph)	0	0	0	172	986	73	150	463	0	0	20	0
Lane Group Flow (vph)	0	0	0	0	1231	0	150	463	0	0	20	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	44.0	44.0	0.0	0.0	44.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%	44.0%	44.0%	0.0%	0.0%	44.0%	0.0%
Maximum Green (s)				34.0	34.0		40.0	40.0			40.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					48.4		40.0	40.0			40.0	
Actuated g/C Ratio					0.48		0.40	0.40			0.40	
v/c Ratio					0.60		0.31	0.77			0.06	

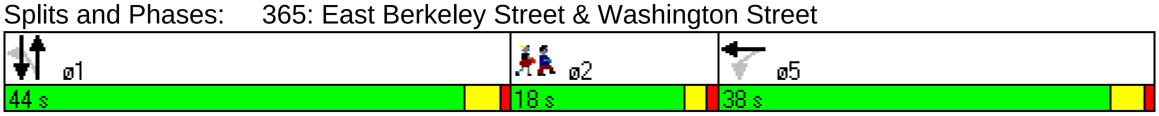
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					7.4		22.8	36.1			19.2	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					7.4		22.8	36.1			19.2	
LOS					A		C	D			B	
Approach Delay					7.4			32.8			19.2	
Approach LOS					A			C			B	
Queue Length 50th (ft)					32		64	251			8	
Queue Length 95th (ft)					m322		105	329			18	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					2063		482	604			331	
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					0.60		0.31	0.77			0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.966							0.850
Flt Protected					0.995			0.986				
Satd. Flow (prot)	0	0	0	0	4361	0	0	1500	0	0	1605	1325
Flt Permitted					0.995			0.837				
Satd. Flow (perm)	0	0	0	0	4361	0	0	1273	0	0	1605	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					87							100
Headway Factor	1.14	1.14	1.14	1.05	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	138	982	310	57	189	0	0	167	80
Peak Hour Factor	0.92	0.92	0.92	0.83	0.93	0.85	0.70	0.91	0.92	0.92	0.82	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	3%	3%	6%	4%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	166	1056	365	81	208	0	0	204	100
Lane Group Flow (vph)	0	0	0	0	1587	0	0	289	0	0	204	100
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	42.0	42.0	0.0	37.0	37.0	0.0	0.0	37.0	37.0
Total Split (%)	0.0%	0.0%	0.0%	42.0%	42.0%	0.0%	37.0%	37.0%	0.0%	0.0%	37.0%	37.0%
Maximum Green (s)				38.0	38.0		33.0	33.0			33.0	33.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)					38.0			49.8			49.8	49.8
Actuated g/C Ratio					0.38			0.50			0.50	0.50
v/c Ratio					0.93			0.46			0.26	0.14
Control Delay					38.8			21.7			17.7	4.8
Queue Delay					0.0			0.0			0.0	0.0

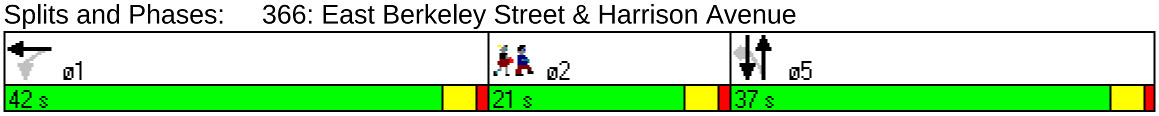
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay					38.8			21.7			17.7	4.8
LOS					D			C			B	A
Approach Delay					38.8			21.7			13.4	
Approach LOS					D			C			B	
Queue Length 50th (ft)					334			104			65	0
Queue Length 95th (ft)					#439			257			146	26
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)					1711			634			800	710
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					0.93			0.46			0.26	0.14

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 33.0 Intersection LOS: C
Intersection Capacity Utilization 66.2% 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: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.949	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4485	0	0	0	0	0	4193	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4485	0	0	0	0	0	4193	0
Right Turn on Red			Yes	No		Yes			Yes			Yes
Satd. Flow (RTOR)											35	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	187	1203	0	0	0	0	0	451	226
Peak Hour Factor	0.92	0.92	0.92	0.89	0.90	0.92	0.92	0.92	0.92	0.92	0.85	0.82
Heavy Vehicles (%)	0%	0%	0%	12%	6%	0%	0%	0%	0%	0%	6%	5%
Adj. Flow (vph)	0	0	0	210	1337	0	0	0	0	0	531	276
Lane Group Flow (vph)	0	0	0	0	1547	0	0	0	0	0	807	0
Turn Type				Split								
Protected Phases				3 4	3 4						1 2	
Permitted Phases												
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	67.0	67.0	0.0	0.0	0.0	0.0	0.0	53.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	55.8%	55.8%	0.0%	0.0%	0.0%	0.0%	0.0%	44.2%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					63.0						49.0	
Actuated g/C Ratio					0.52						0.41	
v/c Ratio					0.66						0.47	
Control Delay					12.4						20.1	
Queue Delay					9.0						0.0	
Total Delay					21.5						20.1	
LOS					C						C	

Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	25.0	28.0	41.0	26.0
Total Split (%)	21%	23%	34%	22%
Maximum Green (s)	19.0	22.0	36.0	21.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					21.5						20.1	
Approach LOS					C						C	
Queue Length 50th (ft)					127						131	
Queue Length 95th (ft)					179						63	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2355						1733	
Starvation Cap Reductn					785						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.99						0.47	

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

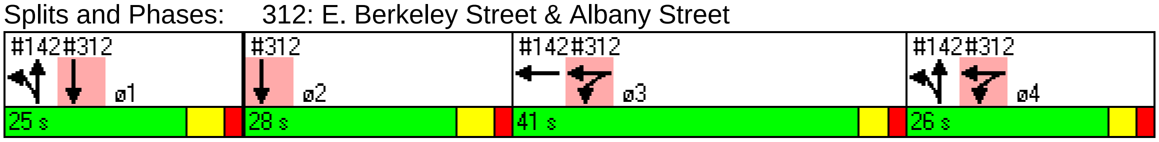
Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.0 Intersection LOS: C

Intersection Capacity Utilization 52.0% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 312: E. Berkeley Street & Albany Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.971			0.965				
Flt Protected							0.950	0.995				
Satd. Flow (prot)	0	0	0	0	4119	0	1395	2716	0	0	0	0
Flt Permitted							0.950	0.995				
Satd. Flow (perm)	0	0	0	0	4119	0	1395	2716	0	0	0	0
Right Turn on Red			Yes			No	No		No			Yes
Satd. Flow (RTOR)												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	810	173	581	627	210	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.81	0.91	0.92	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	11%	6%	6%	11%	9%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	900	214	638	682	239	0	0	0
Lane Group Flow (vph)	0	0	0	0	1114	0	530	1029	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	41.0	0.0	51.0	51.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	34.2%	0.0%	42.5%	42.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					36.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					37.0		70.0	70.0				
Actuated g/C Ratio					0.31		0.58	0.58				
v/c Ratio					0.88		0.65	0.65				
Control Delay					48.5		24.0	21.3				
Queue Delay					11.7		0.0	0.0				
Total Delay					60.1		24.0	21.3				
LOS					E		C	C				
Approach Delay					60.1			22.2				

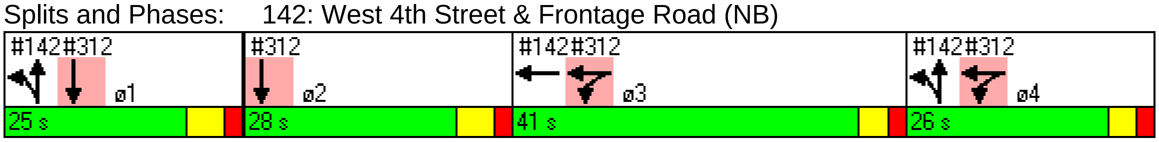
Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	25.0	28.0	26.0
Total Split (%)	21%	23%	22%
Maximum Green (s)	19.0	22.0	21.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					E			C				
Queue Length 50th (ft)					299		254	246				
Queue Length 95th (ft)					#363		#659	#549				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1270		814	1585				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					155		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					1.00		0.65	0.65				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 38.0 Intersection LOS: D
Intersection Capacity Utilization 58.7% 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: 142: West 4th Street & Frontage Road (NB)



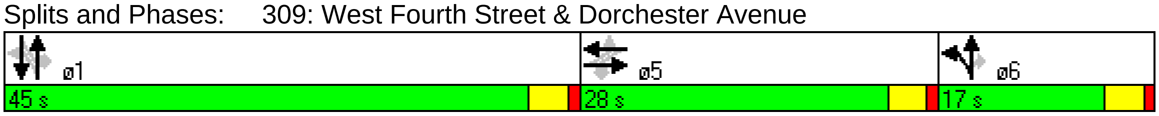
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	10	11	11	11
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.992				0.850		0.938	
Flt Protected		0.987			0.999		0.950				0.999	
Satd. Flow (prot)	0	1630	1411	0	1483	0	1577	2815	1221	0	2597	0
Flt Permitted		0.806			0.995		0.442				0.751	
Satd. Flow (perm)	0	1331	1411	0	1477	0	734	2815	1221	0	1953	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106		3				12		192	
Headway Factor	1.14	1.14	1.14	1.14	1.30	1.14	1.14	1.27	1.42	1.19	1.27	1.19
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	31	105	75	3	264	9	552	288	3	6	207	167
Peak Hour Factor	0.75	0.89	0.71	0.50	0.93	0.50	0.95	0.88	0.25	0.50	0.80	0.87
Heavy Vehicles (%)	8%	2%	3%	33%	2%	6%	3%	6%	0%	6%	3%	14%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	41	118	106	6	284	18	581	327	12	12	259	192
Lane Group Flow (vph)	0	159	106	0	308	0	581	327	12	0	463	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		8.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		12.0			12.0	12.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	0.0	17.0	62.0	62.0	45.0	45.0	0.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	31.1%	0.0%	18.9%	68.9%	68.9%	50.0%	50.0%	0.0%
Maximum Green (s)	24.0	24.0	24.0	24.0	24.0		13.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		24.0	24.0		24.0		54.0	58.0	58.0		41.0	
Actuated g/C Ratio		0.27	0.27		0.27		0.60	0.64	0.64		0.46	
v/c Ratio		0.45	0.23		0.78		1.03	0.18	0.02		0.47	
Control Delay		32.3	6.8		45.6		62.8	6.7	3.0		11.2	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		32.3	6.8		45.6		62.8	6.7	3.0		11.2	
LOS		C	A		D		E	A	A		B	
Approach Delay		22.1			45.6			42.1			11.2	
Approach LOS		C			D			D			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		75	0		160		~182	35	0		50	
Queue Length 95th (ft)		133	19		#292		#439	51	0		72	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		355	454		396		562	1814	791		994	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.45	0.23		0.78		1.03	0.18	0.02		0.47	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 32.6 Intersection LOS: C
Intersection Capacity Utilization 84.1% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 309: West Fourth Street & Dorchester Avenue



Synchro Analysis
Exisiting 2009
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.952			0.993	
Flt Protected					0.968			0.996			0.983	
Satd. Flow (prot)	0	0	0	0	1370	1330	0	2974	0	0	2971	0
Flt Permitted					0.968			0.878			0.647	
Satd. Flow (perm)	0	0	0	0	1370	1330	0	2621	0	0	1955	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						82		95				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	20	8	45	23	251	112	149	312	19
Peak Hour Factor	0.92	0.92	0.92	0.75	0.58	0.55	0.61	0.92	0.77	0.81	0.92	0.75
Heavy Vehicles (%)	0%	0%	0%	9%	20%	2%	3%	4%	3%	1%	1%	10%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	27	14	82	38	273	145	184	339	25
Lane Group Flow (vph)	0	0	0	0	41	82	0	456	0	0	548	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	30.0	30.0	30.0	7.0	50.0	0.0	43.0	43.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	30.0%	30.0%	30.0%	7.0%	50.0%	0.0%	43.0%	43.0%	0.0%
Maximum Green (s)				26.0	26.0	26.0	3.0			39.0	39.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					8.6	8.6		77.8			39.0	
Actuated g/C Ratio					0.09	0.09		0.78			0.39	
v/c Ratio					0.35	0.43		0.21			0.72	
Control Delay					51.4	17.4		5.0			32.3	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					51.4	17.4		5.0			32.3	

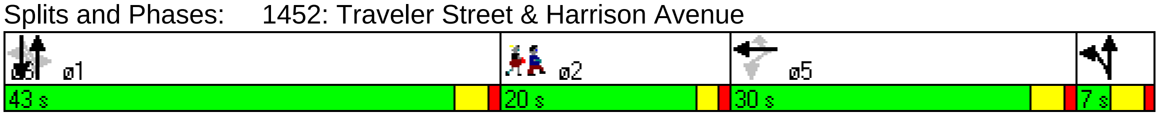
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					D	B		A			C	
Approach Delay					28.7			5.0			32.3	
Approach LOS					C			A			C	
Queue Length 50th (ft)					25	0		9			153	
Queue Length 95th (ft)					36	7		m106			219	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					356	406		2199			762	
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					0.12	0.20		0.21			0.72	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 18 (18%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 20.9 Intersection LOS: C
Intersection Capacity Utilization 44.2% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1452: Traveler Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.973									0.986	
Flt Protected										0.950	0.994	
Satd. Flow (prot)	0	1849	0	0	0	0	0	0	0	1435	2947	0
Flt Permitted										0.950	0.994	
Satd. Flow (perm)	0	1849	0	0	0	0	0	0	0	1435	2947	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		11								600	30	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	206	54	0	0	0	0	0	0	756	627	71
Peak Hour Factor	0.92	0.79	0.83	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.80	0.79
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	0%	0%	3%	4%	0%
Adj. Flow (vph)	0	261	65	0	0	0	0	0	0	822	784	90
Lane Group Flow (vph)	0	326	0	0	0	0	0	0	0	700	996	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.0	56.0	0.0
Total Split (%)	0.0%	31.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.9%	50.9%	0.0%
Maximum Green (s)		29.0								50.0	50.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		24.1								74.1	74.1	
Actuated g/C Ratio		0.22								0.67	0.67	
v/c Ratio		0.79								0.60	0.50	
Control Delay		52.5								4.8	11.9	
Queue Delay		0.1								0.0	0.0	
Total Delay		52.6								4.9	11.9	
LOS		D								A	B	

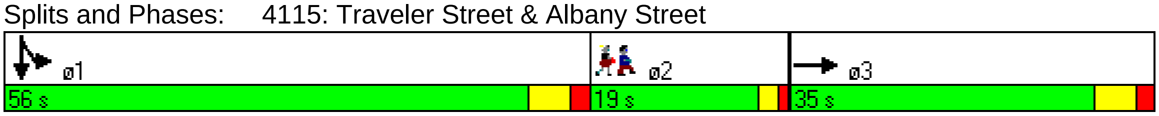
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	17%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		52.6									9.0	
Approach LOS		D									A	
Queue Length 50th (ft)		210								21	146	
Queue Length 95th (ft)		245								181	306	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		529								1162	1994	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		10								3	0	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.63								0.60	0.50	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 80 (73%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 53.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4115: Traveler Street & Albany Street



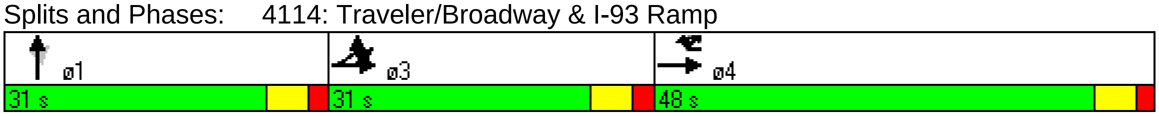
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1721	1682	3094	1213	1398	3154	3764	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1721	1682	3094	1213	1398	3154	3764	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	62	170	730	35	486	39	604	85
Peak Hour Factor	0.44	0.89	0.88	0.85	0.85	0.89	0.78	0.92
Heavy Vehicles (%)	7%	3%	5%	9%	4%	3%	4%	0%
Adj. Flow (vph)	141	191	830	41	572	44	774	92
Lane Group Flow (vph)	141	191	830	41	572	44	866	0
Turn Type	Prot	Prot		custom	custom		Perm	
Protected Phases	3	3	3 4	4	4	1		
Permitted Phases							1	
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		16.0	16.0	29.0	29.0	
Total Split (s)	31.0	31.0	79.0	48.0	48.0	31.0	31.0	0.0
Total Split (%)	28.2%	28.2%	71.8%	43.6%	43.6%	28.2%	28.2%	0.0%
Maximum Green (s)	25.0	25.0		42.0	42.0	25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	24.2	24.2	72.2	44.0	44.0	29.8	29.8	
Actuated g/C Ratio	0.22	0.22	0.66	0.40	0.40	0.27	0.27	
v/c Ratio	0.37	0.52	0.41	0.08	1.02	0.05	0.85	
Control Delay	36.4	39.2	6.7	21.3	77.9	23.2	39.3	
Queue Delay	1.3	2.5	1.5	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	37.8	41.7	8.2	21.3	77.9	23.2	39.3	
LOS	D	D	A	C	E	C	D	
Approach Delay			17.3			38.5		
Approach LOS			B			D		
Queue Length 50th (ft)	72	100	93	20	~431	12	260	
Queue Length 95th (ft)	62	m160	88	44	#585	m12	227	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	422	413	1991	485	559	855	1021	
Starvation Cap Reductn	143	125	918	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.66	0.77	0.08	1.02	0.05	0.85	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 12 (11%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 37.4 Intersection LOS: D
Intersection Capacity Utilization 62.3% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989							
Flt Protected					0.990		0.950					
Satd. Flow (prot)	0	0	0	0	2982	0	1570	1524	0	0	827	0
Flt Permitted					0.990		0.741					
Satd. Flow (perm)	0	0	0	0	2982	0	1225	1524	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					9							
Headway Factor	1.14	1.14	1.14	1.19	1.22	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	208	806	68	116	315	0	0	18	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.97	0.79	0.92	0.88	0.92	0.92	0.71	0.25
Heavy Vehicles (%)	0%	0%	0%	1%	1%	2%	0%	1%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)				0				0	0			
Adj. Flow (vph)	0	0	0	239	831	86	126	358	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1156	0	126	358	0	0	25	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0	0.0	41.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	41.0%	41.0%	0.0%	41.0%	41.0%	0.0%	0.0%	41.0%	0.0%
Maximum Green (s)				37.0	37.0		37.0	37.0			37.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					51.4		37.0	37.0			37.0	
Actuated g/C Ratio					0.51		0.37	0.37			0.37	
v/c Ratio					0.75		0.28	0.63			0.08	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

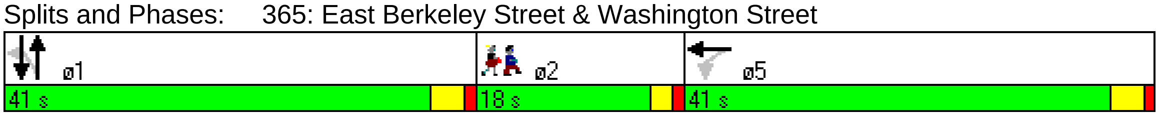
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					13.4		24.2	32.1			21.5	
Queue Delay					1.4		0.0	0.0			0.0	
Total Delay					14.8		24.2	32.1			21.5	
LOS					B		C	C			C	
Approach Delay					14.8			30.1			21.5	
Approach LOS					B			C			C	
Queue Length 50th (ft)					79		56	185			10	
Queue Length 95th (ft)					m#512		102	277			22	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					1537		453	564			306	
Starvation Cap Reductn					200		0	0			0	
Spillback Cap Reductn					0		0	0			0	
Storage Cap Reductn					0		0	0			0	
Reduced v/c Ratio					0.86		0.28	0.63			0.08	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 59.0%	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.

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

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.981							0.850
Flt Protected				0.950				0.987				
Satd. Flow (prot)	0	0	0	1560	3156	0	0	1558	0	0	1621	1325
Flt Permitted				0.950				0.747				
Satd. Flow (perm)	0	0	0	1560	3156	0	0	1179	0	0	1621	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					17							168
Headway Factor	1.14	1.14	1.14	1.20	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	166	895	122	78	252	0	0	223	109
Peak Hour Factor	0.92	0.92	0.92	0.93	0.98	0.93	0.74	0.87	0.92	0.92	0.87	0.65
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	178	913	131	105	290	0	0	256	168
Lane Group Flow (vph)	0	0	0	178	1044	0	0	395	0	0	256	168
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	39.0	39.0	0.0	40.0	40.0	0.0	0.0	40.0	40.0
Total Split (%)	0.0%	0.0%	0.0%	39.0%	39.0%	0.0%	40.0%	40.0%	0.0%	0.0%	40.0%	40.0%
Maximum Green (s)				35.0	35.0		36.0	36.0			36.0	36.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)				35.0	35.0			52.8			52.8	52.8
Actuated g/C Ratio				0.35	0.35			0.53			0.53	0.53
v/c Ratio				0.33	0.94			0.64			0.30	0.22
Control Delay				26.0	47.0			25.4			6.3	1.8
Queue Delay				0.0	20.6			0.0			0.5	0.0

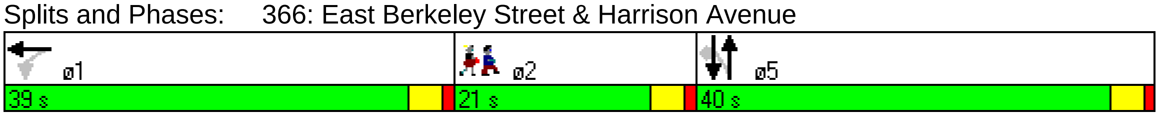
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay				26.0	67.7			25.4			6.8	1.8
LOS				C	E			C			A	A
Approach Delay					61.6			25.4			4.8	
Approach LOS					E			C			A	
Queue Length 50th (ft)				82	331			153			9	0
Queue Length 95th (ft)				139	#467			#403			m186	26
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)				546	1116			622			856	779
Starvation Cap Reductn				0	0			0			291	0
Spillback Cap Reductn				0	110			0			0	11
Storage Cap Reductn				0	0			0			0	0
Reduced v/c Ratio				0.33	1.04			0.64			0.45	0.22

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 42.8 Intersection LOS: D
Intersection Capacity Utilization 74.4% 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: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.950	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4587	0	0	0	0	0	4320	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4587	0	0	0	0	0	4320	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					44						87	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	151	945	0	0	0	0	0	443	238
Peak Hour Factor	0.92	0.92	0.92	0.91	0.94	0.92	0.92	0.92	0.92	0.92	0.74	0.80
Heavy Vehicles (%)	0%	0%	0%	7%	4%	0%	0%	0%	0%	0%	3%	2%
Adj. Flow (vph)	0	0	0	166	1005	0	0	0	0	0	599	298
Lane Group Flow (vph)	0	0	0	0	1171	0	0	0	0	0	897	0
Turn Type				Perm								
Protected Phases					3 4						1 2	
Permitted Phases				3 4								
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	62.0	62.0	0.0	0.0	0.0	0.0	0.0	48.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	56.4%	56.4%	0.0%	0.0%	0.0%	0.0%	0.0%	43.6%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					57.9						44.1	
Actuated g/C Ratio					0.53						0.40	
v/c Ratio					0.48						0.50	
Control Delay					4.0						21.7	
Queue Delay					0.7						0.0	
Total Delay					4.7						21.7	
LOS					A						C	

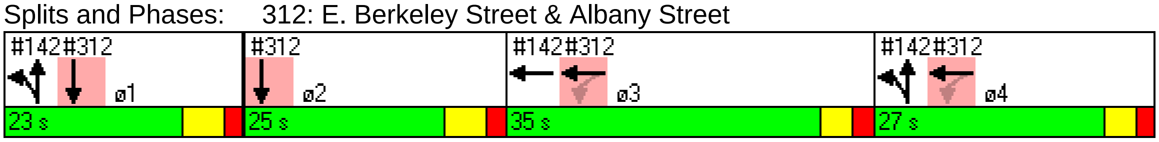
Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	23.0	25.0	35.0	27.0
Total Split (%)	21%	23%	32%	25%
Maximum Green (s)	17.0	19.0	30.0	22.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					4.7						21.7	
Approach LOS					A						C	
Queue Length 50th (ft)					39						161	
Queue Length 95th (ft)					40						217	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2439						1783	
Starvation Cap Reductn					820						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.72						0.50	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 12.1 Intersection LOS: B
Intersection Capacity Utilization 45.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 312: E. Berkeley Street & Albany Street



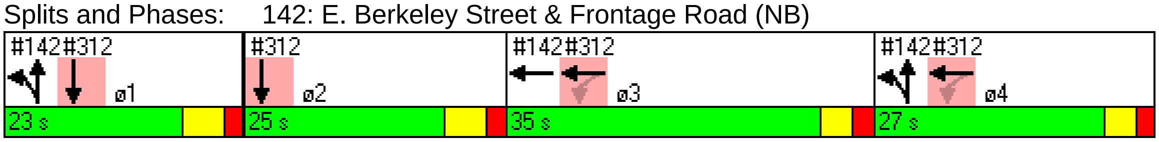
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.986			0.958				
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	4400	0	1435	2887	0	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	4400	0	1435	2887	0	0	0	0
Right Turn on Red			Yes			No	Yes		Yes			Yes
Satd. Flow (RTOR)							379	59				
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	774	72	322	656	271	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.78	0.85	0.86	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	5%	1%	3%	3%	4%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	860	92	379	763	298	0	0	0
Lane Group Flow (vph)	0	0	0	0	952	0	379	1061	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	35.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	31.8%	0.0%	45.5%	45.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					30.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					31.0		66.0	66.0				
Actuated g/C Ratio					0.28		0.60	0.60				
v/c Ratio					0.77		0.37	0.60				
Control Delay					41.1		2.9	16.8				
Queue Delay					0.0		0.0	0.0				
Total Delay					41.1		2.9	16.8				
LOS					D		A	B				
Approach Delay					41.1			13.1				

Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	23.0	25.0	27.0
Total Split (%)	21%	23%	25%
Maximum Green (s)	17.0	19.0	22.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					D			B				
Queue Length 50th (ft)					226		0	197				
Queue Length 95th (ft)					278		47	414				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1240		1006	1737				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					0		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					0.77		0.38	0.61				

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 51.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 142: E. Berkeley Street & Frontage Road (NB)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.993				0.850		0.948	
Flt Protected		0.984			0.999		0.950				0.999	
Satd. Flow (prot)	0	1576	1391	0	1509	0	1593	2940	1308	0	2821	0
Flt Permitted		0.751			0.996		0.243				0.677	
Satd. Flow (perm)	0	1203	1391	0	1505	0	407	2940	1308	0	1912	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			161		3				12		143	
Headway Factor	1.19	1.19	1.19	1.14	1.30	1.14	1.14	1.22	1.30	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	49	123	100	3	310	8	298	380	3	18	470	236
Peak Hour Factor	0.73	0.85	0.62	0.50	0.97	0.44	0.81	0.92	0.25	0.75	0.91	0.82
Heavy Vehicles (%)	8%	1%	1%	0%	1%	4%	2%	5%	0%	0%	3%	5%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	67	145	161	6	320	18	368	413	12	24	516	288
Lane Group Flow (vph)	0	212	161	0	344	0	368	413	12	0	828	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		5.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		9.0			12.0	12.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	0.0	11.0	56.0	56.0	45.0	45.0	0.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	0.0%	12.2%	62.2%	62.2%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0		7.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		30.0	30.0		30.0		48.0	52.0	52.0		41.0	
Actuated g/C Ratio		0.33	0.33		0.33		0.53	0.58	0.58		0.46	
v/c Ratio		0.53	0.28		0.68		1.19	0.24	0.02		0.87	
Control Delay		30.1	5.1		33.8		132.6	9.8	4.3		30.2	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		30.1	5.1		33.8		132.6	9.8	4.3		30.2	
LOS		C	A		C		F	A	A		C	
Approach Delay		19.3			33.8			66.7			30.2	
Approach LOS		B			C			E			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		97	0		166		~147	56	0		184	
Queue Length 95th (ft)		156	8		265		#255	81	0		#314	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		401	571		504		309	1699	761		949	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.53	0.28		0.68		1.19	0.24	0.02		0.87	

Intersection Summary

Area Type: CBD

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 56 (62%), Referenced to phase 1:NBSB, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 41.4 Intersection LOS: D

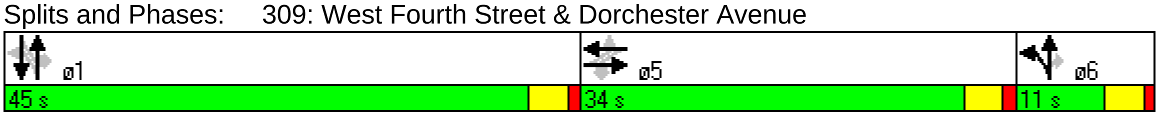
Intersection Capacity Utilization 84.1% ICU Level of Service E

Analysis Period (min) 15

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

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

Splits and Phases: 309: West Fourth Street & Dorchester Avenue



Synchro Analysis
No-Build 2014
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.974			0.984	
Flt Protected					0.978			0.992			0.991	
Satd. Flow (prot)	0	0	0	0	1378	1292	0	2914	0	0	2841	0
Flt Permitted					0.978			0.754			0.684	
Satd. Flow (perm)	0	0	0	0	1378	1292	0	2215	0	0	1961	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						116		34				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	24	26	85	67	377	87	80	285	33
Peak Hour Factor	0.92	0.92	0.92	0.53	0.48	0.73	0.74	0.94	0.83	0.92	0.81	0.63
Heavy Vehicles (%)	0%	0%	0%	16%	11%	5%	4%	8%	10%	8%	5%	9%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	45	54	116	91	401	105	87	352	52
Lane Group Flow (vph)	0	0	0	0	99	116	0	597	0	0	491	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	25.0	25.0	25.0	7.0	35.0	0.0	28.0	28.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	31.3%	31.3%	31.3%	8.8%	43.8%	0.0%	35.0%	35.0%	0.0%
Maximum Green (s)				21.0	21.0	21.0	3.0			24.0	24.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					10.4	10.4		56.0			24.0	
Actuated g/C Ratio					0.13	0.13		0.70			0.30	
v/c Ratio					0.55	0.43		0.32			0.84	
Control Delay					44.1	11.6		6.5			40.8	
Queue Delay					0.0	0.0		0.0			0.1	
Total Delay					44.1	11.6		6.5			40.9	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	25%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					D	B		A			D	
Approach Delay					26.6			6.5			40.9	
Approach LOS					C			A			D	
Queue Length 50th (ft)					48	0		30			120	
Queue Length 95th (ft)					45	24		135			#159	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					362	425		1842			588	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			2	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.27	0.27		0.32			0.84	

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 18 (23%), Referenced to phase 1:NBSB, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 22.7 Intersection LOS: C

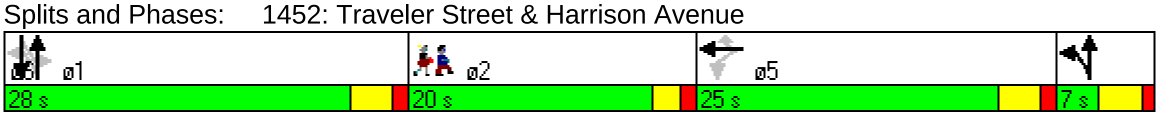
Intersection Capacity Utilization 46.0% ICU Level of Service A

Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1452: Traveler Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.958									0.978	
Flt Protected										0.950	0.991	
Satd. Flow (prot)	0	1712	0	0	0	0	0	0	0	1369	2808	0
Flt Permitted										0.950	0.991	
Satd. Flow (perm)	0	1712	0	0	0	0	0	0	0	1369	2808	0
Right Turn on Red			Yes			Yes			Yes	No		Yes
Satd. Flow (RTOR)		18									23	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	122	46	0	0	0	0	0	0	667	712	132
Peak Hour Factor	0.92	0.90	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.84	0.89	0.74
Heavy Vehicles (%)	0%	6%	14%	0%	0%	0%	0%	0%	0%	8%	6%	13%
Adj. Flow (vph)	0	136	61	0	0	0	0	0	0	794	800	178
Lane Group Flow (vph)	0	197	0	0	0	0	0	0	0	576	1196	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	65.0	0.0
Total Split (%)	0.0%	30.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.2%	54.2%	0.0%
Maximum Green (s)		30.0								59.0	59.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		18.3								89.9	89.9	
Actuated g/C Ratio		0.15								0.75	0.75	
v/c Ratio		0.71								0.56	0.57	
Control Delay		57.3								12.1	10.0	
Queue Delay		0.2								0.0	0.0	
Total Delay		57.5								12.2	10.0	
LOS		E								B	A	

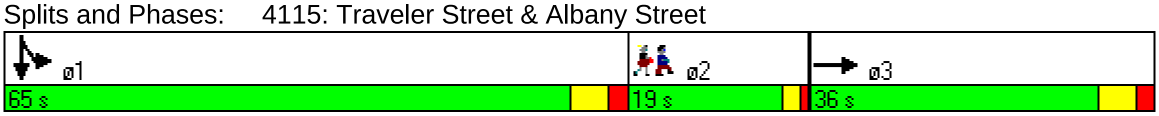
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	16%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		57.5									10.7	
Approach LOS		E									B	
Queue Length 50th (ft)		134								153	156	
Queue Length 95th (ft)		202								457	445	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		470								1025	2109	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		28								8	16	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.45								0.57	0.57	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 49.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4115: Traveler Street & Albany Street



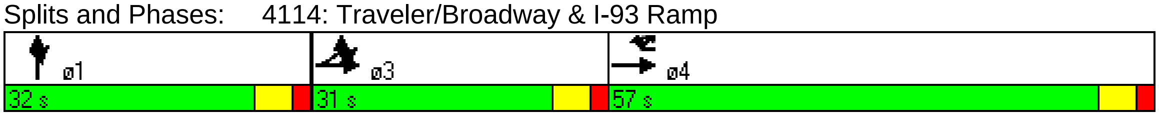
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1674	1590	3008	1271	1384	2777	3521	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1674	1590	3008	1271	1384	2777	3521	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	43	157	588	320	668	225	562	63
Peak Hour Factor	0.89	0.82	0.87	0.82	0.86	0.81	0.95	0.68
Heavy Vehicles (%)	10%	9%	8%	4%	5%	17%	11%	9%
Adj. Flow (vph)	48	191	676	390	777	278	592	93
Lane Group Flow (vph)	48	191	676	390	777	278	685	0
Turn Type	Prot	Prot		custom	custom		Prot	
Protected Phases	3	3	3 4	4	4	1	1	
Permitted Phases								
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		24.0	24.0	29.0	29.0	
Total Split (s)	31.0	31.0	88.0	57.0	57.0	32.0	32.0	0.0
Total Split (%)	25.8%	25.8%	73.3%	47.5%	47.5%	26.7%	26.7%	0.0%
Maximum Green (s)	25.0	25.0		51.0	51.0	26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	23.3	23.3	80.3	53.0	53.0	31.7	31.7	
Actuated g/C Ratio	0.19	0.19	0.67	0.44	0.44	0.26	0.26	
v/c Ratio	0.15	0.62	0.34	0.70	1.27	0.38	0.74	
Control Delay	40.3	49.8	6.1	35.0	165.6	38.2	42.8	
Queue Delay	0.0	2.8	0.6	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	40.3	52.6	6.7	35.0	165.6	38.2	42.8	
LOS	D	D	A	C	F	D	D	
Approach Delay			18.1			41.5		
Approach LOS			B			D		
Queue Length 50th (ft)	27	110	74	270	~760	71	161	
Queue Length 95th (ft)	m52	166	44	354	#932	m128	m285	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	377	358	2009	561	611	735	931	
Starvation Cap Reductn	0	86	907	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.13	0.70	0.61	0.70	1.27	0.38	0.74	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 74 (62%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 65.3 Intersection LOS: E
Intersection Capacity Utilization 77.3% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.991							
Flt Protected					0.993		0.950					
Satd. Flow (prot)	0	0	0	0	4251	0	1540	1509	0	0	827	0
Flt Permitted					0.993		0.744					
Satd. Flow (perm)	0	0	0	0	4251	0	1206	1509	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					11							
Headway Factor	1.14	1.14	1.14	1.19	1.21	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	129	987	65	133	400	0	0	14	0
Peak Hour Factor	0.92	0.92	0.92	0.71	0.95	0.84	0.84	0.82	0.92	0.92	0.71	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	3%	4%	2%	2%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)								0	0			
Adj. Flow (vph)	0	0	0	182	1039	77	158	488	0	0	20	0
Lane Group Flow (vph)	0	0	0	0	1298	0	158	488	0	0	20	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	44.0	44.0	0.0	0.0	44.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%	44.0%	44.0%	0.0%	0.0%	44.0%	0.0%
Maximum Green (s)				34.0	34.0		40.0	40.0			40.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					48.4		40.0	40.0			40.0	
Actuated g/C Ratio					0.48		0.40	0.40			0.40	
v/c Ratio					0.63		0.33	0.81			0.06	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					7.9		23.1	38.9			19.2	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					7.9		23.1	38.9			19.2	
LOS					A		C	D			B	
Approach Delay					7.9			35.1			19.2	
Approach LOS					A			D			B	
Queue Length 50th (ft)					35		68	271			8	
Queue Length 95th (ft)					m331		111	352			18	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					2063		482	604			331	
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					0.63		0.33	0.81			0.06	

Intersection Summary

Area Type: CBD

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

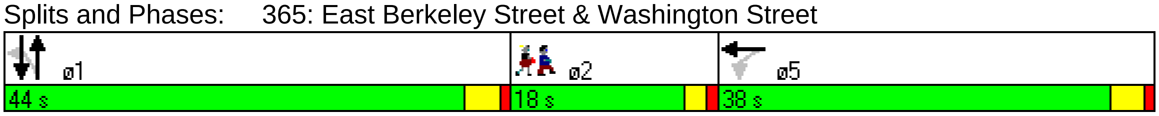
Intersection Signal Delay: 16.9 Intersection LOS: B

Intersection Capacity Utilization 55.8% ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.966							0.850
Flt Protected					0.995			0.986				
Satd. Flow (prot)	0	0	0	0	4361	0	0	1500	0	0	1605	1325
Flt Permitted					0.995			0.722				
Satd. Flow (perm)	0	0	0	0	4361	0	0	1098	0	0	1605	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					87							106
Headway Factor	1.14	1.14	1.14	1.05	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	146	1035	326	60	203	0	0	223	85
Peak Hour Factor	0.92	0.92	0.92	0.83	0.93	0.85	0.70	0.91	0.92	0.92	0.82	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	3%	3%	6%	4%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	176	1113	384	86	223	0	0	272	106
Lane Group Flow (vph)	0	0	0	0	1673	0	0	309	0	0	272	106
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	42.0	42.0	0.0	37.0	37.0	0.0	0.0	37.0	37.0
Total Split (%)	0.0%	0.0%	0.0%	42.0%	42.0%	0.0%	37.0%	37.0%	0.0%	0.0%	37.0%	37.0%
Maximum Green (s)				38.0	38.0		33.0	33.0			33.0	33.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)					38.0			49.8			49.8	49.8
Actuated g/C Ratio					0.38			0.50			0.50	0.50
v/c Ratio					0.98			0.56			0.34	0.15
Control Delay					46.8			25.6			18.8	4.7
Queue Delay					0.0			0.0			0.9	0.0

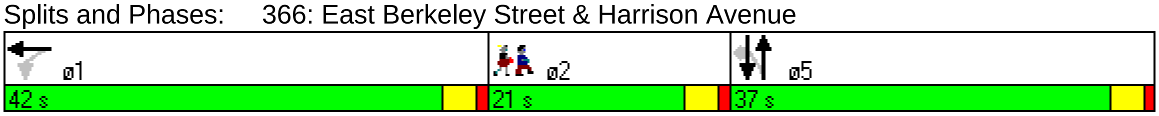
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay					46.8			25.6			19.7	4.7
LOS					D			C			B	A
Approach Delay					46.8			25.6			15.5	
Approach LOS					D			C			B	
Queue Length 50th (ft)					364			120			91	0
Queue Length 95th (ft)					#483			#337			194	27
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)					1711			547			800	713
Starvation Cap Reductn					0			0			293	0
Spillback Cap Reductn					0			0			0	0
Storage Cap Reductn					0			0			0	0
Reduced v/c Ratio					0.98			0.56			0.54	0.15

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 39.0 Intersection LOS: D
Intersection Capacity Utilization 72.2% 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: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.952	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4484	0	0	0	0	0	4205	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4484	0	0	0	0	0	4205	0
Right Turn on Red			Yes	No		Yes			Yes			Yes
Satd. Flow (RTOR)											29	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	199	1267	0	0	0	0	0	520	238
Peak Hour Factor	0.92	0.92	0.92	0.89	0.90	0.92	0.92	0.92	0.92	0.92	0.85	0.82
Heavy Vehicles (%)	0%	0%	0%	12%	6%	0%	0%	0%	0%	0%	6%	5%
Adj. Flow (vph)	0	0	0	224	1408	0	0	0	0	0	612	290
Lane Group Flow (vph)	0	0	0	0	1632	0	0	0	0	0	902	0
Turn Type				Split								
Protected Phases				3 4	3 4						1 2	
Permitted Phases												
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	67.0	67.0	0.0	0.0	0.0	0.0	0.0	53.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	55.8%	55.8%	0.0%	0.0%	0.0%	0.0%	0.0%	44.2%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					63.0						49.0	
Actuated g/C Ratio					0.52						0.41	
v/c Ratio					0.69						0.52	
Control Delay					13.3						21.8	
Queue Delay					24.1						0.3	
Total Delay					37.4						22.1	
LOS					D						C	

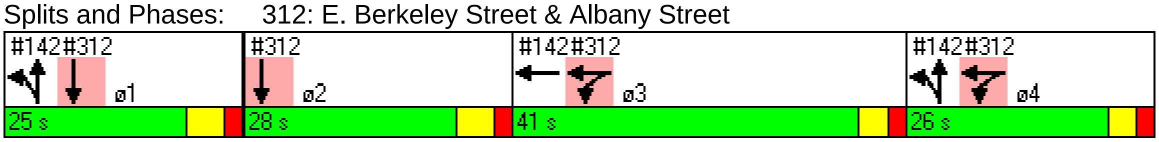
Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	25.0	28.0	41.0	26.0
Total Split (%)	21%	23%	34%	22%
Maximum Green (s)	19.0	22.0	36.0	21.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					37.4						22.1	
Approach LOS					D						C	
Queue Length 50th (ft)					146						150	
Queue Length 95th (ft)					m206						87	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2354						1734	
Starvation Cap Reductn					785						294	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					1.04						0.63	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 55.4% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 312: E. Berkeley Street & Albany Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.971			0.965				
Flt Protected							0.950	0.995				
Satd. Flow (prot)	0	0	0	0	4119	0	1395	2716	0	0	0	0
Flt Permitted							0.950	0.995				
Satd. Flow (perm)	0	0	0	0	4119	0	1395	2716	0	0	0	0
Right Turn on Red			Yes			No	No		No			Yes
Satd. Flow (RTOR)												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	855	182	611	665	221	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.81	0.91	0.92	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	11%	6%	6%	11%	9%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	950	225	671	723	251	0	0	0
Lane Group Flow (vph)	0	0	0	0	1175	0	559	1086	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	41.0	0.0	51.0	51.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	34.2%	0.0%	42.5%	42.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					36.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					37.0		70.0	70.0				
Actuated g/C Ratio					0.31		0.58	0.58				
v/c Ratio					0.93		0.69	0.69				
Control Delay					53.2		25.2	22.2				
Queue Delay					42.1		0.0	0.0				
Total Delay					95.3		25.2	22.2				
LOS					F		C	C				
Approach Delay					95.3			23.2				

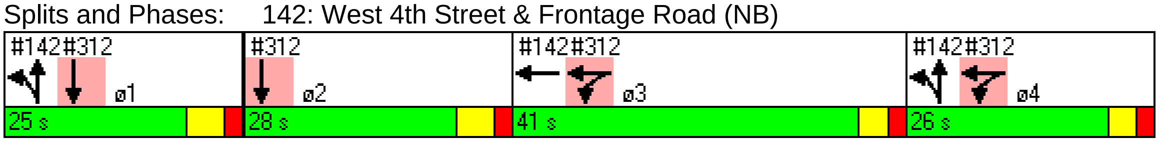
Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	25.0	28.0	26.0
Total Split (%)	21%	23%	22%
Maximum Green (s)	19.0	22.0	21.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			C				
Queue Length 50th (ft)					321		278	269				
Queue Length 95th (ft)					#413		#716	#601				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1270		814	1585				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					194		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					1.09		0.69	0.69				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 53.3 Intersection LOS: D
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: 142: West 4th Street & Frontage Road (NB)



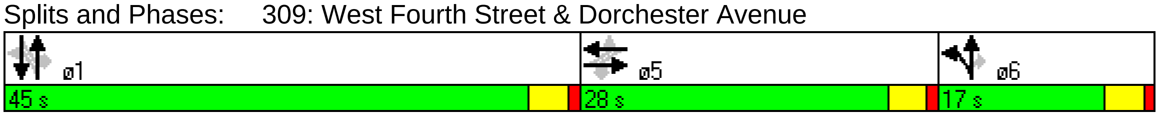
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	10	11	11	11
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.992				0.850		0.938	
Flt Protected		0.987			0.999		0.950				0.999	
Satd. Flow (prot)	0	1630	1411	0	1481	0	1577	2815	1221	0	2597	0
Flt Permitted		0.770			0.993		0.426				0.736	
Satd. Flow (perm)	0	1271	1411	0	1472	0	707	2815	1221	0	1914	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			111		4				16		200	
Headway Factor	1.14	1.14	1.14	1.14	1.30	1.14	1.14	1.27	1.42	1.19	1.27	1.19
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	33	111	79	4	281	10	581	618	4	7	218	176
Peak Hour Factor	0.75	0.89	0.71	0.50	0.93	0.50	0.95	0.88	0.25	0.50	0.80	0.87
Heavy Vehicles (%)	8%	2%	3%	33%	2%	6%	3%	6%	0%	6%	3%	14%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	44	125	111	8	302	20	612	702	16	14	272	202
Lane Group Flow (vph)	0	169	111	0	330	0	612	702	16	0	488	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		8.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		12.0			12.0	12.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	0.0	17.0	62.0	62.0	45.0	45.0	0.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	31.1%	0.0%	18.9%	68.9%	68.9%	50.0%	50.0%	0.0%
Maximum Green (s)	24.0	24.0	24.0	24.0	24.0		13.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		24.0	24.0		24.0		54.0	58.0	58.0		41.0	
Actuated g/C Ratio		0.27	0.27		0.27		0.60	0.64	0.64		0.46	
v/c Ratio		0.50	0.24		0.84		1.11	0.39	0.02		0.50	
Control Delay		34.0	6.8		50.9		89.7	8.3	2.8		11.7	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		34.0	6.8		50.9		89.7	8.3	2.8		11.7	
LOS		C	A		D		F	A	A		B	
Approach Delay		23.2			50.9			45.7			11.7	
Approach LOS		C			D			D			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		81	0		175		~232	88	0		54	
Queue Length 95th (ft)		144	20		#322		#516	118	0		77	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		339	458		395		550	1814	793		981	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.50	0.24		0.84		1.11	0.39	0.02		0.50	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 88.2% 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: 309: West Fourth Street & Dorchester Avenue



Synchro Analysis
No-Build 2014
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.953			0.992	
Flt Protected					0.970			0.996			0.982	
Satd. Flow (prot)	0	0	0	0	1369	1330	0	2977	0	0	2963	0
Flt Permitted					0.970			0.878			0.621	
Satd. Flow (perm)	0	0	0	0	1369	1330	0	2624	0	0	1874	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						87		92				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	20	9	48	25	274	120	156	277	20
Peak Hour Factor	0.92	0.92	0.92	0.75	0.58	0.55	0.61	0.92	0.77	0.81	0.92	0.75
Heavy Vehicles (%)	0%	0%	0%	9%	20%	2%	3%	4%	3%	1%	1%	10%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	27	16	87	41	298	156	193	301	27
Lane Group Flow (vph)	0	0	0	0	43	87	0	495	0	0	521	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	30.0	30.0	30.0	7.0	50.0	0.0	43.0	43.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	30.0%	30.0%	30.0%	7.0%	50.0%	0.0%	43.0%	43.0%	0.0%
Maximum Green (s)				26.0	26.0	26.0	3.0			39.0	39.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					8.6	8.6		77.8			39.0	
Actuated g/C Ratio					0.09	0.09		0.78			0.39	
v/c Ratio					0.36	0.45		0.23			0.71	
Control Delay					51.7	17.2		5.2			32.3	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					51.7	17.2		5.2			32.3	

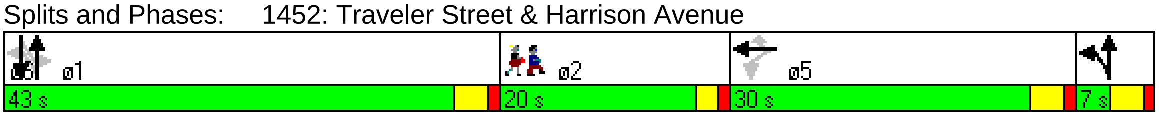
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					D	B		A			C	
Approach Delay					28.6			5.2			32.3	
Approach LOS					C			A			C	
Queue Length 50th (ft)					27	0		10			145	
Queue Length 95th (ft)					38	6		m116			210	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					356	410		2198			731	
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					0.12	0.21		0.23			0.71	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 18 (18%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 44.4%	ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1452: Traveler Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.973									0.987	
Flt Protected										0.950	0.994	
Satd. Flow (prot)	0	1849	0	0	0	0	0	0	0	1435	2949	0
Flt Permitted										0.950	0.994	
Satd. Flow (perm)	0	1849	0	0	0	0	0	0	0	1435	2949	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		11								584	29	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	219	57	0	0	0	0	0	0	800	673	75
Peak Hour Factor	0.92	0.79	0.83	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.80	0.79
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	0%	0%	3%	4%	0%
Adj. Flow (vph)	0	277	69	0	0	0	0	0	0	870	841	95
Lane Group Flow (vph)	0	346	0	0	0	0	0	0	0	742	1064	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.0	56.0	0.0
Total Split (%)	0.0%	31.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.9%	50.9%	0.0%
Maximum Green (s)		29.0								50.0	50.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		25.1								73.1	73.1	
Actuated g/C Ratio		0.23								0.66	0.66	
v/c Ratio		0.80								0.65	0.54	
Control Delay		52.9								6.3	13.0	
Queue Delay		0.2								0.0	0.0	
Total Delay		53.1								6.3	13.0	
LOS		D								A	B	

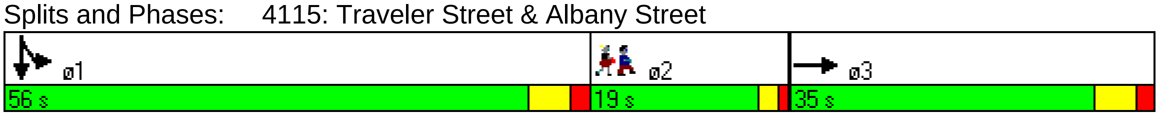
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	17%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		53.1									10.2	
Approach LOS		D									B	
Queue Length 50th (ft)		223								37	170	
Queue Length 95th (ft)		261								262	336	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		529								1150	1969	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		12								8	0	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.67								0.65	0.54	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 80 (73%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 56.1% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4115: Traveler Street & Albany Street



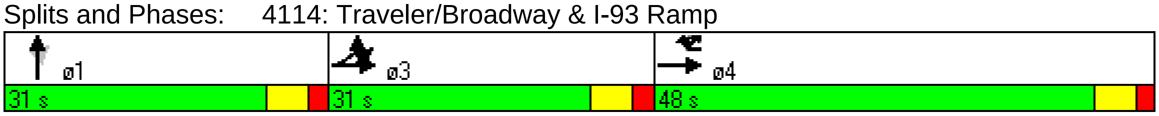
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1721	1682	3094	1213	1398	3154	3764	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1721	1682	3094	1213	1398	3154	3764	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	66	179	775	38	513	55	649	90
Peak Hour Factor	0.44	0.89	0.88	0.85	0.85	0.89	0.78	0.92
Heavy Vehicles (%)	7%	3%	5%	9%	4%	3%	4%	0%
Adj. Flow (vph)	150	201	881	45	604	62	832	98
Lane Group Flow (vph)	150	201	881	45	604	62	930	0
Turn Type	Prot	Prot		custom	custom		Perm	
Protected Phases	3	3	3 4	4	4	1		
Permitted Phases							1	
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		16.0	16.0	29.0	29.0	
Total Split (s)	31.0	31.0	79.0	48.0	48.0	31.0	31.0	0.0
Total Split (%)	28.2%	28.2%	71.8%	43.6%	43.6%	28.2%	28.2%	0.0%
Maximum Green (s)	25.0	25.0		42.0	42.0	25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	25.3	25.3	73.3	44.0	44.0	28.7	28.7	
Actuated g/C Ratio	0.23	0.23	0.67	0.40	0.40	0.26	0.26	
v/c Ratio	0.38	0.52	0.43	0.09	1.08	0.08	0.95	
Control Delay	36.6	39.3	6.8	21.4	94.6	23.2	48.9	
Queue Delay	1.6	3.2	1.6	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	38.2	42.4	8.4	21.4	94.6	23.2	48.9	
LOS	D	D	A	C	F	C	D	
Approach Delay			17.6			47.3		
Approach LOS			B			D		
Queue Length 50th (ft)	78	108	100	22	~478	18	286	
Queue Length 95th (ft)	66	m171	108	47	#634	m15	#271	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	422	413	2035	485	559	823	982	
Starvation Cap Reductn	146	128	917	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.54	0.71	0.79	0.09	1.08	0.08	0.95	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 12 (11%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 44.1 Intersection LOS: D
Intersection Capacity Utilization 63.7% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989							
Flt Protected					0.990		0.950					
Satd. Flow (prot)	0	0	0	0	2982	0	1570	1524	0	0	827	0
Flt Permitted					0.990		0.741					
Satd. Flow (perm)	0	0	0	0	2982	0	1225	1524	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					9							
Headway Factor	1.14	1.14	1.14	1.19	1.22	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	219	849	72	122	322	0	0	18	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.97	0.79	0.92	0.88	0.92	0.92	0.71	0.25
Heavy Vehicles (%)	0%	0%	0%	1%	1%	2%	0%	1%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)				0				0	0			
Adj. Flow (vph)	0	0	0	252	875	91	133	366	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1218	0	133	366	0	0	25	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0	0.0	41.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	41.0%	41.0%	0.0%	41.0%	41.0%	0.0%	0.0%	41.0%	0.0%
Maximum Green (s)				37.0	37.0		37.0	37.0			37.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					51.4		37.0	37.0			37.0	
Actuated g/C Ratio					0.51		0.37	0.37			0.37	
v/c Ratio					0.79		0.29	0.65			0.08	

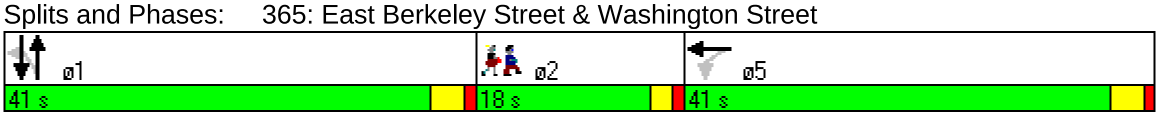
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					13.9		24.5	32.6			21.5	
Queue Delay					2.4		0.0	0.0			0.0	
Total Delay					16.3		24.5	32.6			21.5	
LOS					B		C	C			C	
Approach Delay					16.3			30.5			21.5	
Approach LOS					B			C			C	
Queue Length 50th (ft)					83		59	191			10	
Queue Length 95th (ft)					m#523		107	284			22	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					1537		453	564			306	
Starvation Cap Reductn					197		0	0			0	
Spillback Cap Reductn					0		0	0			0	
Storage Cap Reductn					0		0	0			0	
Reduced v/c Ratio					0.91		0.29	0.65			0.08	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 20.4 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.981							0.850
Flt Protected				0.950				0.987				
Satd. Flow (prot)	0	0	0	1560	3156	0	0	1558	0	0	1621	1325
Flt Permitted				0.950				0.801				
Satd. Flow (perm)	0	0	0	1560	3156	0	0	1264	0	0	1621	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					17							177
Headway Factor	1.14	1.14	1.14	1.20	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	175	942	129	82	276	0	0	184	115
Peak Hour Factor	0.92	0.92	0.92	0.93	0.98	0.93	0.74	0.87	0.92	0.92	0.87	0.65
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	188	961	139	111	317	0	0	211	177
Lane Group Flow (vph)	0	0	0	188	1100	0	0	428	0	0	211	177
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	39.0	39.0	0.0	40.0	40.0	0.0	0.0	40.0	40.0
Total Split (%)	0.0%	0.0%	0.0%	39.0%	39.0%	0.0%	40.0%	40.0%	0.0%	0.0%	40.0%	40.0%
Maximum Green (s)				35.0	35.0		36.0	36.0			36.0	36.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)				35.0	35.0			52.8			52.8	52.8
Actuated g/C Ratio				0.35	0.35			0.53			0.53	0.53
v/c Ratio				0.34	0.99			0.64			0.25	0.23
Control Delay				26.3	56.4			25.2			6.0	1.8
Queue Delay				0.0	43.2			0.0			0.0	0.0

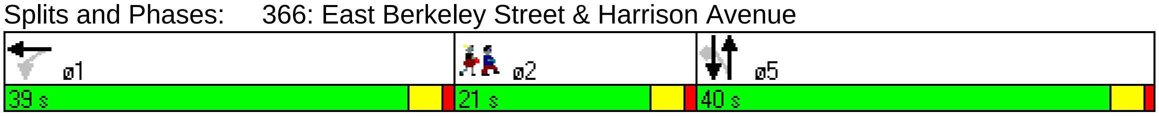
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay				26.3	99.6			25.2			6.0	1.8
LOS				C	F			C			A	A
Approach Delay					88.9			25.2			4.1	
Approach LOS					F			C			A	
Queue Length 50th (ft)				88	357			167			9	0
Queue Length 95th (ft)				147	#508			#430			m135	25
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)				546	1116			667			856	783
Starvation Cap Reductn				0	0			0			0	0
Spillback Cap Reductn				0	126			0			0	13
Storage Cap Reductn				0	0			0			0	0
Reduced v/c Ratio				0.34	1.11			0.64			0.25	0.23

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 60.3 Intersection LOS: E
Intersection Capacity Utilization 75.4% 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: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.951	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4587	0	0	0	0	0	4324	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4587	0	0	0	0	0	4324	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					44						75	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	160	995	0	0	0	0	0	480	251
Peak Hour Factor	0.92	0.92	0.92	0.91	0.94	0.92	0.92	0.92	0.92	0.92	0.74	0.80
Heavy Vehicles (%)	0%	0%	0%	7%	4%	0%	0%	0%	0%	0%	3%	2%
Adj. Flow (vph)	0	0	0	176	1059	0	0	0	0	0	649	314
Lane Group Flow (vph)	0	0	0	0	1235	0	0	0	0	0	963	0
Turn Type				Perm								
Protected Phases					3 4						1 2	
Permitted Phases				3 4								
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	62.0	62.0	0.0	0.0	0.0	0.0	0.0	48.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	56.4%	56.4%	0.0%	0.0%	0.0%	0.0%	0.0%	43.6%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					58.0						44.0	
Actuated g/C Ratio					0.53						0.40	
v/c Ratio					0.51						0.54	
Control Delay					4.1						22.2	
Queue Delay					0.8						0.3	
Total Delay					4.9						22.4	
LOS					A						C	

Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	23.0	25.0	35.0	27.0
Total Split (%)	21%	23%	32%	25%
Maximum Green (s)	17.0	19.0	30.0	22.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					4.9						22.4	
Approach LOS					A						C	
Queue Length 50th (ft)					42						180	
Queue Length 95th (ft)					42						235	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2439						1775	
Starvation Cap Reductn					807						273	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.76						0.64	

Intersection Summary

Area Type: CBD

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

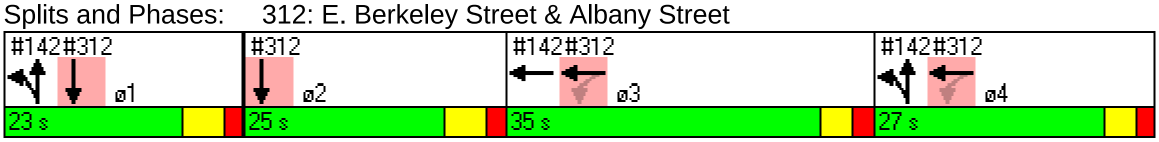
Maximum v/c Ratio: 0.81

Intersection Signal Delay: 12.6 Intersection LOS: B

Intersection Capacity Utilization 48.2% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 312: E. Berkeley Street & Albany Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.986			0.959				
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	4400	0	1435	2890	0	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	4400	0	1435	2890	0	0	0	0
Right Turn on Red			Yes			No	Yes		Yes			Yes
Satd. Flow (RTOR)							392	56				
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	816	76	339	717	285	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.78	0.85	0.86	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	5%	1%	3%	3%	4%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	907	97	399	834	313	0	0	0
Lane Group Flow (vph)	0	0	0	0	1004	0	399	1147	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	35.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	31.8%	0.0%	45.5%	45.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					30.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					31.0		66.0	66.0				
Actuated g/C Ratio					0.28		0.60	0.60				
v/c Ratio					0.81		0.39	0.65				
Control Delay					42.9		3.1	18.0				
Queue Delay					0.0		0.0	0.0				
Total Delay					42.9		3.1	18.0				
LOS					D		A	B				
Approach Delay					42.9			14.2				

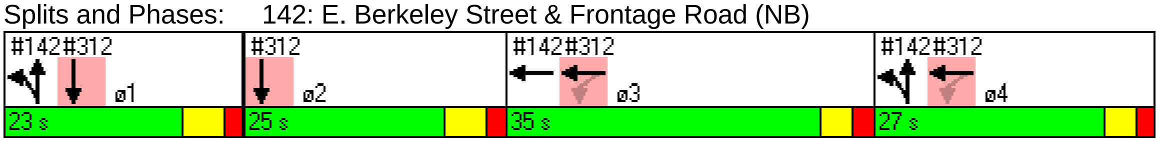
Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	23.0	25.0	27.0
Total Split (%)	21%	23%	25%
Maximum Green (s)	17.0	19.0	22.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					D			B				
Queue Length 50th (ft)					241		2	225				
Queue Length 95th (ft)					296		51	#486				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1240		1018	1756				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					0		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					0.81		0.39	0.65				

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 25.5 Intersection LOS: C
Intersection Capacity Utilization 54.8% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 142: E. Berkeley Street & Frontage Road (NB)



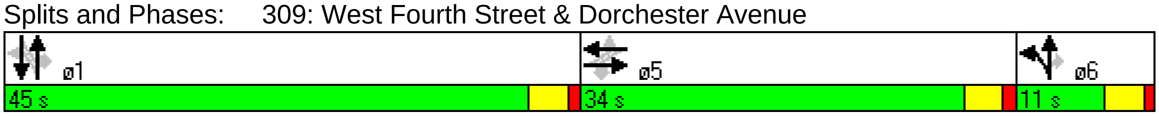
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.993				0.850		0.948	
Flt Protected		0.984			0.999		0.950				0.998	
Satd. Flow (prot)	0	1576	1391	0	1509	0	1593	2940	1308	0	2819	0
Flt Permitted		0.721			0.994		0.219				0.663	
Satd. Flow (perm)	0	1155	1391	0	1502	0	367	2940	1308	0	1872	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		3				16		143	
Headway Factor	1.19	1.19	1.19	1.14	1.30	1.14	1.14	1.22	1.30	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	52	130	106	4	328	9	314	400	4	20	500	252
Peak Hour Factor	0.73	0.85	0.62	0.50	0.97	0.44	0.81	0.92	0.25	0.75	0.91	0.82
Heavy Vehicles (%)	8%	1%	1%	0%	1%	4%	2%	5%	0%	0%	3%	5%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	71	153	171	8	338	20	388	435	16	27	549	307
Lane Group Flow (vph)	0	224	171	0	366	0	388	435	16	0	883	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		5.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		9.0			12.0	12.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	0.0	11.0	56.0	56.0	45.0	45.0	0.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	0.0%	12.2%	62.2%	62.2%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0		7.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		30.0	30.0		30.0		48.0	52.0	52.0		41.0	
Actuated g/C Ratio		0.33	0.33		0.33		0.53	0.58	0.58		0.46	
v/c Ratio		0.58	0.30		0.73		1.33	0.26	0.02		0.95	
Control Delay		32.1	5.1		36.2		190.8	9.9	4.0		40.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		32.1	5.1		36.2		190.8	9.9	4.0		40.5	
LOS		C	A		D		F	A	A		D	
Approach Delay		20.4			36.2			93.5			40.5	
Approach LOS		C			D			F			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		104	0		180		~182	59	0		214	
Queue Length 95th (ft)		168	7		#293		#296	85	0		#358	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		385	578		503		291	1699	762		931	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.58	0.30		0.73		1.33	0.26	0.02		0.95	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 56 (62%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.33
Intersection Signal Delay: 54.6 Intersection LOS: D
Intersection Capacity Utilization 88.5% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 309: West Fourth Street & Dorchester Avenue



Synchro Analysis
Build 2014
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.970			0.985	
Flt Protected					0.974			0.993			0.989	
Satd. Flow (prot)	0	0	0	0	1368	1292	0	2903	0	0	2835	0
Flt Permitted					0.974			0.743			0.621	
Satd. Flow (perm)	0	0	0	0	1368	1292	0	2172	0	0	1780	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						123		42				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	35	28	90	67	377	104	103	285	33
Peak Hour Factor	0.92	0.92	0.92	0.53	0.48	0.73	0.74	0.94	0.83	0.92	0.81	0.63
Heavy Vehicles (%)	0%	0%	0%	16%	11%	5%	4%	8%	10%	8%	5%	9%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	66	58	123	91	401	125	112	352	52
Lane Group Flow (vph)	0	0	0	0	124	123	0	617	0	0	516	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	25.0	25.0	25.0	7.0	35.0	0.0	28.0	28.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	31.3%	31.3%	31.3%	8.8%	43.8%	0.0%	35.0%	35.0%	0.0%
Maximum Green (s)				21.0	21.0	21.0	3.0			24.0	24.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					11.6	11.6		52.4			24.0	
Actuated g/C Ratio					0.14	0.14		0.66			0.30	
v/c Ratio					0.63	0.42		0.36			0.97	
Control Delay					45.5	10.4		7.8			61.5	
Queue Delay					0.0	0.0		0.0			0.3	
Total Delay					45.5	10.4		7.8			61.8	

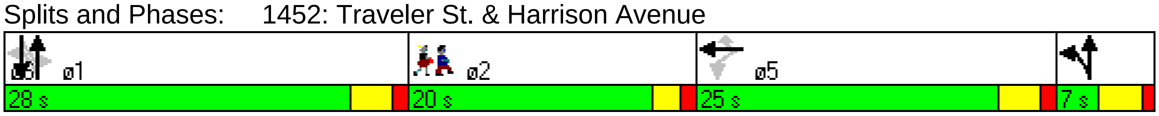
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	25%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					D	B		A			E	
Approach Delay					28.0			7.8			61.8	
Approach LOS					C			A			E	
Queue Length 50th (ft)					60	0		34			132	
Queue Length 95th (ft)					52	23		147			#196	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					359	430		1697			534	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			1	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.35	0.29		0.36			0.97	

Intersection Summary	
Area Type: CBD	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 18 (23%), Referenced to phase 1:NBSB, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 1452: Traveler St. & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.946									0.975	
Flt Protected										0.950	0.992	
Satd. Flow (prot)	0	1679	0	0	0	0	0	0	0	1369	2800	0
Flt Permitted										0.950	0.992	
Satd. Flow (perm)	0	1679	0	0	0	0	0	0	0	1369	2800	0
Right Turn on Red			Yes			Yes			Yes	No		Yes
Satd. Flow (RTOR)		27									27	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	141	78	0	0	0	0	0	0	667	735	154
Peak Hour Factor	0.92	0.90	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.84	0.89	0.74
Heavy Vehicles (%)	0%	6%	14%	0%	0%	0%	0%	0%	0%	8%	6%	13%
Adj. Flow (vph)	0	157	104	0	0	0	0	0	0	794	826	208
Lane Group Flow (vph)	0	261	0	0	0	0	0	0	0	595	1233	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	65.0	0.0
Total Split (%)	0.0%	30.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.2%	54.2%	0.0%
Maximum Green (s)		30.0								59.0	59.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		22.7								85.5	85.5	
Actuated g/C Ratio		0.19								0.71	0.71	
v/c Ratio		0.77								0.61	0.62	
Control Delay		55.8								15.7	13.1	
Queue Delay		0.7								0.0	0.0	
Total Delay		56.5								15.7	13.1	
LOS		E								B	B	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	16%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		56.5									13.9	
Approach LOS		E									B	
Queue Length 50th (ft)		174								197	201	
Queue Length 95th (ft)		249								543	527	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		468								976	2004	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		50								0	2	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.62								0.61	0.62	

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 116 (97%), Referenced to phase 1:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

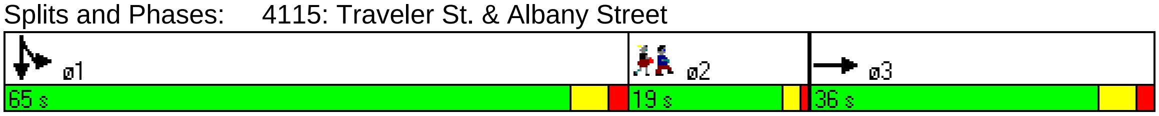
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 19.2 Intersection LOS: B

Intersection Capacity Utilization 53.2% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4115: Traveler St. & Albany Street



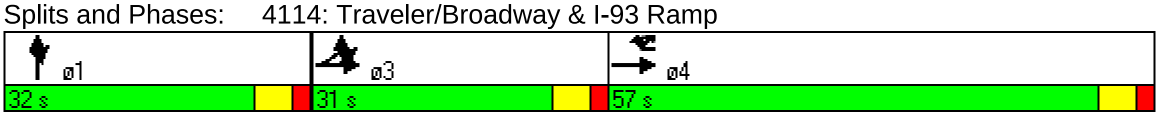
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1674	1590	3008	1271	1384	2777	3521	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1674	1590	3008	1271	1384	2777	3521	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	46	170	591	320	668	225	562	63
Peak Hour Factor	0.89	0.82	0.87	0.82	0.86	0.81	0.95	0.68
Heavy Vehicles (%)	10%	9%	8%	4%	5%	17%	11%	9%
Adj. Flow (vph)	52	207	679	390	777	278	592	93
Lane Group Flow (vph)	52	207	679	390	777	278	685	0
Turn Type	Prot	Prot		custom	custom		Prot	
Protected Phases	3	3	3 4	4	4	1	1	
Permitted Phases								
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		24.0	24.0	29.0	29.0	
Total Split (s)	31.0	31.0	88.0	57.0	57.0	32.0	32.0	0.0
Total Split (%)	25.8%	25.8%	73.3%	47.5%	47.5%	26.7%	26.7%	0.0%
Maximum Green (s)	25.0	25.0		51.0	51.0	26.0	26.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	23.2	23.2	80.2	53.0	53.0	31.8	31.8	
Actuated g/C Ratio	0.19	0.19	0.67	0.44	0.44	0.26	0.26	
v/c Ratio	0.16	0.67	0.34	0.70	1.27	0.38	0.73	
Control Delay	44.1	54.7	5.8	35.0	165.6	39.1	43.8	
Queue Delay	0.0	4.8	0.8	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	44.1	59.5	6.5	35.0	165.6	39.1	43.8	
LOS	D	E	A	C	F	D	D	
Approach Delay			20.3			42.4		
Approach LOS			C			D		
Queue Length 50th (ft)	31	123	75	270	~760	70	166	
Queue Length 95th (ft)	m54	m192	37	354	#932	m132	m288	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	377	358	2003	561	611	735	932	
Starvation Cap Reductn	0	93	951	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.78	0.65	0.70	1.27	0.38	0.73	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 74 (62%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 65.9 Intersection LOS: E
Intersection Capacity Utilization 77.3% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.991							
Flt Protected					0.993		0.950					
Satd. Flow (prot)	0	0	0	0	4252	0	1540	1509	0	0	827	0
Flt Permitted					0.993		0.744					
Satd. Flow (perm)	0	0	0	0	4252	0	1206	1509	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					10							
Headway Factor	1.14	1.14	1.14	1.19	1.21	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	129	994	65	133	400	0	0	14	0
Peak Hour Factor	0.92	0.92	0.92	0.71	0.95	0.84	0.84	0.82	0.92	0.92	0.71	0.92
Heavy Vehicles (%)	0%	0%	0%	3%	3%	4%	2%	2%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)								0	0			
Adj. Flow (vph)	0	0	0	182	1046	77	158	488	0	0	20	0
Lane Group Flow (vph)	0	0	0	0	1305	0	158	488	0	0	20	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	44.0	44.0	0.0	0.0	44.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	38.0%	38.0%	0.0%	44.0%	44.0%	0.0%	0.0%	44.0%	0.0%
Maximum Green (s)				34.0	34.0		40.0	40.0			40.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					48.4		40.0	40.0			40.0	
Actuated g/C Ratio					0.48		0.40	0.40			0.40	
v/c Ratio					0.63		0.33	0.81			0.06	

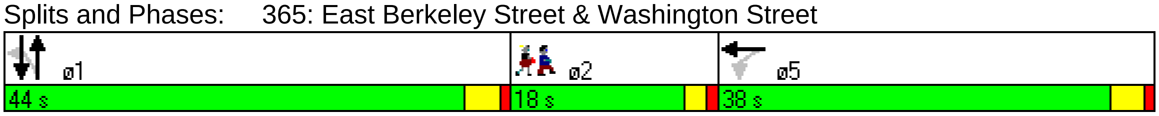
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					8.0		23.1	38.9			19.2	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					8.0		23.1	38.9			19.2	
LOS					A		C	D			B	
Approach Delay					8.0			35.1			19.2	
Approach LOS					A			D			B	
Queue Length 50th (ft)					35		68	271			8	
Queue Length 95th (ft)					m326		111	352			18	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					2063		482	604			331	
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					0.63		0.33	0.81			0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 17.0 Intersection LOS: B
Intersection Capacity Utilization 55.9% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.965							0.850
Flt Protected					0.995			0.986				
Satd. Flow (prot)	0	0	0	0	4356	0	0	1500	0	0	1605	1325
Flt Permitted					0.995			0.713				
Satd. Flow (perm)	0	0	0	0	4356	0	0	1085	0	0	1605	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					90							112
Headway Factor	1.14	1.14	1.14	1.05	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	148	1037	339	60	207	0	0	229	90
Peak Hour Factor	0.92	0.92	0.92	0.83	0.93	0.85	0.70	0.91	0.92	0.92	0.82	0.80
Heavy Vehicles (%)	0%	0%	0%	2%	3%	3%	6%	4%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	178	1115	399	86	227	0	0	279	112
Lane Group Flow (vph)	0	0	0	0	1692	0	0	313	0	0	279	112
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	42.0	42.0	0.0	37.0	37.0	0.0	0.0	37.0	37.0
Total Split (%)	0.0%	0.0%	0.0%	42.0%	42.0%	0.0%	37.0%	37.0%	0.0%	0.0%	37.0%	37.0%
Maximum Green (s)				38.0	38.0		33.0	33.0			33.0	33.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)					38.0			49.8			49.8	49.8
Actuated g/C Ratio					0.38			0.50			0.50	0.50
v/c Ratio					0.99			0.58			0.35	0.16
Control Delay					49.1			26.1			19.0	4.6
Queue Delay					0.0			0.0			0.9	0.0

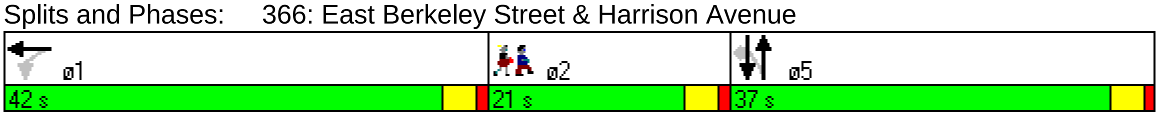
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay					49.1			26.1			19.9	4.6
LOS					D			C			B	A
Approach Delay					49.1			26.1			15.5	
Approach LOS					D			C			B	
Queue Length 50th (ft)					370			122			94	0
Queue Length 95th (ft)					#491			#347			200	27
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)					1711			540			800	716
Starvation Cap Reductn					0			0			291	0
Spillback Cap Reductn					0			0			0	0
Storage Cap Reductn					0			0			0	0
Reduced v/c Ratio					0.99			0.58			0.55	0.16

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 73.2% 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: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.948	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4484	0	0	0	0	0	4189	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4484	0	0	0	0	0	4189	0
Right Turn on Red			Yes	No		Yes			Yes			Yes
Satd. Flow (RTOR)											29	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	199	1271	0	0	0	0	0	539	274
Peak Hour Factor	0.92	0.92	0.92	0.89	0.90	0.92	0.92	0.92	0.92	0.92	0.85	0.82
Heavy Vehicles (%)	0%	0%	0%	12%	6%	0%	0%	0%	0%	0%	6%	5%
Adj. Flow (vph)	0	0	0	224	1412	0	0	0	0	0	634	334
Lane Group Flow (vph)	0	0	0	0	1636	0	0	0	0	0	968	0
Turn Type				Split								
Protected Phases				3 4	3 4						1 2	
Permitted Phases												
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	67.0	67.0	0.0	0.0	0.0	0.0	0.0	53.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	55.8%	55.8%	0.0%	0.0%	0.0%	0.0%	0.0%	44.2%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					63.0						49.0	
Actuated g/C Ratio					0.52						0.41	
v/c Ratio					0.69						0.56	
Control Delay					13.5						24.3	
Queue Delay					19.0						0.4	
Total Delay					32.5						24.7	
LOS					C						C	

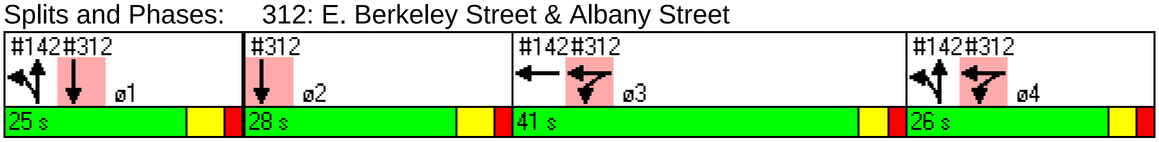
Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	25.0	28.0	41.0	26.0
Total Split (%)	21%	23%	34%	22%
Maximum Green (s)	19.0	22.0	36.0	21.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					32.5						24.7	
Approach LOS					C						C	
Queue Length 50th (ft)					147						160	
Queue Length 95th (ft)					216						128	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2354						1728	
Starvation Cap Reductn					759						290	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					1.03						0.67	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 29.6 — Intersection LOS: C
Intersection Capacity Utilization 56.8% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 312: E. Berkeley Street & Albany Street



142: West 4th Street & Frontage Road (NB)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.975			0.965				
Flt Protected							0.950	0.995				
Satd. Flow (prot)	0	0	0	0	4131	0	1395	2716	0	0	0	0
Flt Permitted							0.950	0.995				
Satd. Flow (perm)	0	0	0	0	4131	0	1395	2716	0	0	0	0
Right Turn on Red			Yes			No	No		No			Yes
Satd. Flow (RTOR)												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	859	152	611	665	221	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.81	0.91	0.92	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	11%	6%	6%	11%	9%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	954	188	671	723	251	0	0	0
Lane Group Flow (vph)	0	0	0	0	1142	0	559	1086	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	41.0	0.0	51.0	51.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	34.2%	0.0%	42.5%	42.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					36.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					37.0		70.0	70.0				
Actuated g/C Ratio					0.31		0.58	0.58				
v/c Ratio					0.90		0.69	0.69				
Control Delay					50.1		25.2	22.2				
Queue Delay					31.5		0.0	0.0				
Total Delay					81.6		25.2	22.2				
LOS					F		C	C				
Approach Delay					81.6			23.2				

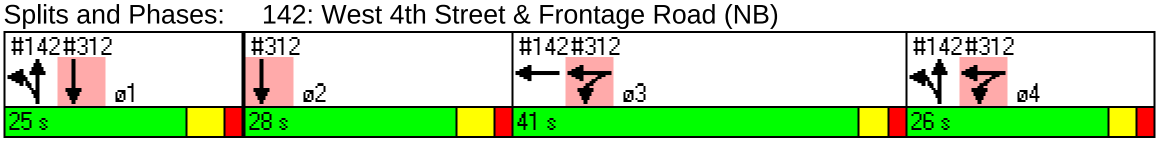
Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	25.0	28.0	26.0
Total Split (%)	21%	23%	22%
Maximum Green (s)	19.0	22.0	21.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			C				
Queue Length 50th (ft)					309		278	269				
Queue Length 95th (ft)					#392		#716	#601				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1274		814	1585				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					199		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					1.06		0.69	0.69				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 47.1 Intersection LOS: D
Intersection Capacity Utilization 60.9% 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: 142: West 4th Street & Frontage Road (NB)



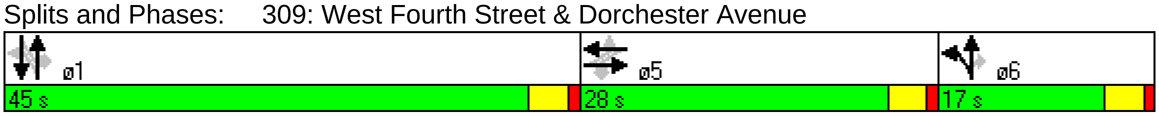
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	10	11	11	11
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.992				0.850		0.938	
Flt Protected		0.987			0.999		0.950				0.999	
Satd. Flow (prot)	0	1630	1411	0	1481	0	1577	2815	1221	0	2598	0
Flt Permitted		0.770			0.993		0.424				0.736	
Satd. Flow (perm)	0	1271	1411	0	1472	0	704	2815	1221	0	1914	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			111		4				16		199	
Headway Factor	1.14	1.14	1.14	1.14	1.30	1.14	1.14	1.27	1.42	1.19	1.27	1.19
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	33	111	79	4	281	10	585	618	4	7	221	176
Peak Hour Factor	0.75	0.89	0.71	0.50	0.93	0.50	0.95	0.88	0.25	0.50	0.80	0.87
Heavy Vehicles (%)	8%	2%	3%	33%	2%	6%	3%	6%	0%	6%	3%	14%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	44	125	111	8	302	20	616	702	16	14	276	202
Lane Group Flow (vph)	0	169	111	0	330	0	616	702	16	0	492	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		8.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		12.0			12.0	12.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	0.0	17.0	62.0	62.0	45.0	45.0	0.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	31.1%	0.0%	18.9%	68.9%	68.9%	50.0%	50.0%	0.0%
Maximum Green (s)	24.0	24.0	24.0	24.0	24.0		13.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		24.0	24.0		24.0		54.0	58.0	58.0		41.0	
Actuated g/C Ratio		0.27	0.27		0.27		0.60	0.64	0.64		0.46	
v/c Ratio		0.50	0.24		0.84		1.12	0.39	0.02		0.50	
Control Delay		34.0	6.8		50.9		93.1	8.3	2.8		11.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		34.0	6.8		50.9		93.1	8.3	2.8		11.8	
LOS		C	A		D		F	A	A		B	
Approach Delay		23.2			50.9			47.4			11.8	
Approach LOS		C			D			D			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		81	0		175		~239	88	0		56	
Queue Length 95th (ft)		144	20		#322		#531	118	0		78	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		339	458		395		549	1814	793		980	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.50	0.24		0.84		1.12	0.39	0.02		0.50	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 7 (8%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 37.9 Intersection LOS: D
Intersection Capacity Utilization 88.5% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 309: West Fourth Street & Dorchester Avenue



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	199	8	12	137	18	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	216	9	13	149	20	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	279			262		
pX, platoon unblocked						
vC, conflicting volume			225		396	221
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			225		396	221
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1356		607	824

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	225	162	49
Volume Left	0	13	20
Volume Right	9	0	29
cSH	1700	1356	721
Volume to Capacity	0.13	0.01	0.07
Queue Length 95th (ft)	0	1	5
Control Delay (s)	0.0	0.7	10.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.7	10.4
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Synchro Analysis
Build 2014
PM Peak Hour

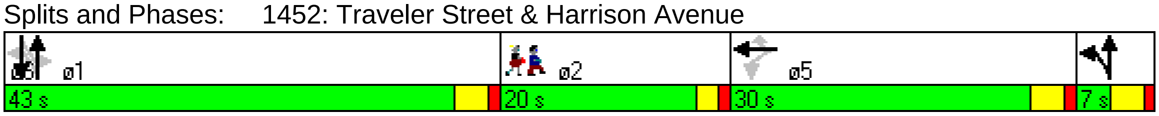
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50	50	50	50		50	50	
Trailing Detector (ft)				0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt						0.850		0.948			0.993	
Flt Protected					0.967			0.996			0.980	
Satd. Flow (prot)	0	0	0	0	1373	1330	0	2962	0	0	2961	0
Flt Permitted					0.967			0.878			0.604	
Satd. Flow (perm)	0	0	0	0	1373	1330	0	2611	0	0	1825	0
Right Turn on Red			No			Yes			Yes			No
Satd. Flow (RTOR)						96		118				
Headway Factor	1.14	1.14	1.14	1.14	1.25	1.25	1.14	1.14	1.14	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		369			279			363			368	
Travel Time (s)		8.4			6.3			8.3			8.4	
Volume (vph)	0	0	0	35	12	53	25	274	138	180	277	20
Peak Hour Factor	0.92	0.92	0.92	0.75	0.58	0.55	0.61	0.92	0.77	0.81	0.92	0.75
Heavy Vehicles (%)	0%	0%	0%	9%	20%	2%	3%	4%	3%	1%	1%	10%
Parking (#/hr)											0	0
Adj. Flow (vph)	0	0	0	47	21	96	41	298	179	222	301	27
Lane Group Flow (vph)	0	0	0	0	68	96	0	518	0	0	550	0
Turn Type				Perm		Perm	D.P+P			Perm		
Protected Phases					5		6	1 6			1	
Permitted Phases				5		5	1			1		
Detector Phases				5	5	5	6	1 6		1	1	
Minimum Initial (s)				8.0	8.0	8.0	3.0			8.0	8.0	
Minimum Split (s)				12.0	12.0	12.0	7.0			12.0	12.0	
Total Split (s)	0.0	0.0	0.0	30.0	30.0	30.0	7.0	50.0	0.0	43.0	43.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	30.0%	30.0%	30.0%	7.0%	50.0%	0.0%	43.0%	43.0%	0.0%
Maximum Green (s)				26.0	26.0	26.0	3.0			39.0	39.0	
Yellow Time (s)				3.0	3.0	3.0	3.0			3.0	3.0	
All-Red Time (s)				1.0	1.0	1.0	1.0			1.0	1.0	
Lead/Lag				Lead	Lead	Lead	Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	2.0			2.0	2.0	
Recall Mode				None	None	None	Max			C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					9.8	9.8		76.6			39.0	
Actuated g/C Ratio					0.10	0.10		0.77			0.39	
v/c Ratio					0.51	0.44		0.24			0.97dl	
Control Delay					55.7	15.4		5.5			35.5	
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					55.7	15.4		5.5			35.5	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	17.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					E	B		A			D	
Approach Delay					32.1			5.5			35.5	
Approach LOS					C			A			D	
Queue Length 50th (ft)					42	0		11			158	
Queue Length 95th (ft)					51	6		m114			230	
Internal Link Dist (ft)		289			199			283			288	
Turn Bay Length (ft)												
Base Capacity (vph)					357	417		2161			712	
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					0.19	0.23		0.24			0.77	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 18 (18%), Referenced to phase 1:NBSB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 45.8%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	

Splits and Phases: 1452: Traveler Street & Harrison Avenue



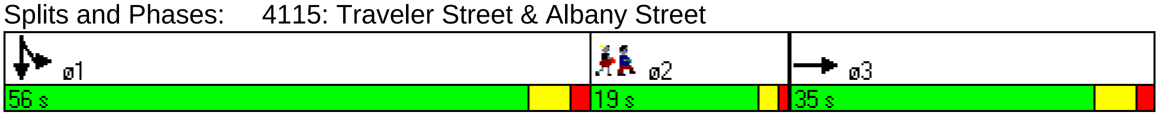
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50								50	50	
Trailing Detector (ft)		0								0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.95
Frt		0.964									0.983	
Flt Protected										0.950	0.995	
Satd. Flow (prot)	0	1832	0	0	0	0	0	0	0	1435	2943	0
Flt Permitted										0.950	0.995	
Satd. Flow (perm)	0	1832	0	0	0	0	0	0	0	1435	2943	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		17								560	29	
Headway Factor	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			277			405			731	
Travel Time (s)		6.0			6.3			9.2			16.6	
Volume (vph)	0	241	92	0	0	0	0	0	0	800	697	99
Peak Hour Factor	0.92	0.79	0.83	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.80	0.79
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	0%	0%	3%	4%	0%
Adj. Flow (vph)	0	305	111	0	0	0	0	0	0	870	871	125
Lane Group Flow (vph)	0	416	0	0	0	0	0	0	0	762	1104	0
Turn Type										Split		
Protected Phases		3								1	1	
Permitted Phases												
Detector Phases		3								1	1	
Minimum Initial (s)		8.0								8.0	8.0	
Minimum Split (s)		14.0								17.0	17.0	
Total Split (s)	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.0	56.0	0.0
Total Split (%)	0.0%	31.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.9%	50.9%	0.0%
Maximum Green (s)		29.0								50.0	50.0	
Yellow Time (s)		4.0								4.0	4.0	
All-Red Time (s)		2.0								2.0	2.0	
Lead/Lag										Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)		2.0								2.0	2.0	
Recall Mode		None								C-Max	C-Max	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										4.0	4.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		28.1								70.1	70.1	
Actuated g/C Ratio		0.26								0.64	0.64	
v/c Ratio		0.86								0.68	0.59	
Control Delay		55.7								7.8	14.8	
Queue Delay		0.5								0.1	0.0	
Total Delay		56.2								7.9	14.9	
LOS		E								A	B	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	4.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	17%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	9.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		56.2									12.0	
Approach LOS		E									B	
Queue Length 50th (ft)		262								59	214	
Queue Length 95th (ft)		317								327	356	
Internal Link Dist (ft)		182			197			325			651	
Turn Bay Length (ft)												
Base Capacity (vph)		529								1117	1885	
Starvation Cap Reductn		0								0	0	
Spillback Cap Reductn		12								15	1	
Storage Cap Reductn		0								0	0	
Reduced v/c Ratio		0.80								0.69	0.59	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 80 (73%), Referenced to phase 1:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 20.1	Intersection LOS: C
Intersection Capacity Utilization 60.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4115: Traveler Street & Albany Street



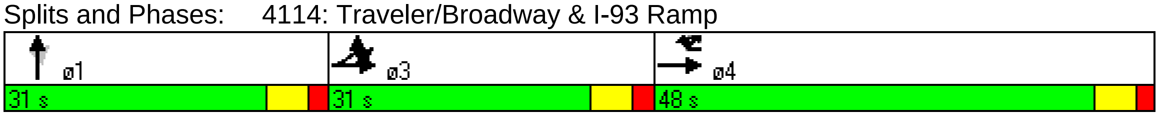
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	14	12	13	12	12	12	12
Storage Length (ft)		25		0			0	
Storage Lanes		1		2			3	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	
Turning Speed (mph)	15	15		9	9		9	9
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.95	0.76	0.95
Frt				0.850	0.850			
Flt Protected	0.950	0.950						
Satd. Flow (prot)	1721	1682	3094	1213	1398	3154	3764	0
Flt Permitted	0.950	0.950						
Satd. Flow (perm)	1721	1682	3094	1213	1398	3154	3764	0
Right Turn on Red	No				No			No
Satd. Flow (RTOR)								
Headway Factor	0.97	1.05	1.14	1.10	1.14	1.14	1.14	1.14
Link Speed (mph)			30			30		
Link Distance (ft)			277			427		
Travel Time (s)			6.3			9.7		
Volume (vph)	70	193	779	38	513	55	649	90
Peak Hour Factor	0.44	0.89	0.88	0.85	0.85	0.89	0.78	0.92
Heavy Vehicles (%)	7%	3%	5%	9%	4%	3%	4%	0%
Adj. Flow (vph)	159	217	885	45	604	62	832	98
Lane Group Flow (vph)	159	217	885	45	604	62	930	0
Turn Type	Prot	Prot		custom	custom		Perm	
Protected Phases	3	3	3 4	4	4	1		
Permitted Phases							1	
Detector Phases	3	3	3 4	4	4	1	1	
Minimum Initial (s)	13.0	13.0		8.0	8.0	23.0	23.0	
Minimum Split (s)	23.0	23.0		16.0	16.0	29.0	29.0	
Total Split (s)	31.0	31.0	79.0	48.0	48.0	31.0	31.0	0.0
Total Split (%)	28.2%	28.2%	71.8%	43.6%	43.6%	28.2%	28.2%	0.0%
Maximum Green (s)	25.0	25.0		42.0	42.0	25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lead		Lag	Lag			
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	C-Max	C-Max	
Walk Time (s)	7.0	7.0		0.0	0.0	7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0	16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	
Act Effct Green (s)	24.4	24.4	72.4	44.0	44.0	29.6	29.6	
Actuated g/C Ratio	0.22	0.22	0.66	0.40	0.40	0.27	0.27	
v/c Ratio	0.42	0.58	0.43	0.09	1.08	0.07	0.92	
Control Delay	39.2	43.0	7.1	21.4	94.6	22.9	44.6	
Queue Delay	1.7	3.8	2.1	0.0	0.0	0.0	0.0	

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBT	NBR	NBR2
Total Delay	40.9	46.8	9.2	21.4	94.6	22.9	44.6	
LOS	D	D	A	C	F	C	D	
Approach Delay			19.7			43.3		
Approach LOS			B			D		
Queue Length 50th (ft)	89	124	100	22	~478	17	284	
Queue Length 95th (ft)	70	m185	114	47	#634	m15	#271	
Internal Link Dist (ft)			197			347		
Turn Bay Length (ft)	25	25						
Base Capacity (vph)	422	413	2022	485	559	848	1012	
Starvation Cap Reductn	141	123	951	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.57	0.75	0.83	0.09	1.08	0.07	0.92	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 12 (11%), Referenced to phase 1:NBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 43.4 Intersection LOS: D
Intersection Capacity Utilization 64.6% ICU Level of Service C
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: 4114: Traveler/Broadway & I-93 Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	11	12	12	12	11	12
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	
Trailing Detector (ft)				0	0		0	0			0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989							
Flt Protected					0.990		0.950					
Satd. Flow (prot)	0	0	0	0	2982	0	1570	1524	0	0	827	0
Flt Permitted					0.990		0.741					
Satd. Flow (perm)	0	0	0	0	2982	0	1225	1524	0	0	827	0
Right Turn on Red			No			Yes			No			No
Satd. Flow (RTOR)					9							
Headway Factor	1.14	1.14	1.14	1.19	1.22	1.19	1.19	1.30	1.14	1.14	1.19	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		359			474			818			310	
Travel Time (s)		8.2			10.8			18.6			7.0	
Volume (vph)	0	0	0	219	856	72	122	332	0	0	18	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.97	0.79	0.92	0.88	0.92	0.92	0.71	0.25
Heavy Vehicles (%)	0%	0%	0%	1%	1%	2%	0%	1%	0%	0%	100%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	0	0	0	0
Parking (#/hr)				0				0	0			
Adj. Flow (vph)	0	0	0	252	882	91	133	377	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1225	0	133	377	0	0	25	0
Turn Type				Perm			Perm					
Protected Phases					5			1			1	
Permitted Phases				5			1					
Detector Phases				5	5		1	1			1	
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)				34.0	34.0		27.0	27.0			27.0	
Total Split (s)	0.0	0.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0	0.0	41.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	41.0%	41.0%	0.0%	41.0%	41.0%	0.0%	0.0%	41.0%	0.0%
Maximum Green (s)				37.0	37.0		37.0	37.0			37.0	
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	
Lead/Lag							Lead	Lead			Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	
Recall Mode				Max	Max		C-Max	C-Max			C-Max	
Walk Time (s)				12.0	12.0		14.0	14.0			14.0	
Flash Dont Walk (s)				18.0	18.0		9.0	9.0			9.0	
Pedestrian Calls (#/hr)				0	0		0	0			0	
Act Effct Green (s)					51.4		37.0	37.0			37.0	
Actuated g/C Ratio					0.51		0.37	0.37			0.37	
v/c Ratio					0.80		0.29	0.67			0.08	

Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	7.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	15.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay					13.9		24.5	33.4			21.5	
Queue Delay					2.6		0.0	0.0			0.0	
Total Delay					16.5		24.5	33.4			21.5	
LOS					B		C	C			C	
Approach Delay					16.5			31.1			21.5	
Approach LOS					B			C			C	
Queue Length 50th (ft)					87		59	199			10	
Queue Length 95th (ft)					m#515		107	296			22	
Internal Link Dist (ft)		279			394			738			230	
Turn Bay Length (ft)							70					
Base Capacity (vph)					1537		453	564			306	
Starvation Cap Reductn					198		0	0			0	
Spillback Cap Reductn					0		0	0			0	
Storage Cap Reductn					0		0	0			0	
Reduced v/c Ratio					0.91		0.29	0.67			0.08	

Intersection Summary

Area Type: CBD

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 44 (44%), Referenced to phase 1:NBSB, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 20.8 Intersection LOS: C

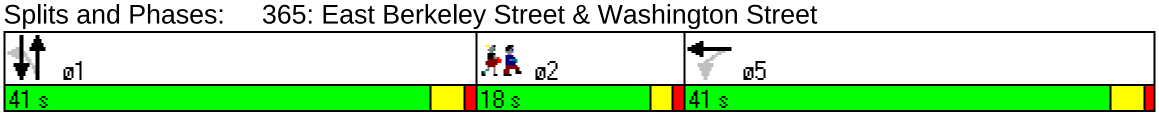
Intersection Capacity Utilization 62.0% ICU Level of Service B

Analysis Period (min) 15

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

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

Splits and Phases: 365: East Berkeley Street & Washington Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	12	13	12	13	12	12	11	13
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50		50	50			50	50
Trailing Detector (ft)				0	0		0	0			0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979							0.850
Flt Protected				0.950				0.987				
Satd. Flow (prot)	0	0	0	1560	3149	0	0	1558	0	0	1621	1325
Flt Permitted				0.950				0.789				
Satd. Flow (perm)	0	0	0	1560	3149	0	0	1245	0	0	1621	1325
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					20							185
Headway Factor	1.14	1.14	1.14	1.20	1.14	1.10	1.14	1.25	1.14	1.14	1.19	1.25
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		474			287			615			363	
Travel Time (s)		10.8			6.5			14.0			8.3	
Volume (vph)	0	0	0	179	946	143	82	280	0	0	192	120
Peak Hour Factor	0.92	0.92	0.92	0.93	0.98	0.93	0.74	0.87	0.92	0.92	0.87	0.65
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	10	0	0	0	0	0	0
Parking (#/hr)				0			0	0				0
Adj. Flow (vph)	0	0	0	192	965	154	111	322	0	0	221	185
Lane Group Flow (vph)	0	0	0	192	1119	0	0	433	0	0	221	185
Turn Type				Perm			Perm					Perm
Protected Phases					1			5			5	
Permitted Phases				1			5					5
Detector Phases				1	1		5	5			5	5
Minimum Initial (s)				8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)				24.0	24.0		12.0	12.0			12.0	12.0
Total Split (s)	0.0	0.0	0.0	39.0	39.0	0.0	40.0	40.0	0.0	0.0	40.0	40.0
Total Split (%)	0.0%	0.0%	0.0%	39.0%	39.0%	0.0%	40.0%	40.0%	0.0%	0.0%	40.0%	40.0%
Maximum Green (s)				35.0	35.0		36.0	36.0			36.0	36.0
Yellow Time (s)				3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)				1.0	1.0		1.0	1.0			1.0	1.0
Lead/Lag				Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				C-Max	C-Max		Max	Max			Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				9.0	9.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)				35.0	35.0			52.8			52.8	52.8
Actuated g/C Ratio				0.35	0.35			0.53			0.53	0.53
v/c Ratio				0.35	1.00			0.66			0.26	0.24
Control Delay				26.4	60.6			25.8			6.4	1.8
Queue Delay				0.0	48.4			0.0			0.0	0.0

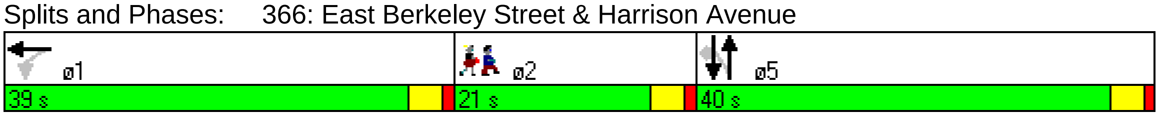
Lane Group	ø2
Lane Configurations	
Ideal Flow (vphpl)	
Lane Width (ft)	
Total Lost Time (s)	
Leading Detector (ft)	
Trailing Detector (ft)	
Turning Speed (mph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Headway Factor	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Volume (vph)	
Peak Hour Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phases	
Minimum Initial (s)	8.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	10.0
Pedestrian Calls (#/hr)	13
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay				26.4	109.0			25.8			6.4	1.8
LOS				C	F			C			A	A
Approach Delay					96.9			25.8			4.3	
Approach LOS					F			C			A	
Queue Length 50th (ft)				90	~369			171			8	0
Queue Length 95th (ft)				150	#522			#441			m132	22
Internal Link Dist (ft)		394			207			535			283	
Turn Bay Length (ft)												
Base Capacity (vph)				546	1115			658			856	787
Starvation Cap Reductn				0	0			0			0	0
Spillback Cap Reductn				0	127			0			0	14
Storage Cap Reductn				0	0			0			0	0
Reduced v/c Ratio				0.35	1.13			0.66			0.26	0.24

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 65.1 Intersection LOS: E
Intersection Capacity Utilization 76.8% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 366: East Berkeley Street & Harrison Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)				50	50						50	
Trailing Detector (ft)				0	0						0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Frt											0.948	
Flt Protected					0.993							
Satd. Flow (prot)	0	0	0	0	4587	0	0	0	0	0	4311	0
Flt Permitted					0.993							
Satd. Flow (perm)	0	0	0	0	4587	0	0	0	0	0	4311	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					44						74	
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			261			454			405	
Travel Time (s)		5.5			5.9			10.3			9.2	
Volume (vph)	0	0	0	160	999	0	0	0	0	0	500	290
Peak Hour Factor	0.92	0.92	0.92	0.91	0.94	0.92	0.92	0.92	0.92	0.92	0.74	0.80
Heavy Vehicles (%)	0%	0%	0%	7%	4%	0%	0%	0%	0%	0%	3%	2%
Adj. Flow (vph)	0	0	0	176	1063	0	0	0	0	0	676	362
Lane Group Flow (vph)	0	0	0	0	1239	0	0	0	0	0	1038	0
Turn Type				Perm								
Protected Phases					3 4						1 2	
Permitted Phases				3 4								
Detector Phases				3 4	3 4						1	
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)	0.0	0.0	0.0	62.0	62.0	0.0	0.0	0.0	0.0	0.0	48.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	56.4%	56.4%	0.0%	0.0%	0.0%	0.0%	0.0%	43.6%	0.0%
Maximum Green (s)												
Yellow Time (s)												
All-Red Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)												
Recall Mode												
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)					58.0						44.0	
Actuated g/C Ratio					0.53						0.40	
v/c Ratio					0.51						0.59	
Control Delay					4.1						22.6	
Queue Delay					0.8						0.4	
Total Delay					4.9						23.0	
LOS					A						C	

Lane Group	ø1	ø2	ø3	ø4
Lane Configurations				
Ideal Flow (vphpl)				
Lane Width (ft)				
Total Lost Time (s)				
Leading Detector (ft)				
Trailing Detector (ft)				
Turning Speed (mph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Headway Factor				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Volume (vph)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	4
Permitted Phases				
Detector Phases				
Minimum Initial (s)	11.0	10.0	8.0	8.0
Minimum Split (s)	20.0	25.0	16.0	17.0
Total Split (s)	23.0	25.0	35.0	27.0
Total Split (%)	21%	23%	32%	25%
Maximum Green (s)	17.0	19.0	30.0	22.0
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	4.0	5.0
Pedestrian Calls (#/hr)	0	5	0	0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay					4.9						23.0	
Approach LOS					A						C	
Queue Length 50th (ft)					42						203	
Queue Length 95th (ft)					42						250	
Internal Link Dist (ft)		160			181			374			325	
Turn Bay Length (ft)												
Base Capacity (vph)					2439						1769	
Starvation Cap Reductn					807						266	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.76						0.69	

Intersection Summary

Area Type: CBD

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

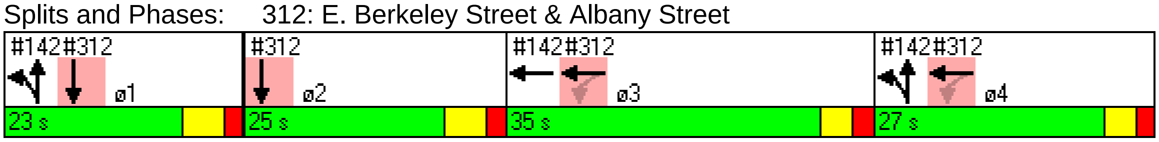
Maximum v/c Ratio: 0.81

Intersection Signal Delay: 13.1 Intersection LOS: B

Intersection Capacity Utilization 49.7% ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 312: E. Berkeley Street & Albany Street



142: E. Berkeley Street & Frontage Road (NB)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)					50		50	50				
Trailing Detector (ft)					0		0	0				
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	0.91	0.91	0.95	1.00	1.00	1.00
Frt					0.986			0.959				
Flt Protected							0.950					
Satd. Flow (prot)	0	0	0	0	4400	0	1435	2890	0	0	0	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	4400	0	1435	2890	0	0	0	0
Right Turn on Red			Yes			No	Yes		Yes			Yes
Satd. Flow (RTOR)							392	56				
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		261			1259			445			427	
Travel Time (s)		5.9			28.6			10.1			9.7	
Volume (vph)	0	0	0	0	820	76	339	717	285	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.90	0.78	0.85	0.86	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	5%	1%	3%	3%	4%	0%	0%	0%
Adj. Flow (vph)	0	0	0	0	911	97	399	834	313	0	0	0
Lane Group Flow (vph)	0	0	0	0	1008	0	399	1147	0	0	0	0
Turn Type							Split					
Protected Phases					3		1 4	1 4				
Permitted Phases												
Detector Phases					3		1 4	1 4				
Minimum Initial (s)					8.0							
Minimum Split (s)					16.0							
Total Split (s)	0.0	0.0	0.0	0.0	35.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0
Total Split (%)	0.0%	0.0%	0.0%	0.0%	31.8%	0.0%	45.5%	45.5%	0.0%	0.0%	0.0%	0.0%
Maximum Green (s)					30.0							
Yellow Time (s)					3.0							
All-Red Time (s)					2.0							
Lead/Lag					Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)					2.0							
Recall Mode					None							
Walk Time (s)					7.0							
Flash Dont Walk (s)					4.0							
Pedestrian Calls (#/hr)					0							
Act Effct Green (s)					31.0		66.0	66.0				
Actuated g/C Ratio					0.28		0.60	0.60				
v/c Ratio					0.81		0.39	0.65				
Control Delay					43.0		3.1	18.0				
Queue Delay					0.0		0.0	0.0				
Total Delay					43.0		3.1	18.0				
LOS					D		A	B				
Approach Delay					43.0			14.2				

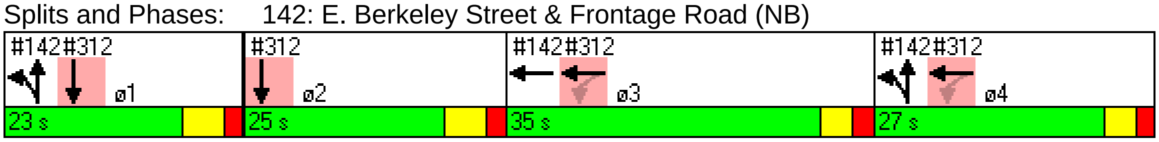
Lane Group	ø1	ø2	ø4
Lane Configurations			
Ideal Flow (vphpl)			
Total Lost Time (s)			
Leading Detector (ft)			
Trailing Detector (ft)			
Turning Speed (mph)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Headway Factor			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Volume (vph)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	4
Permitted Phases			
Detector Phases			
Minimum Initial (s)	11.0	10.0	8.0
Minimum Split (s)	20.0	25.0	17.0
Total Split (s)	23.0	25.0	27.0
Total Split (%)	21%	23%	25%
Maximum Green (s)	17.0	19.0	22.0
Yellow Time (s)	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lead/Lag		Lead	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0
Flash Dont Walk (s)	7.0	12.0	5.0
Pedestrian Calls (#/hr)	0	5	0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					D			B				
Queue Length 50th (ft)					242		2	225				
Queue Length 95th (ft)					298		51	#486				
Internal Link Dist (ft)		181			1179			365			347	
Turn Bay Length (ft)												
Base Capacity (vph)					1240		1018	1756				
Starvation Cap Reductn					0		0	0				
Spillback Cap Reductn					0		0	0				
Storage Cap Reductn					0		0	0				
Reduced v/c Ratio					0.81		0.39	0.65				

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 20 (18%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 25.6 Intersection LOS: C
Intersection Capacity Utilization 54.9% ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 142: E. Berkeley Street & Frontage Road (NB)



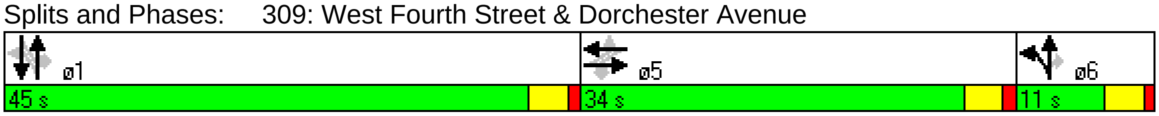
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	12	12	12
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.993				0.850		0.948	
Flt Protected		0.984			0.999		0.950				0.998	
Satd. Flow (prot)	0	1576	1391	0	1509	0	1593	2940	1308	0	2819	0
Flt Permitted		0.721			0.994		0.217				0.663	
Satd. Flow (perm)	0	1155	1391	0	1502	0	364	2940	1308	0	1873	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		3				16		141	
Headway Factor	1.19	1.19	1.19	1.14	1.30	1.14	1.14	1.22	1.30	1.14	1.22	1.14
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1259			276			321			432	
Travel Time (s)		28.6			6.3			7.3			9.8	
Volume (vph)	52	130	106	4	328	9	318	400	4	20	504	252
Peak Hour Factor	0.73	0.85	0.62	0.50	0.97	0.44	0.81	0.92	0.25	0.75	0.91	0.82
Heavy Vehicles (%)	8%	1%	1%	0%	1%	4%	2%	5%	0%	0%	3%	5%
Parking (#/hr)				0	0	0		0	0		0	0
Adj. Flow (vph)	71	153	171	8	338	20	393	435	16	27	554	307
Lane Group Flow (vph)	0	224	171	0	366	0	393	435	16	0	888	0
Turn Type	Perm		Perm	Perm			D.P+P		Perm	Perm		
Protected Phases		5			5		6	1 6			1	
Permitted Phases	5		5	5			1		1 6	1		
Detector Phases	5	5	5	5	5		6	1 6	1 6	1	1	
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		5.0			8.0	8.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0		9.0			12.0	12.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	0.0	11.0	56.0	56.0	45.0	45.0	0.0
Total Split (%)	37.8%	37.8%	37.8%	37.8%	37.8%	0.0%	12.2%	62.2%	62.2%	50.0%	50.0%	0.0%
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0		7.0			41.0	41.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	
Lead/Lag	Lead	Lead	Lead	Lead	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	Max	Max	Max	Max	Max		Max			C-Max	C-Max	
Act Effct Green (s)		30.0	30.0		30.0		48.0	52.0	52.0		41.0	
Actuated g/C Ratio		0.33	0.33		0.33		0.53	0.58	0.58		0.46	
v/c Ratio		0.58	0.30		0.73		1.36	0.26	0.02		0.95	
Control Delay		32.1	5.1		36.2		200.0	9.9	4.0		41.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0		0.0	
Total Delay		32.1	5.1		36.2		200.0	9.9	4.0		41.8	
LOS		C	A		D		F	A	A		D	
Approach Delay		20.4			36.2			98.3			41.8	
Approach LOS		C			D			F			D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		104	0		180		~188	59	0		217	
Queue Length 95th (ft)		168	7		#293		#303	85	0		#362	
Internal Link Dist (ft)		1179			196			241			352	
Turn Bay Length (ft)												
Base Capacity (vph)		385	578		503		290	1699	762		930	
Starvation Cap Reductn		0	0		0		0	0	0		0	
Spillback Cap Reductn		0	0		0		0	0	0		0	
Storage Cap Reductn		0	0		0		0	0	0		0	
Reduced v/c Ratio		0.58	0.30		0.73		1.36	0.26	0.02		0.95	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 56 (62%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 56.7 Intersection LOS: E
Intersection Capacity Utilization 88.8% 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: 309: West Fourth Street & Dorchester Avenue



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	310	8	12	79	21	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	337	9	13	86	23	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	279			262		
pX, platoon unblocked						
vC, conflicting volume			346		453	341
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			346		453	341
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	95
cM capacity (veh/h)			1225		562	706

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	346	99	57
Volume Left	0	13	23
Volume Right	9	0	34
cSH	1700	1225	640
Volume to Capacity	0.20	0.01	0.09
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	1.1	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	11.2
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Trip Generation

275 Albany Street
Preliminary Trip Generation Estimate
Howard/Stein-Hudson Associates

Land Use	Size	Category	Trip Rates (Trips/ksf or unit)	Unadjusted Vehicle Trips	Internal trips[1]	Pass-by %	Less capture trips	Assumed national vehicle occupancy rate[2]	Converted to Person trips	Transit Share[3]	Transit Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Vehicle Share[3]	Total Vehicle Person Trips	Auto 7) Person Trips	Taxi [7)] Person Trips	Assumed local auto occupancy rate for autos [4 A]	Assumed local auto occupancy rate for taxis [4B]	Total Adjusted Auto Trips	Total Adjusted Taxi Trips 8)	Total Adjusted Auto + Taxi Trips
Daily Trip Generation																						
Business Hotel (Extended Stay) [5]																						
	198	Total	7.27	1,439	0	0%	1,439	2.1	3,023	12%	363	35%	1,058	53%	1,602	1,121	481	2.1	1.1	534	586	1,120
	Units	In	3.64	720	0	0%	720	2.1	1,511	12%	181	35%	529	53%	801	561	240	2.1	1.1	267	293	560
		Out	3.64	720	0	0%	720	2.1	1,511	12%	181	35%	529	53%	801	561	240	2.1	1.1	267	293	560
Hotel [6]																						
	210	Total	8.17	1,716	0	0%	1,716	2.1	3,603	12%	432	35%	1,261	53%	1,910	1,337	573	2.1	1.1	637	698	1,334
	rooms	In	4.09	858	0	0%	858	2.1	1,801	12%	216	35%	631	53%	955	668	286	2.1	1.1	318	349	667
		Out	4.09	858	0	0%	858	2.1	1,801	12%	216	35%	631	53%	955	668	286	2.1	1.1	318	349	667
Total		Total		3,155					6,626		795		2,319		3,512					1,171	1,283	2,454
		In		1,578					3,313		398		1,160		1,756					585	642	1,227
		Out		1,578					3,313		398		1,160		1,756					585	642	1,227
AM Peak Hour Trip Generation																						
Business Hotel [5]																						
	198	Total	0.58	115	0	0%	115	2.1	241	21%	51	37%	89	42%	101	71	30	2.1	1.1	34	37	71
	Units	In	0.34	68	0	0%	68	2.1	142	21%	30	37%	53	42%	60	42	18	2.1	1.1	20	19	38
		Out	0.24	47	0	0%	47	2.1	99	21%	21	37%	37	42%	42	29	12	2.1	1.1	14	19	32
Hotel [6]																						
	210	Total	0.56	118	0	0%	118	2.1	247	21%	52	37%	91	42%	104	73	31	2.1	1.1	35	38	72
	rooms	In	0.34	72	0	0%	72	2.1	151	21%	32	37%	56	42%	63	44	19	2.1	1.1	21	19	40
		Out	0.22	46	0	0%	46	2.1	96	21%	20	37%	36	42%	40	28	12	2.1	1.1	13	19	32
Total		Total		232					488		103		181		205					68	75	143
		In		139					293		62		108		123					41	37	78
		Out		93					195		41		72		82					27	37	65
PM Peak Hour Trip Generation																						
Business Hotel [5]																						
	198	Total	0.62	123	0	0%	123	2.1	258	21%	54	37%	95	42%	108	76	32	2.1	1.1	36	40	76
	Units	In	0.37	74	0	0%	74	2.1	155	21%	32	37%	57	42%	65	45	19	2.1	1.1	22	20	41
		Out	0.25	49	0	0%	49	2.1	103	21%	22	37%	38	42%	43	30	13	2.1	1.1	14	20	34
Hotel [6]																						
	210	Total	0.59	124	0	0%	124	2.1	260	21%	55	37%	96	42%	109	76	33	2.1	1.1	36	40	76
	rooms	In	0.31	66	0	0%	66	2.1	138	21%	29	37%	51	42%	58	41	17	2.1	1.1	19	20	39
		Out	0.28	58	0	0%	58	2.1	122	21%	26	37%	45	42%	51	36	15	2.1	1.1	17	20	37
Total		Total		247					518		109		192		218					73	80	152
		In		139					293		61		108		123					41	40	81
		Out		107					225		47		83		95					32	40	71

Notes:

1. Internal trips based on ITE Trip Generation Handbook, 2nd Edition, Multi-Use Development
2. 2001 National vehicle occupancy rates - 1.2: Home to work; 1.8: Retail; 2.1: Social and Recreational
3. Mode shares based on 2000 Census data and BTD Data for Area 3.

4A. Local vehicle occupancy rates based on 2000 Census data and 2001 National VOR.

4B. For taxi cabs, 1.1 passengers per cab. (2.1 minus 1 driver equals 1.1)

5. ITE Trip Generation Rate, 8th Edition, LUC 312 (Business Hotel), average rate
6. ITE Trip Generation Rate, 8th Edition, LUC 310 (Hotel), average rate
7. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project.

Appendix C

Air Quality

APPENDIX C AIR QUALITY

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 4.6 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale and stationary source air quality analyses.

Motor Vehicle Emissions

The EPA MOBILE6.2 computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2009 and 2014 for speed limits of 2.5, 10, 15, and 30 mph for use in the microscale analyses. The 10 mph rate was used to estimate parking garage emissions.

CAL3QHC

For the intersections studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOBILE6.2. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 321 cm was used. Idle emission rates for queue links were based on 2.5 mph emission rates derived in MOBILE6.2 and converted from grams per mile to grams per hour. Emission rates for speeds of 10, 15, and 30 mph were used for free flow links and turn movements.

AERMOD

The EPA AERMOD model was used to calculate air quality impacts due to the parking garage vents, heating combustion boilers, emergency generators, and cooling towers. For non-combustion sources, ambient temperature releases were assumed; otherwise temperatures from the exhaust gas were used. Urban dispersion coefficients were used. Building downwash was accounted for in the modeling based on the building heights and projected widths of the buildings. The maximum modeled impacts from the garage vents and the stack sources were conservatively added to monitored background values for comparison to the NAAQS.

Stationary Source Emissions

Emissions for the heating combustion units were calculated using the latest DEP emission limits for boilers based on the Boiler Environmental Results Program (ERP). Emissions for the emergency generators and cooling towers were obtained from vendor information for a similar size unit. The resulting hourly emission rate in pounds per hour were converted to grams per second and input to the AERMOD model. For the NAAQS analysis, a similar approach was conducted for SO_2, NO_x, PM-10, and PM-2.5. The emergency generator emissions were calculated based on a g/bhp-hr emission factor provided by vendor information for typical size units.

All assumptions and data used in the stationary source emissions and stack parameter calculations are provided herein.

Boiler, Cooling Tower, Emergency Generator and Garage Exhaust Vent Emissions Calculations

275 Albany St. - Calculation of Modeling Emission Rates

Heating Boilers

Building Name	Hotel	Ext. Stay Hotel	Hotel	Ext. Stay Hotel		
Project Phase	Final	Final	Final	Final		
Designation	HBOIL1-2	EXTBOIL1-2	HWH1-2	EXTWH1-2		
Make/Model	Hydrotherm KN-20	Hydrotherm KN-20	PVI 2500 P600 ATP	PVI 3500 N900 ATP		
Qty.	3	3	2	2		
Heat Input (MMBTU/hr) (ea)	2.00	2.00	2.01	2.80	Emission rates	
Boiler Emission Rates					lb/MMBTU	
Short Term						
NOx (g/s ea.)	0.0088	0.0088	0.0089	0.0123	0.035	ERP limits
CO (g/s ea.)	0.0202	0.0202	0.0203	0.0282	0.080	ERP limits
VOC (g/s ea.)	0.0076	0.0076	0.0076	0.0106	0.030	ERP limits
PM-10/PM-2.5 (g/s ea.)	0.0025	0.0025	0.0025	0.0035	0.010	ERP limits Assume PM10=PM2.5
SO2 (g/s ea.)	0.0002	0.00015	0.00015	0.00021	0.0006	AP42 Table 1.4-2
Long Term (assume 15% annual capacity factor)						
NOx (g/s ea.)	0.0013	0.0013	0.0013	0.0019		
CO (g/s ea.)	0.0030	0.0030	0.0030	0.0042		
VOC (g/s ea.)	0.0011	0.0011	0.0011	0.0016		
PM-10/PM-2.5 (g/s ea.)	0.0004	0.0004	0.0004	0.0005		
SO2 (g/s ea.)	0.0000	0.00002	0.00002	0.00003		
Stack Parameters (each unit)						
Gas Exit Temp (°F)	*170*	*170*	*225*	*225*		
Exhaust air (CFM)	990.96	990.96	1082.86	1508.46		
Gas Exit Velocity (fps)	*84.12*	*84.12*	*91.92*	*128.04*		
Primary Building Height (ft)	148.02	217.50	148.02	217.50		
Stack Height (ft) (above roofline)	10.00	10.00	10.00	10.00		
Stack Height (ft)	*158.02*	*227.50*	*158.02*	*227.50*		
Stack Diameter (ft)	*0.5*	*0.5*	*0.5*	*0.5*		

Cooling Towers

Building Name	Hotel	Ext. Stay Hotel
Project Phase	Final	Final
# of CTs	2	2
Designation	HCT1-2	EXTCT1-2
Make/Model	Baltimore Air Coil 15177	Baltimore Air Coil 15162
Cooling Tower Rate (tons each)	177	162
Cooling Tower Specs (per tower)		
Cooling Tower Exhaust Flow (cfm)	70800	64800
Cooling Tower Exhaust Flow (kg/s)	37.2	34.1
Cooling Tower Exhaust Temp (°F)	*78*	*78*
Cooling Tower Stack Diameter (ft)	*5.5*	*5.5*
Cooling Tower Stack Velocity (fps)	*49.67*	*45.46*
Tower Overall Dimensions (width, length, height of stack exit) (ft)	8'-6" x 11'-10" x 11'-7"	8'-6" x 11'-10" x 11'-7"
CT Stack Height (ft) (above roofline)	11.583	11.583
Primary Building Height (ft)	148.02	217.50
CT Stack Height (ft)	*159.60*	*229.08*
Number of cells (per tower)	1	1
Cooling Tower Drift		
Drift Rate (% of circ water)	0.001	0.001
Circulating Water Rate (gph)	61,200	57,600
Circulating Water Rate (gpm)	1,020	960
TDS+TSS concentration in drift (mg/L)	1,500	1,500
PM emission rate in drift (lb/hr)	0.008	0.007
PM emission rate in drift (g/s)	0.00097	0.00091

Emergency Engines

Building Name	Hotel	Ext. Stay Hotel
Project Phase	Final	Final
Number	1	1
Generator Designation	HGEN1	EXTGEN2
Generator Size (kW)	1000	1000
Make	CAT	CAT
Model	C32 DITA	C32 DITA
Fuel type	Diesel	Diesel
100% load fuel consumption	72.5	72.5
100% load fuel consumption units	gph	gph
Heat Input (MMBTU/hr)	9.9325	9.9325
Horsepower (hp)	1502	1502
Emission Factors		
NOx (g/BHP-hr)	4.7	4.7
CO (g/BHP-hr)	0.11	0.11
VOC (g/BHP-hr)	0.05	0.05
PM10/PM2.5 (g/BHP-hr)	0.03	0.03
SO2 (lb/mmBTU)	0.001515	0.001515
HAPs (lb/mmBTU)	0.00149198	0.00149198
Emission Rates		
Short Term		
NOx (g/s)	1.961	1.961
CO (g/s)	0.046	0.046
VOC (g/s)	0.021	0.021
PM10/PM2.5 (g/s)	0.013	0.013
SO2 (g/s)	0.002	0.002
HAPs (g/s)	0.002	0.002
Long Term (300 hr/yr)		
NOx (g/s)	0.06716	0.06716
CO (g/s)	0.00157	0.00157
VOC (g/s)	0.00071	0.00071
PM10/PM2.5 (g/s)	0.00043	0.00043
SO2 (g/s)	0.00006	0.00006
HAPs (g/s)	0.00006	0.00006
Stack Parameters		
Exhaust Temperature (°F)	833	833
Total Exhaust Flow (ACFM)	8214.2	8214.2
Flange Diameter (in)	8	8
Maximum Backpressure (in. H2O)	40.2	40.2
Maximum velocity (fpm)	19353.18	19353.18
Flow area required (sq ft)	0.42	0.42
Number of exhausts (typ. 1 or 2)	1	1
Selected silencer diameter (in)	12	12
Actual silencer opening area (sq ft)(ea.)	0.785	0.785
Actual velocity (fpm) (ea.)	10458.644	10458.644
Actual velocity (fps) (ea.)	174.311	174.311
Single Stack Effective Diameter (ft)	1.000	1.000
Single Stack Effective Velocity (fps)	174.311	174.311
Primary Building Height (ft)	148.02	217.50
Stack Height (ft) (10' above roofline)	*158.02*	*227.50*

Garage Exhaust Vents

		Shared Garage	
total spaces		137	
	Residential spaces	0	
	Hotel spaces	137	
# vehicles entering garage/hr		102.75	assume peak turnover of 75% of total spaces
Levels		3	
Number of vents		1	
Stack Exhaust Flow (acfm)		90000	30K cfm per floor (per WFK mech report)
Stack Exhaust Temperature (°F)		*70*	Assumed underground temp remains consistent
outlet area per vent (sqft)		25	Assumed 5x5 sq.
effective diameter (ft)		*5.64190*	Vent is louvered on side of bldg. Thus model as BETA horizontal release in ISC-AERMOD View
Stack Velocity (fpm)		3600.00000	
Stack Velocity (fps)		60.00000	
Stack height (ft)		*37*	roof height (40 ft) - 3 ft down on side (assumed)
Garage Distance Traveled (ft)		579	measured distance from entry to approximate midpoint
Hourly garage mileage (VMT)		8.451	

Total Emissions

	Per Vent Emission Rates		2014 Emission Factors M6.2 g/mile
Composite VOC (g/s):	0.00104	Composite VOC (g/mile):	0.442
Composite CO (g/s):	0.02907	Composite CO (g/mile):	12.383
Composite NOX (g/s):	0.00086	Composite NOX (g/mile):	0.368
Total PM2.5 (g/s):	0.00003	Total PM2.5 (g/mile):	0.011
Total PM10 (g/s):	0.00006	Total PM10 (g/mile):	0.025
SO2 (g/s):	0.00002	SO2 (g/mile):	0.008

Example Emissions Assumption.

The 137-space garage is 3 levels. It is assumed that the garage is, on average, 75% full. It's also assumed that a vehicle travels up the garage ramp, and makes 4 turns to traverse a level with each turn the length of the building. It is assumed that the vehicles travel halfway, on average, into the garage at any time. Some travel through all levels. Some find parking on the ground floor level. In this case, the distance is approximately 579 feet to the mid level. It is assumed that there's 50% turnover during a daily hour.

Using this assumption, a total VMT of 8.451 miles is traveled (579 feet/level x 3 levels x 102.75 cars / 5,280 feet per mile / 2 (halfway) / 2 (turnover)).

Emission factor is assumed to be weighted average of 10 mph LDGV, LDGT<6000gvw, LDDV, and MC. Higher of summer/winter values.

Since traffic in/out of garage will not be at peak hour for all 24 hrs per day, the following factors were assumed to account for fluctuating usage

Hour	Factor	Hour	Factor	Hour	Factor
1 AM to 5 AM	0.25	9 AM to 4 PM	0.50	8 PM to 12 AM	0.25
6 AM to 8 AM	1.00	5 PM to 7 PM	1.00		

275 Albany St. - Calculation of Modeling Emission Rates

summer 2014 10 mph

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.2903	0.4171	0.164		0.0367	0.0004	0.0016	0.0861	0.0037	1
Fuel Economy (mpg):	24.1	18.5	14.2	17.1	9.9	32.4	18.3	7.3	50	16.2
Composite Emission	Factors (g/m i):									
Composite VOC :	0.456	0.388	0.467	0.41	0.716	0.555	0.353	0.63	5.42	0.472
Composite CO :	5.05	4.79	5.12	4.88	14.32	2.188	0.917	1.984	36.49	5.138
Composite NOX :	0.364	0.315	0.453	0.354	0.603	0.66	0.315	4.225	1	0.702
Composite CO2 :	368	479.2	624.2	520.1	894.1	314.1	555.3	1398.2	177.4	564.01
2.5 Total PM:	0.0113	0.0113	0.0113	0.0113	0.0242	0.0579	0.0313	0.076	0.0207	0.0174
Total PM:	0.0248	0.0248	0.0248	0.0248	0.0394	0.0755	0.0466	0.1073	0.0372	0.0325
SO2:	0.0066	0.0087	0.0115	0.0095	0.0163	0.0029	0.0052	0.013	0.0033	0.0092

Winter 20131 10 mph

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.2945	0.4151	0.163		0.0362	0.0004	0.0016	0.0855	0.0037	1
Fuel Economy (mpg):	24.1	18.5	14.2	17.1	9.9	32.4	18.3	7.3	50	16.2
Composite Emission	Factors (g/m i):									
Composite VOC :	0.399	0.371	0.497	0.407	0.766	0.546	0.367	0.641	4.85	0.454
Composite CO :	13.07	11.72	11.73	11.73	18.47	2.154	0.934	2.115	33.28	11.604
Composite NOX :	0.351	0.37	0.544	0.419	0.71	0.655	0.336	4.563	1.38	0.768
Composite CO2 :	368	479.1	624.1	520	894.2	314.1	555.5	1399	177.4	562.7
2.5 Total PM:	0.0113	0.0113	0.0113	0.0113	0.0251	0.0579	0.0326	0.0802	0.0207	0.0178
Total PM:	0.0248	0.0248	0.0248	0.0248	0.0404	0.0755	0.048	0.1119	0.0372	0.0329
SO2:	0.0066	0.0087	0.0115	0.0095	0.0163	0.0029	0.0052	0.013	0.0033	0.0092

Summer garage vehicles :	LDGV	LDGT12	LDDV	MC	SUM
actual fraction	0.2903	0.4171	0.0004	0.0037	0.7115
garage fraction	0.4080	0.5862	0.0006	0.0052	1
					Composite EF
Composite VOC :	0.456	0.388	0.555	5.42	0.442
Composite CO :	5.05	4.79	2.188	36.49	5.059
Composite NOX :	0.364	0.315	0.66	1.00	0.339
Composite CO2 :	368	479.2	314.1	177.4	432.167
Total PM2.5:	0.0113	0.0113	0.0579	0.0207	0.011
Total PM10:	0.0248	0.0248	0.0755	0.0372	0.025
SO2:	0.0066	0.0087	0.0029	0.0033	0.008

Winter garage vehicles :	LDGV	LDGT12	LDDV	MC	SUM
actual fraction	0.2945	0.4151	0.0004	0.0037	0.7137
garage fraction	0.4126	0.5816	0.0006	0.0052	1
					Composite EF
Composite VOC :	0.399	0.371	0.546	4.85	0.406
Composite CO :	13.07	11.72	2.154	33.28	12.383
Composite NOX :	0.351	0.37	0.655	1.38	0.368
Composite CO2 :	368	479.1	314.1	177.4	431.599
Total PM2.5:	0.0113	0.0113	0.0579	0.0207	0.011
Total PM10:	0.0248	0.0248	0.0755	0.0372	0.025
SO2:	0.0066	0.0087	0.0029	0.0033	0.008

Due to excessive size AERMOD, CAL3QHC, and MOBILE6.2 input and output files are available on digital media upon request.