Project Notification Form
375 Market Street, Brighton

Submitted Pursuant to Article 80 of the Boston Zoning Code

November 1, 2011

Submitted to:

Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Submitted by:

Brookline Development Corporation
3 Craftsland Road
Brookline, MA 02467

Prepared by:

Mitchell L. Fischman Consulting, LLC
41 Brush Hill Road
Newton, MA 02461

In Association with:

McDermott Quilty & Miller LLP
O'Sullivan Architects, Inc.
GEOD Consulting
Radner Design Associates
Tech Environmental
Fore Solutions

41 Brush Hill Road
Newton, MA 02461

November 1, 2011

Mr. Peter Meade, Director
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Attention: Mr. Erico J. Lopez, Project Manager

Re: Project Notification Form ("PNF")
Article 80 - Large Project Review
375 Market Street, Brighton

Dear Director Meade:

On behalf of Brookline Development Corporation (the "Proponent"), owner of the property located at 375 Market Street, Brighton, Massachusetts (the "Site"), I am pleased to transmit this Project Notification Form for the 375 Market Street Project in accordance with Article 80 of the Boston Zoning Code (the "Code").

The proposed project (the "Project") involves the development of a new, four-story mixed use residential building with underground parking and ground floor commercial space, as well as related improvements in open space, landscaping and vehicular and pedestrian access at the Site. The Project will also remove an existing commercial building, which was most recently used as the former training facility for the New England Council of Carpenters Apprenticeship and Training Fund. The Project will contain approximately 65,727 square feet of building, with 39 residential units on four levels and 3,567 square feet of commercial space at the ground floor. The Project will also contain an underground parking garage containing approximately 22,425 square feet with 58 spaces and accommodation for 12-bicycles. The Proponent will also comply with the Mayor's Executive Order Relative to Affordable Housing, dated February 29, 2000, and as amended on May 16, 2006, with respect to affordable units.

We have enjoyed working with the BRA, other City agencies and the community on the preparation of this PNF, and we appreciate the time your staff has taken to discuss the 375 Market Street project.

Sincerely,

Mitchell L.Fischman
Mitchell L. Fischman Consulting, LLC
on behalf of Brookline Development Corporation

Attachment: PNF, 375 Market Street, Brighton, MA

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

This Project Notification Form ("PNF") is being submitted in accordance with Article 80 of the Boston Zoning Code ("the Code") by Brookline Development Corporation, Inc. (the "Proponent") for 375 Market Street, a proposed mixed-use project near the intersection of Market and Bennett Streets in the Brighton neighborhood of Boston (the "Project Site"). The new project will contain a four-story mixed use residential building with approximately 65,727 square feet of building area above ground including 39 residential units on four-levels, 3,567 square feet of commercial space at the ground floor, plus an underground parking garage containing approximately 22,425 square feet with 58 spaces and accommodation for 12-bicycles as well as related improvements resulting in additional open space, landscaping and vehicular and pedestrian access at the Project Site ("Proposed Project"). The Proposed Project will also remove an existing commercial building, which was most recently used as the training facility for the New England Council of Carpenters Apprenticeship and Training Fund.

The Proposed Project will address a neighborhood housing need for nearby residents as well as the nearby employment centers including New Balance and WGBH which is estimated to employ approximately 2,400 workers. The site is conveniently located close to Brighton Center and within 10 minutes of the Massachusetts Turnpike and Storrow Drive as well as close to MBTA bus lines providing easy access to downtown Boston.

The Proponent commenced "Large Project Review" under Article 80 of the Boston Zoning Code with a filing to the BRA on July 29, 2011 of a Letter of Intent to file a Project Notification Form (see **Appendix A**). The Proponent has also initiated outreach to City agencies including the Boston Redevelopment Authority, the Boston Transportation Department, and the Mayor's Office of Neighborhood Services as well as to neighborhood representatives and interested parties over the past year with respect to the Proposed Project. The Proponent began meeting with neighbors and abutters of the Project Site in July, 2010 and hosted several site meetings with residents of the immediate area. On April 7, 2011, the Proponent also appeared before the Brighton/Allston Improvement Association to make an initial presentation on the Proposed Project and, after fielding general concerns focused mostly on the size and scope of the Proposal at that time, agreed to continue the discussion with the group once the Project Notification Form ("PNF") was filed and under city review. With guidance from the BRA's design staff, the Proponent has reduced the size and scope of the Proposed Project and held yet another site meeting on May 25, 2011 to present revised plans and update the community on the Proposed Project's status. The current proposal presented in this PNF has been reduced in size from a building area of 75,516 square feet above ground (plus an underground parking garage containing approximately 27,480) to the current size of 65,727 square feet above ground (plus 22,425 square feet in the underground parking garage); and the number of proposed residential units has been reduced from 44 to 39 units. The Proposed Project represents over a year of extensive community outreach and reflects a significant reduction in size to achieve smart growth development which we believe will better conform to the Brighton community.

This PNF presents details about the Proposed Project, and provides an expansion of the normal information contained within a PNF including an in-depth analysis of urban design, environmental protection, historic resources, infrastructure, transportation and other aspects of the Proposed Project in order to better inform City agencies and neighborhood residents of the current proposal, its potential impacts, and mitigation proposed to address potential impacts. Based on this comprehensive approach to detailing potential impacts and mitigation, it is the desire of the Proponent that the BRA, after reviewing public and agency comments, will issue a Scoping Determination Waiving Further Review pursuant to the Article 80 process.

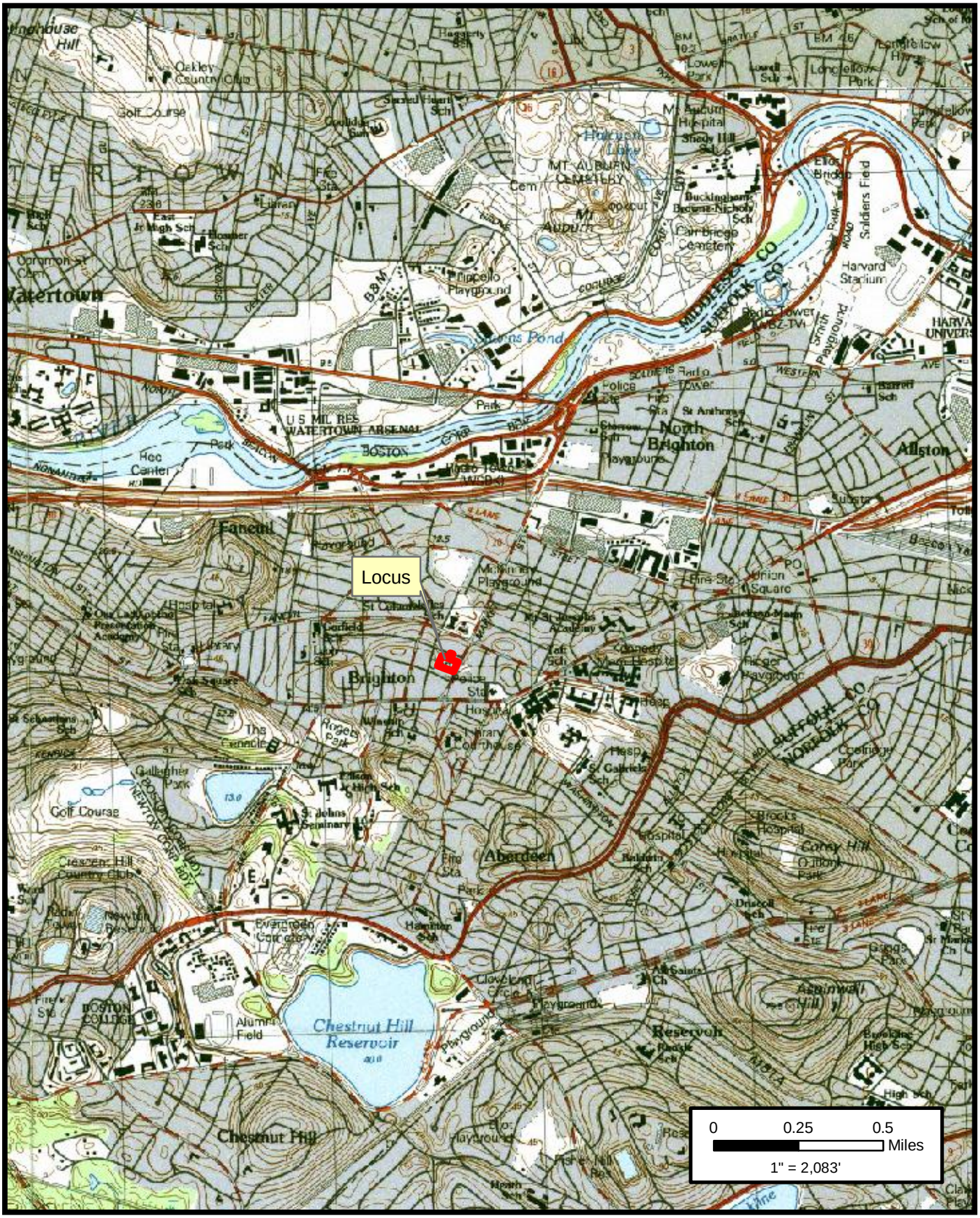
1.2 Proposed Project

1.2.1 Project Site and Context

The Project Site is composed of four city lots covering a total of 32,893 square feet. The largest lot is located behind two smaller lots which front on Market Street, and the fourth lot is a small lot (approximately 2,400 square feet) fronting on Bennett Street. The lots fronting on Market Street are covered by an asphalt parking lot with curb-cut access to Market Street from each lot. The rear lot contains a 8,400 square feet, one-story industrial warehouse building and two wooden sheds with the remainder of the lot covered by asphalt parking and internal vehicle driveways. The lot facing Bennett Street is currently occupied by an asphalt driveway with access blocked by a chain link gate and fence along the Bennett Street sidewalk (see **Figure 1-1. Project Locus** and **Figure 1-2. Project Aerial)**. These parcels are located in the Neighborhood Shopping Subdistrict (NS-.5) of the Allston-Brighton Neighborhood District (Article 51) as defined by the Boston Zoning Code. The Proposed Project will replace an aging 13,000 sf structure surrounded by asphalt surface parking areas (See **Figure 1-3. Existing Conditions Survey).**

The neighborhood contains a mixture of residential and retail uses. To the north is the residential area along Bennett Street. To the south is the mixed residential and commercial area along Surrey Street that includes the new TD Branch Bank. To the west is the residential area which extends along Leicester Street, and, to the east is the mixed multi-family and retail and service uses along Market Street.

The concept for the Proposed Project is as a mixed-use complex with neighborhood service retail at the ground level and a range of apartment types including one-, two- and three-bedroom units on the upper floors. Not only will the proposed housing be close to major work centers, it is also convenient to neighborhood services including restaurants and businesses in Brighton Center. It is also within 10 minutes to the nearby Arsenal Mall shopping area containing more regional uses. In recent years, Brighton Center has undergone significant renovation at the southern end of Market Street, while the northern end has recently seen the addition of a new CVS Pharmacy to add to the already established New Balance and WGBH offices.



TETRA TECH

One Grant Street
Framingham, MA 01701

Project Locus

375 Market Street
Brighton, Massachusetts

9/9/11

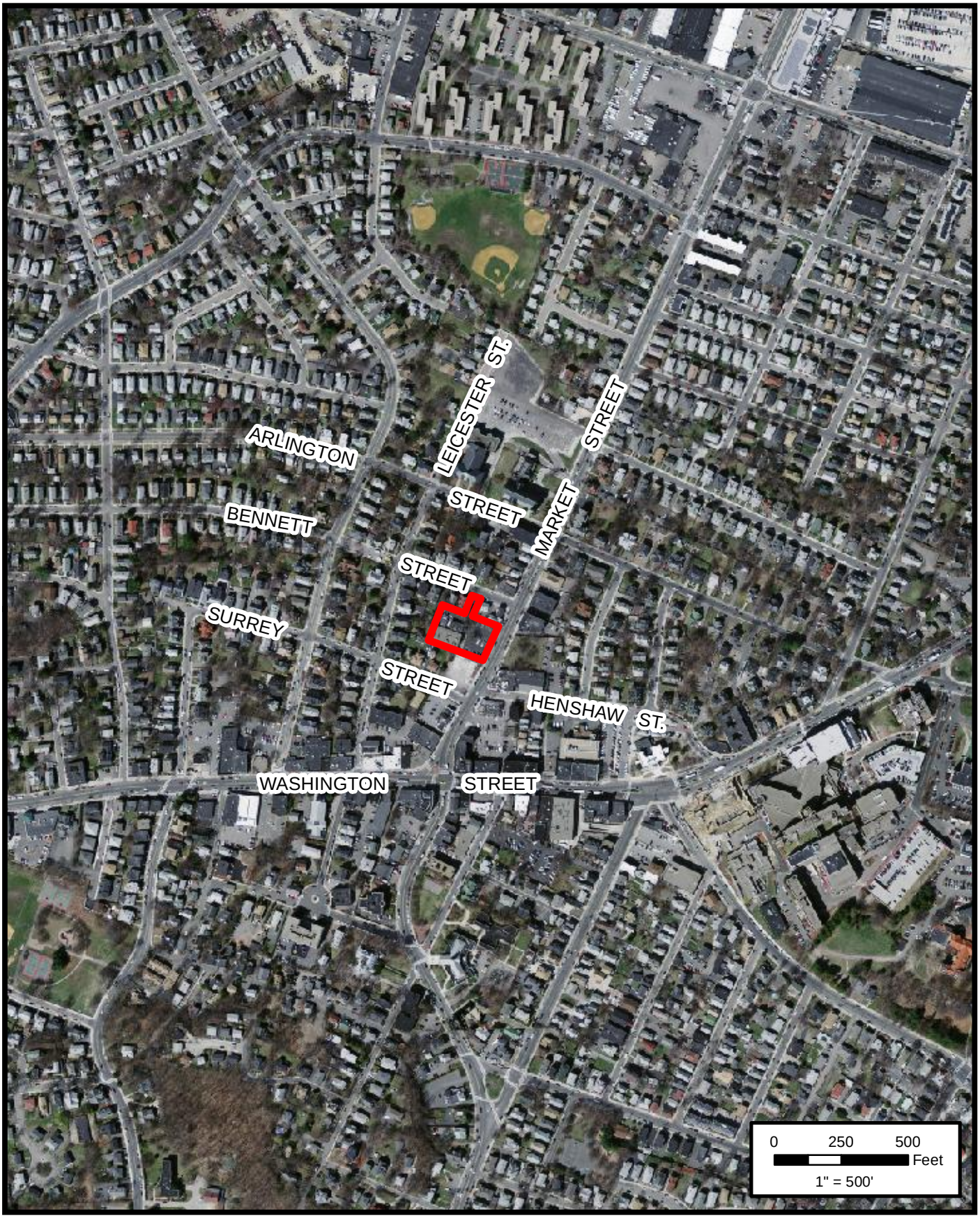
Z

Source: MassGIS, USGS

Figure 1-1

Created by: JLP

11-11041 USGS.mxd



TETRA TECH
One Grant Street
Framingham, MA 01701

Project Aerial (2008)

375 Market Street
Brighton, Massachusetts

9/9/11

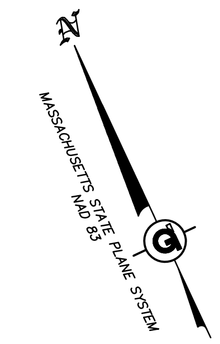
Z

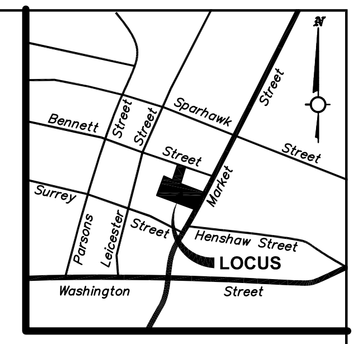
Source: MassGIS

Figure 1-2

Created by: JLP

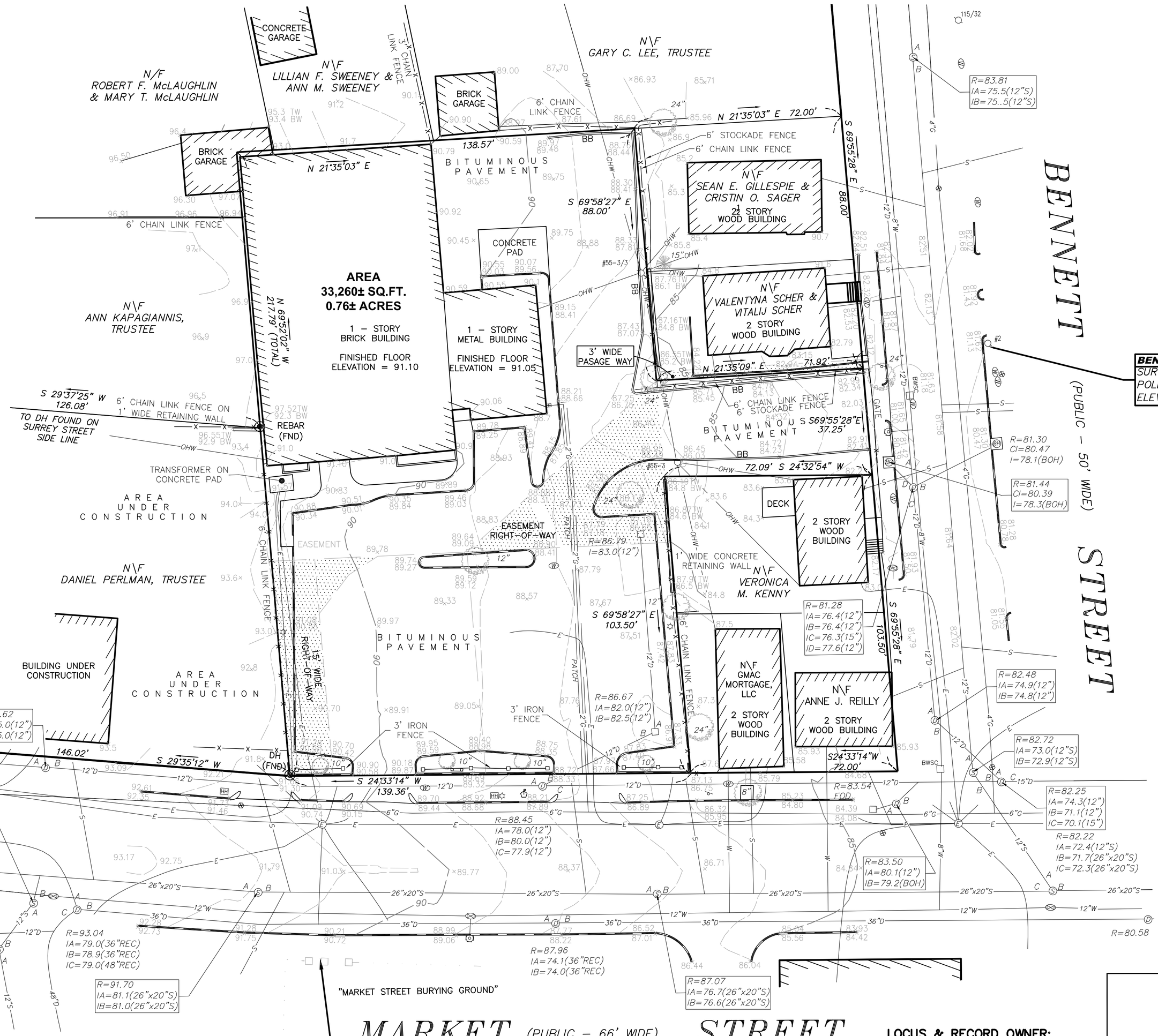
11-11041 AERIAL.mxd





NOTES:

1. TOPOGRAPHIC DETAIL AND SURFACE IMPROVEMENTS DEPICTED HEREON WERE OBTAINED FROM A FIELD SURVEY CONDUCTED ON 03/02/11 – 03/08/11 BY GEOD CONSULTING, INC.
2. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ARE BASED UPON A FIELD SURVEY OF VISIBLE FEATURES AND A COMPILATION OF PLANS OF RECORD. GEOD CONSULTING, INC. DOES NOT WARRANTY THE LOCATION OF ALL UTILITIES DEPICTED. THE CONTRACTOR, PRIOR TO COMMENCEMENT OF CONSTRUCTION, SHALL VERIFY THE LOCATION OF ALL UTILITIES AND CONTACT DIG SAFE AT 1–888–344–7233.
3. BEARINGS SHOWN ON PLAN REFERENCE THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83).
4. THE ELEVATIONS SHOWN HEREON WERE BASED ON THE CITY OF BOSTON VERTICAL DATUM (BCBD).
5. THE PURPOSE OF THIS PLAN IS TO PROVIDE A RECORD CONDITIONS PLAN CONSISTING OF OBSERVABLE SURFACE FEATURES AT THE TIME AND DATE OF THE FIELD SURVEY.
6. OWNERS OF PROPERTIES ARE SHOWN ACCORDING TO CURRENT CITY OF BOSTON ASSESSORS RECORDS, AND IS NOT INTENDED AS A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN.
7. THE BOUNDARY LINES DEPICTED ARE BASED ON A ALTA/ACSM LAND TITLE SURVEY PREPARED BY HARRY R. FELDMAN, INC., DATED: 01/20/2010.



BENCHMARK 1
SURVEY SPIKE SET IN UTILITY POLE #2 1' ABOVE GRADE.
ELEVATION=82.54' (BCB DATUM)

BENCHMARK 2
CHISEL SQUARE AT BACK OF WALK IN LOWER EAST CORNER OF 3' WIDE GRANITE ENTRY WAY TO CEMETERY.
ELEVATION=90.80' (BCB DATUM)

LEGEND:

⌀	UTILITY POLE
FH	FIRE HYDRANT
WG	WATER GATE
WS	WATER SERVICE
BWSC	BWSC WATER HAND HOLD
GG	GAS GATE
PB	POST/BOLLARD
S	SIGN
MB	MAIL BOX
GM	GAS METER
HH	HAND HOLD
LP	LIGHT POLE
E	ELECTRIC MANHOLE
S	SEWER MANHOLE
CB	CATCH BASIN
BH	BRADLY HEAD DRAIN MANHOLE
D	DRAIN MANHOLE
R=	RIM ELEVATION
I=	INVERT ELEVATION
CI	CURB INLET
FOD	FULL OF DEBRIS
BB	BITUMINOUS BIRM
99.99TW	SPOT GRADE TOP OF WALL
99.99BW	SPOT GRADE BOTTOM OF WALL
99.99	SPOT GRADE
24"	TREE
	CHAIN LINK FENCE
	STOCKADE FENCE
	STONE WALL
S	SEWER
D	STORM DRAIN
W	WATER MAIN
G	GAS MAIN
OHW	OVERHEAD WIRES
	STREET RIGHT–OF–WAY
	ASSESSORS LINES
38	INTERMEDIATE CONTOUR
40	INDEX CONTOUR
	VERTICAL GRANITE CURB

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

LOCUS & RECORD OWNER:
385 MARKET STREET
BOSTON (BRIGHTON), MA

BRIGHTON PARK ASSOCIATES LLC
3 CRAFTSLAND ROAD CHESTNUT HILL MA 02467
BOOK 46559 PAGE 47
ASSESSORS ID #: 2202435001

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D

FIGURE: 1–3

EXISTING CONDITIONS SURVEY
LOCATED IN
BOSTON (BRIGHTON), MASSACHUSETTS
(SUFFOLK COUNTY)

PREPARED FOR
BROOKLINE DEVELOPMENT CORPORATION LLC
SCALE: 1"= 20' DATE: MARCH 8, 2011

GEOD CONSULTING
ENGINEERING·PHOTOGRAMMETRY·SURVEYING
24 RAY AVENUE, BURLINGTON, MA 01803
Phone (781) 273–3434 Fax (781) 273–3430

SHEET No. 1 OF 1 | PROJECT No. 11577M

1.2.2 Detailed Project Description

The Proposed Project involves the development of a new, four-story mixed use residential building with underground parking and ground floor commercial space, as well as related improvements in open space, landscaping and vehicular and pedestrian access at the Property. The Project will also remove an existing commercial building, which was most recently used as the former training facility for the New England Council of Carpenters Apprenticeship and Training Fund and has no special historic or architectural significance to the surrounding neighborhood. The new structure will contain approximately 65,727 square feet of building, with 39 residential units on four-levels and 3,567 square feet of commercial space on the ground floor. The preliminary unit breakdown is for 3-three-bedrooms, 34-two-bedrooms, and 2-one-bedrooms. Parking will be provided on-site with 58 below-grade spaces in a single-level, underground garage for residents and visitors. Included in the below-level parking garage will be 58 spaces of residential parking plus 3 handicap and 3 guest spaces. The preliminary breakdown is contained below:

2 - 1-Bedroom Units	2 Spaces
34 - 2-Bedroom Units	41 Spaces
3 - 3-Bedroom Units	9 Spaces
Handicap Spaces	3 Spaces
Visitor Spaces	3 Spaces
Total	58 Spaces

The Proponent will comply with the Mayor's Executive Order Relative to Affordable Housing, dated February 29, 2000, and as amended on May 16, 2006, with respect to affordable units.

The Proposed Project fronts on, and will be provided sole access from, Market Street. Although there is an existing curb-cut along Bennett Street which is fenced off, there will be no access in the current proposal from Bennett Street. In addition, the existing lot currently along Bennett Street will be developed as open space for the Project's residents with a gate along Bennett Street to limit access.

The building is proposed to be 4-stories with the building set back from Market Street to allow for plantings to soften the street edge.

1.2.3 Project Site Access

As discussed, the Proposed Project will front on and be accessed only from Market Street. Market Street is a four-lane, primary north-south connector between Brighton, Storrow Drive and Watertown.

1.2.4 Project Data/Approximate Dimensions

Table 1-1: Project Data/Approximate Dimensions	
Lot Area (square feet):	33,260
Total Gross Floor Area: Residential: Retail: Total (including Common Space):	 62,160 3,576 65,727
Building Height:	46'-4"
Floor Area Ratio (FAR):	1.97
Below-Grade Garage and Parking Spaces: Below-Grade: Residential Other Handicap Visitors Total Spaces:	 52 3 HCP 3 Visitors 58

2.0 GENERAL INFORMATION

2.1 Proponent Information

The Proponent is Brookline Development Corporation, located in Brookline, Massachusetts. Founded in 1999 by Jeff Feuerman, the firm specializes in residential development, with prior experience in the development and construction of residential and multi-family projects in Boston and Brookline, Massachusetts. Mr. Feuerman has developed, constructed and now owns residential buildings including:

1. 150 Chestnut Hill Avenue, Brighton, with 21 multi-family units and 37 garage spaces; and

2. Various multi-family projects in Brookline and 20 plus Brownstone gut rehabilitation projects in Boston primarily in the Back Bay and South End neighborhoods.

Mr. Feuerman is the owner, developer and General Contractor of all of his projects. His approach to development focuses on an attention to detail, resulting in a reputation for high quality buildings that will be managed, operated, and maintained by Brookline Development Corporation.

2.2 Project Team and Schedule

Project Name:	**375 Market Street**
Location:	**375 Market Street, Brighton, MA**
Proponent:	Brookline Development Corporation 3 Craftsland Road Brookline, MA 02467 Tel: 617-733-5455 Fax: 617-738-4390 *Jeff Feuerman* *Jeff@Brooklinedevelopmentcorp.com*
Architect:	O'Sullivan Architects 580 Main Street Suite 204 Reading, MA 01867 Tel: 781-439-6166 Fax: 718-439-6170 *David O'Sullivan, AIA, President* *osulli@osullivanarchitects.com* *Jonathan Stone, Project Manager* *jstone@osullivanarchitects.com*

Landscape Architect:	Radner Design Associates 945 Concord Street, Suite 100 Framingham, MA 01701 Tel: 508-736-6144 *Michael Radner, ASLA, LEED ap* *mradner@radnerdesign.com*
Legal Counsel, Public Outreach, and Overall Project Manager:	McDermott, Quilty & Miller LLP 131 Oliver Street, 5th Floor Boston, MA 02110 Tel: 617-946-4600 *Joseph P. Hanley, Esq- Partner* *JHanley@mqmllp.com* *Kristen Scanlon* *KScanlon@mqmllp.com*
Permitting Consultant:	Mitchell L Fischman Consulting, LLC 41 Brush Hill Road Newton, MA 02461 Tel: 781-760-1726 *mitch.fischman@tetratech.com*
Transportation and Civil Engineer:	GEOD Consulting 24 Ray Avenue Burlington, MA 01803 Tel: 781-273-3434 Fax: 781-27303430 James Lyons, Senior Engineer jlyons@geodcorp.com Chris Emilius, PE cemilius@geodcorp.com

Air Quality and Noise Consultant:	Tech Environmental 303 Wyman Street, Suite 295 Waltham, MA 02451 Tel: 781-890-2220 Fax: 781-890-9451 Peter H. Guldberg, Managing Principal pGuldberg@TechEnv.com Marc Wallace, Associate, Project Manager mWallace@TechEnv.com Ryan Callahan rCallahan@TechEnv.com
21E Consultant:	NewPath 237 South Street Hingham, MA 02043 *Jeffrey T. Mosholder, LSP, PE, Manager*
Mechanical Engineer:	GD Consulting Engineers 40 Willard Street 3rd Floor Quincy, MA 02169 Tel: 617-376-8877 Fax: George Dubin dubinengrs@verizon.net
LEED Consultant:	Fore Solutions 386 Fore Street Portland, Maine 04101 Tel: 207-347-5066 x210 Jay Waterman, LEED AP BD+C/Homes jay@fore-solutions.com
Estimated Construction Commencement:	April 2012
Estimated Completion:	April 2013
Approximate Construction Cost:	$15 Million
Status of Project Design:	Schematic

2.3 Public Benefits

The proposed project will create a new mixed-use project with workforce housing to serve the vast array of office users at nearby WGBH and New Balance buildings as well as residents within Allston-Brighton requiring access to Boston's major transportation roadways and public transportation. This development replaces underutilized commercial and office site uses. In addition, the Project will contribute the following benefits to the neighborhood and the City of Boston:

1. Provide 5 units of affordable housing in accordance with the City's Inclusionary Housing Policy;
2. Participate in support of the local neighborhood park system;
3. Expand the City's tax base through the increase in property values anticipated at this location;
4. Provide approximately 30 - 40 new construction jobs in the city of Boston;
5. Provide approximately 10 new permanent jobs from the retail uses and in the new building;
6. Reduce the impervious asphalt and building coverage of the existing uses and providing more open space at grade-level;
7. Improve drainage by adding landscaped and permeable surfaces;
8. Enhance neighborhood properties with landscaped areas, trees and improved fencing;
9. Improve air quality due to the provision of trees and vegetation; and
10. Increase residential population to support nearby neighborhood business and shops.

2.4 Compliance with Boston Zoning Code

The Project is located within the Neighborhood Shopping Subdistrict (NS-.5) of the Allston-Brighton Neighborhood District (Article 51) as defined by the Boston Zoning Code. After conducting extensive preliminary community outreach with neighbors and abutters of the Property, the Applicant filed a permit application with the City of Boston Inspectional Services Department ("ISD") on June 15, 2011. On July 5, 2011, ISD issued Zoning Code and Building Code refusal letters indicating that the Project would require variance and conditional use relief from the City of Boston Board of Appeal (the "Board") for certain use, dimensional, parking, and other violations. Following receipt of the above-referenced refusal letters, the Applicant filed the necessary appeals with the Board. Copies of the appeals are included **Appendix B**. The Applicant will file an Application for Article 85 Demolition Delay Review to the Boston Landmarks Commission pursuant to Section 85-3 (2) of the Boston Zoning Code to demolish the existing commercial building as portions of the structure are more than fifty (50) years old.

2.4.1 Dimensional Requirements

Table 2-1 below summarizes the dimensional requirements in the Allston Brighton Neighborhood District, as set forth in Tables E of Article 51 of the Boston Zoning Code, and compares the requirements to the dimensions for the proposed project. The dimensional variances or zoning interpretation will be sought relating to: Floor Area Ratio, Building Height, and Usable Open Space.

Required off-street parking spaces and off-street loading facilities are expected to be determined as a part of the Large Project Review in accordance with the provisions of Article 80 of the Boston Zoning Code. Design elements of the Project will also be reviewed pursuant to Large Project Review.

Table 2-1 375 Market Street: Dimensional Requirements

Dimensional Element	NS-.5 Subdistrict	Proposed Project[1]
Maximum Floor Area Ratio	.5	1.97
Maximum Building Height	35'-0"	46'-4"
Minimum Lot Size	None	-
Minimum Lot Width	None	-
Minimum Lot Area Per Dwelling Unit	None	-
Minimum Lot Area Per Dwelling Unit	None	-
Minimum Lot Frontage	None	-
Minimum Usable Open Space (Square Feet Per Dwelling Unit)	50 sf/unit	386 sf/unit (See Footnote 2)
Minimum Front Yard	None	3'-7"
Minimum Side Yard	None (10ft abutting 2F-5000)	6'-0"
Minimum Rear Yard	20'	20'-0"

1 The dimensions described in this table may change as the Proposed Project undergoes design review with the BRA.

2 The Proponent believes this condition has been met and may seek an interpretation from the ZBA on same.

2.5 List of Permits or Other Approvals Which May Be Sought*

Agency Name	Required Permit or Action
State	
Massachusetts Department of Environmental Protection, Division of Air Quality Control	Notice of Commencement of Demolition and Construction
Massachusetts Water Resources Authority	Temporary Construction De-Watering Permit; Sewer Use Discharge Permit –Gas Trap Permit
Massachusetts Historical Commission	Historic Review under 950CNR 71.00 – Related to impact on Nearby Burying Ground that is on the National Register
Local	
Boston Redevelopment Authority	Article 80 Large Project Review, Certificate of Compliance; Cooperation, Affordable Housing/Marketing and Other Article 80 Agreements; Approval Recommendation to the ZBA
Boston Zoning Board of Appeal	Variances and Conditional Use Permits, including but not limited to Off-Street Parking, FAR, Screening and Buffering, Multi-Family Dwelling Use, Building Height and Usable Open Space**
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan; Commercial Driveway Permit
Boston Landmarks Commission	Article 85 Demolition Delay Review
Boston Department of Public Works/ Public Improvements Commission	Curb Cut Permit**;** Street/Sidewalk Occupancy Permit; Use of Premises Permit; Possible Specific Repair Plan Approval; Possible Marquee License(s)
Boston Parks and Recreation Commission	Review of construction within 100 feet of City of Boston Park, if required
Boston Water and Sewer Commission	Water and Sewer Connection Permits; Temporary Construction Dewatering; General Services Application; Site Plan Review
Boston Fire Department	Approval of Fire Safety Equipment
Boston Department of Inspectional Services	Demolition and Building Permits; Certificates of Occupancy; Other Construction Related Permits

*This is a preliminary list based on project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits may be needed.

**The Proponent believes this condition has been met and may seek an interpretation from the ZBA on same.

2.6 Legal Information

Legal Judgments or Actions Pending Concerning the Proposed Project

The Proponent is not aware of any legal judgments.

History of Tax Arrears on Property Owned in Boston by the Applicant

The Proponent owns no real estate in Boston on which real estate tax payments are in arrears.

Evidence of Site Control over the Project Area

The Proponent entered into purchase and sales agreements for the four parcels.

Nature and Extent of Any and All Public Easements

There are no public easements on any of the four parcels.

2.7 Public Review Process

The Proponent began meeting with neighbors and abutters of the Property in July of 2010 and has hosted several site meetings with residents in the immediate area, in addition to meeting with local elected neighborhood representatives. On April 7, 2011, the Applicant also appeared before the Brighton/Allston Improvement Association to make an initial presentation on the Project and, after fielding general concerns focused mostly on the size and scope of the Project, agreed to continue the discussion with the group once the Project was filed and under review. With guidance from the BRA's design staff, the Proponent then reduced the size and scope of the Project and held yet another site meeting on May 25, 2011 to present the revised plans and update the community on the status of the same.

An Impact Advisory Group ("IAG") has been established by the City of Boston for review of the impacts from this project. The project team is expected to review plans with the IAG in conjunction with the filing of the PNF.

The Proponent or its representatives will attend additional meetings with the BRA and the neighborhood following this submission as part of the Article 80 Large Project Review process. The Proponent is committed to a continuing dialogue with the neighborhood, public agencies, elected officials, and other interested parties throughout the permitting and construction process.

3.0 URBAN AND SUSTAINABLE DESIGN

3.1 Introduction

Discussion of urban design elements for the proposed new building is provided in the sections below along with the plans, perspectives, and photographs that are included at the end of this section (see **Figures 3-1** through **3-14**).

As a result of meetings with the Brighton-Allston Improvement Association and the abutters, and following preliminary design reviews by the Boston Redevelopment Authority staff, the proposed development represents a synthesis of the requirements of the Proponent to pursue a feasible project and the City and BRA to achieve a development concept which will be compatible with the neighborhood. The site is currently occupied by an outdated, single-story industrial building in a location where its revitalization will strengthen Market Street and nearby Brighton Center. The proposed project will also continue the effort to bring additional housing to this section of the city.

3.2 Neighborhood Context

The site is located in a Neighborhood Shopping Subdistrict (NS-.5) zone of the Allston-Brighton Neighborhood District and is directly across from the Market Street Burying Ground. The neighborhood includes a variety of multifamily homes and apartment buildings as well as businesses ranging from the newly constructed TD Bank adjacent to the property to the Brighton Beer Garden and Corrib Pub and Restaurant to the many smaller storefront businesses located to the south at the intersection of Market and Washington Streets.

The site is bordered to the north by single and multifamily homes in addition to the chain link fence and gate enclosing the project site from Bennett Street; to the east, across Market Street, by the Market Street Burying Ground; to the south by the newly constructed TD Bank as well as more single and multifamily homes along Surrey Street; and to the west by a series of multifamily homes ranging in architectural style and detail along Leicester Street. Further south along Market Street is a 4 story, brick apartment building with retail on the first floor, the existing Sovereign Bank and several mid-rise apartment buildings. Looking north along Market Street are additional residential homes, two 3-story brick apartment buildings, and Catholic Cathedral and school. The neighborhood is truly a blend of uses, styles and architecture.

3.3 Building Design

3.3.1 Design Concept

The proposed re-development at 375 Market Street is reminiscent of the older mixed-use buildings in the immediate area, but with the addition of cleaner lines and details giving the proposed building an updated look and feel while maintaining the characteristics you would expect to see in the more traditional residential sections of Brighton. The existing underutilized site creates a gap in the streetscape of Market Street and the proposed re-development will fill this gap and bring people and new services into the neighborhood. The proposed project is expected to continue upgrading efforts already started along Market Street and revive interest in this quadrant of the City.

In order to be successful, the proposed project must work in conjunction with the area and be mindful of its impact and presence. In addition to being almost self-sustaining, the proposed project should contribute to the over-all well-being of the neighborhood, and positively impact Brighton and Boston, becoming an attractive gateway development entering Brighton Center from the north. For this reason, the building has been developed in a scale and architecture that demonstrate a contemporary approach and commitment to continue the revitalization of this area while maintaining a classic Brighton image and character. The design of the proposed building is in a traditional style with traditional materials blended with new technologies and cleaner detailing.

The proposed project is for a mixed-use concept. This is the new reality for urban growth and hearkens back to the origins of the great American city. With the current concerns of low-impact development and energy conscious design, this proposed live/shop environment suits this location and sets a revival tone for the future of Brighton. The concept of living close to work, shopping and community life is nothing new to many neighborhoods closer to downtown and the expansion of that formula will be beneficial to the City and the neighborhood.

3.3.2 Height and Massing

The site for 375 Market Street has many influences to consider relative to massing and scale of the building elements. The site abuts two different zones with effectively two different sets of characteristics. The primary facade will be facing east toward Market Street and the 3-story, main mass of the building will be set back from the sidewalk 6’-0” to allow for sidewalk planters with street trees that will encourage the pedestrian to engage the site and building while walking along Market Street. Directly adjacent to the site on the South is a newly constructed TD Bank with parking lot and drive-up teller. To the east is the Market Street Burying Ground as well as a variety of small to medium sized commercial, industrial and multi-family buildings ranging from single to three stories in height. To the north and west are two and three story multifamily homes and residential condominiums. Market Street is a four-lane collector street with wide sidewalks on each side. Bennett Street is a two-lane neighborhood roadway with two travel lanes plus parking and a sidewalk on each side. Buildings along Bennett Street tend to align at eight to ten

feet behind the sidewalk line. Leicester Street is a one-way, one lane neighborhood roadway with one travel lane heading north and curbside parking on the both sides in front of the single and multifamily homes which on average align ten to fifteen feet behind the edge of the sidewalk. Surrey Street is a one-way, one lane neighborhood roadway with one lane of travel heading west and curbside parking on both sides with similar conditions to Leicester Street.

The proposed project is comprised of three basic design elements consisting of the main mass, the top floor, and the residential entrance. The main mass is a three-story structure which fronts on Market Street to maximize open space at the sides and rear of the site. At approximately 37'-6" tall the main mass encompasses most of the building occasionally interrupted by decks and changes in material to break down the scale while maintaining continuity around the building. The inset top floor is an additional 9'-4" above the main mass but is set back from the exterior face in varying distances ranging from 7'-0" to 27'-0" at the sides and rear to create an undulating roof line, while on the Market Street façade the top floor is held in at an equal distance of 8'-0" from the exterior face to provide a cleaner line when viewed from Market Street. The residential entrance is specially designed at an intermediate height to appropriately delineate its different use from the commercial storefront at the pedestrian level and it's strategically placed at the north corner of the site along Market Street where the zone transitions to residential.

3.3.3 Facade Design, Fenestration, and Building Materials

While there are many external influences to direct the design of the proposed building, it is also important that the Proposed Project remains distinct. The design of the building responds to the differing scale elements but contains a common thread through the use of materials. The design team has selected materials which relate to the human scale, are environmentally appropriate, conform to traditional standards and incorporate new technologies. The main pedestrian level elements are brick, pre-cast stone, mullioned storefront, patterned pavers and landscaping. As the material relates more to the macro scale, siding systems are utilized in conjunction with brick to reinforce the residential aspects. The size and pattern of the fenestration assists in the creation of the hierarchy of base, middle and crown within the building, and reinforces the relationship between the two uses while the choice of color and materials aid in the visual linkage of the building.

3.4 Site Design

3.4.1 Landscaped Areas and Pedestrian Circulation

As in many urban environments, space on the project site for landscaping is limited, so the project will make good use of the undeveloped portion of the site to provide for private and common patios, screening to neighbors, transitions to surrounding grades, pedestrian access and enhancement of the streetscape within the public Right of Way on Market Street.

Residents on the first floor will have private terraces varying in area from 120 to 140 square feet. A paved courtyard located along the north facing side yard will be created for use by all residents. This space will be partially covered and will have space for tables and chairs. The northernmost portion of the site will provide accessible pedestrian access to Bennett Street as well as a secondary egress from the building. This area will be landscaped and lighted with low level light bollards, and a new decorative metal gate and fence controlling public access from Bennett Street will be installed. Walkways around the building will be provided for egress.

The remaining edges of the site will be planted with a variety of deciduous and evergreen shrubs along the property line and where not on top of the proposed underground parking in order to soften the edges of the site. In areas close to the building and on top of the structural deck, a combination of loose decorative stone, low groundcovers, ornamental grasses and lawn will be installed. Drought tolerant and native species will dominate the plant palette, and lawn areas will be very limited.

Retaining walls will be necessary on the north and south edges of the property. On portions of the north edge, segmental retaining walls will be built that will vary in height from 0' to 4' to retain earth on the project site. On the south edge, a poured concrete wall will be built with a natural stone veneer to retain earth from the abutting properties.

A new poured concrete sidewalk along Market Street will be installed and street trees planted in open pits along the curb line in order to provide an attractive storefront for those businesses, and to moderate the scale of the new building. The existing light pole on Market Street will be retained and street trees will be located so as not to interfere with the luminaire.

3.4.2 Parking and Vehicular Circulation

Singular vehicular access/egress will be from Market Street and located on the southern end of the site towards the newly constructed TD Bank to limit noise and traffic at the residential edges of the site. The Market Street entrance is in direct alignment with the underground parking garage ramps and the majority of the ramps will be within the building.

There will parking provided for both the proposed residential uses as well as guest and handicap parking spaces. All parking will be exclusively provided in the underground garage with a total of 58 spaces. The underground parking will be secure to prevent unauthorized parking and will be serviced by an elevator directly to the residential floors above.

3.5 Sustainable Design

The 375 Market Street Proponent will implement sustainable design and energy conservation measures as part of the Project. Early efforts have focused on the review and evaluation of the requirements of Article 37 of the Boston Zoning Code relative to the City's Green Building policies and procedures. The City

seeks actively to promote opportunities for decreasing energy and water usage and costs, improving the efficiency and longevity of building systems and decreasing the burdens imposed on the city infrastructure, the environment and public health.

The Proponent is committed to pursuing U.S. Green Building ("USGBC") Leadership in Energy and Environmental Design ("LEED") certification for the proposed building. The proposed building systems and components are being reviewed by our LEED certified architectural staff.

An attached LEED checklist has been provided to identify sustainability goals for this Project. It does not reflect any of the LEED points given pursuant to Article 37 for the City's targeted mitigation areas (Boston Green Building Credits) such as transportation demand management, groundwater protection, etc. Highlights are outlined below, including details on implementation measures to the extent that they are defined at this stage of the design. Selection of specific building systems and specifications will be determined in consideration of the Project's sustainability goals. As goals are now being established, design solutions will be developed in an effort to finalize the pertinent LEED credits. The final design should help create a sustainable development that will serve to minimize environmental impacts, optimize interior environmental quality for the building inhabitants and enhance the surrounding community.

INNOVATION & DESIGN PROCESS

Integrated Project Planning

1.1 Preliminary Rating (Pre-requisite)
Target Performance Tier: Certified

1.2 Integrated Project Team (1 Credit)
Record Regular Meetings with project team. Ensure all disciplines are included in meetings: Landscape designer, mechanical engineer, architect, civil engineer will meet at least monthly during schematic, design development and construction documents phases, at a minimum.

1.3 Professional Credentialed with Respect to LEED for Homes (1 Credit)
Project will ensure that a member of the design or construction team is credentialed with respect to LEED for homes.

1.4 Design Charrette (1 Credit)

Credit not targeted at this time.

1.5 Building Orientation for Solar Design (1 Credit)
East-West axis may meet the intent of this credit. Project team will perform calculations to determine fenestration per building side/orientation. Not currently targeted.

Quality Management for Durability

2.1 Durability Planning (Pre-requisite)
Team will complete durability evaluation form and create a strategy checklist that the contractor and Rater will both approve and sign-off once work is visually verified on site. These items include climate- and weather-specific strategies that address issues such as heat loss, interstitial condensation, air infiltration, water infiltration, pests, etc.

2.2 Durability Management (Pre-requisite).
Builder to conduct inspections using durability checklist to ensure that all.

2.3 Third-Part Durability Management Verification (3 points)
Credit not targeted

Innovative or Regional Design

Team will determine if there are exemplary or innovative strategies proposed that could earn credits (up to 4 pts).

LOCATION & LINKAGES

1.0 LEED for Neighborhood Development (10 pts)

Credit not targeted at this time.

2.0 Site Selection (2 points)
Project appears to meet all of the required criteria. More information needed to determine 100 yr. floodplain.

3.0 Preferred Locations

3.1 Edge Development (1 point) *see 3.2*

3.2 Infill (2 points)
Project appears to have 75% + bordering developed land.

3.3 Previously Developed (1 point)
The Project Site has previously been completely developed and is located within an urban area. This development does not violate any of the established criteria.

4.0 Existing Infrastructure
Project is within close proximity to existing infrastructure.

5.0 Community Resources / Transit

5.1 Basic Community Resources / Transit (1 point) *See 5.3*

5.2 Extensive Community Resources / Transit (2 points) *See 5.3*

5.3 Outstanding Community Resources / Transit (3 points)

Many basic resources nearby. Project should be able to earn all 3 points.

6.0 Access to open space (1 point)

There is a ¾ acre or more park within ½ mile of the site.

SUSTAINABLE SITES

1.0 Site Stewardship

1.1 Erosion Controls During Construction (pre-requisite)

A management plan will enforce measures to protect adjacent areas from pollution. Details will be provided in drawings.

1.2 Minimize Disturbance Area of Site (1 point)

A management plan will enforce measures to protect adjacent areas from pollution.

2.0 Landscaping

2.1 No Invasive Plants (pre-requisite)

No invasive plants will be used. The landscape architect will choose plants that are not on any invasive plant list.

2.2 Basic Landscaping (2 points)

Credit not targeted at this time.

2.3 Limit Conventional Turf (3 points)

Credit not targeted at this time.

2.4 Drought-Tolerant Plants (2 points)

Credit not targeted at this time.

2.5 Reduce Overall Irrigation Demand by at least 20% (6 points)

Credit not targeted at this time.

3.0 Reduce Local Heat Island Effects (1 Point)

Credit not targeted at this time.

4. Surface Water Management

4.1 Permeable Lot (4 Points)

Credit not targeted at this time.

4.2 Permanent Erosion Controls (1 Point)

Credit not targeted at this time.

4.3 Management of Runoff from Roof (2 Points)

Credit not targeted at this time.

5. Non-toxic Pest Control

5.0 Pest Control Alternatives (2 Points)

*Credit not targeted at this time.*6. Compact Development

6.1 Moderate Density (2 Points) *See 6.3*

6.2 High Density (2 Points) *See 6.3*

6.3 Very High Density (2 Points)

Project appears to meet density requirements for 6.3 with 39 units in 0.76 acres for a density of 51 units per acre.

WATER EFFICIENCY

1. Water Reuse

1.1 Rainwater Harvesting System (4 points)

Credit not targeted at this time.

1.2 Graywater Reuse System (4 points)

Credit not targeted at this time.

1.3 Use of Municipal Water System (4 points)

Credit not targeted at this time.

2. Irrigation System

2.1 High Efficiency Irrigation System (3 points)

Credit not targeted at this time.

2.2 Third Party Inspection (1 point)

Credit not targeted at this time.

2.3 Reduce Overall Irrigation Demand by at Least 45% (3 point)

Credit not targeted at this time.

3. Indoor Water Use

3.1 High Efficiency Fixtures and Fittings (3 points) *See 3.2*

3.2 Very High Efficiency Fixtures and Fittings (3 points)

Toilets will have an average flow rate of less than or equal to 1.30 GPF. Lavatory faucets will have an average flow rate of 1.5 GPM.

ENERGY & ATMOSPHERE

1. Optimize Energy Performance

1.1 Performance of Energy Star for Homes (prerequisite)

HERS rating of 65 will be targeted. The project is taking the performance-based approach and will model the concept design to determine the HERS rating. A rating of 65 assumes high-performance building envelope, air sealing details, as well as high-performance glazing and mechanical system. De-centralized mechanical systems will have heating, cooling and hot water production in each unit, reducing the need for a large central mechanical room and reducing heat loss from long pipe runs.

1.2 Exceptional Energy Performance (34 points)

HERS 65 is targeted as noted above.

7. Water Heating

7.1 Efficient Hot Water Distribution System (2 points)

Individual hot water heaters will be installed in each unit's mechanical room, shortening distances to fixtures and reducing heat loss. Credit not targeted at this time.

7.2 Pipe Insulation (1 point)

R-4 insulation will be specified for all domestic hot water pipes.

11. Residential refrigerant Management

11.1 Refrigerant Charge Test (pre-requisite)

The project construction team will ensure that pre-packaged A/C units meet the requirements or testing occurs on site.

11.2 Appropriate HVAC Refrigerants (1 point)

No Chlorofluorocarbon based (CFC) refrigerants will be used in the building. Refrigerant and equipment selections will be evaluated to optimize the balance between ozone-depletion and global warming effects.

MATERIALS & RESOURCES

1. Material Efficient Framing

1.1 Framing Order Waste Factor (prerequisite)

Stick-built framing will be used and detailed framing documents (1.2 below) will ensure a framing order waste factor less than 10%.

1.2 Detailed Framing Documents (1 point)

Credit not targeted at this time.

1.3 Detailed Cut List & Lumber Order (1 point)

Credit not targeted at this time.

1.4 Framing Efficiencies (3 point)

Two-stud corners and headers sized for loads will be used at a minimum. Perhaps ladder blocking as well. Credit not targeted at this time.

1.5 Off-Site Fabrication (3 point)

Credit not targeted at this time.

2. Environmentally Preferable Products

2.1 FSC Certified Tropical Wood (prerequisite)

There will be no tropical woods installed in the project. If any tropical wood is specified, it will be FSC certified.

2.2 Environmentally Preferable Products (8 point)

Credit not targeted at this time.

3. Waste Management

3.1 Construction Waste Management Planning (prerequisite)

A waste management plan will be implemented that seeks to divert a minimum of 75% of waste material removed from the Project Site from landfills through recycling and salvaging. Depending on space on the job site, separation of recycled construction materials will occur on site with different dumspters. Training of contractor and sub-contractors will occur at a pre-construction meeting and will be ongoing with a construction waste coordinator designated by the primary contractor.

3.2 Construction Waste Reduction (3 points)

A waste management plan will be implemented that seeks to divert 75% of waste material removed from the Project Site from landfills through recycling and salvaging

INDOOR ENVIRONMENTAL QUALITY (EQ)

1. Energy Star with Indoor Air Package

1.0 ENERGY STAR with Indoor Air Package (13)

ASHRAE Standard 62.1-2007 will set the standard for minimum indoor air quality. Credit EQc1.0 is a performance based approach that uses the EPA's Indoor Air Plus Package to determine overall good air quality. The project will take the prescriptive path as noted in the below credits that meet the same requirements.

2. Combustion Venting

2.1 Basic Combustion Venting Measures (pre-requisite)

Project will have no unvented combustion appliances, carbon monoxide detectors on each floor of the building and power vented exhaust for all heating and hot water equipment. There will be no fireplaces in the

2.2 Enhanced Combustion Venting Measures (2 points)

No fireplaces.

3. Moisture Control

3.0 Moisture Load Control (1 point)

Credit not targeted at this time. There will be no supplementary dehumidification system.

4. Outdoor Air Ventilation

4.1 Basic Outdoor Air ventilation (pre-requisite)

The project will use a Heat Recovery Ventilation (HRV) system or potentially a Heat Recovery Ventilation System (HRV) to provide a continuous flow of fresh air to residents. The system will meet the requirements of ASHRAE 62.2 – 2007.

4.2 Enhanced Outdoor Air ventilation (1 point)

Credit not targeted at this time.

4.3 Third-Party Performance Testing (1 point)

Credit not targeted at this time.

5. Local Exhaust

5.1 Basic Local Exhaust (pre-requisite)

Bathroom exhaust fans will all be Energy Star labeled and have an air flow rate of at least 50CFM.

5.2 Enhanced Local Exhaust (1 point)

ASHRAE Standard 62.1-2007 will set the standard for minimum indoor air quality. The ERV/HRV continuously operating exhaust fan will provide enhanced exhaust for the project.

5.3 Enhanced Local Exhaust Third-Party Performance Testing (1 point)

Building systems will be commissioned in accordance with USGBC requirements and the Green Rater will perform the exhaust flow testing to ensure the flow rate is correct.

6. Distribution of Space Heating and Cooling

6.1 Room-by-room load calculations (pre-requisite)

Mechanical contractor will perform Manual J calculations to ensure proper sizing of heating loads in the building and to right-size the mechanical system. Mechanical contractor will also perform Manual D calculations for right-sizing of duct work, as needed.

6.2 Return Air Flow / Room-by-room Controls (1 point)

Credit not targeted at this time.

6.3 Third-party Performance Test / Multiple Zones (2 points)

Credit not targeted at this time.

7. Air Filtering

7.1 Good Filters (pre-requisite)

The ERV or HRV meets this requirement for good filtration (MERV 8)

7.2 Better Filters (1 point)

Credit not targeted at this time.

7.3 Best Filters (2 points)

Credit not targeted at this time.

8. Contaminant Control

8.1 Indoor Contaminant Control During Construction (1 point)

Credit not targeted at this time.

8.2 Indoor Contaminant Control (2 points)

Credit not targeted at this time.

8.3 Preoccupancy flush (2 points)

Credit not targeted at this time.

9. Radon Protection

9.1 Radon-Resistant Construction in High Risk Areas (prerequisite)

Boston not in a high risk area. Testing will occur prior to occupancy after construction to determine if active radon system is needed.

9.2 Radon-Resistant Construction in Moderate Risk Areas (1 point)

Credit not targeted at this time.

10. Garage Pollutant Protection

10.1 No HVAC in Garage (pre-requisite)

Garage will be sealed from mechanical room on the first floor. All air handling equipment will be placed outside the fire-rated envelope of the garage.

10.2 Minimize Pollutants from Garage (2 points)

Credit not targeted at this time.

10.3 Exhaust Fan in Garage (1 point)

Credit not targeted at this time.

10.4 Detached Garage or no garage (3 point)

N/A

AWARENESS & EDUCATION (AE)

1. Education of the Homeowner or Tennant

1.1 Basic Operations Training (pre-requisite)

The Proponent intends to develop tenant guidelines, educational programs and resources for the tenants within the building that inform the residents about the green features of their home. Occupant behavior will be discussed at length as an opportunity to have an even greater reduction in energy use, just based on occupant behavior.

1.2 Enhanced Training (1 point)

Credit not targeted at this time.

1.3 Public Awareness (1 point)

A website, a planned newspaper article and LEED construction signage will help inform the public about the green features of the building. Credit not targeted at this time.

2. Education of the Building Manager

2.0 Education of the Building Manager (1 point)

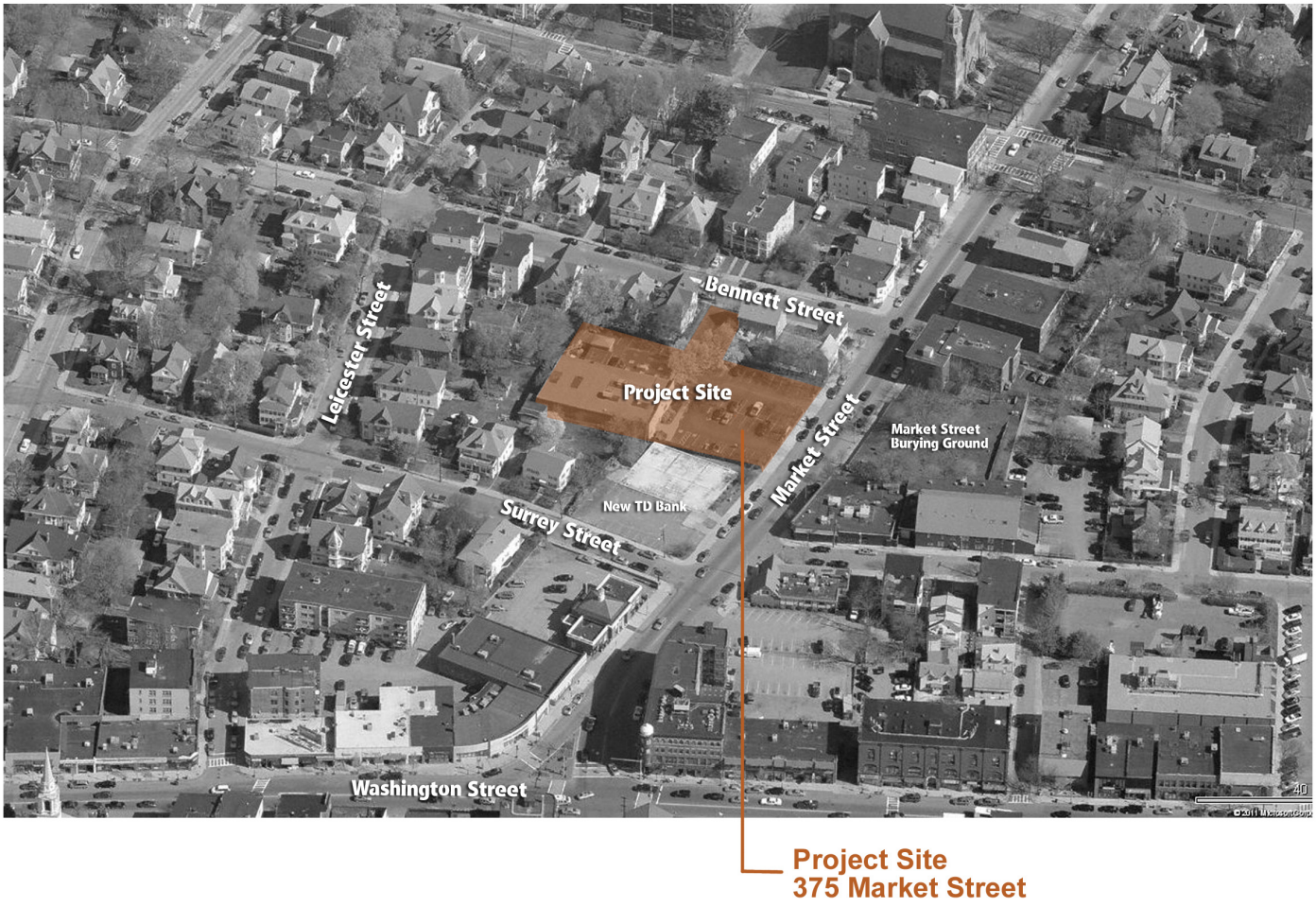
The Proponent intends to develop tenant operating manuals, educational programs and resources for the tenants within the building. The Building Manager will have an additional walk through of the building with the design team, particularly the mechanical engineer, to learn about efficient operations of the building systems.

In addition to the requirements of LEED for Homes certification, the Proponent has retained a LEED accredited professional, Jay Waterman, of Fore Solutions based in Portland Maine.

3.6 Urban Design Submission and Project Drawings

Figures 3-1 through **3-14** more fully illustrate the Urban and Sustainable Design narrative and include the following figures and photographs:

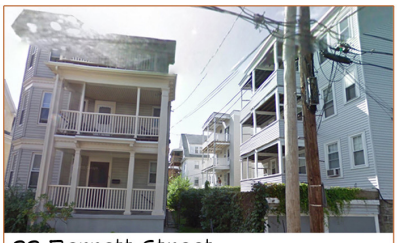
Figure 3-1 Project Location
Figure 3-2 Neighborhood Study
Figure 3-3 Neighborhood Study
Figure 3-4 Garage Floor Plan
Figure 3-5 First Floor Plan
Figure 3-6 Second and Third Floor Plan
Figure 3-7 Fourth Floor Plan
Figure 3-8 Elevations
Figure 3-9 Landscape Plan
Figure 3-10 View from across Market Street
Figure 3-11 View from North on Market Street
Figure 3-12 View from across Bennett Street
Figure 3-13 View from South on Market Street
Figure 3-14 LEED for Homes Simplified Project Checklist



375 Market Street
Brighton, MA

Figure 3-1
Project Location

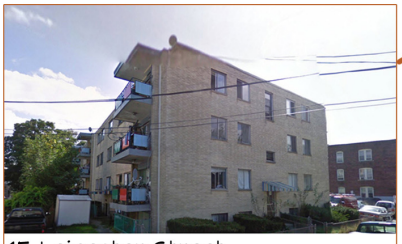

55 Leicester Street


22 Bennett Street

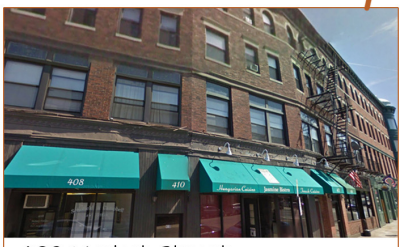

7 Bennett Street


39 Leicester Street


37 Leicester Street


15 Leicester Street

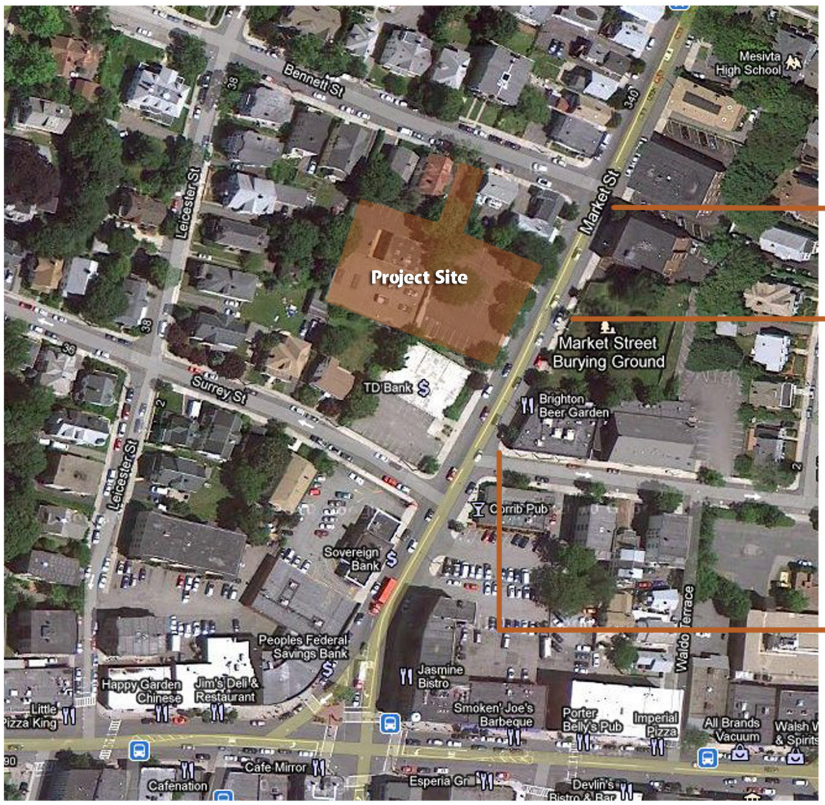

15 - 17 Surrey Street


408 Market Street


64 Henshaw Street

375 Market Street
Brighton, MA

Figure 3-2
Neighborhood Study




360 Market Street

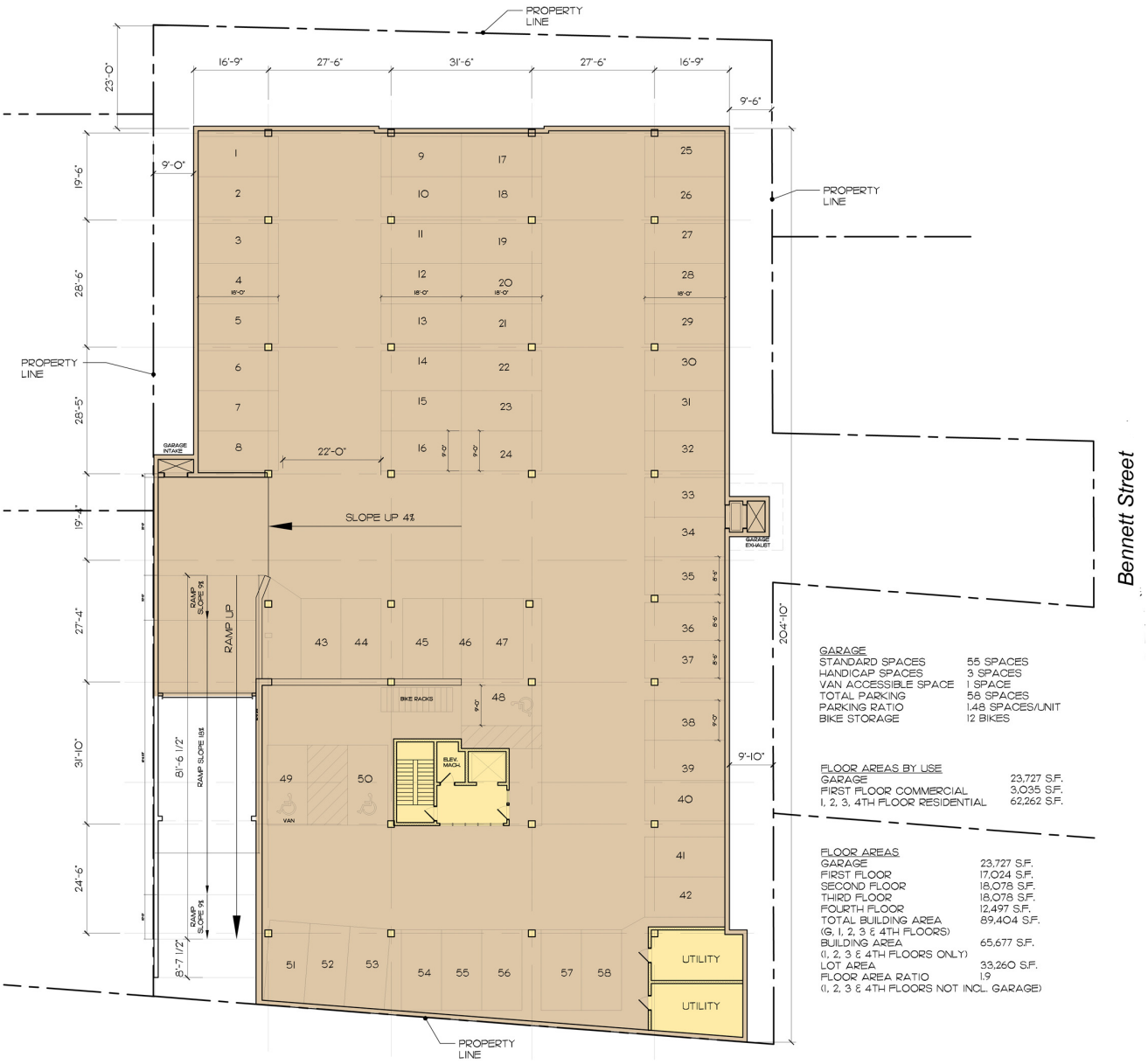

Market Street Burying Ground


386 Market Street

Address	Zoning	F.A.R. (allowed)	Stories	F.A.R. (approx.)	Lot Size (sqft)	Lot Coverage
375 Market St.	NS-.5	.5	4	1.9	33,260	55% Bldg, 10% Paved, 35% Landscaped
7 Bennett St.	2F-5000	.6	3	1.04	7,169	38% Bldg, 10% Paved, 52% Landscaped
22 Bennett St.	2F-5000	.6	3	.75	4,678	39% Bldg, 21% Paved, 40% Landscaped
55 Leicester St.	2F-5000	.6	3	.989	3,855	42% Bldg, 28% Paved, 30% Landscaped
39 Leicester St.	2F-5000	.6	2	.475	6,087	30% Bldg, 30% Paved, 40% Landscaped
37 Leicester St.	2F-5000	.6	2.5	.533	6,320	52% Bldg, 13% Paved, 40% Landscaped
15 Leicester St.	2F-5000	.6	3.5	1.3	17, 426	37% Bldg, 53% Paved, 10% Landscaped
15-17 Surrey St	2F-5000	.6	2	.247	8,171	15% Bldg, 20% Paved, 65% Landscaped
408 Market St.	NS-1	1.0	4	2.7	5,313	65% Bldg, 35% Paved, 0% Landscaped
64 Henshaw St.	NS-.5	.5	3	.73	5,952	45% Bldg, 25% Paved, 30% Landscaped
386 Market St.	NS-.5	1	1	1.0	6,115	98% Bldg, 2% Paved, 0% Landscaped
Market St Burying Ground	OS-CM	n/a	n/a	n/a		
360 Market St.	2F-5000	.6	3.5	1.38	25,314	39% Bldg, 51% Paved, 10% Landscaped

375 Market Street
Brighton, MA

Figure 3-3
Neighborhood Study



GARAGE

STANDARD SPACES	55 SPACES
HANDICAP SPACES	3 SPACES
VAN ACCESSIBLE SPACE	1 SPACE
TOTAL PARKING	58 SPACES
PARKING RATIO	1.48 SPACES/UNIT
BIKE STORAGE	12 BIKES

FLOOR AREAS BY USE

GARAGE	23,727 S.F.
FIRST FLOOR COMMERCIAL	3,035 S.F.
1, 2, 3, 4TH FLOOR RESIDENTIAL	62,262 S.F.

FLOOR AREAS

GARAGE	23,727 S.F.
FIRST FLOOR	17,024 S.F.
SECOND FLOOR	18,078 S.F.
THIRD FLOOR	18,078 S.F.
FOURTH FLOOR	12,497 S.F.
TOTAL BUILDING AREA (G, 1, 2, 3 & 4TH FLOORS)	89,404 S.F.
BUILDING AREA (1, 2, 3 & 4TH FLOORS ONLY)	65,677 S.F.
LOT AREA	33,260 S.F.
FLOOR AREA RATIO (1, 2, 3 & 4TH FLOORS NOT INCL. GARAGE)	1.9

UNIT MIX	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOTAL
FIRST FLOOR	0	4	3	7
SECOND FLOOR	1	11	0	12
THIRD FLOOR	1	11	0	12
FOURTH FLOOR	0	8	0	8
TOTAL	2	34	3	39

375 Market Street
Brighton, MA

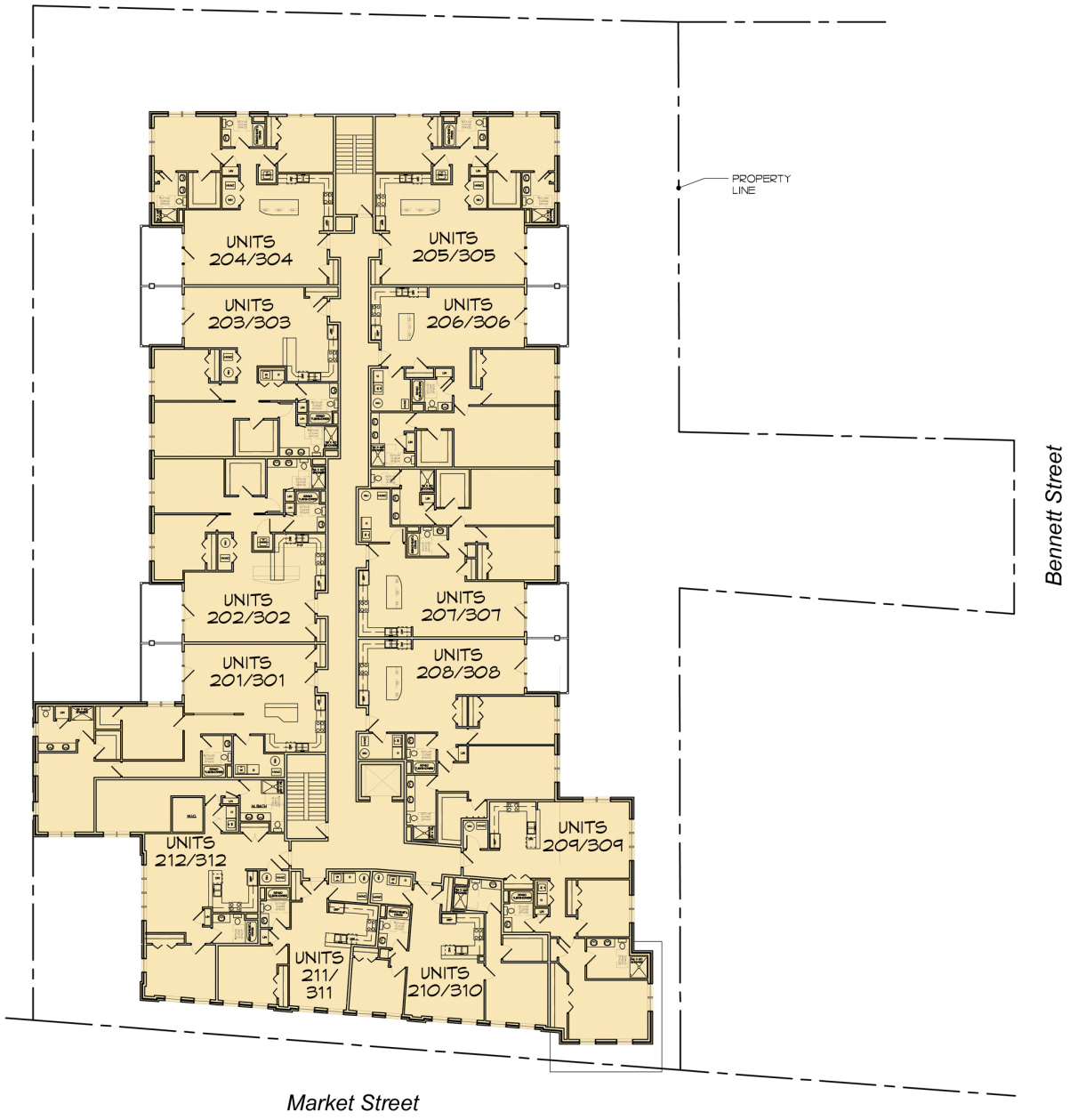
Figure 3-4
Garage Floor Plan

0 10 20 40

375 Market Street
Brighton, MA

Figure 3-5
First Floor Plan

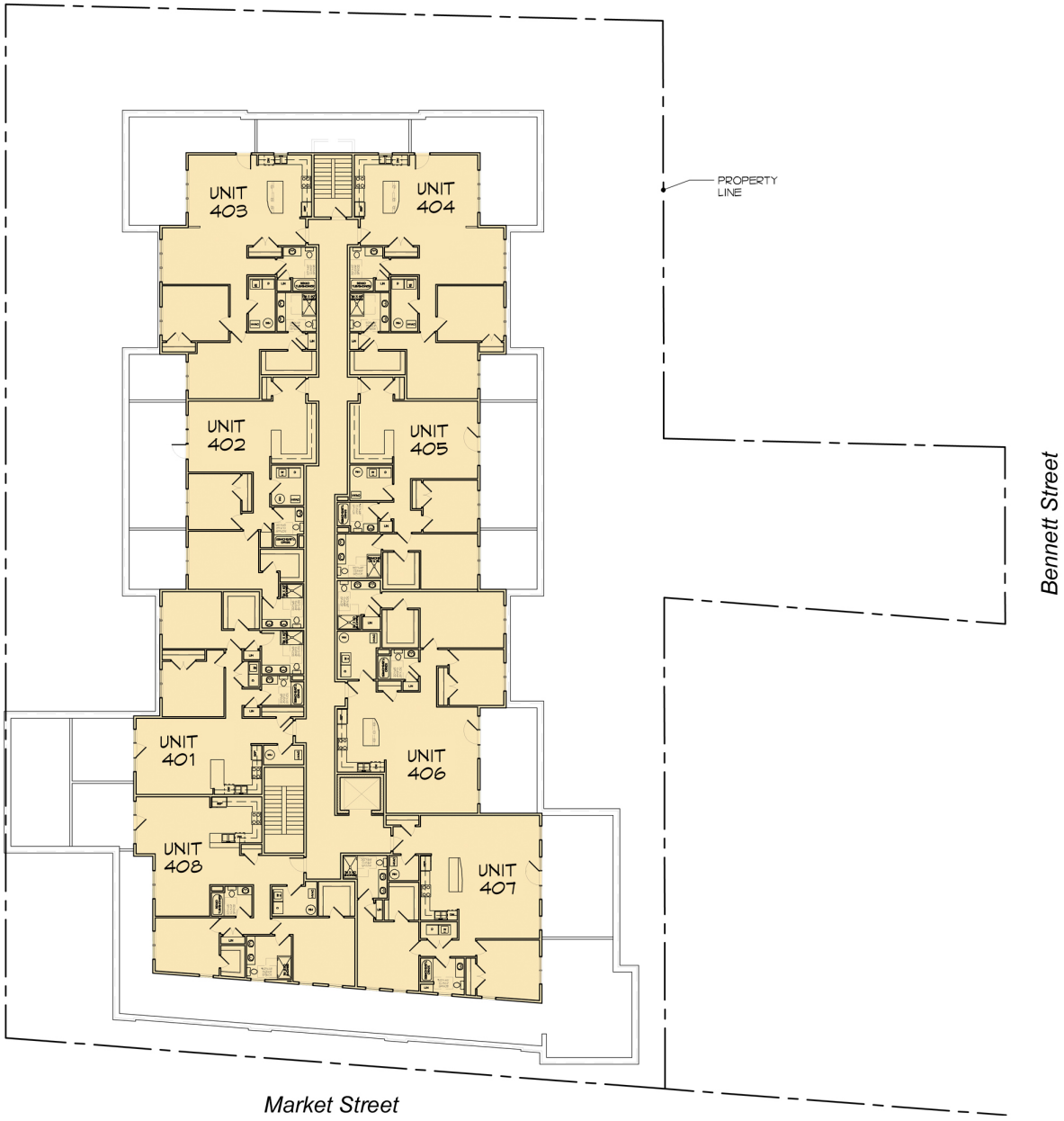
0 10 20 40



375 Market Street
Brighton, MA

Figure 3-6
Second Floor Plan
Third Floor Plan

0 20 10 40



375 Market Street
Brighton, MA

Figure 3-7
Fourth Floor Plan

0 20 10 40

375 Market Street
Brighton, MA

Figure 3-8
Elevations

0 10 20 40

375 Market Street
Brighton, MA

Figure 3-9
Landscape Plan

View from across Market Street

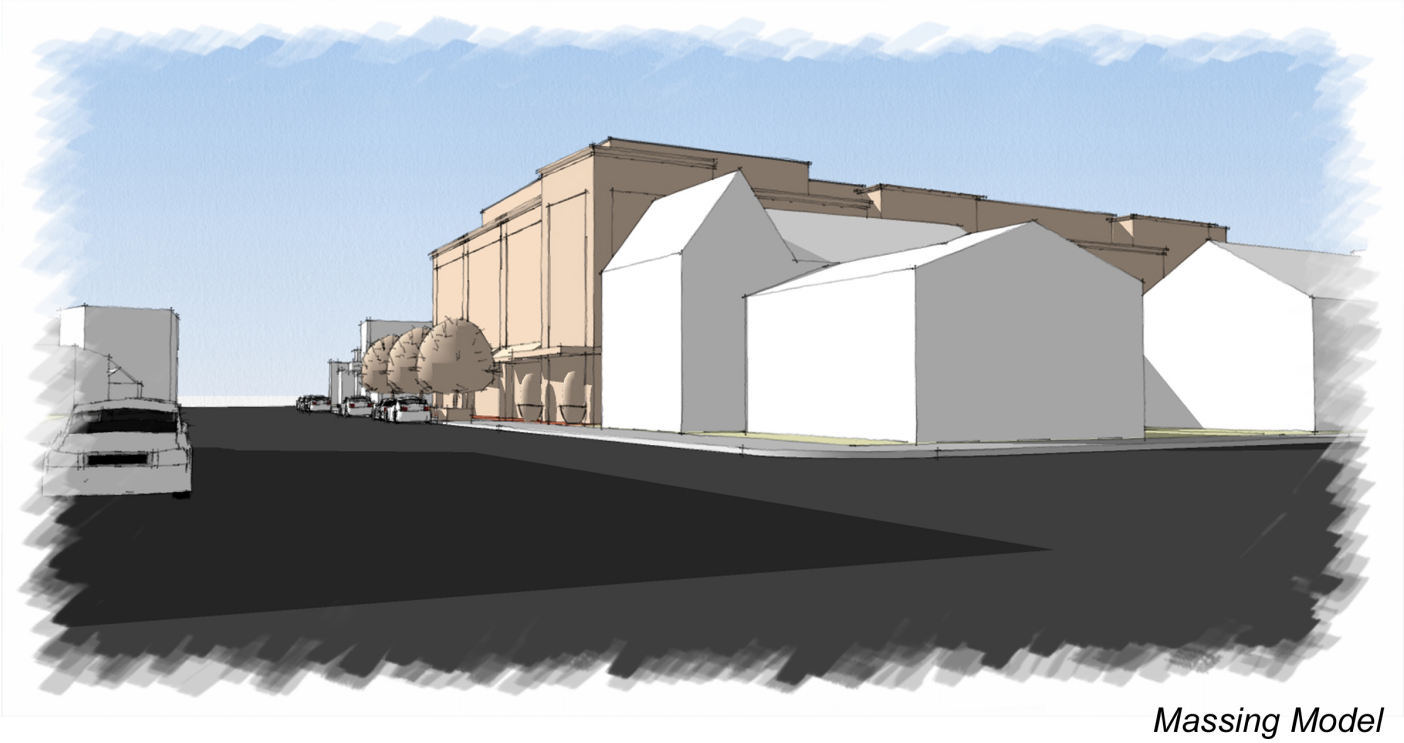
Existing

Massing Model

375 Market Street
Brighton, MA

Figure 3-10
View from across Market Streeet

Existing

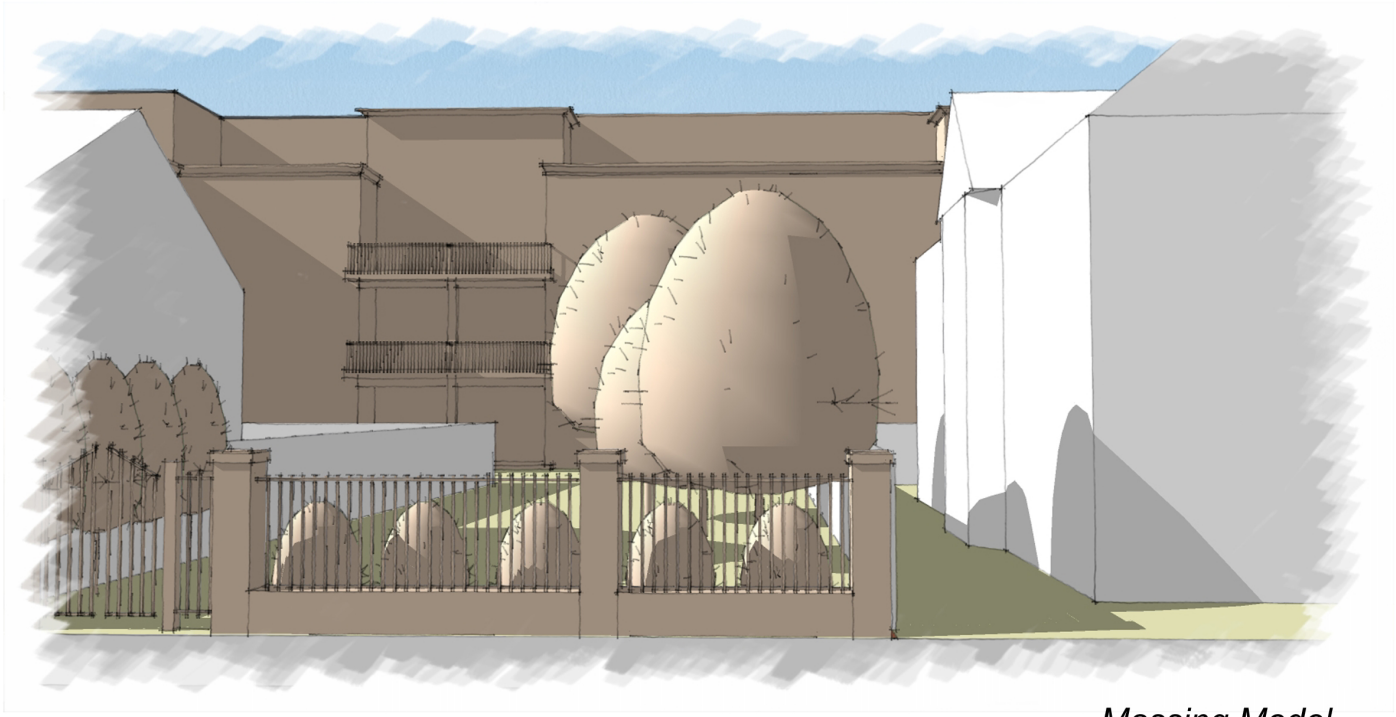


Massing Model

375 Market Street
Brighton, MA

Figure 3-11
View from North on Market Street

Existing



Massing Model

375 Market Street
Brighton, MA

Figure 3-12
View from across Bennett Street

Existing

Massing Model

375 Market Street
Brighton, MA

Figure 3-13
View from South on Market Street

Figure 3-14

LEED for Homes Simplified Project Checklist

for Homes

Builder Name:	***Brookline Development***
Project Team Leader (if different):	***David O'Sullivan***
Home Address (Street/City/State):	***375 Market Street, Brighton, MA***

Project Description:

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

# of units: ***39*** Avg. Home Size Adjustment: ***-2***

Adjusted Certification Thresholds

Certified: ***43.0*** Gold: ***73.0***

Silver: ***58.0*** Platinum: ***88.0***

Project Point Total

Prelim: *56.5 + 13 maybe pts* Final: *0*

Certification Level

Prelim: *Certified* Final: *Not Certified*

Final Credit Category Total Points

ID: 0 *SS: 0* *EA: 0* *EQ: 0*

LL: 0 *WE: 0* *MR: 0* *AE: 0*

Minimum Point Thresholds Not Met for Final Rating

date last updated :

last updated by :

					Max Points	Project Points Preliminary			Final
Innovation and Design Process (ID)			(No Minimum Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Integrated Project Planning		1.1	Preliminary Rating		Prereq	Y			
		1.2	Integrated Project Team		1	1	0		
		1.3	Professional Credentialed with Respect to LEED for Homes		1	0	0	N	
		1.4	Design Charrette		1	0	0	N	
		1.5	Building Orientation for Solar Design		1	0	0	N	
2. Durability Management Process		2.1	Durability Planning		Prereq	Y			
		2.2	Durability Management		Prereq	Y			
		2.3	Third-Party Durability Management Verification		3	0	0		
3.Innovative or Regional Design		3.1	Innovation #1	***Green Cleaning Policy***	1	0	0		
		3.2	Innovation #2	***1/2 mile WD 13 Zipcar locations***	1	0	0		
		3.3	Innovation #3	***1/2 mile WD of 250+ transit rides***	1	0	0		
		3.4	Innovation #4	***Blower Door & Infrared Directed Air Sealing***	1	0	0		
				Sub-Total for ID Category:	***11***	*1*	*0*		***0***
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND		1	LEED for Neighborhood Development	**LL2-6**	10	0	0	N	
2. Site Selection		2	Site Selection		2	2	0		
3. Preferred Locations		3.1	Edge Development	**LL 3.2**	1	0	0	N	
		3.2	Infill		2	2	0		
		3.3	Previously Developed		1	1	0		
4. Infrastructure		4	Existing Infrastructure		1	1	0		
5. Community Resources/ Transit		5.1	Basic Community Resources / Transit	**LL 5.2, 5.3**	1	0	0	N	
		5.2	Extensive Community Resources / Transit	**LL 5.3**	2	0	0	N	
		5.3	Outstanding Community Resources / Transit		3	3	0		
6. Access to Open Space		6	Access to Open Space		1	1	0		
				Sub-Total for LL Category:	***10***	*10*	*0*		***0***
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship		1.1	Erosion Controls During Construction		Prereq	Y			
		1.2	Minimize Disturbed Area of Site		1	1	0		
2. Landscaping		2.1	No Invasive Plants		Prereq	Y			
		2.2	Basic Landscape Design	**SS 2.5**	2	0	0	N	
		2.3	Limit Conventional Turf	**SS 2.5**	3	1	0	N	
		2.4	Drought Tolerant Plants	**SS 2.5**	2	0	0	N	
		2.5	Reduce Overall Irrigation Demand by at Least 20%		6	0	0	N	
3. Local Heat Island Effects		3	Reduce Local Heat Island Effects		1	0	0	N	
4. Surface Water Management		4.1	Permeable Lot		4	0	0	N	
		4.2	Permanent Erosion Controls		1	0	0	N	
		4.3	Management of Run-off from Roof		2	0	0	N	
5. Nontoxic Pest Control		5	Pest Control Alternatives		2	0	0	N	
6. Compact Development		6.1	Moderate Density	**SS 6.2, 6.3**	2	0	0	N	
		6.2	High Density	**SS 6.3**	3	0	0	N	
		6.3	Very High Density		4	4	0		
				Sub-Total for SS Category:	***22***	*6*	*0*		***0***

LEED for Homes Simplified Project Checklist (continued)

					Max Points	Project Points Preliminary			Final
Water Efficiency (WE)			(Minimum of 3 WE Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Water Reuse		1.1	Rainwater Harvesting System	**WE 1.3**	4	0	0	N	
		1.2	Graywater Reuse System	**WE 1.3**	1	0	0	N	
		1.3	Use of Municipal Recycled Water System		3	0	0	N	
2. Irrigation System		2.1	High Efficiency Irrigation System	**WE 2.3**	3	0	0	N	
		2.2	Third Party Inspection	**WE 2.3**	1	0	0	N	
		2.3	Reduce Overall Irrigation Demand by at Least 45%		4	0	0	N	
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	1	0	N	
		3.2	Very High Efficiency Fixtures and Fittings		6	2	0		

Project Point Total		Final Credit Category Total Points				
Prelim: *56.5 + 13 maybe pts*	Final: *0*	*ID: 0*	*SS: 0*	*EA: 0*		*EQ: 0*
Certification Level		*LL: 0*	*WE: 0*	*MR: 0*		*AE: 0*
Prelim: *Certified*	Final: *Not Certified*	*Minimum Point Thresholds Not Met for Final Rating*				

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

LEED for Homes Simplified Project Checklist

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

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

					Max Points	Project Points Preliminary			Final
Energy and Atmosphere (EA)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
2. Insulation		2.1	Basic Insulation		Prereq				
		2.2	Enhanced Insulation		2	*0*	*0*		
3. Air Infiltration		3.1	Reduced Envelope Leakage		Prereq				
		3.2	Greatly Reduced Envelope Leakage		2	*0*	*0*		
		3.3	Minimal Envelope Leakage	**EA 3.2**	3	*0*	*0*		

Project Point Total			Final Credit Category Total Points				
Prelim: *56.5 + 13 maybe pts*	Final: *0*		*ID: 0*	*SS: 0*	*EA: 0*		*EQ: 0*
Certification Level			*LL: 0*	*WE: 0*	*MR: 0*		*AE: 0*
Prelim: *Certified*	Final: *Not Certified*		*Minimum Point Thresholds Not Met for Final Rating*				
4. Windows	4.1	Good Windows		Prereq			
	4.2	Enhanced Windows		2	0	0	
	4.3	Exceptional Windows	**EA 4.2**	3	0	0	
5. Heating and Cooling Distribution System	5.1	Reduced Distribution Losses		Prereq			
	5.2	Greatly Reduced Distribution Losses		2	0	0	
	5.3	Minimal Distribution Losses	**EA 5.2**	3	0	0	
6. Space Heating and Cooling Equipment	6.1	Good HVAC Design and Installation		Prereq			
	6.2	High-Efficiency HVAC		2	0	0	
	6.3	Very High Efficiency HVAC	**EA 6.2**	4	0	0	
7. Water Heating	7.1	Efficient Hot Water Distribution		2	0	0	
	7.2	Pipe Insulation		1	0	0	
	7.3	Efficient Domestic Hot Water Equipment		3	0	0	
8. Lighting	8.1	ENERGY STAR Lights		Prereq			
	8.2	Improved Lighting		2	0	0	
	8.3	Advanced Lighting Package	**EA 8.2**	3	0	0	
9. Appliances	9.1	High-Efficiency Appliances		2	0	0	
	9.2	Water-Efficient Clothes Washer		1	0	0	
10. Renewable Energy	10	Renewable Energy System		10	0	0	
11. Residential Refrigerant Management	11.1	Refrigerant Charge Test		Prereq			
	11.2	Appropriate HVAC Refrigerants		1	0	0	
			Sub-Total for EA Category:	***38***	*18*	*13*	***0***

4.0 ENVIRONMENTAL PROTECTION

4.1 Shadow

4.1.1 Introduction

The following shadow study describes and graphically depicts anticipated new shadow impacts from the Proposed Project compared to shadows cast from existing buildings in the area that normally is presented in the Draft Project Impact Report but has been presented below in order to provide more detailed information during the neighborhood and city review of this PNF. The Study presents both the No Build (existing) conditions and the Build conditions for the hours 9:00 a.m., 12:00 Noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice. In addition, shadows are depicted for 6:00 p.m. during the summer solstice and for 5:30 p.m. during the autumnal equinox. (The change in time for autumnal equinox due to sun set time.)

4.1.2 Vernal Equinox (March 21)

See Figures 4.1-1 through 4.1-3

At 9:00 a.m., new shadows will be cast in a westerly direction towards the rear of the Project site. New shadows will be cast on the ground and on an existing detached garage located at the very back of the lot at 18 Bennett Street.

At 12:00 p.m., new shadows will be cast to the north with majority of new shadows from the Proposed Project being cast on the ground within the Project site. New shadow will also be cast on part of the southern façade of 369 Market Street.

At 3:00 p.m., shadows will be cast in a northeasterly direction and will fall to the rear of the lots beginning at 8 Bennett Street through 14 Bennett Street as well as the southern facing façades of 14 Bennett Street and 369 Market Street. New shadow will also be cast onto the sidewalk and part (approximately 1/4) of the southbound side of Market Street. The majority of new shadow will be on the ground.

4.1.3 Summer Solstice (June 21)

See Figures 4.1-4 through 4.1-7

At 9:00 a.m., new shadows will be cast in a westerly direction towards the rear of the Project site on the ground and on part of an existing detached garage roof in addition to part of the east and north facing façades or said a garage.

At 12:00 p.m., new shadows will be cast to the north with majority being cast on the ground within the Project site.

At 3:00 p.m., new shadows will be cast in a northeasterly direction with majority being cast on the ground within the Project site. New shadow will also fall onto the southern side of the lot at 369 Market Street. New shadow will also be cast onto the sidewalk and part (approximately 1/4) of the southbound drive lane of Market Street. The majority of new shadows will fall on the ground.

At 6:00 p.m., due to the low angle of the sun a new shadow will cast to the east across Market Street and onto the western half the Market Street Burying Ground.

4.1.4 Autumnal Equinox (September 21)

See Figures 4.1-8 through 4.1-11

At 9:00 a.m., new shadows will be cast in a westerly direction towards the rear of the Project site on the ground and on an existing detached garage located at the very back of lot at 18 Bennett Street and to the rear of the lot at 47 Leicester Street.

At 12:00 p.m., new shadows will be cast to the north with majority being cast on the ground within the Project site. New shadow will also be cast on part of the southern façade of 369 Market Street.

At 3:00 p.m., new shadows will fall to the northeast and be cast on the ground at the rear of the lots located at 369 Market Street, 8 Bennett Street, and 12 Bennett Street. New shadow will also fall onto the southern side of 369 Market Street as well as the rear façade of 12 Bennett Street. New shadow will also be cast onto the sidewalk and part (approximately 1/2) of the southbound drive lane of Market Street. The majority of the new shadows will fall on the ground.

At 5:30 p.m., due to the length of the shadows at this time of the day in the Fall, much of neighborhood is already covered in existing shadows. New shadows will extend to the east primarily on the roof tops of 365 and 369 Market Street. New shadow will also be cast to the east across Market and onto part (approximately 1/2) of the Market Street Burying Ground. New shadows will also be cast onto the south facing wall and part of the roof of the apartment building at 360 Market Street at 5:30 p.m.

4.1.5 Winter Solstice (December 21)

See Figures 4.1-12 through 4.1-14

At 9:00 a.m., due to the low angle of the sun new shadows will fall to the ground at the rear of the lots located at 8 through 22 Bennett Street and in some cases both onto the side or rear facades, in of those same addresses. New shadow will also be cast onto the roofs, side walls, and rear walls

of the existing garages located at the backyards of 18 and 22 Bennett Street, and 51 Leicester Street.

At 12:00 p.m., new shadow will be cast to the North, falling on the south facing facades of 8 through 14 Bennett Street. New shadows will also fall on the south facing wall of 369 Market Street. The majority of the new shadows will be cast on the ground in the backyards of 8 through 14 Bennett Street.

At 3:00 p.m., where shadows are the longest, the new shadow will stretch across Bennett Street, although the majority of Bennett Street is already in shade at this time. New shadow will also extend north on Market Street. New shadows will also be cast on part of the south facing façades at 369 Market Street and 8 Bennett Street, and on part of the south facing facades of 12 and 14 Bennett Street.

4.1.6 Summary

For much of the year, most of the new shadows cast by the Proposed Project will be contained mainly within the Project site itself. During summer and fall early evenings, new shadows will cross Market Street and shade a portion of the Market Street Burying Ground, but only for a limited amount of time.

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

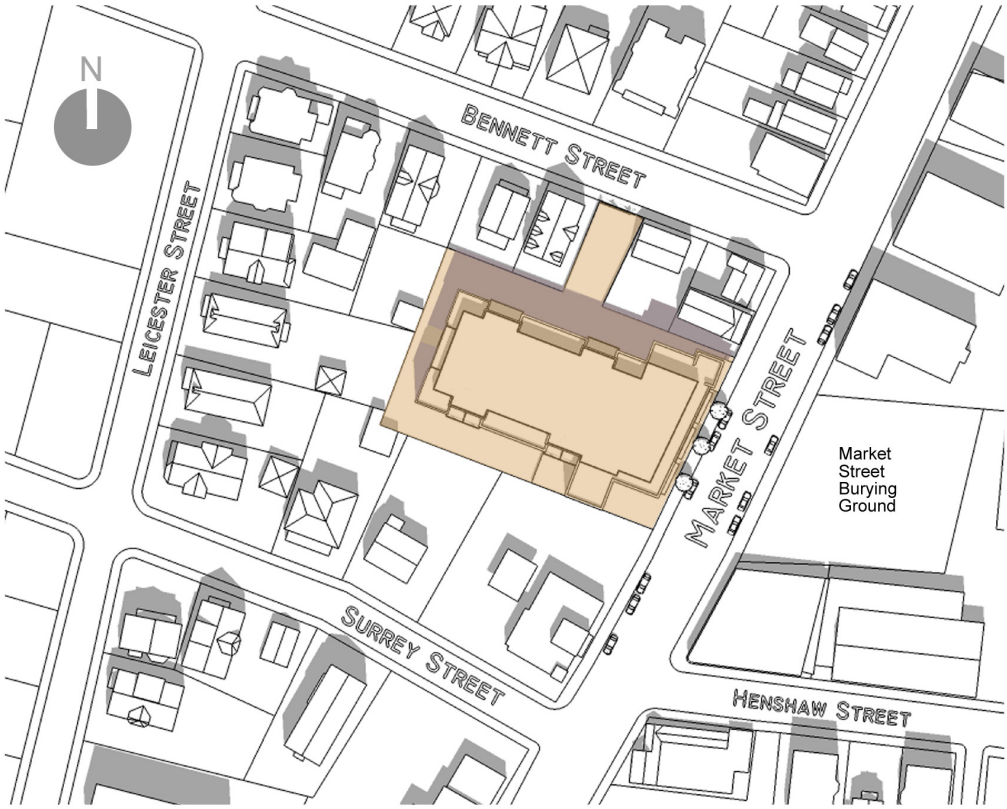
New Shadow
Existing Shadow

Build

No Build

375 Market Street
Brighton, MA

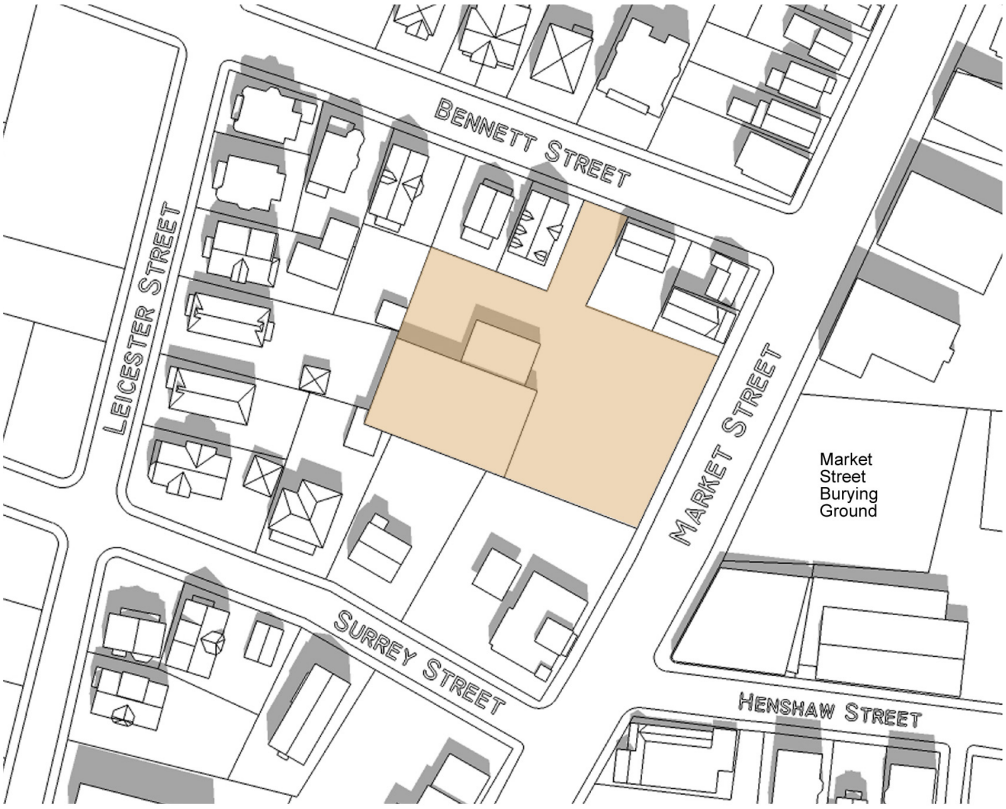
Figure 4.1-1
Azimuth 125.8 Altitude 33.0



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

New Shadow
Existing Shadow

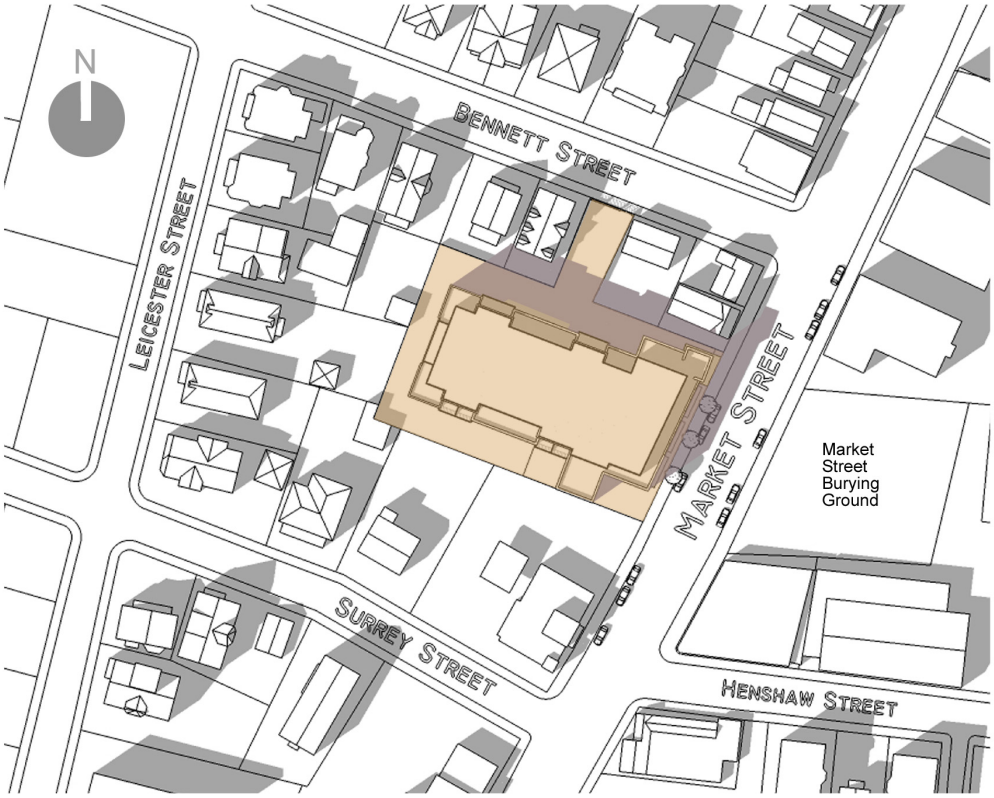
Build



No Build

375 Market Street
Brighton, MA

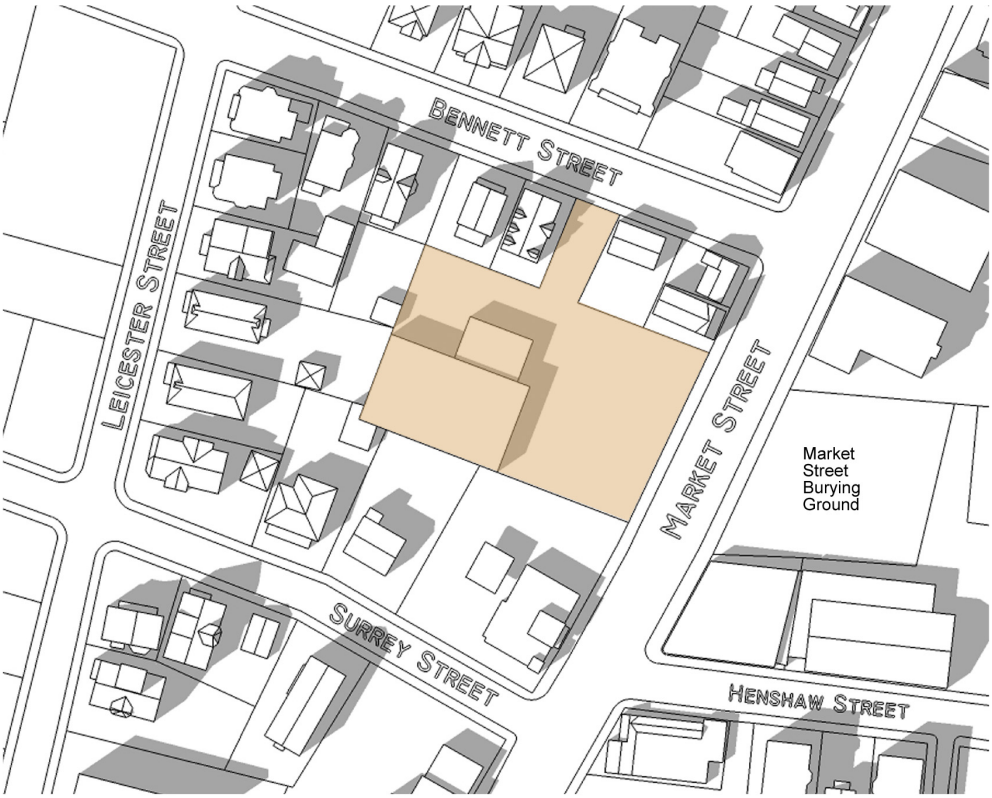
Figure 4.1-2
Azimuth 183.1 Altitude 47.9



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

New Shadow
Existing Shadow

Build



No Build

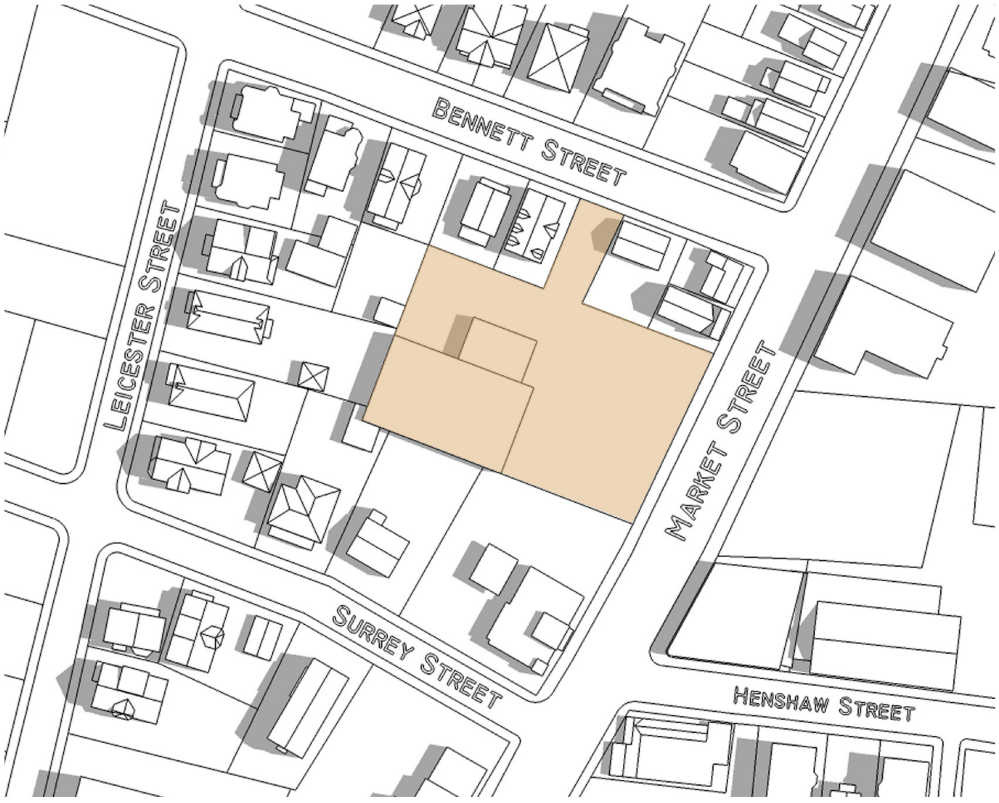
375 Market Street
Brighton, MA

Figure 4.1-3
Azimuth 238.2 Altitude 30.5

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

New Shadow
Existing Shadow

Build



No Build

375 Market Street
Brighton, MA

Figure 4.1-4
Azimuth 105.5 Altitude 50.9

Shadow Study
June 21
12:00 p.m.

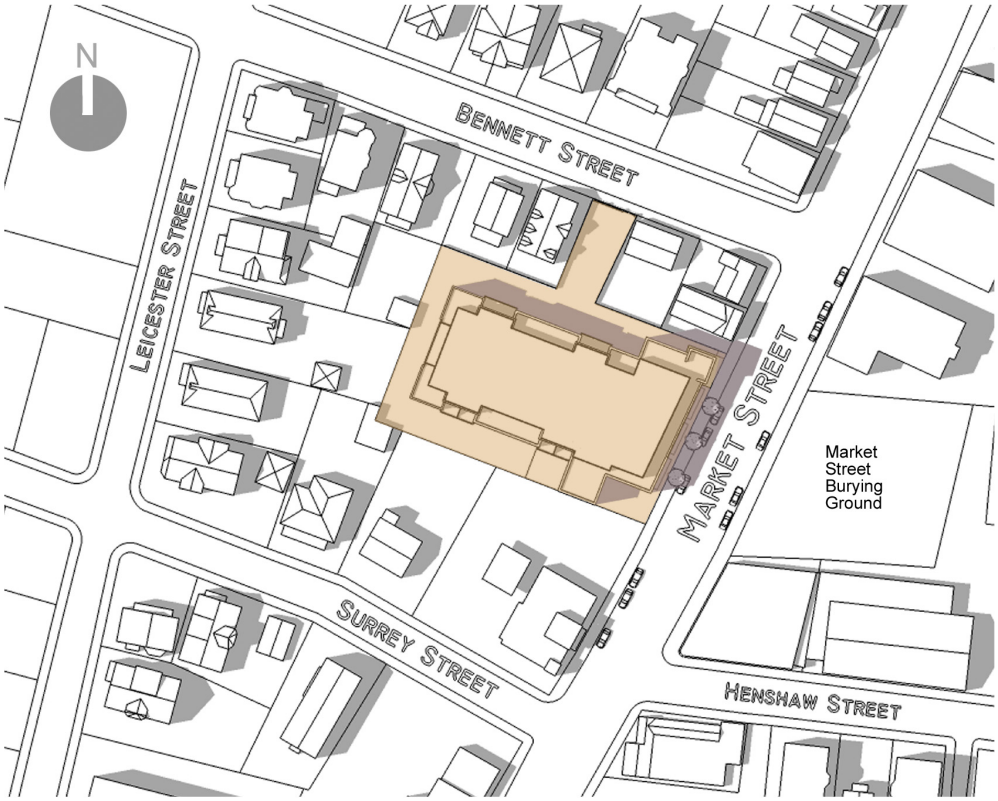
New Shadow
Existing Shadow

Build

No Build

375 Market Street
Brighton, MA

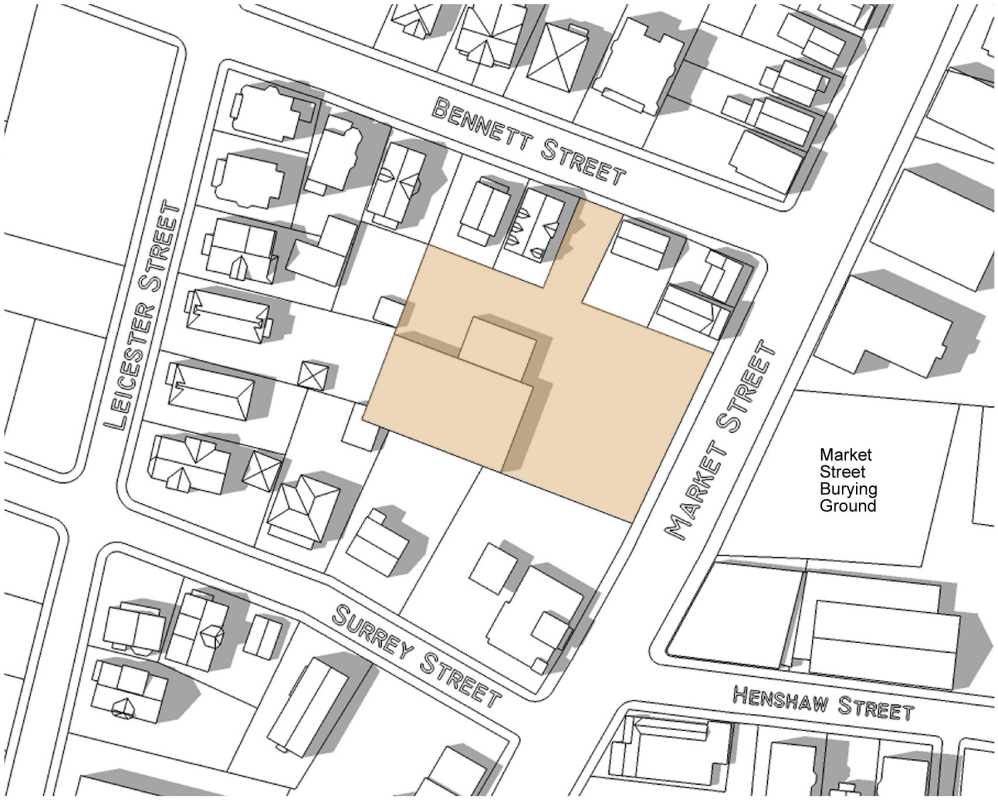
Figure 4.1-5
Azimuth 189.8 Altitude 70.9



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

New Shadow
Existing Shadow

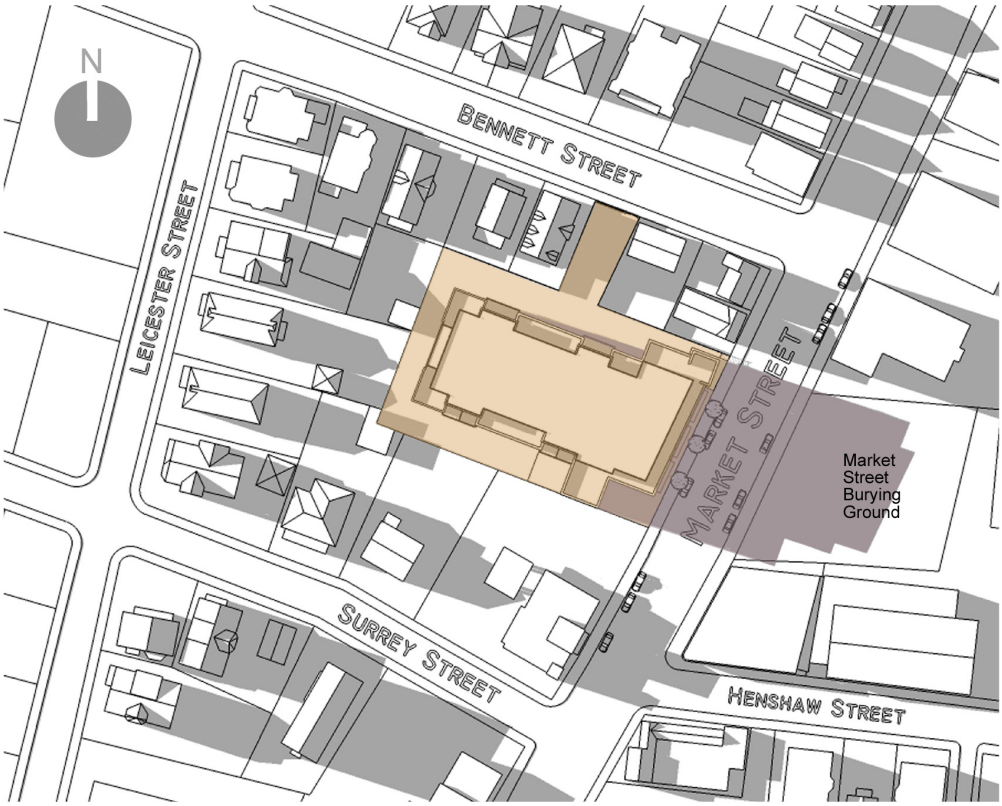
Build



No Build

375 Market Street
Brighton, MA

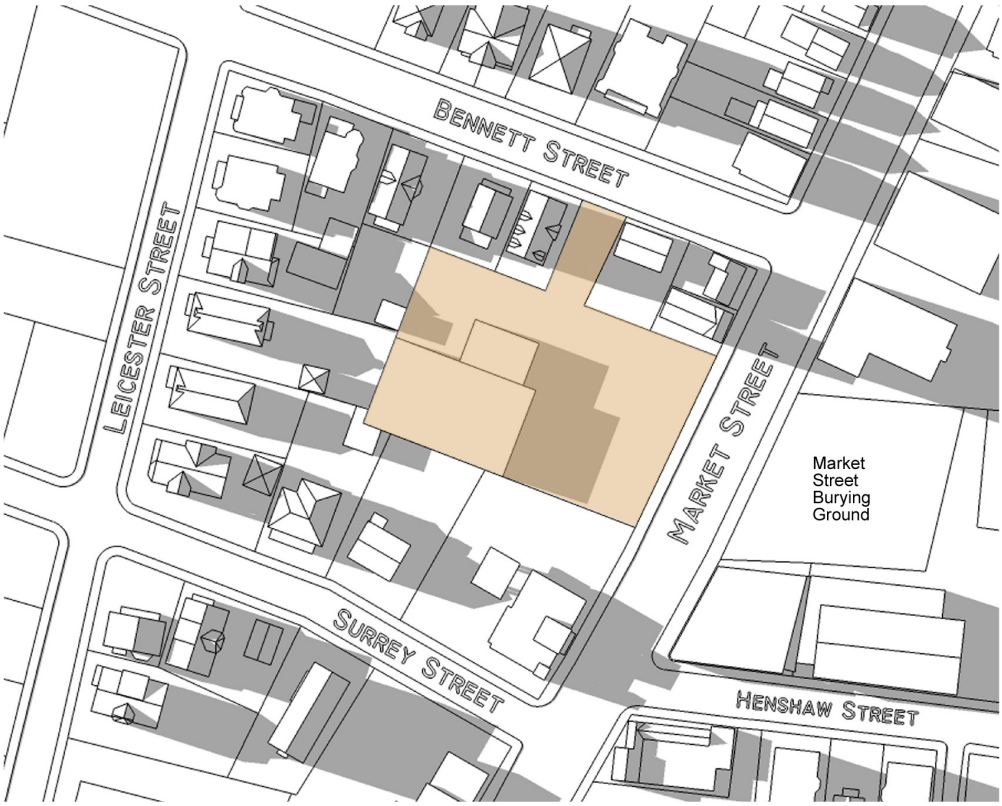
Figure 4.1-6
Azimuth 260.5 Altitude 45.9



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

New Shadow
Existing Shadow

Build



No Build

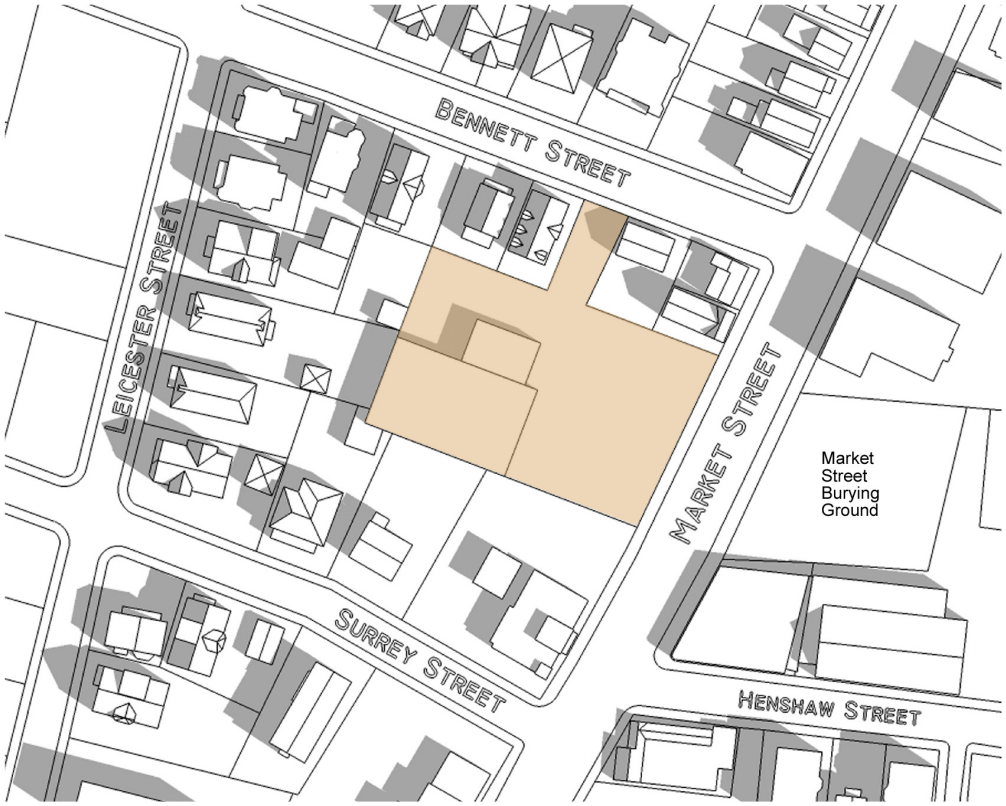
375 Market Street
Brighton, MA

Figure 4.1-7
Azimuth 289.9 Altitude 13.2

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

New Shadow
Existing Shadow

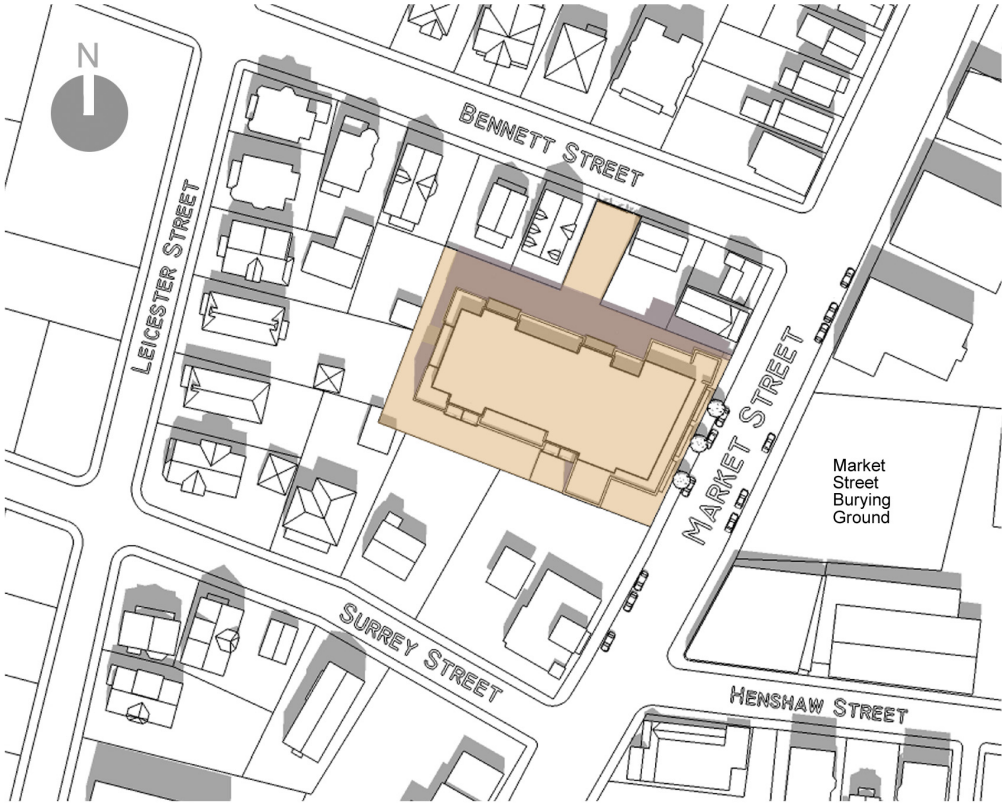
Build



No Build

375 Market Street
Brighton, MA

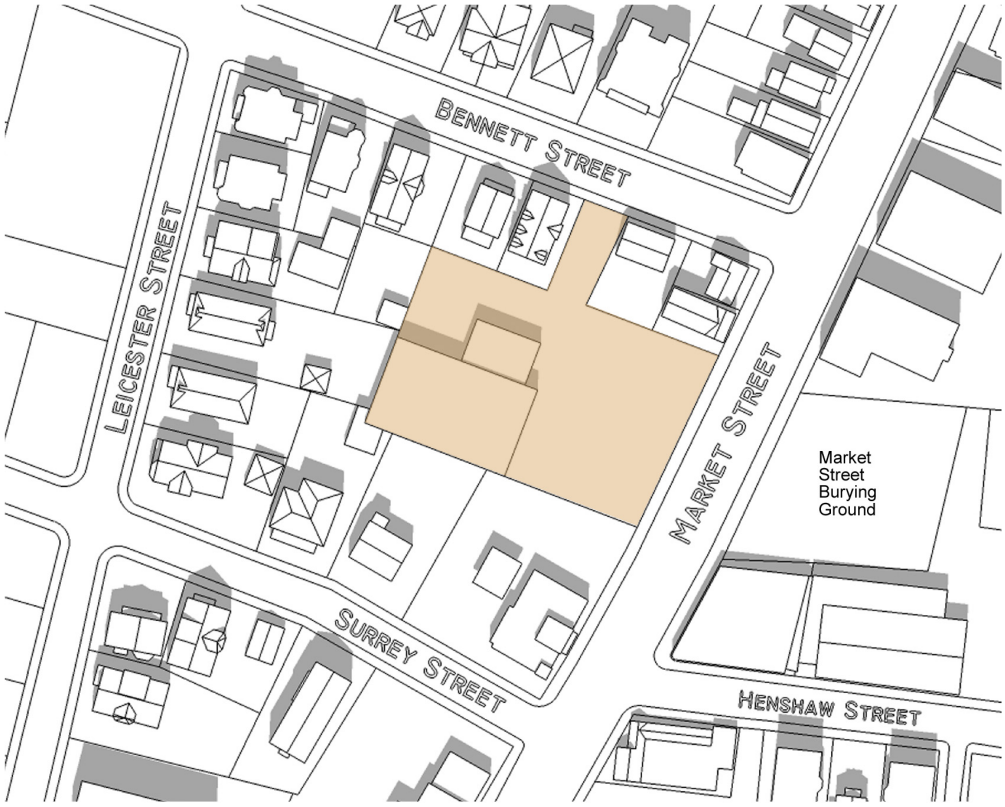
Figure 4.1-8
Azimuth 128.9 Altitude 35.5



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

New Shadow
Existing Shadow

Build



No Build

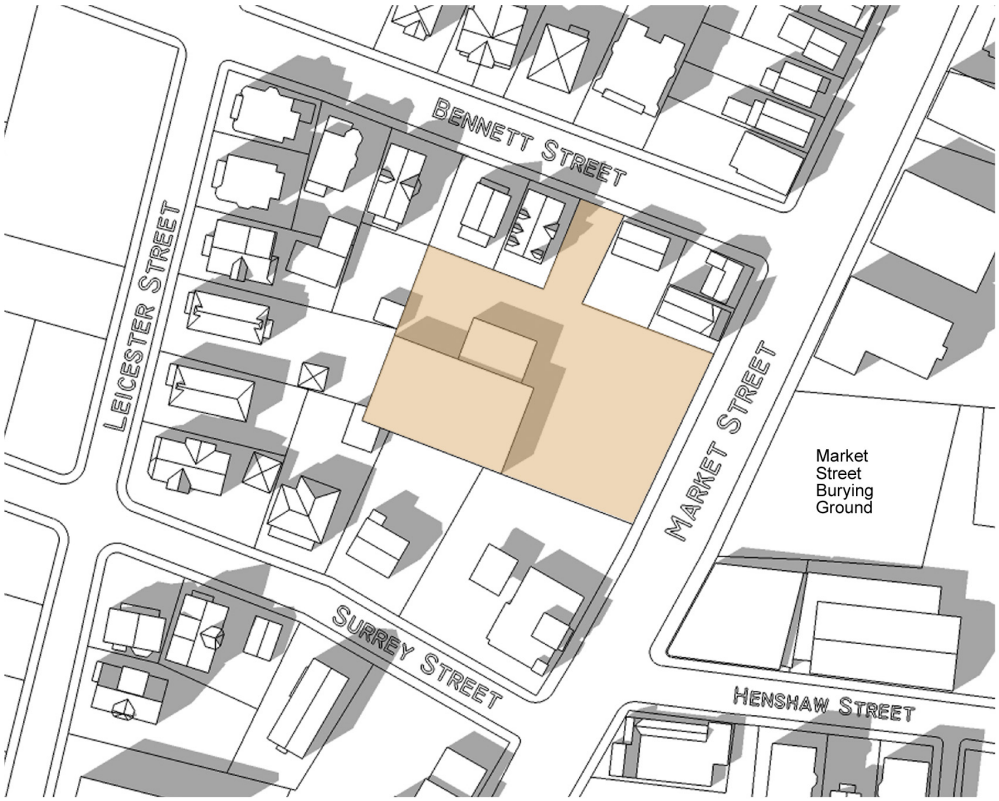
375 Market Street
Brighton, MA

Figure 4.1-9
Azimuth 188.4 Altitude 48.0

Shadow Study
September 21
3:00 p.m.

New Shadow
Existing Shadow

Build



No Build

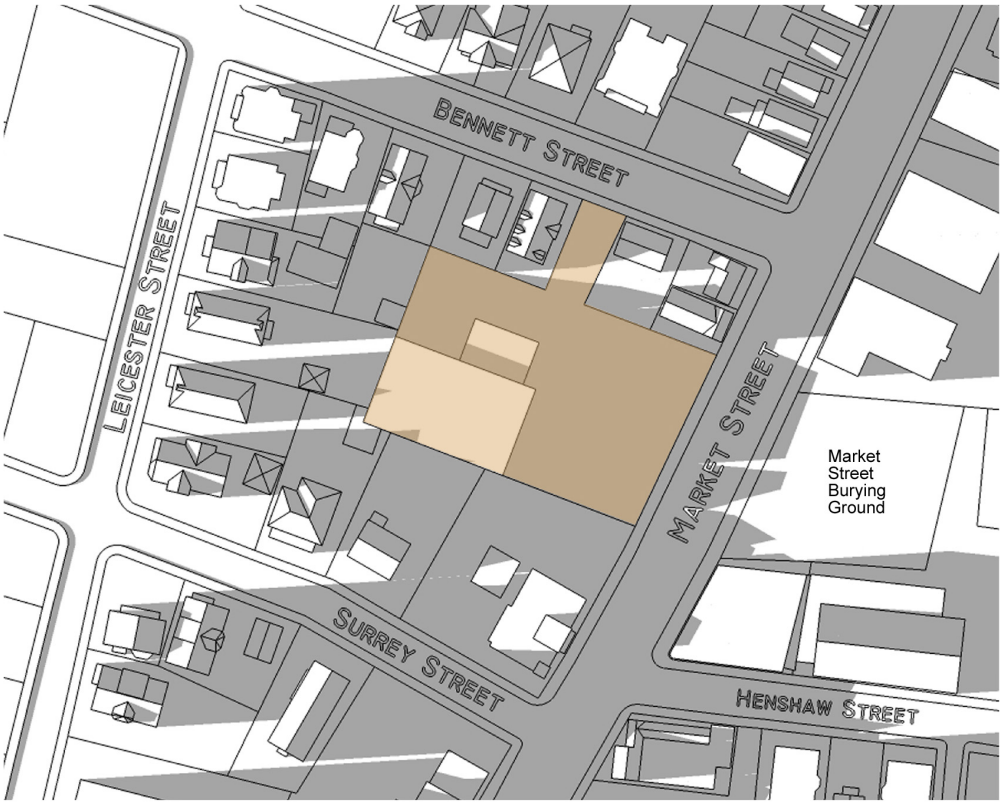
375 Market Street
Brighton, MA

Figure 4.1-10
Azimuth 241.5 Altitude 28.4

Shadow Study
September 21,
5:30 p.m.

New Shadow
Existing Shadow

Build



No Build

375 Market Street
Brighton, MA

Figure 4.1-11
Azimuth 238.2 Altitude 30.5

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

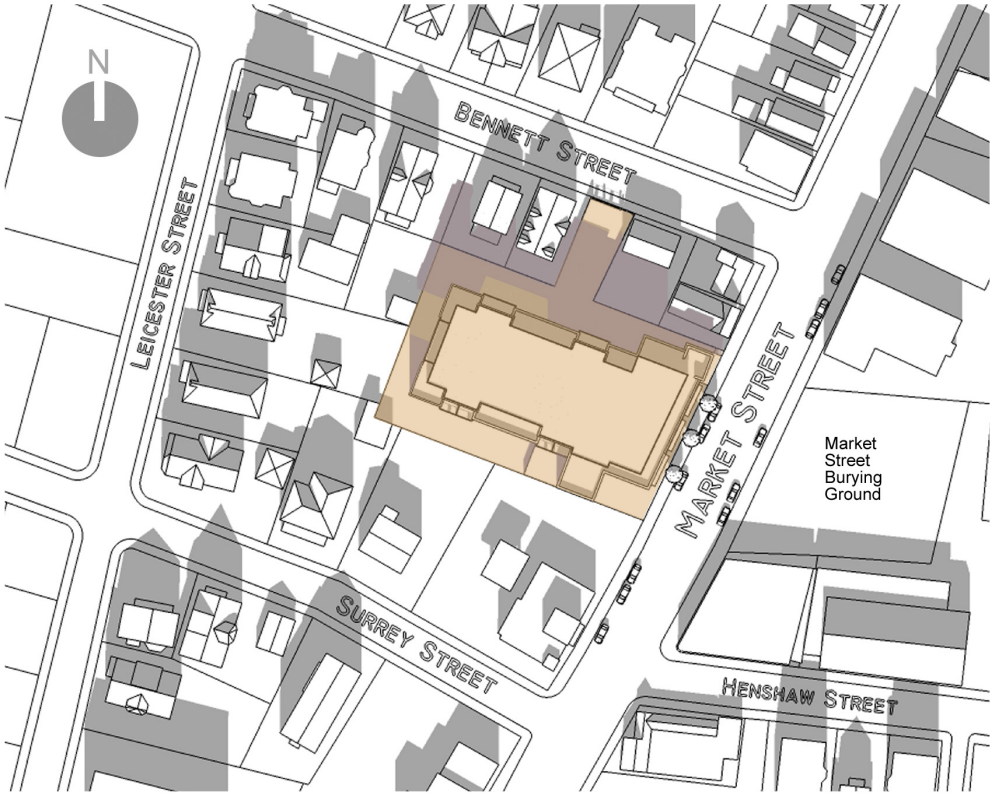
New Shadow
Existing Shadow

Build

No Build

375 Market Street
Brighton, MA

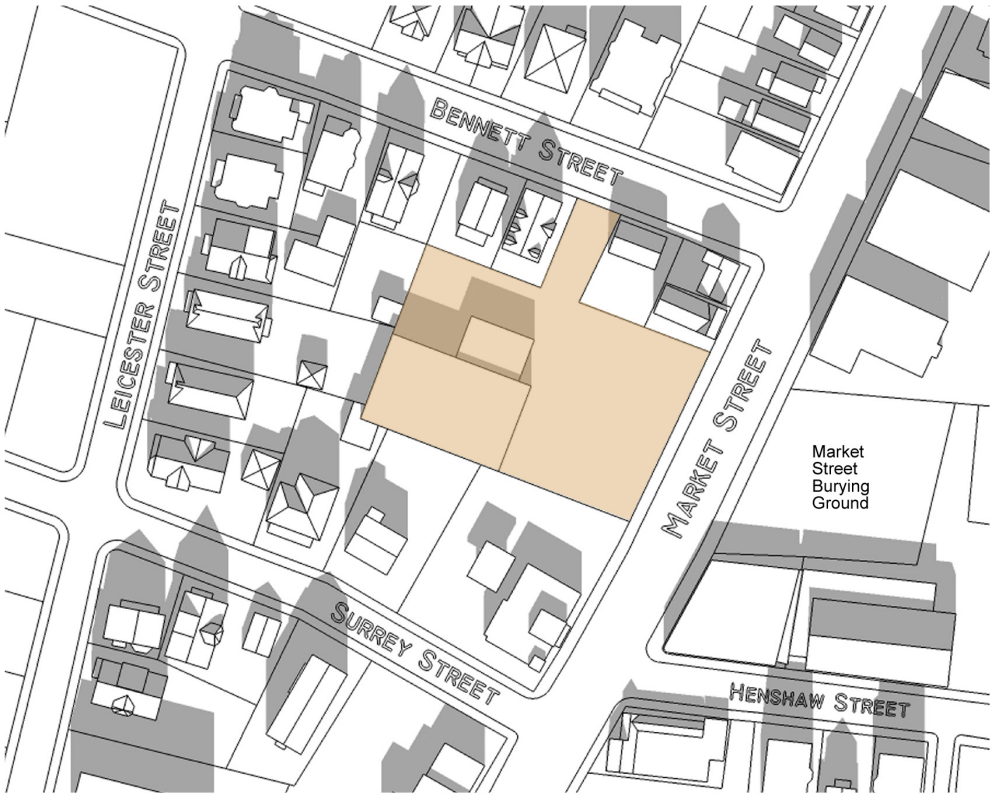
Figure 4.1-12
Azimuth 142.0 Altitude 14.4



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

New Shadow
Existing Shadow

Build



No Build

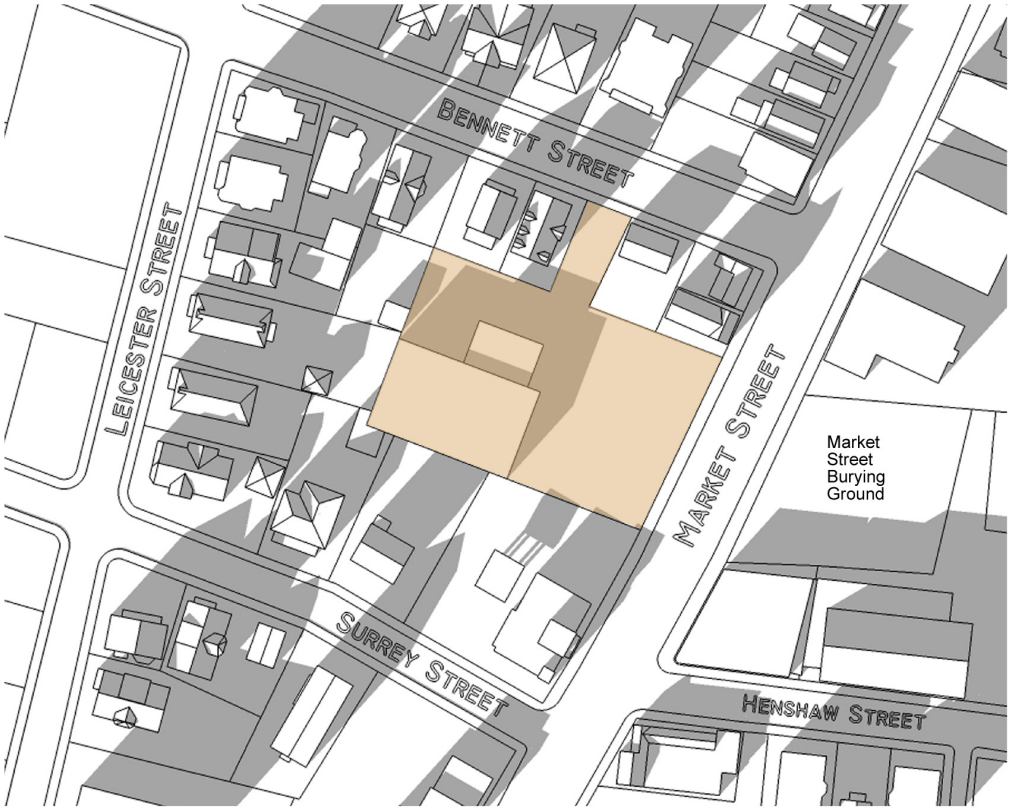
375 Market Street
Brighton, MA

Figure 4.1-13
Azimuth 184.4 Altitude 24.2

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

New Shadow
Existing Shadow

Build



No Build

375 Market Street
Brighton, MA

Figure 4.1-14
Azimuth 225.0 Altitude 10.1

4.2 Wind

As the proposed building height will be approximately 4-stories and slightly more than 45 feet in total height, the Proposed Project is not expected to create adverse pedestrian level wind conditions in the adjoining 3 to 3-1/2 story residential neighborhood. In fact, it is expected that there may be some improvement in nearby wind conditions as much of the existing site contains open surface parking which tends to pick up larger wind speeds for northerly winter winds coming off Market Street.

4.3 Daylight

While the proposed building height of slightly over 45 feet exceeds the 35 feet under existing zoning, any reduction of daylight should be confined to areas within the site.

4.4 Solar Glare

Solar glare impacts are not expected. The proposed building is expected to have both solid and glass areas incorporated into the building facades

4.5 Air Quality

Tech Environmental, Inc. performed air quality analyses for the proposed 375 Market Street project. These analyses consisted of: 1) an evaluation of existing air quality; 2) an evaluation of potential carbon monoxide (CO) impacts from the operation of the Project's underground parking garage ventilation, and 3) a microscale CO analysis for intersections in the Project area that meet the BRA criteria for requiring such an analysis.

4.5.1 Existing Air Quality

The City of Boston is currently classified as being in attainment of the Massachusetts and National Ambient Air Quality Standards ("NAAQS") for all of the criteria air pollutants except ozone (see **Table 4.5-1**). These air quality standards have been established to protect the public health and welfare in ambient air, with a margin for safety.

In January 2010, EPA set a new 1-hour NO_2 standard at 100 parts per billion (ppb) or 188 micrograms per cubic meter (ug/m^3) and retained the current annual average NO_2 standard of 53 ppb or 100 ug/m^3. The new hourly NO_2 standard is based on the three-year average of the 98th percentile of the annual distribution of daily maximum one-hour concentrations.

In June 2010, EPA set a new 1-hour SO_2 standard at 75 ppb or 196 ug/m^3. The new hourly SO_2 standard is based on the three-year average of the 99th percentile of the annual distribution of daily maximum one-hour concentrations.

The Massachusetts Department of Environmental Protection ("DEP") currently operates air monitors in various locations throughout the city. The closest, most representative, DEP monitors for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and lead are located at Kenmore Square. The closest, most representative, DEP monitor for ozone is located at Dudley Square (Harrison Avenue).

Table 4.5-2 summarizes the DEP air monitoring data, for the most recent available, complete, three-year period (2008-2010), that are considered to be representative of the project area. **Table 4.5-2** shows that the existing air quality in the Project area is generally much better than the NAAQS. The highest impacts relative to a NAAQS are for ozone and $PM_{2.5}$. Ozone is a regional air pollutant on which the small amount of additional traffic generated by this Project will have an insignificant impact. The Project's operations will not have a significant impact on local $PM_{2.5}$ concentrations.

Table 4.5-1: Massachusetts and National Ambient Air Quality Standards (NAAQS)		
Pollutant	**Averaging Time**	**NAAQS (µg/m^3)**
SO_2	1-hour^P 24-hour^P Annual^P (Arithmetic Mean)	196[a] 365[b] 80
CO	1-hour^P 8-hour^P	40,000[b] 10,000[b]
NO_2	1-hour^P Annual$^{P/S}$ (Arithmetic Mean)	188[c] 100
PM_{10}	24-hour$^{P/S}$	150
$PM_{2.5}$	24-hour$^{P/S}$ Annual$^{P/S}$ (Arithmetic Mean)	35[d] 15[e]
O_3	8-hour$^{P/S}$	147[f]
Pb	Rolling 3-Month Avg.$^{P/S}$ Calendar Quarter$^{P/S}$ (Arithmetic Mean)	0.15 1.5

P = primary standard; S = secondary standard.

[a] 99th percentile 1-hour concentrations in a year (average over three years).

[b] One exceedance per year is allowed.

[c] 98th percentile 1-hour concentrations in a year (average over three years).

[d] 98th percentile 24-hour concentrations in a year (average over three years).

[e] Three-year average of annual arithmetic means.

[f] Three-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must not exceed 0.075 ppm (147 ug/m^3) (effective May 27, 2008) and the annual PM_{10} standard was revoked in 2006.

Table 4.5-2: Representative Existing Air Quality in the Project Area				
Pollutant, Averaging Period	**Monitor Location**	**Value ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**	**Percent of NAAQS**
CO, 1-hour	Kenmore Square, Boston	2,061	40,000	5%
CO, 8-hour	Kenmore Square, Boston	1,718	10,000	17%
NO_2, 1-hour	Kenmore Square, Boston	103.1	188	55%
NO_2, Annual	Kenmore Square, Boston	41.4	100	41%
Ozone, 8-hour	Harrison Avenue, Boston	123	147	84%
PM_{10}, 24-hour	Kenmore Square, Boston	43	150	29%
$PM_{2.5}$, 24-hour	Kenmore Square, Boston	22.3	35	64%
$PM_{2.5}$, Annual	Kenmore Square, Boston	9.8	15	65%
Lead, Quarterly	Kenmore Square, Boston	0.015	1.5	1%
SO_2, 1-hour	Kenmore Square, Boston	56.7	196	29%
SO_2, 24-hour	Kenmore Square, Boston	36.7	365	10%
SO_2, Annual	Kenmore Square, Boston	10.5	80	13%

Source: MassDEP, http://www.mass.gov/dep/air/priorities/aqreports.htm and email from Ann, Sorenson, MassDEP, September, 2010.

Notes:

(1) Annual averages are highest measured during the most recent three-year period for which data are available (2008 - 2010). Values for periods of 24-hours or less are highest, second-highest over the three-year period unless otherwise noted.

(2) The eight-hour ozone value is the 3-year average of the annual fourth-highest values, the 24-hour $PM_{2.5}$ value is the 3-year average of the 98th percentile values, the annual $PM_{2.5}$ value is the 3-year average of the annual values – these are the values used to determine compliance with the NAAQS for these air pollutants.

(3) The one-hour NO_2 value is the -year average of the 98th percentile values and the one-hour SO_2 value is the -year average of the 99th percentile values

(4) The one-hour ozone standard was revoked by the US EPA in 2005; the annual PM_{10} standard was revoked in 2006 and the 3-hour SO_2 standard was revoked by the US EPA in 2010.

4.5.2 Impacts from Underground Parking Garage Ventilation

The 375 Market Street project includes a parking garage, located under the building, designed to provide parking spaces for 58 vehicles. An analysis of the worst-case air quality impacts from the proposed parking garage was performed (see **Appendix C**). The procedures used for this analysis are consistent with U.S. EPA's Volume 9 guidance.[1] The objective of this analysis was to determine the maximum CO concentrations inside the garage and at the closest sensitive

[1] US EPA, "Guidelines for Air Quality Maintenance Planning and Analysis Volume 9 (Revised): Evaluating Indirect Sources," EPA-450/4-78-001, September 1978.

receptors surrounding the Project. These closest sensitive receptors include: air intakes located on the proposed building and nearby existing buildings, and pedestrians at ground level anywhere near the Project. CO emissions from motor vehicles operating inside the garage were calculated and the CO concentrations inside the garage and surrounding the Project were predicted for the morning and afternoon peak traffic periods. The garage exhaust CO emissions were modeled using an U.S. EPA-approved air model.

Garage Ventilation System

The proposed underground parking garage will require mechanical ventilation. The garage ventilation system will be designed to provide adequate dilution of the motor vehicle emissions before they are vented outside. The design of the garage ventilation system will meet all building code requirements. Full ventilation of the garage will require fans that will supply a maximum flow of approximately 19,400 cubic feet per minute (cfm) of fresh air. This quantity of air is designed to meet the building code and will be more than adequate to dilute the emissions inside the parking garage to safe levels before they are vented outside. The garage ventilation exhaust will likely be located at ground-level.

Peak Garage Traffic Volumes

The garage will have one access/egress point, onto Market Street and located on the southern end of the site towards the newly constructed TD Bank to limit noise and traffic at the residential edges of the site. The Market Street entrance is in direct alignment with the underground parking garage ramps and the majority of the ramps will be within the building. The peak morning and afternoon one-hour entering and exiting traffic volumes for the garage are shown in **Table 4.5-3**.

Table 4.5-3: Peak-Hour Garage Traffic Volumes

Period	Entering (vehicles/hour)	Exiting (vehicles/hour)	Total (vehicles/hour)
Morning Peak Hour	15	31	46
Afternoon Peak Hour	28	16	44

Source: GEOD Consulting, Inc.

Motor Vehicle Emission Rates

The U.S. Environmental Protection Agency (EPA) MOBILE6.2 emission factor model was used to calculate single vehicle CO emissions rates, for a vehicle speed of 5 mph. The inputs to the MOBILE6.2 model followed the latest guidance from the Massachusetts Department of

Environmental Protection (DEP) and were performed for the earliest possible Project completion year of 2013. This represents the worst case, since the MOBILE6.2 model predicts decreasing CO emissions rates in future years due to more stringent emission control requirements for new motor vehicles. The CO emission rate calculated by MOBILE6.2, for a speed of 5 mph, was 7.62 grams per mile (gpm) for each entering and exiting vehicle. These emission rates apply to wintertime conditions when motor vehicle CO emissions are greatest due to cold temperatures. MOBILE6.2 model output is provided in the **Appendix C.**

To determine the maximum one-hour CO emissions inside the garage it was necessary to estimate the amount of time each motor vehicle will be in the parking garage with its engine running. To be conservative, it was assumed that every car entering the garage will travel to the farthest parking spot on the lower level, and that the vehicles leaving the garage will have to travel the same distance from inside the garage to the exit. The calculations in **Appendix C** show how long each vehicle was calculated to travel in the garage for both the morning and afternoon peak periods.

Peak Garage CO Emission Rate and CO Concentration Inside the Garage

The peak one-hour CO emission rate for the parking garage was calculated to be 0.21 grams per minute for the morning peak hour and 0.20 grams per minute for the afternoon peak hour. Applying the maximum volumetric garage ventilation flow rate for the parking garage, the peak one-hour CO concentration inside the garage was calculated to be 0.34 parts of CO per million parts of air (ppm) for the morning peak hour and 0.33 ppm for the afternoon peak hour. Therefore, the peak one-hour CO concentration inside the garage will be 0.34 ppm with a peak one-hour emission rate of 0.21 grams/minute (0.0036 grams/second), corresponding to the morning peak period. These predictions represent conservative estimates of the peak garage CO emissions and concentrations.

Peak Ambient CO Concentration

On April 11, 2011, U.S. EPA replaced the SCREEN3 model with AERSCREEN as the recommended air dispersion screening model. Worst-case concentrations of CO from the underground parking garage were predicted for locations around the building with the AERSCREEN model (Version 11060). The results of the air quality analysis for locations outside and around the building are summarized in **Table 4.5-4**. The results in **Table 4.5-4** represent all outside locations on and near the Project Site, including building air intakes, nearby businesses and residences, and pedestrians/sidewalks. **Appendix C** contains the AERSCREEN model output.

The AERSCREEN model was used to predict the maximum concentration of CO by modeling the garage emissions as a point source with aerodynamic building downwash. The AERSCREEN model was used to predict the total maximum concentration of CO by modeling the fuel combustion equipment and garage emissions as one volume source with the total peak morning CO emissions (0.0036 grams/sec). The predicted concentrations presented here represent the

worst-case air quality impacts from the garage at all locations on and around the Project. The AERSCREEN model predicts one-hour average concentrations of air pollutants.

The AERSCREEN model predicts that the maximum one-hour CO concentration from the garage exhaust will be 0.55 ppm (626 $\mu g/m^3$). This concentration represents the maximum CO concentration at any location surrounding the Project.

The maximum predicted eight-hour CO concentration at any ambient (outside) location will be significantly smaller than the one-hour prediction. This is because: 1) the average number of vehicles entering and exiting the garage over the peak eight-hour period will be significantly less than the peak one-hour values used to predict the peak one-hour CO impact, and 2) the worst-case meteorological conditions used to predict the peak one-hour impact will not persist for eight consecutive hours. AERSCREEN guidance allows the maximum eight-hour CO impact to be conservatively estimated by multiplying the maximum one-hour impact by a factor of 0.9 (i.e. the eight-hour impact is 90% of the one-hour impact). The maximum predicted eight-hour CO concentration was determined to be approximately 0.5 ppm (2.9 ppm x 0.9).

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare in ambient air, with a margin for safety. The NAAQS for CO are 35 ppm for a one-hour average and 9 ppm for an eight-hour average. The Commonwealth of Massachusetts has established the same standards for CO. Conservative, urban CO background values of 1.8 ppm for a one-hour period and 1.5 ppm for an eight-hour period were added to the maximum predicted garage ambient impacts to represent the CO contribution from other, more distant, sources. With the conservative background concentration added, the peak, total, one-hour and eight-hour CO impacts from the garage, at any location around the building, will be no larger than 2.4 ppm and 2.0 ppm, respectively. These maximum predicted total CO concentrations (garage exhaust impacts plus background) are safely in compliance with the NAAQS. This analysis demonstrates that the operation of the parking garage will not have an adverse impact on air quality.

Conclusions

A conservative air quality analysis demonstrates that there will be no adverse air quality impacts from the operation of the Project's proposed parking garage.

Table 4.5-4: Peak Predicted Parking Garage Air Quality Impacts				
Location	**Peak Predicted One-Hour Impact (ppm)**	**One-Hour NAAQS (ppm)**	**Peak Predicted Eight-Hour Impact (ppm)**	**Eight-Hour NAAQS (ppm)**
Outside – Surrounding the Building* (Parking Garage)	2.4**	35 (NAAQS)	2.0**	9 (NAAQS)

NAAQS = Massachusetts and National Ambient Air Quality Standards for CO (ppm = parts per million)
* Representative of maximum CO impact at all nearby residences, buildings, and sidewalks.
** Includes background concentrations of 1.8 ppm for the one-hour period and 1.5 ppm for the eight-hour period.

4.5.3 Microscale CO Analysis for Selected Intersections

The Boston Redevelopment Authority (BRA) requires a microscale air quality analysis for any intersection in the Project study area where intersections or roadways existing level of service ("LOS") operates at D, E or F or the project contributes to a reduction in LOS to D, E or F and the proposed project causes a 10% increase in traffic on nearby roadways or 3) the project will generate 3,000 or more new average daily trips. For such intersections, a microscale air quality analysis is required to examine the CO concentrations at sensitive receptors near the intersection.

The 375 Market Street project will consist of a mix of 39 residential units on four-levels, and 3,567 square feet of commercial space at the ground floor, which will generate very few motor vehicle trips (374 average daily trips). A LOS analysis was performed for the Project for two intersections: 1) Market Street at Arlington and Sparhawk Streets and 2) Market Street / Bennett Street unsignalized intersection (See **Section 6.0**).

The 375 Market St traffic impact to the existing transportation infrastructure will be minimal. The effect of the 375 Market St generated traffic on the future year build condition will not increase the delay time of either intersection by more than 2 seconds. The LOS will not increase at either intersection; therefore, a microscale CO air quality analysis is not warranted and the Project will not have a significant impact on air quality.

4.6 Noise Impacts

Tech Environmental, Inc., performed a noise study to determine whether the operation of the proposed Project will comply with the City of Boston Noise Regulations and the Massachusetts Department of Environmental Protection ("DEP") Noise Policy.

4.6.1 Common Measures of Community Noise

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (or 73 dB), not a doubling to 140 dB. Thus, every 3 dB increase represents a doubling of sound energy. For broadband sounds, a 3 dB change is the minimum change perceptible to the human ear. **Table 4.6-1** gives the perceived change in loudness of different changes in sound pressure levels.[2]

Table 4.6-1: Subjective Effects of Changes in Sound Pressure Levels

Change in Sound Level	Apparent Change in Loudness
3 dB	Just perceptible
5 dB	Noticeable
10 dB	Twice (or half) as loud

Non-steady noise exposure in a community is commonly expressed in terms of the A-weighted sound level (dBA); A-weighting approximates the frequency response of the human ear. Levels of many sounds change from moment to moment. Some are sharp impulses lasting 1 second or less, while others rise and fall over much longer periods of time. There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. Similarly, the L_{10} can also be thought of as the level representing the quietest 90 percent of any time period. The L_{10} and L_{90} are broadband sound pressure measures, i.e., they include sounds at all frequencies.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines nine octave bands from 32 Hz to 8,000 Hz. A source is said to create a pure tone if acoustic energy is concentrated in a narrow frequency range and one octave band has a sound level 3 dB greater than both adjacent octave bands.

The acoustic environment in an urban area such as the Project area results from numerous sources. Observations show that major contributors to the background sound level in the Project area include motor vehicle traffic on local and distant streets, aircraft over-flights, mechanical

[2] American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1989 ASHRAE Handbook--Fundamentals (I-P) Edition, Atlanta, GA, 1989.

equipment on nearby buildings, and general city noises such as street sweepers and police/fire sirens. Typical sound levels associated with various activities and environments are presented in **Table 4.6-2**.

4.6.2 Noise Regulations

Commonwealth Noise Policy

The DEP regulates noise through 310 CMR 7.00, "Air Pollution Control." In these regulations "air contaminant" is defined to include sound and a condition of "air pollution" includes the presence of an air contaminant in such concentration and duration as to "cause a nuisance" or "unreasonably interfere with the comfortable enjoyment of life and property."

Regulation 7.10 prohibits "unnecessary emissions" of noise. The DEP DAQC Policy Statement 90-001 (February 1, 1990) interprets a violation of this noise regulation to have occurred if the noise source causes either:

1. An increase in the broadband sound pressure level of more than 10 dBA above the ambient level; or
2. A "pure tone" condition.

The ambient background level is defined as the L_{90} level as measured during equipment operating hours. A "pure tone" condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

The DEP does not regulate noise from motor vehicles accessing a site or the equipment backup notification alarms. Therefore, the provisions described above only apply to a portion of the sources that may generate sound following construction of the Project.

Local Regulations

The City of Boston Environment Department regulates noise through the Regulations for the Control of Noise as administered by the Air Pollution Control Commission. The Project is located in an area consisting of commercial and residential uses. The Project will have low-rise residential uses to the north, east, and south. The Project must comply with Regulation 2.2 for noise levels in Residential Zoning Districts at these residential locations**. Table 4.6-3** lists the maximum allowable octave band and broadband sound pressure levels for residential and business districts. Daytime is defined by the City of Boston Noise Regulations as occurring between the hours of 7:00 a.m. and 6:00 p.m. daily except Sunday. Compliance with the most restrictive nighttime residential limits will ensure compliance for other land uses with equal or higher noise limits.

Table 4.6-2: Common Indoor and Outdoor Sound Levels			
Outdoor Sound Levels	**Sound Pressure (μPa)**	**Sound Level (dBA)**	**Indoor Sound Levels**
	6,324,555	110	Rock Band at 5 m
Jet Over-Flight at 300 m		105	
	2,000,000	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		95	
	632,456	90	Food Blender at 1 m
Diesel Truck at 15 m		85	
Noisy Urban Area—Daytime	200,000	80	Garbage Disposal at 1 m
		75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		65	Normal Speech at 1 m
	20,000	60	
Quiet Urban Area—Daytime		55	Quiet Conversation at 1m
	6,325	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		45	
	2,000	40	Empty Theater or Library
Quiet Suburb—Nighttime		35	
	632	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		25	Empty Concert Hall
Rustling Leaves	200	20	Average Whisper
		15	Broadcast and Recording Studios
	63	10	
		5	Human Breathing
Reference Pressure Level	20	0	Threshold of Hearing

Notes: μPa, or micro-Pascals, describes sound pressure levels (force/area). DBA, or A-weighted decibels, describes sound pressure on a logarithmic scale with respect to 20 μPa (reference pressure level).

Table 4.6-3: Maximum Allowable Sound Pressure Levels (dB) City of Boston			
	Zoning District		
Octave Band (Hz)	Residential (Daytime)	Residential (All Other Times)	Business (anytime)
32 Hz	76	68	79
63 Hz	75	67	78
125 Hz	69	61	73
250 Hz	62	52	68
500 Hz	56	46	62
1000 Hz	50	40	56
2000 Hz	45	33	51
4000 Hz	40	28	47
8000 Hz	38	26	44
Broadband (dBA)	**60**	**50**	**65**

4.6.3 Pre-Construction Sound Level Measurements

Existing baseline sound levels in the Project area were measured during the quietest overnight period when human activity and street traffic were at a minimum, and when the Project's mechanical equipment (the principal sound sources) could be operating. Since the Project's mechanical equipment may operate at any time during a 24-hour day, a weekday between 12:00 a.m. and 5:00 a.m. was selected as the worst-case time period, i.e., the time period when Project-related sounds may be most noticeable due to the quieter background sound levels. Establishing an existing background (L_{90}) during the quietest hours of the facility operation is a conservative approach for noise impact assessment and is required by the DEP Noise Policy.

The nighttime noise measurement locations are as follows (see the Figure 1 in the **Noise Appendix** [**Appendix D**]):

Monitoring Location #1: 375 Market Street

Monitoring Location #2: 3 Surrey Street

Broadband (dBA) and octave band sound level measurements were made with a CEL Model 593 environmental sound level analyzer, at each monitoring location, for a duration of approximately one-half hour. The full octave band frequency analysis was performed on the frequencies spanning 16 to 16,000 Hertz. A time-integrated statistical analysis of the data used to quantify the sound variation was also performed, including the calculation of the L_{90}, which is used to set the ambient background sound level.

The CEL 593 model is equipped with a model CEL 250 ½" precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. This meter meets or exceeds all requirements set forth in the ANSI S1.4-1983 Standards for Type 1 quality and accuracy and the State and City requirements for sound level instrumentation. Prior to any measurements, this sound analyzer was calibrated with an ANSI Type 1 calibrator that has an accuracy traceable to the National Institute of Standards and Technology (NIST). During all measurements, the CEL 593 was tripod mounted at approximately five feet above the ground in open areas away from vertical reflecting surfaces.

The sound level monitoring was conducted on Wednesday, August 24, 2011. Weather conditions during the sound survey were conducive to accurate sound level monitoring: the temperature was 60°F, the skies were partly cloudy, and the winds were 3 to 10 mph. The microphone of the sound level analyzer was fitted with a 7-inch windscreen to negate any effects of wind-generated noise.

The nighttime sound level measurements taken in the vicinity of the Project Site reveal sound levels that are generally low for an urban area. A significant source of existing sound at all locations is motor vehicle traffic on distant and local streets, residential and commercial air handling equipment, and aircraft over-flights.

The results of the nighttime baseline sound level measurements are presented in **Table 4.6-4**, and the complete measurement printouts are provided in **Appendix D**. The nighttime background L_{90} level was 46 dBA at Location #2 and 47 dBA at Location #1. The octave band data in **Table 4.6-4** show that no pure tones were detected in the nighttime noise measurements.

Table 4.6-4: Nighttime Baseline Sound Level Measurements August 24, 2011		
Sound Level Measurement	**(Location #1) 375 Market Street 12:01 - 12:31 a.m.**	**(Location #2) #3 Surrey Street 12:33- 1:03 a.m.**
Broadband (dBA) Background (L_{90})	47	46
Octave Band L_{90} (dB) 16 Hz 32 Hz 63 Hz 125 Hz 250 Hz 500 Hz 1000 Hz 2000 Hz 4000 Hz 8000 Hz 16000 Hz	 35 43 50 51 47 45 43 38 31 23 16	 34 43 49 47 44 43 40 38 31 23 16
Pure Tone?	No	No

4.6.4 Reference Data for Acoustic Modeling

The mechanical systems for the Proposed Project are in the early design stage. Typical sound power data for the equipment of the expected size and type for the Project have been used in the acoustic model to represent the Project's mechanical equipment. The sound levels from all potential significant Project noise sources are discussed in this section.

The design for the Proposed Project is expected to include the following significant mechanical equipment:

- Thirty nine (39) 3-ton HVAC units on the building rooftop, to provide air conditioning for the building interior.
- Five makeup air handling units on the building rooftop.

The equipment listed above, which will be located on the building roof, was included in the noise impact analysis. The Project's traffic was not included in the noise analysis because motor vehicles are exempt under both the City of Boston and Massachusetts DEP noise regulations.

The sound generation profiles for the mechanical equipment noise sources operating concurrently under full-load conditions were used to determine the maximum possible resultant sound levels

from the Project Site as a whole, to define a worst-case scenario. To be in compliance with City and DEP regulations, the resultant sound level must not exceed the allowable octave band limits in the City of Boston noise regulation and must be below the allowable incremental noise increase, relative to existing noise levels, as required in the DEP Noise Policy.

This sound level impact analysis was performed using sound generation data for representative equipment to demonstrate compliance with noise regulations. As the building design evolves, the sound generation for the actual equipment selected may differ from the values that were utilized for the analysis.

4.6.5 Calculated Future Sound Levels

Methodology

Future maximum sound levels at the upper floors of all existing residences bordering the Project, and at the nearest residential property lines, were calculated with acoustic modeling software assuming simultaneous operation of all mechanical equipment at their maximum loads.

The Cadna-A computer program, a comprehensive 3-dimensional acoustical modeling software package was used to calculate Project generated sound propagation and attenuation.[3] The model is based on ISO 9613, an internationally recognized standard specifically developed to ensure the highly accurate calculation of environmental noise in an outdoor environment. ISO 9613 standard incorporates the propagation and attenuation of sound energy due to divergence with distance, surface and building reflections, air and ground absorption, and sound wave diffraction and shielding effects caused by barriers, buildings, and ground topography.

Receptors

The closest/worst-case sensitive (residential) location is to the north of the project area on Bennett Street. This location was selected based on the proximity of the equipment (smaller distances correspond to larger noise impacts) and the amount of shielding by other buildings (taller nearby residential locations will experience less shielding from the Project's rooftop mechanical equipment, which may result in larger potential noise impacts from the Project). This location is expected to receive the largest sound level impacts from the Project's rooftop mechanical equipment. It can be classified as a residential zone.

The sound level impacts from the building's mechanical equipment were predicted at the four closest (worst case) property lines. The property lines would include Bennett Street to the north, Leicester Street to the west, Surrey Street to the south, and Market Street to the east. For locations below the building roof line on which the equipment is to be located, the higher the elevation of the receptor, the less shielding it will experience from the roofline. Figure 1 in **Appendix D** shows the locations of the modeled noise receptors. Noise impacts at other nearby noise-sensitive

[3] Cadna-A Computer Aided Noise Abatement Program, Version 3.7.1.

locations (residences, parks, etc.) farther from the Project Site will be less than those predicted for these receptors.

4.6.6 Compliance with State and Local Noise Standards

The City of Boston and DEP noise standards apply to the operation of the mechanical equipment at the proposed Project. The details of the noise predictions are presented in **Tables 4.6-5** through **4.6-9**. The sound impact analysis includes the simultaneous operation of the Project's rooftop HVAC equipment. The predicted sound levels are worst-case predictions that represent all hours of the day, as the analysis assumes full operation of the mechanical equipment 24-hours a day. The typical sound level impacts from the mechanical equipment will likely be lower than what is presented here, since most of the mechanical equipment will operate at full-load only during certain times of the day and during the warmer months of the year, it is not likely that all of the mechanical equipment will operate at the same time. Sound level impacts at locations farther from the Project (e.g. other residences, etc.) will be lower than those presented in this report.

City of Boston Noise Standards

The noise impact analysis results, presented in **Tables 4.6-5** through **4.6-9**, reveal that the sound level impact at the worst-case property line and the closest residence will be between 46 and 49 dBA. The smallest sound level impact of 46 dBA is predicted to occur at the eastern property line (Market Street). The largest sound level impact of 48 dBA is predicted to occur at the closest Bennett Street residence. Noise impacts predicted at all locations are in compliance with the City of Boston's nighttime noise limit (50 dBA) for a residential area. Note that sound levels from the project at 375 Market Street will be below the residential nighttime limits at all times. The results also demonstrate compliance with the City of Boston, residential, non-daytime, octave band noise limits at both closest locations.

The City of Boston noise limits for business areas are significantly higher than the nighttime noise limits for residential areas (see **Table 4.6-3**). The Project will also easily comply with the City of Boston business area noise limits at all surrounding commercial properties.

Massachusetts DEP Noise Regulations

The predicted sound level impacts at the worst-case property line and the worst-case residential locations were added to the measured L_{90} value of the quietest daily hour to test compliance with DEP's noise criteria. Assuming the Project's mechanical noise is constant throughout the day, the Project will cause the largest increase in sound levels during the period when the lowest background noise occurs. Minimum background sound levels (diurnal) typically occur between 12:00 a.m. and 5:00 a.m.

The predicted sound level impacts at the worst-case property line and the closest residences were added to the L_{90} values measured during the period with the least amount of background noise to test compliance with DEP's noise criteria. The predicted noise impacts at the property line and the closest residences were added to the most-representative measured L_{90} values to determine the

largest possible increase in the sound level at each location during the quietest hour at the Project Site.

As shown in **Tables 4.6-5** through **4.6-9**, the Project is predicted to produce only a 3-4 dBA change in the background sound levels at all modeled locations. Therefore, the Project's worst-case sound level impacts during the quietest nighttime periods will be in compliance with the Massachusetts DEP allowed noise increase of 10 dBA. The noise predictions for each octave band indicate that the mechanical equipment will not create a pure tone condition at any location.

4.6.7 Conclusions

Sound levels at all nearby sensitive locations and at all property lines will fully comply with the most stringent City of Boston and DEP daytime and nighttime sound level limits.

This acoustic analysis demonstrates that the Project's design will meet the applicable acoustic criteria.

Table 4.6-5: Estimated Future Sound Level Impacts – Anytime Bennett Street (Closest Residence) – Location M1		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	67
63 Hz	67	65
125 Hz	61	61
250 Hz	52	50
500 Hz	46	41
1000 Hz	40	35
2000 Hz	33	25
4000 Hz	28	16
8000 Hz	26	12
Broadband (dBA)	**50**	**48**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Location # 2)	46
375 Market Street Project*	48
Calculated Combined Future Sound Level	50
Calculated Incremental Increase	+4
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.6-6: Estimated Future Sound Level Impacts – Anytime Northern Property Line – Location M2		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	67
63 Hz	67	65
125 Hz	61	60
250 Hz	52	47
500 Hz	46	38
1000 Hz	40	33
2000 Hz	33	26
4000 Hz	28	18
8000 Hz	26	16
Broadband (dBA)	**50**	**46**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Location # 1)	46
375 Market Street Project*	46
Calculated Combined Future Sound Level	49
Calculated Incremental Increase	+3
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.6-7: Estimated Future Sound Level Impacts – Anytime Western Property Line – Location M3		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	67
63 Hz	67	65
125 Hz	61	59
250 Hz	52	47
500 Hz	46	38
1000 Hz	40	32
2000 Hz	33	25
4000 Hz	28	17
8000 Hz	26	15
Broadband (dBA)	**50**	**48**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Location # 2)	46
375 Market Street Project*	48
Calculated Combined Future Sound Level	50
Calculated Incremental Increase	+ 4
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.6-8: Estimated Future Sound Level Impacts – Anytime Southern Property Line – Location M4		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	68
63 Hz	67	66
125 Hz	61	61
250 Hz	52	48
500 Hz	46	39
1000 Hz	40	33
2000 Hz	33	26
4000 Hz	28	18
8000 Hz	26	16
Broadband (dBA)	**50**	**47**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Location # 2)	46
375 Market Street Project*	47
Calculated Combined Future Sound Level	50
Calculated Incremental Increase	+ 4
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.6-9: Estimated Future Sound Level Impacts – Anytime Eastern Property Line – Location M5		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	68
63 Hz	67	65
125 Hz	61	61
250 Hz	52	49
500 Hz	46	40
1000 Hz	40	37
2000 Hz	33	29
4000 Hz	28	22
8000 Hz	26	22
Broadband (dBA)	**50**	**46**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Location # 3)	47
375 Market Street Project*	46
Calculated Combined Future Sound Level	50
Calculated Incremental Increase	+3
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: DEP Policy allows a sound level increase of up to 10 dBA

4.7 Flood Hazard Zones/Wetlands

There is no portion of the Project Site within the 100-year flood elevation as indicated on the Flood Insurance Rate Maps, nor are there any wetland resource areas regulated by the Massachusetts Wetlands Protection Act on or within 100 feet of the Project Site.

4.8 Water Quality/Stormwater Management

The Project is not expected to affect the water quality of nearby water bodies. The proposed building; and related hard surface areas will cover a large portion of the site with some landscaped treated area adjacent to the building and in the area connecting to Bennett Street.

There will be a reduction in impervious area because of the creation of an open space/park area near Bennett Street but the existing drainage patterns will not change. Stormwater runoff from roofs is considered "clean" with no sediments or pollutants, therefore treatment is not typically required. In addition, some of the stormwater on the roofs could be collected by any planted areas that are incorporated into the Project design.

All necessary dewatering will be conducted in accordance with a Massachusetts Water Resource Authority ("MWRA") and Boston Water and Sewer Commission ("BWSC") discharge permits. The effects of the construction dewatering should be limited even though there will be substantial excavation needed as the depth of excavation is well above the water table. The Project will also comply with required local and state stormwater management regulations.

Boston Water & Sewer Commission

Proposed connections to the Commission's water, sanitary sewer, and storm drain system will be designed in conformance with the Commission's design standards, Sewer Use and Water Distribution System Regulations, and Requirements for Site Plans. The Proponent will submit a General Service Application and a Site Plan for review and approval prior to construction. The Site Plan will indicate the existing and proposed water mains, sanitary sewers, storm sewers, telephone, gas, electric, steam, and cable television.

4.9 Geotechnical/Groundwater Impacts

Based upon available information from four borings advanced to the depths of between 7 and 31 feet, taken in conjunction with subsurface investigations completed for a Site Assessment completed by HMM Associates in 1989, subsurface conditions are anticipated to include medium dense fill, medium to coarse sand, gravel and cobble fragments with an occasional fine sand unit or silty sand bed. The majority of the unconsolidated glacial deposits appear to be of glacial origin and was mostly readily classified as glacial till. Groundwater was encountered in the borings at depths varying from 26.75 to 29.12 feet below the existing ground surface.

Probable Project Impact and Mitigation Measures

Provisions will be incorporated into the design and construction procedures to limit potential adverse impacts to adjacent structures and utilities. Specific mitigation measures are as follows:

- If proximity of construction to residential structure warrants, a pre-construction survey will be conducted of abutting and adjacent structures to document existing conditions.
- The design team will conduct studies, prepare designs and specifications, and review contractor's submittals for conformance to the Project contract documents with specific attention to protection of nearby structures and facilities. The contractor will be required to modify construction methods and take all necessary steps during the work to protect nearby buildings and other facilities.

- Minimizing impacts from construction vibrations due to excavation is an important consideration in the design and construction of the proposed building. First, thresholds for vibration levels will be incorporated into the Contract Documents for construction. These thresholds will be based upon industry-recognized standards which have been developed for the protection of the specific types of structures present in the surrounding neighborhood. If vibration thresholds are exceeded, the Contractor will be required to modify his operations to result in lower construction-related vibrations.
- The design team will provide on-site monitoring of the contractor's excavations and foundation construction activities during the below–grade portion of the work. This will enable observation of the contractor's compliance with the construction specifications and to facilitate adjustments to procedures based on observed performance.

4.10 Solid and Hazardous Materials

4.10.1 Operational Solid Waste

The Proponent will implement measures to handle the anticipated generation, storage, and disposal of solid waste generated by the Project. Operational measures will be been considered that will be employed to promote waste reduction and recycling. The Project will accommodate recycling measures meeting or exceeding the City's recycling guidelines. In addition, the disposal and construction contracts will include specific language to ensure the contractor's compliance with City and State regulations. Demolition and construction debris will be recycled to the maximum extent possible.

It is estimated that approximately 124 tons of solid waste may be generated by uses within the three new buildings. This estimate is based on the assumption that each residential bedroom will generate approximately 1.5 tons per year, and the retail/commercial uses being considered may generate up to 5.5 tons per year of waste for each 1,000 square feet of space.

The building's interior design will encourage the recycling of solid waste by providing storage areas for recyclable materials in appropriate areas. As typically requested by the Boston Environment Department, the building will provide the appropriate spaces required to institute a recycling program that meets or exceeds the City's recycling guidelines, and that provides recycling areas for waste paper and newspaper, metal, glass, and plastics (#1 through #7, co-mingled). These areas will be located on the ground floor level in the trash room.

4.11 Construction Period Waste

Solid waste generated during construction will consist of largely of demolition debris, and limited excavated materials. Excavated soil and debris to be taken off-site will be characterized, as necessary, prior to removal, and if necessary delivered to an appropriate disposal facility in accordance with regulatory requirements.

The disposal and construction contracts will include specific language to ensure the contractor's compliance with City and State regulations. Demolition and construction debris will be recycled to the maximum extent possible. Normal construction debris will be disposed of into dumpsters that will be located within the Project Site and legally emptied at an approved receiving facility. Containment of construction materials and miscellaneous trash will be controlled by proper on-site supervision, and storage of construction debris on-site will be kept to a minimum.

The Proponent's contractor will be instructed to take an active role in ensuring that waste removal and disposal during construction and operation will be in conformance with the City and DEP's Regulations for Solid Waste.

4.11.1 Hazardous Materials

Based on an ASTM Phase I Environmental Site Assessment Report completed for the Proponent in March, 2010 by NewPath, a section of the building that currently occupies the site was used to sell and service automobiles. It was believed in prior studies that the Carpenters Union purchased the building c1974 and has used it since that time for training. At some point in 1950, the original homes and storefronts which fronted Market Street were demolished and the space was used to construct a service garage and filling station. The five Underground Storage Tanks (USTs) and the service garage were successfully removed from the site in 1989 (with four of the tanks completely intact and a fifth one having a small crack evidencing minor gasoline contamination in the upper four feet of the excavations without evidence that the tank leaked and no additional investigations were deemed to be required), and the area was paved for use as a parking lot which continues to this time.

Based on the four soil borings, three of which were completed as groundwater monitoring wells from the 1988 HMM Study referenced previously, field screening of soil samples and laboratory analysis of groundwater sample no evidence of oil or gas releases were noted. NewPath concluded in its March 2010 site assessment report that that site's historical operations had not significantly impacted the site's soil or groundwater, and that the site use since that time has been relatively benign with no new recognized environmental conditions ("REC's). It therefore did not recommend any additional work at the time of the 2010 Assessment.

4.12 Construction Impacts

Construction methodologies that ensure public safety throughout the project site will be employed. Construction management and scheduling will aim to minimize impacts on the surrounding environment. This will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and control of dust generation.

Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and Boston Water and Sewer Commission ("BWSC") storm drain

systems. During construction, existing catchbasins will be protected from sediments with filter fabric or hay bales filters.

A Construction Management Plan ("CMP") will be submitted to the Boston Transportation Department ("BTD") for approval prior to the start of construction. The CMP will address transportation, parking, truck routes, truck scheduling, construction worker scheduling, and staging issues for the Project. The CMP will establish the guidelines for the duration of the Project and will include specific mitigation measures and staging plans to minimize impacts to the abutters. The Project contractor will be bound by the CMP.

Construction Activity Schedule

The construction period for the Project is expected to last approximately 12-15 months. Typical construction hours will be from 7:00 a.m. to 6:00 p.m., Monday through Friday, as stipulated by the City of Boston Noise and Work Ordinances.

If work is proposed outside established hours, the Boston Air Pollution Control Commission ("APCC") will be notified at the time a permit is sought from the Commissioner of the Inspectional Services Department.

Table 4.12-1 below outlines the preliminary construction schedule for the Project**.**

Table 4.12-1: Proposed Preliminary Construction Schedule

Construction Activity	Anticipated Duration
Building Demolition and Salvage Operations	1 -2 months
Excavation, Earth Support and Caisson Installation	1 -2 months
Foundation Installation	1 month
Steel Erection and Concrete Plank Installation	3 months
Façade Construction	4 months
Interior Work and Finishes	4 months

4.12.1 Construction Air Quality

The generation of dust is likely from construction activities. The following measures will be employed to reduce potential generation of dust and airborne particles:

1. Wetting agents will be used regularly to control and suppress dust that may come from the construction materials and from demolition;
2. Trucks for transportation of construction debris will be fully covered;
3. Storage of construction debris on site will be kept to a minimum;

4. Actual construction practices will be monitored to ensure those unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that any emissions of dust are negligible; and
5. A wheel wash area will be established to minimize dust and mud accumulations in city streets, or periodic street sweeping may be utilized to maintain an acceptable street/sidewalk condition.

4.12.2 Construction Noise

Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures will include:

1. Instituting a pro-active program to ensure compliance with the city of Boston noise limitation policy;
2. Using appropriate mufflers on all equipment and performing ongoing maintenance of intake and exhaust mufflers;
3. Maintaining muffling enclosures on continuously operating equipment, such as air compressors and welding generators;
4. Replacing specific construction operations and techniques by less noisy ones where feasible (e.g. electric instead of diesel powered equipment and hydraulic tools instead of pneumatic tools);
5. Selecting equipment operations to keep average levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
6. Turn off idle equipment; and
7. Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

4.12.3 Rodent Control

The City of Boston enforces the requirements established under Massachusetts State Sanitary Code, Chapter 11, 105 CMR 410.550. This policy requires an established rodent control program be implemented prior to issuance of any demolition or building permits. During construction, service visits will be made by a certified rodent control firm to monitor and maintain the rodent control program.

5.0 HISTORIC RESOURCES

5.1 Introduction

This section of the PNF identifies and describes historic resources in the vicinity of the Project Site and evaluates the impacts of the Project on these resources. The Project Site does not contain structures which are listed on the National or State Register of Historic Places, as Boston Landmarks, or which are included in the Massachusetts Historical Commission ("MHC") Inventory of Historic and Archaeological Assets of the Commonwealth.

The Project Site is composed of four city lots covering a total of 32,893 square feet. The largest lot is located behind two smaller lots which front on Market Street, and the fourth lot is a small lot (approximately 2,400 square feet) fronting on Bennett Street. The lots fronting on Market Street are covered by an asphalt parking lot with curb-cut access to Market Street from each lot. The rear lot contains a 8,400 square feet, one-story industrial warehouse building and two wooden sheds, which are believed to be over 50-years old, with the remainder of the lot covered by asphalt parking and internal vehicle driveways. The lot facing Bennett Street is currently occupied by an asphalt driveway with access blocked by a chain link gate and fence along the Bennett Street sidewalk.

The Proponent expects to undergo Article 85 Demolition Delay review to demolish at least one of the site buildings to allow the proposed project to proceed.

The proposed re-development at 375 Market Street is reminiscent of the older mixed-use buildings in the immediate area, but with the addition of cleaner lines and details giving the proposed building an updated look and feel while maintaining the characteristics you would expect to see in the more traditional residential sections of Brighton. The existing underutilized site creates a gap in the streetscape of Market Street and the proposed re-development will fill this gap and bring people and new services into the neighborhood. The proposed project is expected to continue upgrading efforts already started along Market Street and revive interest in this quadrant of the City.

The site for 375 Market Street has many influences to consider relative to massing and scale of the building elements. The site abuts two different zones with effectively two different sets of characteristics. The primary facade will be facing east toward Market Street and the 3-story, main mass of the building will be set back from the sidewalk 6'-0" to allow for sidewalk planters with street trees that will encourage the pedestrian to engage the site and building while walking along Market Street.

If a state permit is required for the Project, a Massachusetts Historical Commission Project Notification Form may be filed in accordance with M.G.L. Chapter 9, Sec. 26-27c, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00).

5.2 Site Surroundings

Directly adjacent to the site on the South is a newly constructed TD Bank with parking lot and drive-up teller. To the east is the Market Street Burying Ground as well as a variety of small to medium sized commercial, industrial and multi-family buildings ranging from single to three stories in height. To the north and west are two and three story multifamily homes and residential condominiums. Market Street is a four-lane collector street with wide sidewalks on each side. Bennett Street is a two-lane neighborhood roadway with two travel lanes plus parking and a sidewalk on each side. Buildings along Bennett Street tend to align at eight to ten feet behind the sidewalk line. Leicester Street is a one-way, one lane neighborhood roadway with one travel lane heading north and curbside parking on the both sides in front of the single and multifamily homes which on average align ten to fifteen feet behind the edge of the sidewalk. Surrey Street is a one-way, one lane neighborhood roadway with one lane of travel heading west and curbside parking on both sides with similar conditions to Leicester Street.

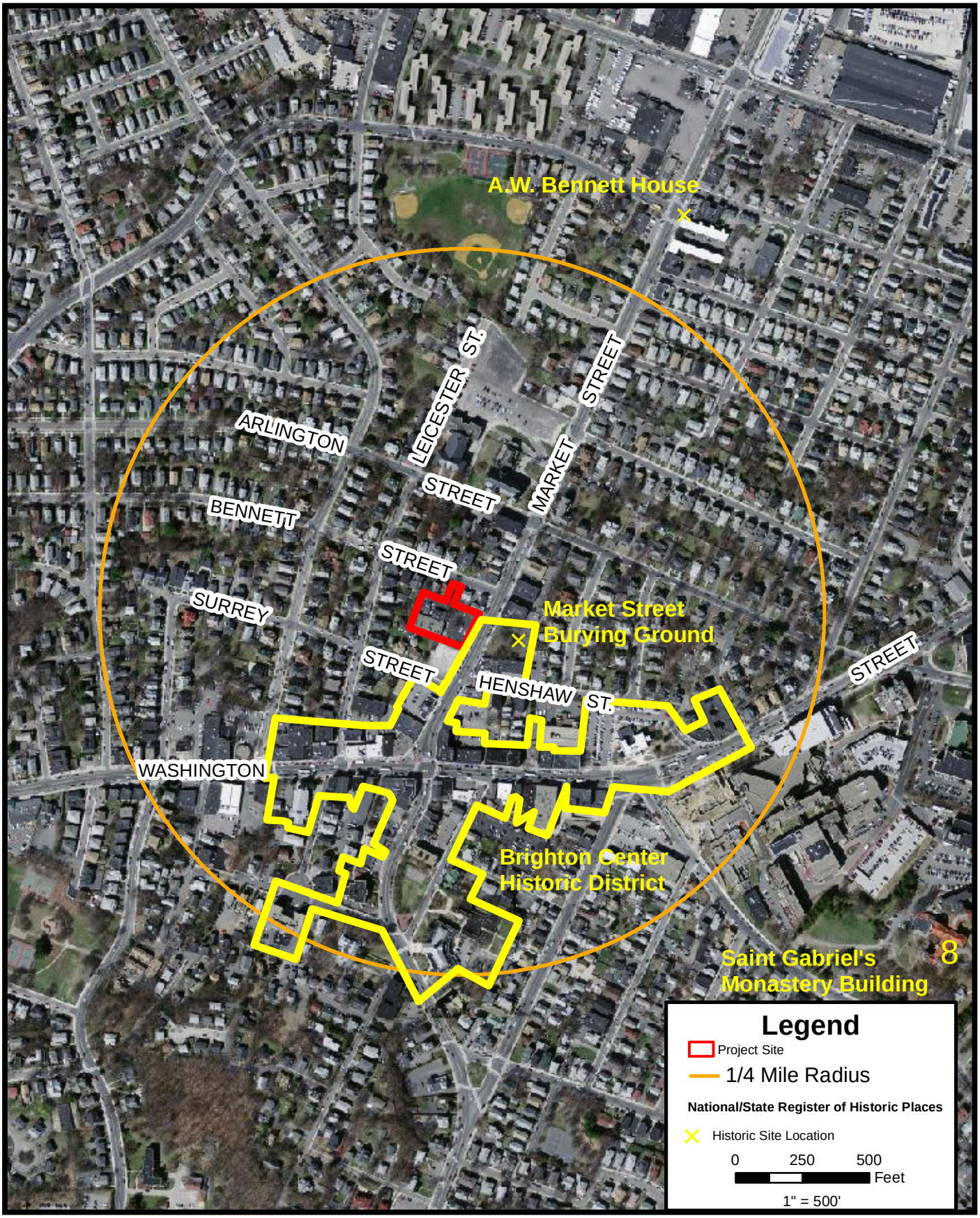
5.3 Site History and Existing Buildings

The property was earlier used to sell and service automobiles. It was believed in prior studies that the Carpenters Union purchased the building c1974 and has used it since that time for training. At some point in 1950, the original homes and storefronts which fronted Market Street were demolished and the space was used to construct a service garage and filling station. The service garage was demolished in 1989, and the area in front of the existing Carpenters Union building was paved for use as a parking lot which continues to this time.

5.4 Historic Structures and Districts

According to Massachusetts Historical Commission files, the building or properties at 375 -Market Street are not listed in the National or State Register of Historic Places, the Inventory of Historical and Archaeological Assets of the Commonwealth, nor are the buildings considered to be a Boston Landmark. According to MassGIS and a review of local historic properties, the nearest historical district on the National/State Register is the Brighton Center Historic District.

The listed historic resources on the National and State Registers of Historic Places identified within an approximately ¼ mile radius of the Project Site are shown in **Figure 5-1. Historic Resources**. The closest historic resource is the Market Street Burial Ground/1764 with an historic stone wall along Market Street. There are also approximately 37 contributing and 16 noncontributing buildings to the Brighton Center Historic District which is on the National Register of Historic Places. The buildings within this district have been classified as mid 19th century: Greek Revival and Late Victorian: Italianate, Gothic, Queen Anne, and Second Empire (NR Form, Approved by MHC, 1/5/01).



TETRA TECH

One Grant Street
Framingham, MA 01701

Historic Resources

375 Market Street
Brighton, Massachusetts

9/9/11

Z

Source: MassGIS, USGS

Figure
5-1

Created by: JLP

11-11041 Historic.mxd

5.5 Potential Impacts to Historic Resources

The Brighton Center Historic District includes the Market Street Burial Ground across the street from the Site. As the project design is contextual with the adjacent residential area, it is not expected that it will affect this historic resources or others within the District as identified on **Figure 5.1.**

5.6 Archaeological Resources

According to the USGS archaeological map on file at the Massachusetts Historical Commission, there are no known or designated archaeological properties on or in vicinity of the project site.

The area-specific conditions that characterize the project site include industrial buildings and parking lots. Because of previous site development, it is unlikely there is the potential for the presence of archeological resources that might be disturbed by the Project.

6.0 TRANSPORTATION

6.1 Introduction

This section describes the transportation-related components of the 375 Market Street development ("the Project") in accordance with the Boston Transportation Department's ("BTD") *Transportation Access Plan Guidelines* (2001) and the Article 80 Large Project Review process. Although BTD has not issued a formal transportation scoping determination, this section adheres to the general format requested by BTD. The contents of the transportation study are also based on preliminary discussions with BTD and BRA staff. Based on these discussions, the analysis is focused on new parking, pedestrian activity levels, bicycle circulation and facilities, transportation demand management measures ("TDM"), and site access.

This section also addresses the impacts on the transportation system associated with the development of the Project. Specific tasks completed include:

- Definition of existing roadway and pedestrian facilities, public transportation services, and parking availability in the site vicinity;
- Determination of background traffic growth, specific development by others, and infrastructure improvements unrelated to the project;
- Estimation of project-generated traffic and distribution, including additional pedestrian and public transportation demand;
- Analysis of project-related traffic impacts to area traffic operations;
- Recommendations regarding vehicular and pedestrian site access; parking access; transportation demand management (TDM) programs and construction management.

6.1.1 Purpose of the Report

This section outlines the applicable development review components as described in Article 80 of the Boston Zoning Code and provides a description of anticipated transportation impacts associated with the proposed Project. This report provides a comprehensive assessment of existing and future traffic conditions within the study area, including:

- A summary of existing traffic conditions including observed traffic volumes, intersection traffic control, on-street parking restrictions, area parking facilities, area transit service, observed pedestrian circulation, and project loading.
- An evaluation of the project's impact, including peak hour traffic flow increases, additional pedestrian activity, increases in transit ridership, and project parking supply.
- Identification of appropriate measures to mitigate project-related impacts, including Transportation Demand Management (TDM) measures to minimize auto-related impacts.

6.1.2 Project Description

The proposed new four-story, mixed use residential building with underground parking and ground floor commercial space will accommodate 39 residential units, approximately 3,291 gross square feet of ground floor retail uses, and a total of 58 parking spaces located in a one-level, below-grade garage under the site ("proposed project"). The existing Market Street curb side parking will be increased from 3-4 spaces to 5 spaces.

The proposed project has frontage on both Market and Bennett Streets. The main vehicular and bicycle access and egress to the site are from Market Street which allows direct access to the underground parking facility. Pedestrian access and egress to the building is from the main entry located on Market Street with a secondary entrance located on Bennett Street through a small, open green space area. Market Street is a two-lane primary northeast-southwest connector between Brighton and Watertown, Bennett Street is a two-lane secondary street running northwest–southeast and exiting onto Market Street at a non-signalized intersection.

The Market Street vehicular entrance will be the only access to the 58 space below-level parking garage. Five public parking spaces will be available curbside along Market Street.

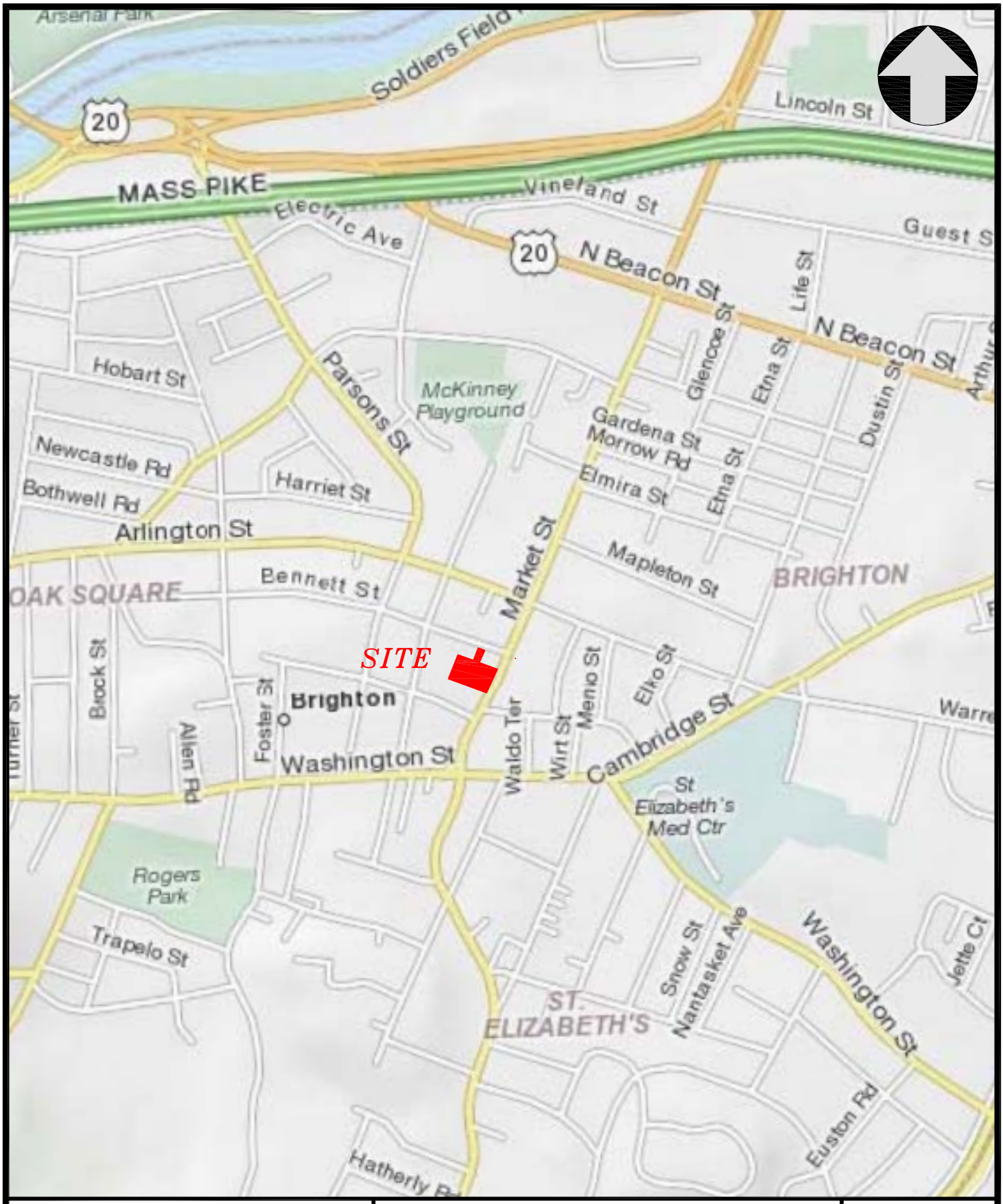
6.1.3 Study Methodology

The study describes the transportation impacts of the proposed project in accordance with the Boston Transportation Department *Transportation Access Plan Guidelines*. This transportation evaluation was conducted in three distinct stages. The first stage describes the existing transportation conditions within the study area, including observed traffic volumes, intersection traffic control, on-street parking restrictions, area parking facilities, area transit service, observed pedestrian circulation, and project loading. The second stage is an assessment of future traffic conditions, including traffic impacts associated with the proposed development and other area projects. The third stage includes recommendations to mitigate project-related impacts.

6.1.4 Study Area

The study area for this transportation evaluation includes roadways and intersections expected to accommodate the majority of project-related traffic, and was determined based on consultation with the Boston Transportation Department. In summary, the study area, shown in **Figure 6-1**, Site Location Map, includes a portion of the Market Street corridor, including the following intersections:

- Market Street at Bennett Avenue
- Market Street at site driveway
- Market Street at Arlington and Sparhawk Streets



GEOD CONSULTING
ENGINEERING SITE DEVELOPMENT TRANSPORTATION
24 Ray Avenue, Burlington, MA 01803
Phone : 781-273-3434 Fax : 781-273-3430

375 MARKET STREET
BRIGHTON, MASSACHUSETTS

SITE LOCATION PLAN

FIGURE:
6.1
10/11/11

Existing Transportation Conditions

Evaluation of project-related impacts requires the identification of the existing traffic parameters within the study area. This section provides a summary of observed transportation conditions within the study area including existing traffic volumes within the study area, existing parking restrictions along roadways proximate to the site, existing bus service within the study area, and observed pedestrian activity proximate to the project site.

6.2.1 Existing Roadway Network

A comprehensive field inventory of roadway and intersection geometrics was conducted in September, 2011. The field investigation consisted of an inventory of existing roadway and intersection geometrics, traffic control, parking restrictions and land use information within the study area, as described below.

Market Street

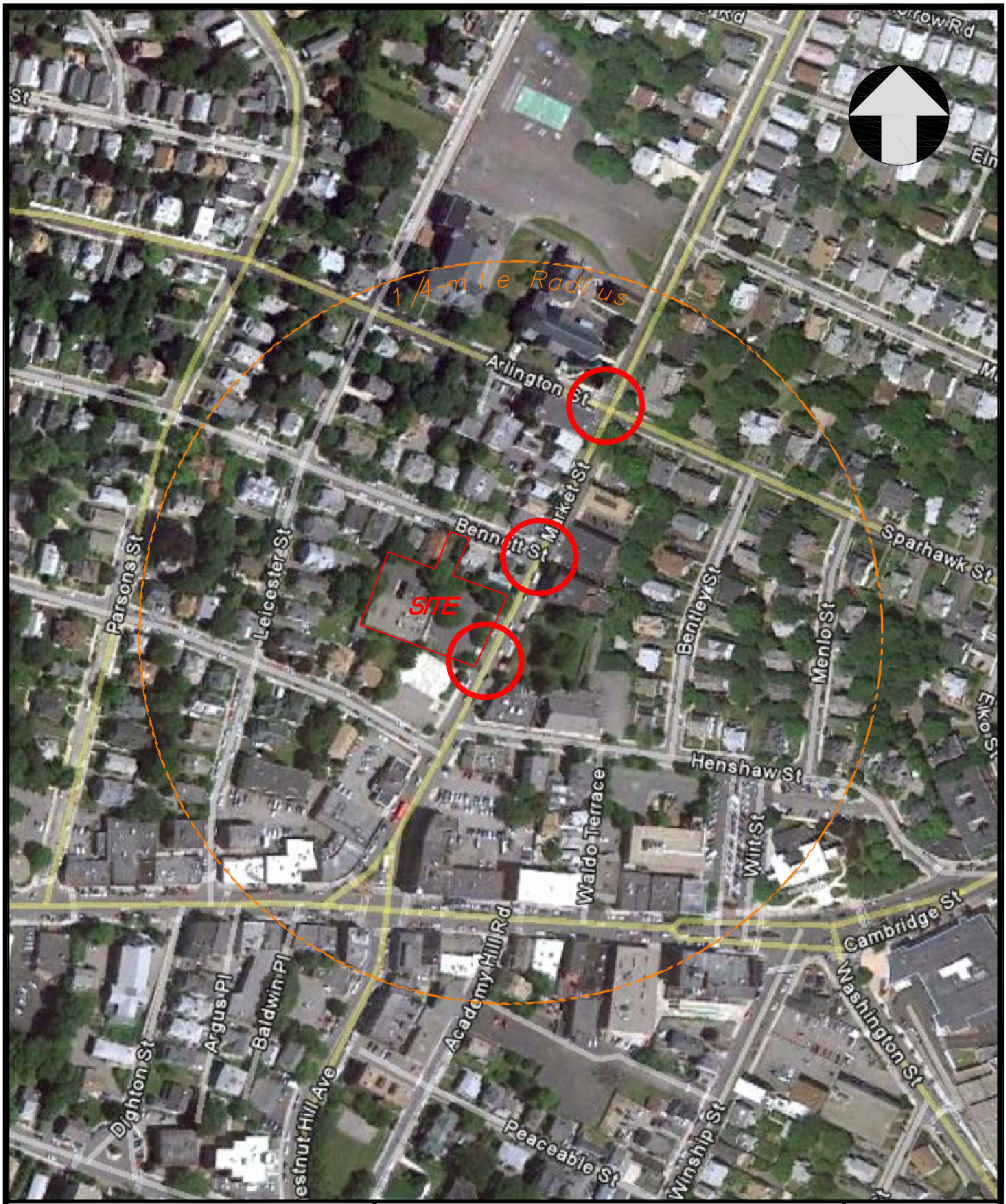
Market Street is a two-lane primary northeast-southwest connector (two-lane urban arterial roadway) between Brighton and Watertown and is owned and maintained by the City of Boston. Market Street is approximately 45 feet in width, providing one lane of travel in each direction, with non-metered street parking provided along both sides of the corridor from Washington Street to North Beacon where curbside parking is discontinued and the street becomes four-lanes with two lanes of travel in each direction. Land use along Market Street, in the vicinity of the project site consists of mixed-use residential and commercial properties. Pedestrian amenities along the corridor include sidewalks along both sides of the roadway, with painted crosswalks provided at key intersections.

Bennett Street

Bennett Street is a two-lane secondary street (local roadway) running northwest–southeast and exiting onto Market Street at a non-signalized intersection. Bennett Street, which is owned and maintained by the City of Boston, is approximately 31.5 feet in width, providing one lane of travel in each direction, with unrestricted on-street parking provided along both sides of the street. Land use along Bennett Street and in the vicinity of the project site consists of residential properties. Pedestrian amenities along the corridor include sidewalks along both sides of the roadway with a painted crosswalk at two intersections and no crosswalk at the intersection of Market Street.

6.2.2 Study Area Intersections

The following briefly describes the existing geometric conditions at each of the study area intersections. The study area can be seen in **Figure 6-2.**



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375 MARKET STREET
BRIGHTON, MASSACHUSETTS

STUDY AREA INTERSECTIONS

FIGURE:
6.2
10/11/11

Market Street at Bennett Street

Market Street and Bennett Street meet to form a three-way intersection under STOP-sign control at Bennett Street. The northbound and southbound Market Street approaches provide one approximate 12-foot travel lane in each direction, with unrestricted parking provided along both sides of the corridor. The eastbound Bennett Street approach provides one approximate 12-foot general purpose travel lane which operates under STOP-sign control. Sidewalks are provided along both sides of each intersection approach with no painted crosswalk provided at any intersection approach.

Market Street at Site Drive

Market Street and the site drive will meet to form a three-way intersection under STOP-sign control at the site drive only. The northbound and southbound Market Street approaches provide one approximate 12-foot travel lane in each direction, with unrestricted parking provided along both sides of the corridor. The eastbound site drive approach provides one approximate 12-foot general purpose travel lane which operates under STOP-sign control. Sidewalks are provided along both sides of Market Street.

Market Street at Arlington and Sparhawk Streets

Market Street and Arlington St./Sparhawk St. meet to form a four-way signalized intersection. The Market Street northbound and southbound approaches both have a 12 foot wide lane operating as a through, left and right turn lane. Arlington Street is the eastbound approach with one 12 foot lane operating as a through, left and right turn lane and approximately 5 feet of excess shoulder. Sparhawk Street is the westbound approach with a 13 foot wide lane operating as a through, left and right turn lane, and no shoulder width.

The intersection signal equipment is coordinated along the Market Street corridor from Arlington to North Beacon Street. We have been provided with the coordinated corridor's signal phasing and timing.

6.2.3 Existing Traffic Volumes

As discussed with BTD, existing vehicle counts were performed at the study area intersections during the weekday for an 11 hour period from 7:00 am to 6:00 pm on Tuesday, September 13, 2011. This time period represents the AM peak hour of 7am – 10am, the Midday peak hour of 10am – 2pm, and the PM peak hour of 2pm to 6pm. The actual counts are shown in **Appendix E**.

Based on a review of the collected data, the peak hour occurred between the hours of 7:45 and 8:45 AM at Arlington St and 8:00 – 9:00 AM at Bennett St. during the weekday morning, between the hours of 12:45 – 1:45 PM at Arlington and 12:30 – 1:30 PM at Bennett during the mid day and between 4:45 - 5:45 PM at Arlington and 5:00 – 6:00 PM at Bennett during the

evening. In all instances individual peak hour traffic volumes for the intersection was utilized for analysis purposes.

Peak hour traffic flow along Market Street, in the vicinity of the project site, ranges from approximately 1,046 vehicles per hour (vph) during the weekday morning peak hour to approximately 1,247 vph during the weekday evening peak hour. Existing 2011 peak hour vehicular traffic volumes are displayed graphically in **Figure 6-3**.

6.2.4 Seasonal Adjustment

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, historic traffic count data were reviewed for the nearest MassDOT permanent count station to the project site. Based on a review of this data, it was determined that traffic volumes for the month of September is approximately 0.3 percent above average-month conditions. To provide a conservative (above average) analysis scenario, the traffic volumes collected as a part of this study were not adjusted downward to average-month conditions.

6.2.5 Vehicle Crash Analysis

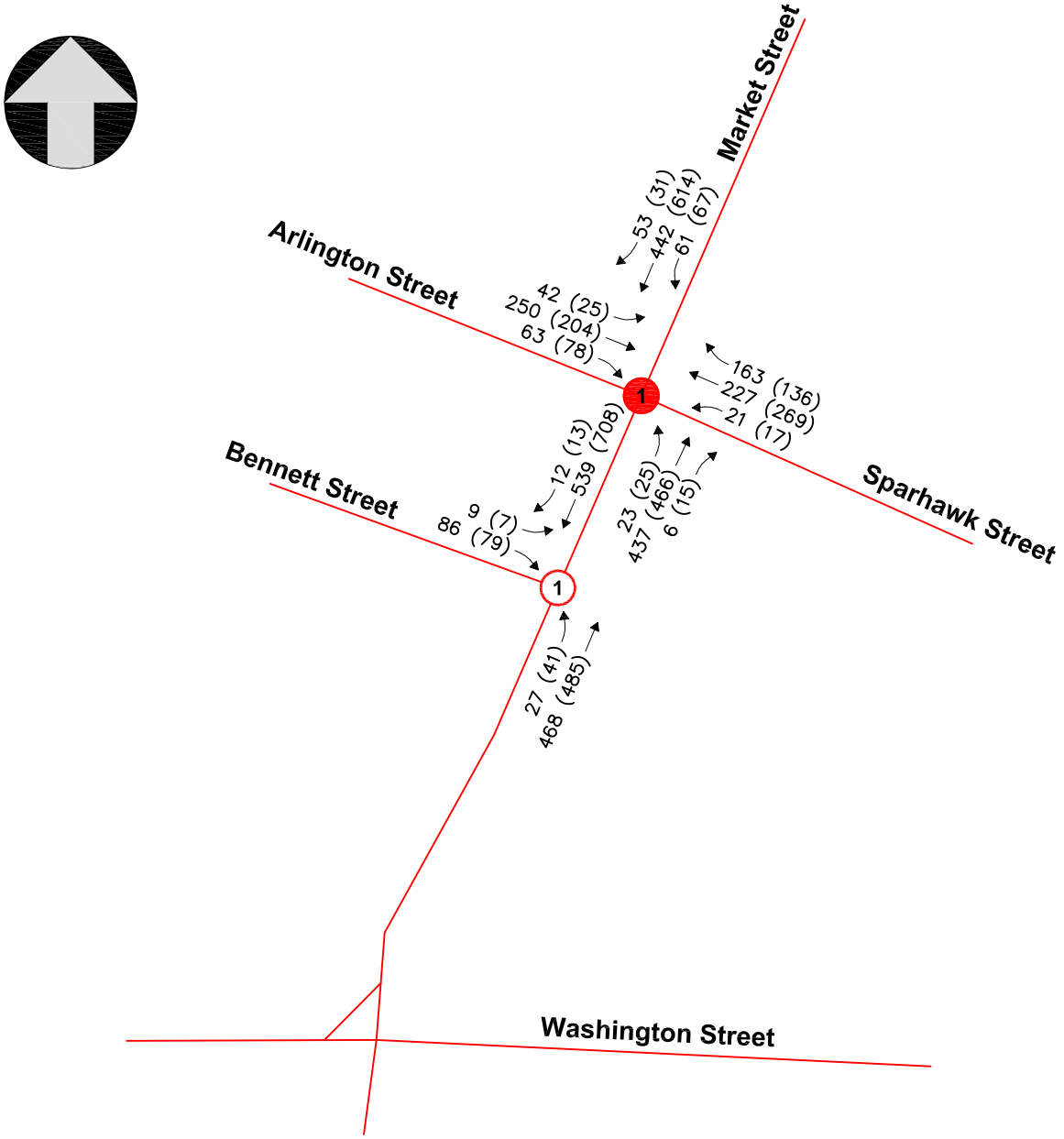
Motor vehicle crash information for the study area intersections was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent three-year period available (2007 through 2009) in order to examine motor vehicle crash trends occurring within the study area.

There were no accidents reported at Market St./ Bennett St. or at the existing project site drives. The Market St. at Arlington St./Sparhawk St. intersection had 5, 6 and 5 accidents for the years 2007, 2008 and 2009, respectively. 12 of the accidents had property damage only and 4 had personal injury. Utilizing MassDOT's crash rate analysis methodology, the intersection crash rate is 0.60. The MassDOT crash rate average for a signalized intersection in which the project is located (District 4) is 0.78. The state crash rate average is 0.81. Therefore the Market St at Arlington St./Sparhawk St. intersection crash rate is comfortably below the MassDOT District and state wide average.

6.2.6 Existing Pedestrian Volumes

Pedestrian walking trips account for a significant number of trips within the Brighton area. Within the vicinity of the Project Site, there are a number of land uses that generate pedestrian activity. The study area is well suited to accommodate pedestrian activity, with sidewalks provided along both sides of all roadways within the study area, and crosswalks provided at key pedestrian crossings along these corridors.

Existing pedestrian traffic volumes were recorded at the study area intersection during the 11 hour period from 7am to 6pm on the same day as the vehicular counts, Tuesday September 13, 2011. This time period represents the AM peak hour of 7am – 10am, the Mid day peak hour of 10am – 2pm, and the PM peak hour of 2pm to 6pm. Existing 2011 peak hour pedestrian traffic volumes are displayed graphically in **Figure 6-4.**



LEGEND:

AM PEAK HOUR	XXX
PM PEAK HOUR	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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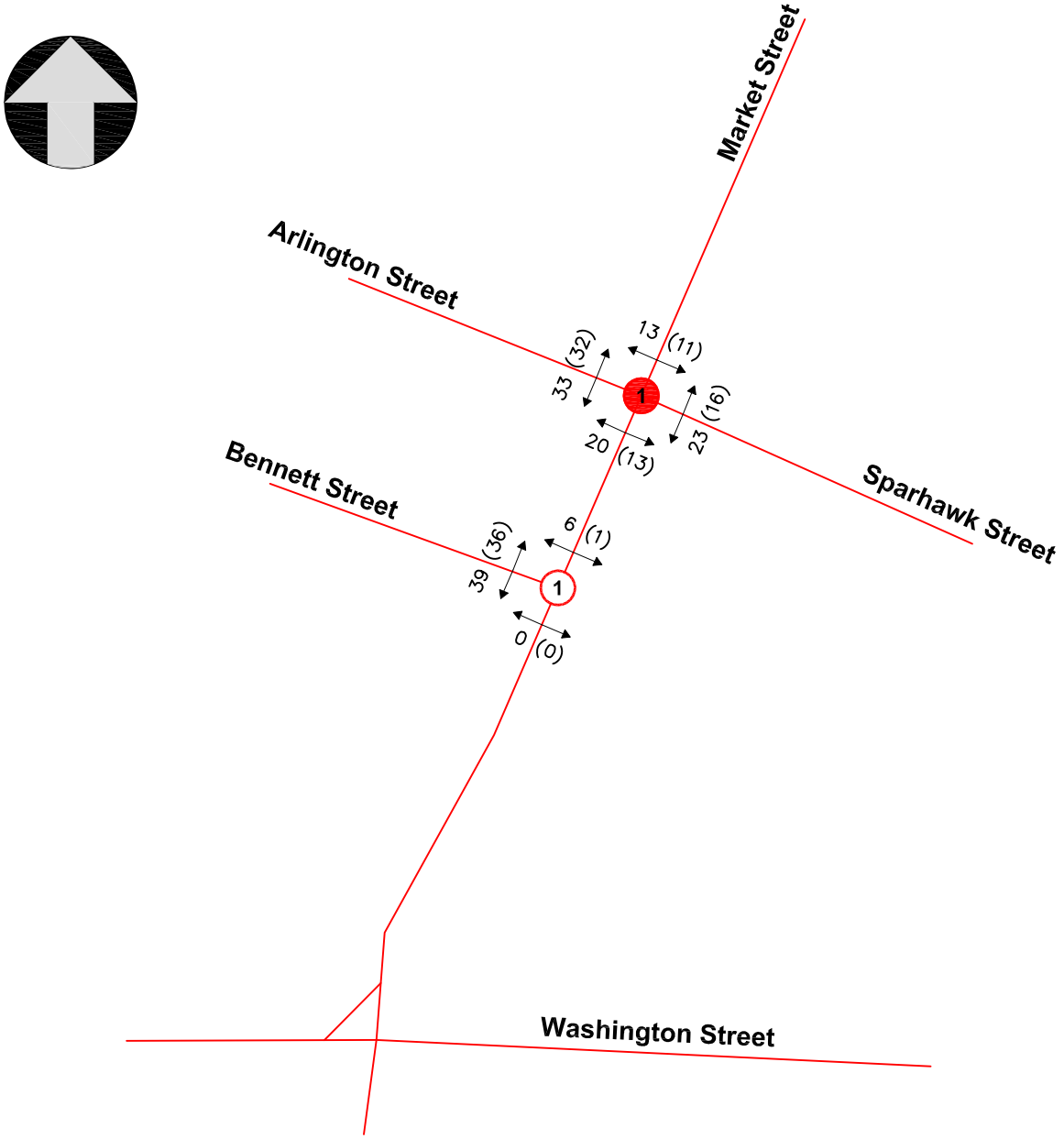
2011 EXISTING WEEKDAY PEAK HOUR TRAFFIC VOLUMES

FIGURE:
6.3
10/10/11



LEGEND:

AM PEAK HOUR	XXX
PM PEAK HOUR	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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2011 EXISTING WEEKDAY PEAK HOUR PEDESTRIAN VOLUMES

FIGURE:
6.4
10/10/11

6.2.7 Existing Bicycle Routes and Volumes

Bicycle accommodations are present within the study area. Multi use paths exist with designated bicycle routes (shared travel way) along Market Street, Arlington and Sparhawk Streets, Cambridge Street, Faneuil Street and North Beacon Street.

Existing bicycle traffic volumes were recorded at the study area intersection during the 11 hour period from 7am to 6pm on the same day as the vehicular counts, Tuesday September 13, 2011. This time period represents the AM peak hour of 7am – 10am, the Mid day peak hour of 10am – 2pm, and the PM peak hour of 2pm to 6pm. Existing 2011 peak hour bicycle traffic volumes are displayed graphically in **Figure 6-5.**

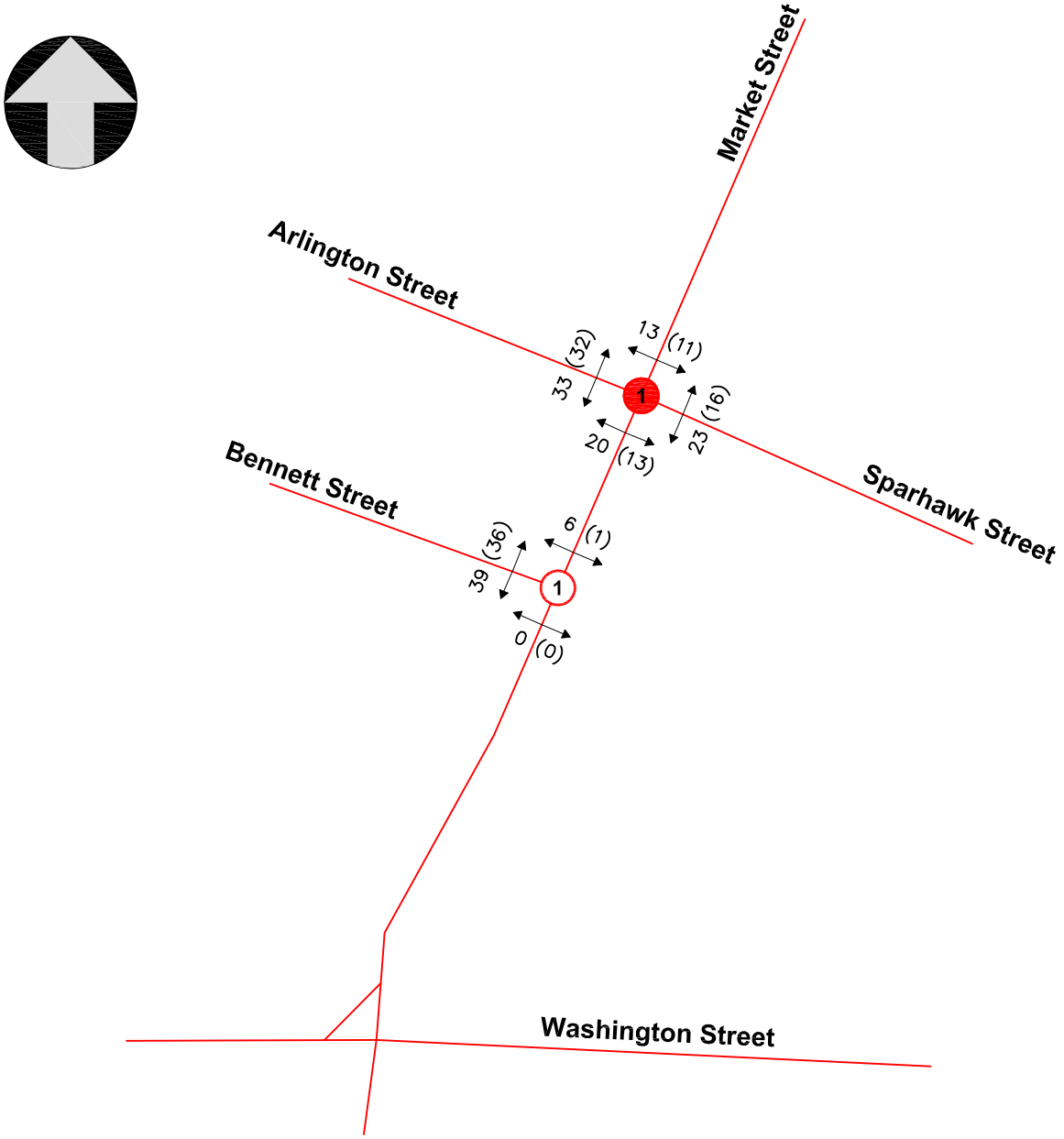
6.2.8 Existing Parking Conditions

In order to document existing parking supply characteristics within the study area, a curbside parking inventory was conducted along roadways proximate to the project site. Within the vicinity of the project site, on-street parking is unrestricted along both Market Street and Bennett Street.

Four parking spaces are presently curb side adjacent to the site between the existing two site drives. Curb side parking across the street on the east side of Market Street will remain as will the curb side parking adjacent to the site on the west side of Market St. The project site will reduce the curb cuts from two to one, and one curb side parking space for a total of five.

6.2.9 Existing Public Transportation

The study area is served by a number of public transportation bus routes operated by the Massachusetts Bay Transit Authority (MBTA). A substantial asset for the project site is its proximity to existing MBTA routes that provide alternative travel options for residences and employees of the proposed facility. Existing public transportation serving the project site is depicted in **Figure 6-6**.



LEGEND:

AM PEAK HOUR	XXX
PM PEAK HOUR	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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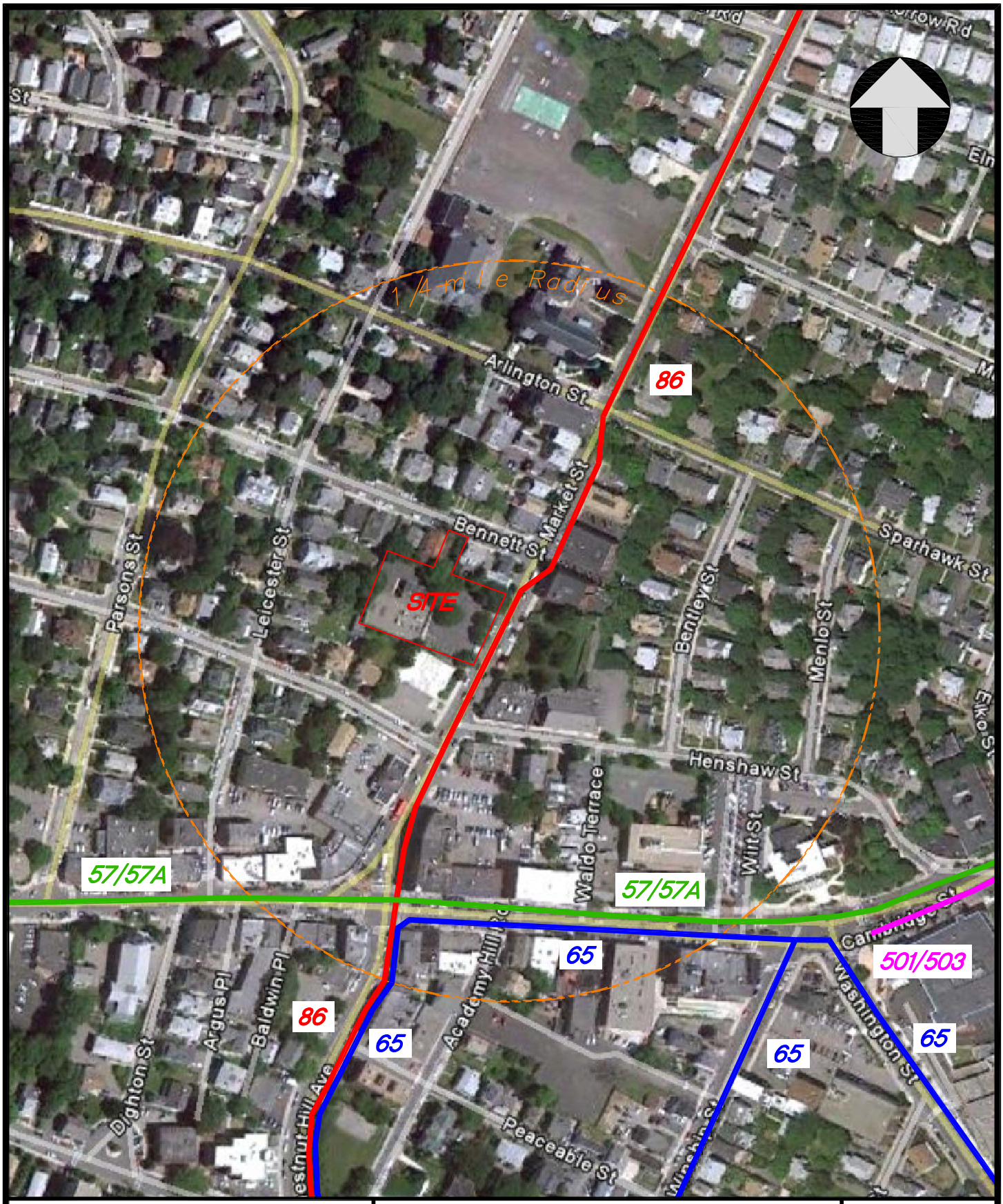
2011 EXISTING WEEKDAY PEAK HOUR PEDESTRIAN VOLUMES

FIGURE:
6.4
10/10/11



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PUBLIC TRANSPORTATION MAP

FIGURE:
6.6
10/11/11

Bus Service

The MBTA operates several local bus routes within the study area. The following describes specific site routes; peak hour headways, service availability, complete schedule and route map information can be provided.

Local bus service within ¼ mile of the site is:

- No. 86 bus (Sullivan Square Station – Reservoir (Cleveland Circle) via. Harvard Square Station);
- No. 501/503 bus (Route 501 - Express Bus Brighton Center – Downtown Boston, Route 503 – Express Bus Brighton Center – Copley Square);
- No. 57/57A bus (Route 57/57A Watertown Yard or Oak Square – Kenmore Station via. Newton Corner and Brighton Center);
- No. 65 bus (Route 65 Brighton Center – Kenmore Sta. via Washington Street, Brookline Village & Brookline Avenue).

6.3 Future Transportation Conditions

Evaluation of the project impacts requires the establishment of a future baseline condition. This section describes future infrastructure that will be in place to serve the project, and estimates future traffic conditions with and without the proposed project.

Consultation with the BTD resulted in the selection of a future 2017 design year for analysis purposes. Traffic-volume patterns in 2017 within the study area reflect increases associated with normal background growth and planned area development projects. The following sections provide an overview of planned development projects and transportation infrastructure improvements within the area, the future year No-Build traffic volumes, and projections of future Build traffic volumes.

6.3.1 Planned Infrastructure Projects

The Boston Transportation Department, in conjunction with the Boston Redevelopment Authority (BRA), Executive Office of Transportation (EOT), Massachusetts Bay Transit Authority (MBTA) and Department of Conservation and Recreation (DCR) are in the preliminary planning stages of major transportation improvements within the areas encompassing the Fenway, Longwood Medical Area, Kenmore Square and Boston University campus as part of a recently approved economic stimulus bill. The bill includes thirty-six million dollars of appropriations to fund roadway design and improvements, traffic management measures, MBTA station improvements including Kenmore, Fenway and Longwood stations, a North Allston multi-modal station, as well

as nineteen million dollars through bond authorization for additional MBTA station improvements and an Urban Ring tunnel study.

While the long term transportation benefits associated with these improvements projects will ultimately have a significant benefit on traffic, transit and pedestrian activity within the study area, no improvements have been accounted for as part of this report given that the project is still in the preliminary planning stages.

6.3.2 General Background Traffic Growth

Independent of the proposed project, traffic volumes on the future roadway network under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth and traffic related to specific development by others expected to be complete by the 2017 analysis year. Upon consultation with the BTD, the No-Build conditions for study area intersections were developed by applying a compounded annual background traffic growth rate to the 2011 Existing peak-hour traffic volumes over the five year planning horizon, as well as traffic volumes associated with specific area developments. A 0.5 percent annual growth rate was utilized, which is consistent with the growth rate used for other recently approved area studies.

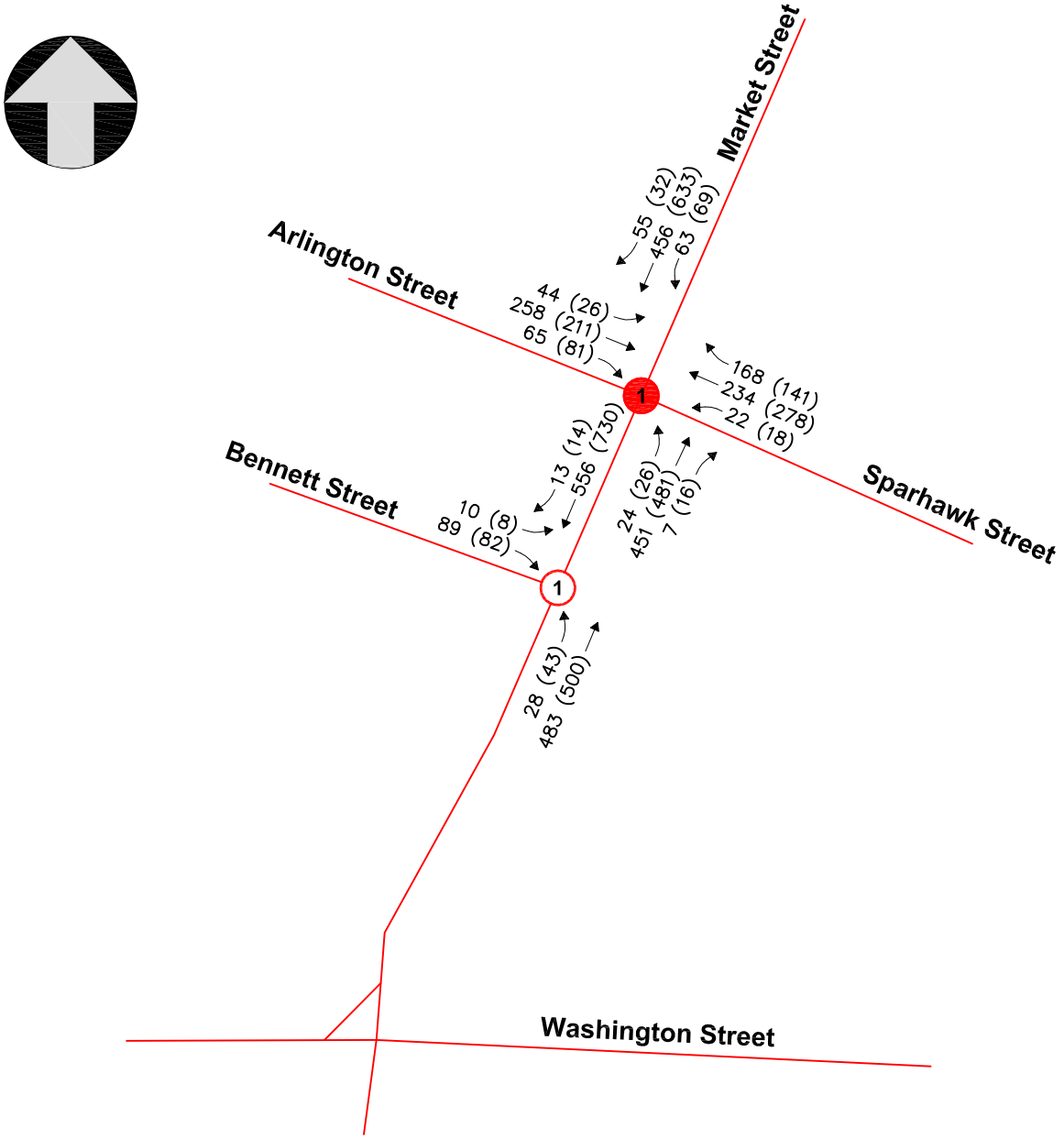
6.3.3 Planned Area Development Projects

Based on consultation with BTD and BRA, several proposed area developments were identified, however those projects do not appear to be moving forward primarily due to the current economic climate. Those projects include the Boston College Institutional Master Plan and the Harvard University Science Complex.

Other projects which were viewed as possible trip generation contributors but had recently been completed, and as such their traffic was captured in the existing traffic count program. Those projects include the CVS Pharmacy at the intersection of Market St. and North Beacon St. and the 150 Chestnut Hill Ave. 21 unit residential condominium complex.

6.3.4 No-Build Traffic Volume Networks

Future year 2017 weekday morning and weekday evening No-Build peak hour traffic volume networks were developed by applying the compounded background growth rate to existing traffic volumes over the five-year planning horizon. The future 2017 No-Build traffic volume networks are displayed on **Figure 6-7.**



LEGEND:

AM PEAK HOUR	XXX
PM PEAK HOUR	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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2017 NO-BUILD FUTURE YEAR TRAFFIC VOLUMES

FIGURE:
6.7
10/10/11

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6.3.5 Trip Generation Summary

The anticipated trip-generation characteristics of the project were developed using Trip Generation, 8th Edition published by the Institute of Transportation Engineers (ITE)[4] for similar land uses as those proposed. ITE Land Use Codes (LUC) 230 – Residential Condominium/Townhouse, and LUC 814 – Specialty Retail, the two most appropriate categories for the proposed development were utilized to model the trip generation characteristics of the development. The controlling variable for LUC 230 was the number of units and for LUC 814 it was square footage.

The resulting ITE trip generation was then distilled to person-trips using a vehicle occupancy ratio (VOR) of 1.2 persons per vehicle (based on discussions with BTD) and then assigned to a specific mode of transportation (i.e., automobile, pedestrian/bicycle or public transportation) based on information provided by BTD and comments received at working meetings with the neighborhood. For the purposes of this assessment and in order to provide a conservative (high) analysis condition from which to evaluate the impact of the project on the transportation system, it was assumed that 90 percent of the trips generated by the project would be made by private automobile or truck, with the remaining 10 percent made by public transportation (transit) and pedestrian/bicycle.

Not all of the automobile-trips expected to be generated by the proposed project will consist of new trips on the roadway network. A portion of the trips generated by the project will consist of pass-by/diverted link trips, or vehicles traveling along Market Street for other purposes that will patronize the specialty retail portion of the project. Retailers believe that up to 50% of the trips generated consist of pass-by trips. Again, in order to provide a conservative (high) analysis scenario and in accordance with state standards, a 25 percent pass-by trip rate was used for the automobile trips associated with just the specialty retail portion of this project. The pass by trip does not pertain to the residential aspect of the project.

As can be seen in **Table 6.1** the proposed project was shown to result in 374 new automobile trips (187 entering and 187 existing) on an average weekday, with 55 new transit/pedestrian/bicycle trips (28 entering and 28 exiting). During the weekday morning peak, the project was shown to generate 36 new automobile trips (11 entering and 25 exiting), with 6 new transit/pedestrian/bicycle trips (2 entering and 4 exiting). During the weekday evening peak, the project was also shown to generate 36 new automobile trips (23 entering and 13 exiting), with 5 new transit/pedestrian/bicycle trips (3 entering and 2 exiting).

In summary we believe it is fair to state that the number of trips generated on a daily and peak hour condition are very low, particularly, when compared to the existing traffic volumes which utilize the transportation infrastructure.

TABLE 6.1

TRIP GENERATION - 375 MARKET STREET, BRIGHTON, MA

	Time Period/Direction	Vehicle Trips TOTAL(a)		Person Trips TOTAL(b)		Persn Auto Trp TOTAL(c)		Tran/Ped/Bicy TOTAL(d)		Auto Trips TOTAL(e)		Pass-By (25%) TOTAL(f)		New Auto Trips TOTAL(g)	
		ENTER	EXIT	ENTER	EXIT	ENTER	EXIT	ENTER	EXIT	ENTER	EXIT	ENTER	EXIT	ENTER	EXIT
TOTAL TRIP GENERATION FOR 375 MARKET STREET															
	Average Weekday Daily	**460**		**552**		**497**		**55**		**414**		**40**		**374**	
		230	230	276	276	248	248	28	28	207	207	20	20	187	187
	Weekday Morning Peak Hour	**46**		**55**		**50**		**6**		**41**		**5**		**36**	
		15	31	18	37	16	33	2	4	14	28	2	2	11	25
	Weekday Evening Peak Hour	**44**		**53**		**48**		**5**		**40**		**4**		**36**	
		28	16	34	19	30	17	3	2	25	14	2	2	23	13
SPECIALTY RETAIL CENTER (LUC 814)															
	Average Weekday Daily	**176**		**211**		**190**		**21**		**158**		**40**		**119**	
		88	88	106	106	95	95	11	11	79	79	20	20	59	59
	Weekday Morning Peak Hour	**22**		**26**		**24**		**3**		**20**		**5**		**15**	
		11	11	13	13	12	12	1	1	10	10	2	2	7	7
	Weekday Evening Peak Hour	**16**		**19**		**17**		**2**		**14**		**4**		**11**	
		9	7	11	8	10	8	1	1	8	6	2	2	6	5
RESIDENTIAL CONDOMINIUM/TOWNHOUSE (LUC 230)															
	Average Weekday Daily	**284**		**341**		**307**		**34**		**256**		**0**		**256**	
		142	142	170	170	153	153	17	17	128	128	0	0	128	128
	Weekday Morning Peak Hour	**24**		**29**		**26**		**3**		**22**		**0**		**22**	
		4	20	5	24	4	22	0	2	4	18	0	0	4	18
	Weekday Evening Peak Hour	**28**		**34**		**30**		**3**		**25**		**0**		**25**	
		19	9	23	11	21	10	2	1	17	8	0	0	17	8

(a) - Based on ITE LUC 230 - Residential Condominium/Townhouse and LUC 814 - Specialty Retail Center.

(b) - Vehicle Trips x 1.2 persons per vehicle.

(c) - Total Person Trip x 0.90.

(d) - Total Person Trips x 0.10 (assumes 5 percent transit trips, 3 percent pedestrian trips and 2 percent bicycle trips).

(e) - Person Automobile Trips divided by 1.2.

(f) - Auto Trips(e) x 0.25.

(g) - Auto Trips(e) - Pass-By (25%)(f)

- Person Trips

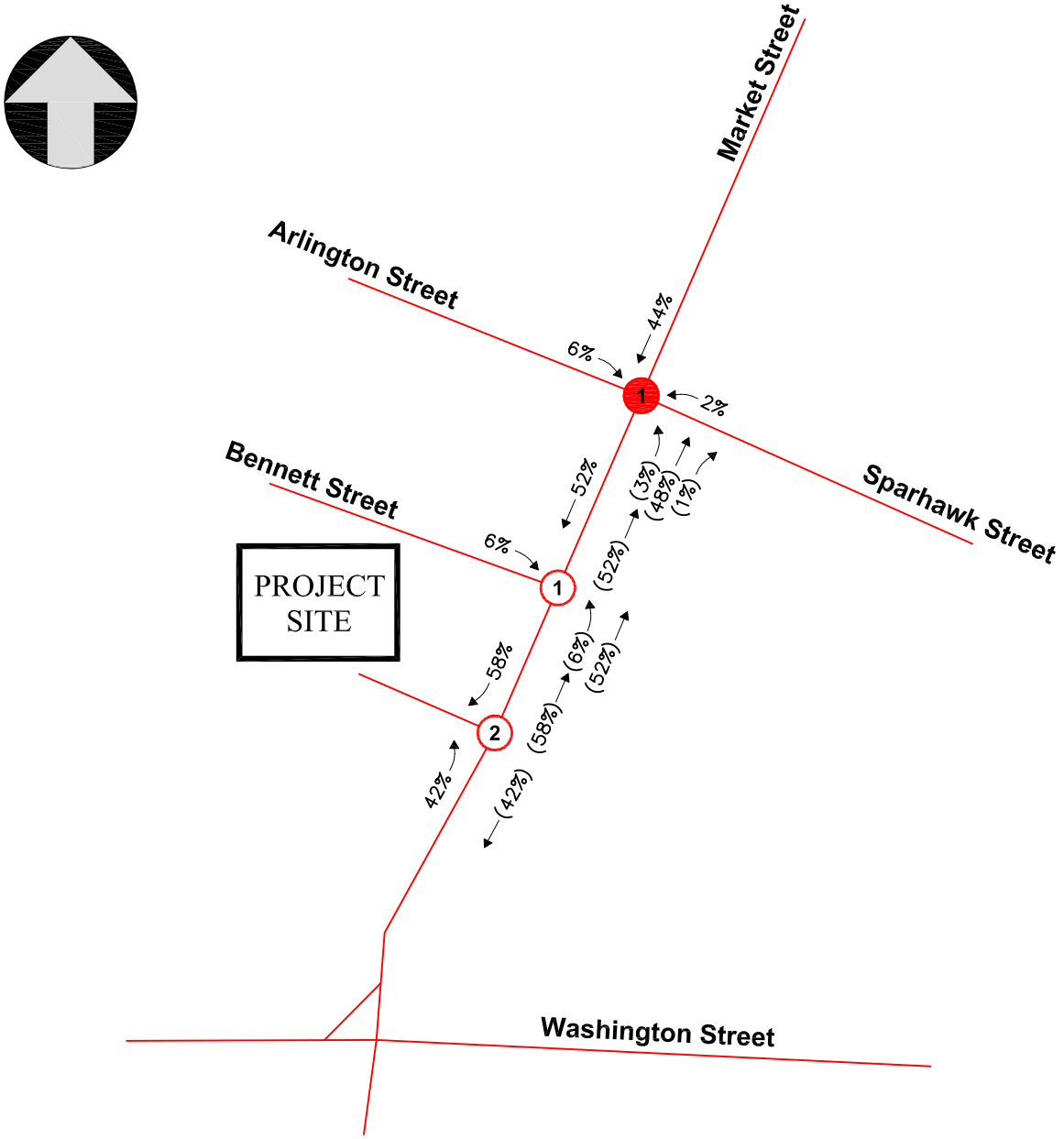
- Vehicle Trips

6.3.6 Trip Distribution Summary

Design year (2017) Build traffic volumes for the study area roadways were based on vehicle-trip-generation estimates previously summarized in **Table 6.1**. Having estimated project-generated vehicle trips, the next step is to determine the trip distribution of project-related traffic and assign these trips to the local roadway network. Based on a review of area traffic patterns, 58 percent of project-related traffic is assigned to and from Market Street, north of the project site, with 42 percent of project-related traffic assigned to and from Market Street, south of the project site. The trip distribution patterns for project-related traffic volumes are displayed in **Figure 6-8.**

6.3.7 Build Traffic Volume Networks

The site-generated traffic volumes were assigned to the roadway network and combined with the 2017 No-Build traffic volumes to develop the 2017 Build weekday morning and weekday evening peak-hour traffic-volume networks. **Figures 6-9 and 6-10** depict the 2017 site-generated traffic volumes for the weekday morning and evening peak hours, respectively. These volumes were added to the 2017 No-Build traffic volumes to develop the 2017 Build traffic volumes, which are depicted in **Figure 6-11** for the weekday morning and evening peak hours.



LEGEND:

AM & PM PEAK HOUR - ENTER	XX%
AM & PM PEAK HOUR - EXIT	(XX%)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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TRIP DISTRIBUTION
AM & PM PEAK HOUR

FIGURE:
6.8
10/11/11

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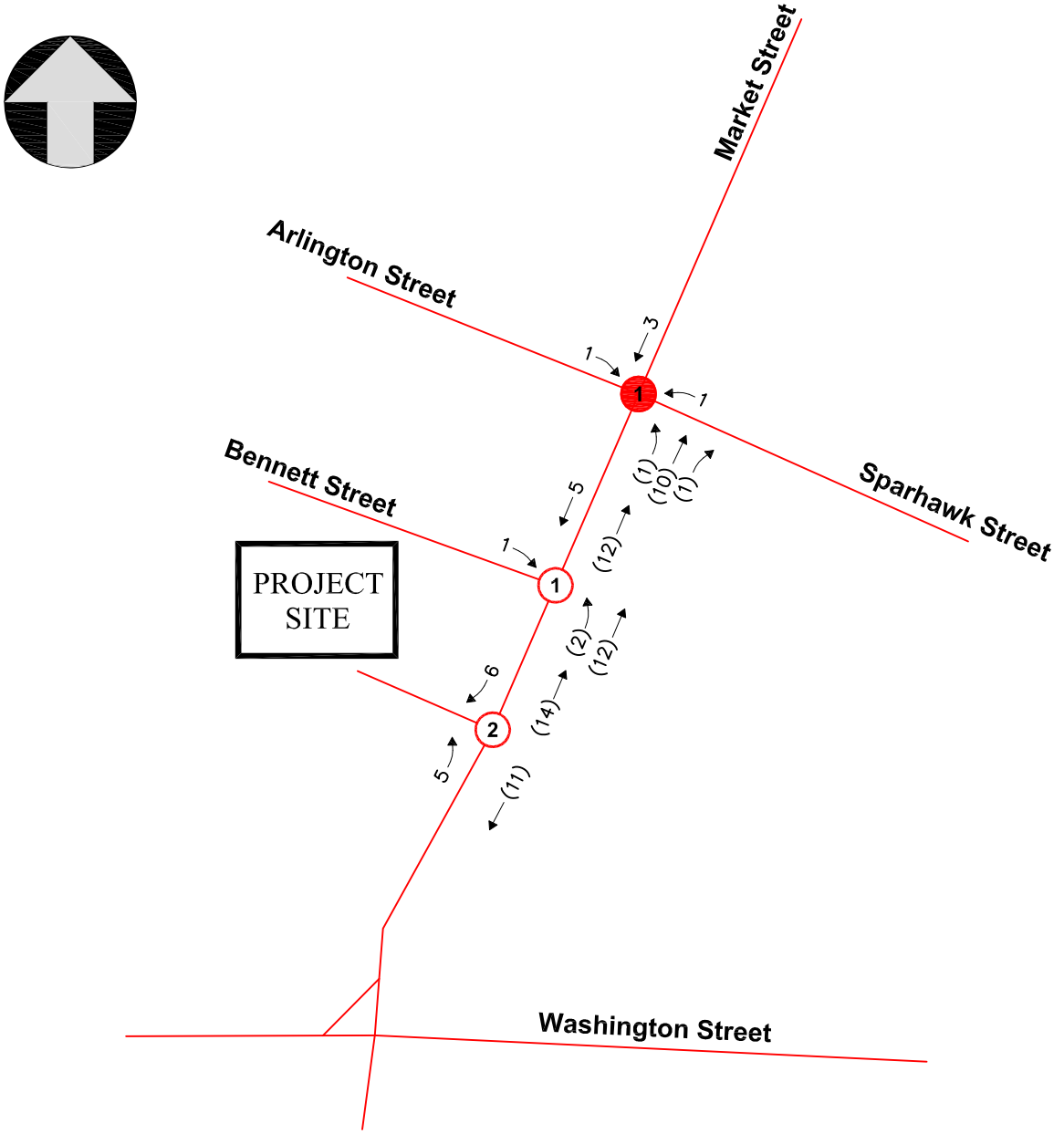

LEGEND:

AM PEAK HOUR - ENTER	XXX
AM PEAK HOUR - EXIT	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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375 MARKET STREET
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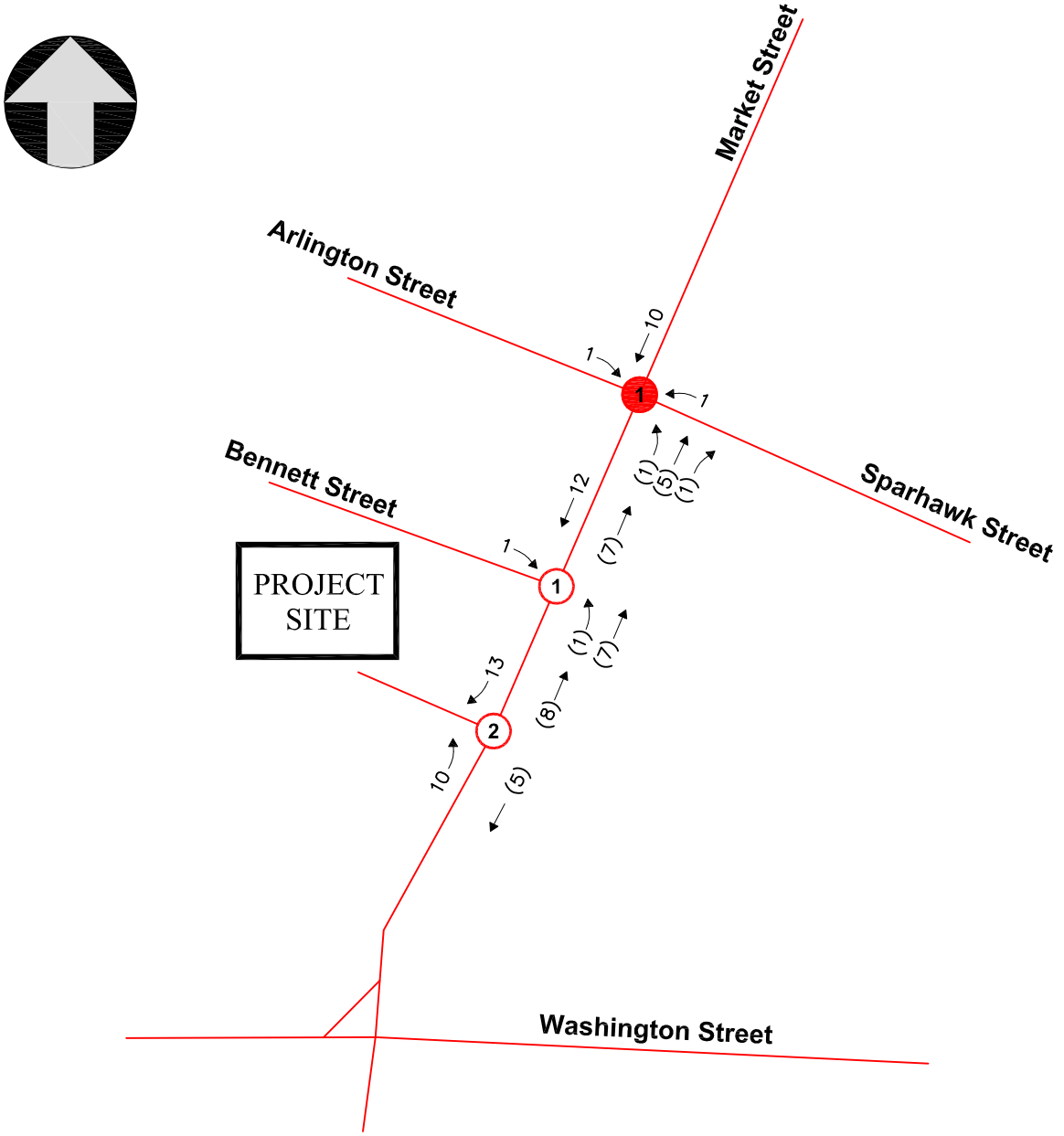
SITE GENERATED PEAK HOUR TRAFFIC VOLUMES - AM PEAK HOUR

FIGURE:
6.9
10/11/11



LEGEND:

PM PEAK HOUR - ENTER	XXX
PM PEAK HOUR - EXIT	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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SITE GENERATED PEAK HOUR TRAFFIC VOLUMES - PM PEAK HOUR

FIGURE:
6.10
10/11/11

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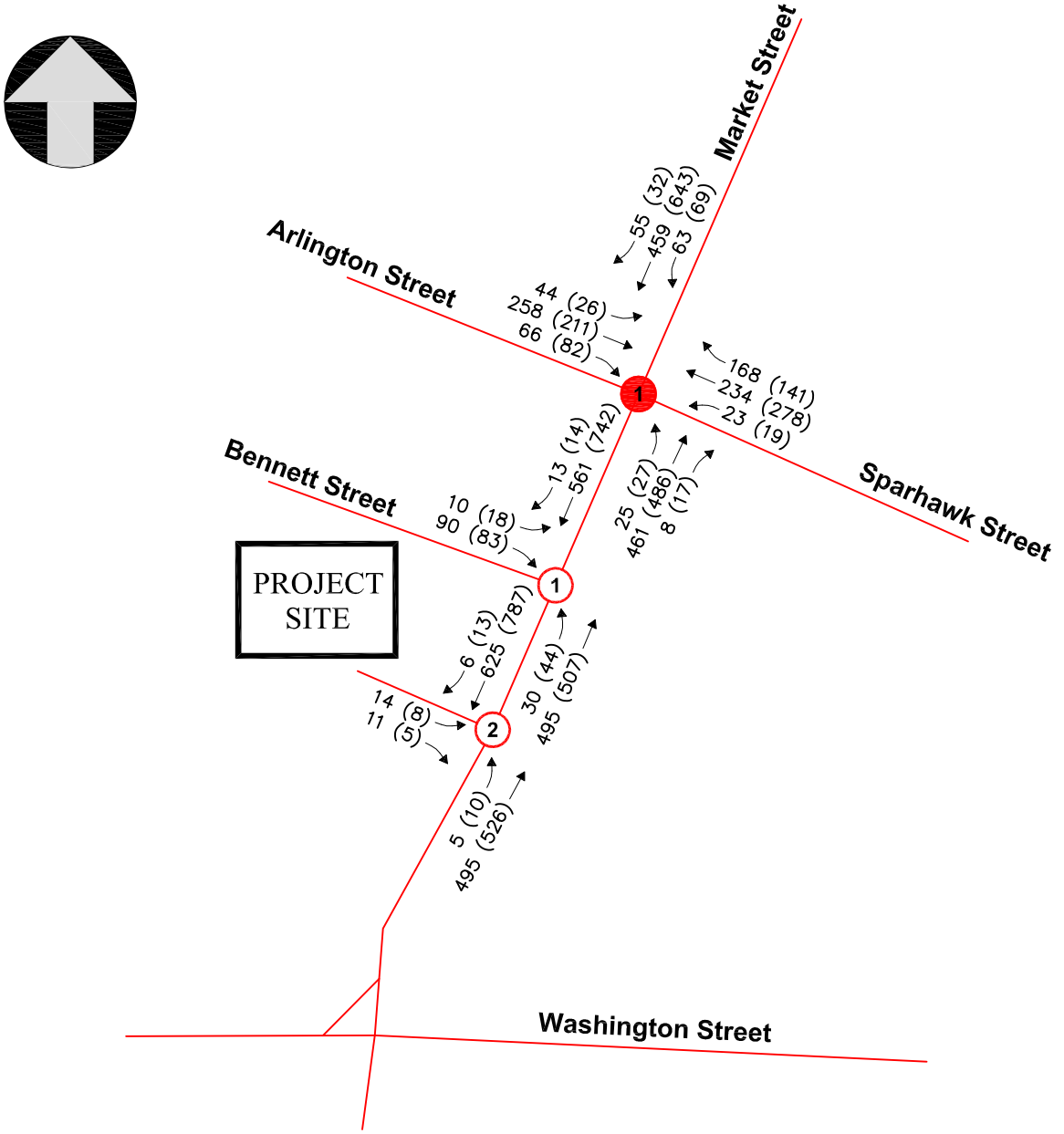

LEGEND:

AM PEAK HOUR	XXX
PM PEAK HOUR	(XXX)
DIRECTION OF TRAVEL	→
SIGNALIZED INTERSECTION	1
UNSIGNALIZED INTERSECTION	1

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2017 BUILD PEAK HOUR VOLUMES

FIGURE:
6.11
10/11/11

P:\11577M 385 Market St, Brighton\PNF\DWG\Transportation\11577M_Report-Graphics_101111.dwg Oct 13, 2011 10:03am

Traffic Operations Analysis

In order to assess quality of traffic flow, intersection capacity analyses were conducted for 2011 Existing, 2017 No-Build, and 2017 Build traffic-volume and roadway conditions. Capacity analyses provide an indication of how well the roadway facilities will serve the traffic demands placed upon them. Additionally, the pedestrian and bicycle impact was included in the analysis was to determine existing operating conditions for critical pedestrian crosswalks and walkways adjacent to the project site, as well as potential project-related impacts to these facilities. Finally, this section presents a discussion of project access and parking, and loading and deliveries operations.

6.4.1 Intersection Capacity Analyses

This section presents methodology and results of the capacity analysis conducted for the study area intersections.

Methodology

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[5] The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing the worst.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

LOS A represents a condition with little or no delay to minor street traffic.

LOS B represents a condition with short delays to minor street traffic.

LOS C represents a condition with average delays to minor street traffic.

LOS D represents a condition with long delays to minor street traffic.

[5]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2000.

LOS E represents operating conditions at or near capacity level, with very long delays to minor street traffic.

LOS F represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2000 *Highway Capacity Manual.*[6] Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the affects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the 2000 *Highway Capacity Manual*.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

LOS A describes operations with very low delay; most vehicles do not stop at all.

LOS B describes operations with relatively low delay. However, more vehicles stop than LOS A.

LOS C describes operations with higher delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

LOS D describes operations with delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with high delay values. Individual cycle failures are frequent occurrences.

LOS F describes operations with high delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. **Table 6-2** summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

[6] *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

TABLE 6.2

LEVEL of SERVICE (LOS) DELAY THRESHOLD for INTERSECTIONS

UNSIGNALIZED INTERSECTION AVERAGE VEHICLE DELAY (SECONDS)	SIGNALIZED INTERSECTION AVERAGE VEHICLE DELAY (SECONDS)	LEVEL OF SERVICE	EXPECTED DELAY
Equal to or Less than 10.0	Equal to or Less than 10.0	A	Little or no delay
Between 10.1 and 15.0	Between 10.1 and 20.0	B	Short traffic delays
Between 15.1 and 25.0	Between 20.1 and 35.0	C	Average traffic delays
Between 25.1 and 35.0	Between 35.1 and 55.0	D	Long traffic delays
Between 35.1 and 50.0	Between 55.1 and 80.0	E	Very long traffic delays
Greater than 50.0	Greater than 80.0	F	Forced flow

6.4.2 Results of Analysis

The intersections were analyzed using the SYNCHRO version 7.0 computer model, which is based on the 2000 *Highway Capacity Manual* procedures and is officially sanctioned by the EOEA/EOTC.

Level-of-service analyses were conducted for 2011 Existing, 2017 No-Build, and 2017 Build conditions for the intersections within the study area. The results of the intersection capacity analyses are summarized in **Tables 6.3** through **6.5**, with detailed analysis results presented in the **Appendix G**. The following is a summary of level-of-service analyses for the intersections within the study area.

TABLE 6.3

2011 EXISTING CONDITIONS - OPERATIONAL ANALYSIS

CONDITION/ INTERSECTION		CAPACITY ANALYSYS						QUEUE LENGTH PERCENTILES (ft)			
		AM PEAK HOUR			PM PEAK HOUR			AM PEAK HOUR		PM PEAK HOUR	
TYPE	DESCRIPTION	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]	50th	95th	50th	95th
Signalized	**Market St / Arlington St / Sparhawk St**	**1.03**	**74.3**	**E**	**1.03**	**65.3**	**E**	-		-	
	Market St - Northbound Left/Through/Right	0.78	29.8	C	0.77	30.4	C	228	#593	239	#598
	Market St - Southbound Left/Through/Right	0.89	33.8	C	1.03	66.3	E	213	#714	315	#901
	Arlington St - Eastbound Left/Through/Right	1.26	170.8	F	1.00	81.8	F	~306	#486	234	#422
	Sparhawk - Westbound Left/Through/Right	1.07	93.9	F	1.03	93.0	F	~304	#491	~306	#514
Unsignalized	**Market St / Bennett St**	-			-			-		-	
	Market St - Northbound Through/Left	0.04	1.0	A	0.08	2.2	A	0	3	0	7
	Market St - Southbound Through/Right	0.35	0.0	A	0.46	0.0	A	0	0	0	0
	Bennett St - Eastbound Left/Right	0.32	21.2	C	0.49	41.2	E	0	33	0	61

1 - Volume to Capacity Ratio

2 - Average Delay expressed in seconds per vehicle

3 - Level of Service

4 - # indicates 95th percentile volume exceeds capacity, queue may be longer

5 - ~ indicates volume exceeds capacity, queue is theoretically infinite

As summarized in **Table 6.3**, the intersection of Market Street at Arlington Street and Sparhawk Street currently operates at an overall level-of-service (LOS) E during the weekday morning and evening peak hours. The Market Street approaches operate at acceptable LOS C, except for the PM southbound approach. This approach has a protected left hand turn phase which provides 8 – 10 seconds to clear the left hand turns. The southbound left hand turn has a high volume, particularly in relation to the rest of the left hand turns at the intersection for both peak hours. Additionally the total approach volume is significantly higher in the PM while the remaining approaches for both the AM and PM peak hours remain similar. The analytical calculations are shown in **Appendix F**.

The minor approaches, Arlington St. and Sparhawk St., both fail with LOS F in both peak hours. The queue lengths also support the inadequate operational capacity of the minor approaches. The Market St. intersections are interconnected with a series of signalized intersections which stretch from Arlington/Sparhawk to North Beacon Street. The interconnection prohibits the ability to revise the signal phasing and timing, hence the intersection must stay in its current condition, or changes will affect the entire coordinated corridor. The intersection cycle length is set at 90 seconds for the AM and 100 seconds for the PM. If the corridor intersections cycle lengths are increased by 10 seconds the minor side streets would benefit. However, this would need to be investigated along the entire corridor, and the adverse impact to the corridor would need to be evaluated before the minor approaches were provided the additional cycle length time.

The Market Street / Bennett Street unsignalized intersection shows the AM peak hour to operate adequately, however the Bennett St approach has PM LOS E. This is due to the high volume of traffic on Market Street in the PM (approximately 1,200 in the PM and 1,000 in the AM), which is not allowing gaps in the traffic for Bennett Street traffic to enter.

TABLE 6.4

NO-BUILD and BUILD 2017 FUTURE YEAR - OPERATIONAL ANALYSIS

CONDITION/ INTERSECTION		AM PEAK HOUR NO-BUILD			AM PEAK HOUR BUILD			PM PEAK HOUR NO-BUILD			PM PEAK HOUR BUILD		
TYPE	DESCRIPTION	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]	V/C[1]	Delay[2]	LOS[3]
Signalized	**Market St / Arlington St / Sparhawk St**	**1.08**	**86.5**	**F**	**1.09**	**88.4**	**F**	**1.07**	**76.2**	**E**	**1.09**	**77.3**	**E**
	Market St - Northbound Left/Through/Right	0.81	32.0	C	0.84	34.4	C	0.80	32.4	C	0.82	26.5	C
	Market St - Southbound Left/Through/Right	0.93	39.6	D	0.94	41.0	D	1.08	80.0	E	1.09	85.9	F
	Arlington St - Eastbound Left/Through/Right	1.33	201.3	F	1.34	202.6	F	1.05	96.9	F	1.06	98.7	F
	Sparhawk - Westbound Left/Through/Right	1.12	109.7	F	1.13	114.2	F	1.07	106.3	F	1.08	107.7	F
Unsignalized	**Market St / Bennett St**	-			-			-			-		
	Market St - Northbound Through/Left	0.04	1.1	A	0.04	1.2	A	0.09	2.6	A	0.10	2.8	A
	Market St - Southbound Through/Right	0.36	0.0	A	0.37	0.0	A	0.48	0.0	A	0.48	0.0	A
	Bennett St - Eastbound Left/Right	0.36	23.6	C	0.32	20.4	C	0.61	56.6	F	0.62	54.3	F
Unsignalized	**Market St / 375 Market St Driveway**	-			-			-			-		
	Market St - Northbound Through/Left				0.01	0.2	A				0.02	0.1	A
	Market St - Southbound Through/Right				0.40	0.0	A				0.51	0.0	A
	Site Drive - Eastbound Left/Right				0.10	19.6	C				0.10	34.3	D

1 - Volume to Capacity Ratio

2 - Average Delay expressed in seconds per vehicle

3 - Level of Service

TABLE 6.5

NO-BUILD and BUILD 2017 FUTURE YEAR - QUEUE LENGTH PERCENTILES (ft)

CONDITION/ INTERSECTION		AM PEAK HOUR NO-BUILD		AM PEAK HOUR BUILD		PM PEAK HOUR NO-BUILD		PM PEAK HOUR BUILD	
TYPE	DESCRIPTION	50th	95th	50th	95th	50th	95th	50th	95th
Signalized	**Market St / Arlington St / Sparhawk St**	-		-		-		-	
	Market St - Northbound Left/Through/Right	245	#622	260	~646	254	#631	279	#653
	Market St - Southbound Left/Through/Right	226	#748	228	~754	333	#942	342	#960
	Arlington St - Eastbound Left/Through/Right	~328	#510	~329	#511	~265	#446	~267	#449
	Sparhawk - Westbound Left/Through/Right	~324	#514	~329	#519	~335	#539	~339	#543
Unsignalized	**Market St / Bennett St**	-		-		-		-	
	Market St - Northbound Through/Left	0	3	0	3	0	7	0	8
	Market St - Southbound Through/Right	0	0	0	0	0	0	0	0
	Bennett St - Eastbound Left/Right	0	40	0	34	0	81	0	87
Unsignalized	**Market St / 375 Market St Driveway**	-		-		-		-	
	Market St - Northbound Through/Left			0	0			0	0
	Market St - Southbound Through/Right			0	1			0	2
	Site Drive - Eastbound Left/Right			0	8			0	8

1 - # indicates 95th percentile volume exceeds capacity, queue may be longer

As summarized in **Tables 6.4 and 6.5**, the intersection of Market Street at Arlington Street and Sparhawk Street future year no-build and build condition operates at a LOS F and E during the AM and PM peak hour, respectively. Similar to the existing condition the Market St. northbound approach operates adequately with a LOS C, and the southbound approach is also adequate for the AM. However the PM southbound approach degrades to a LOS D because of the high southbound volumes. The analytical calculations are shown in **Appendix G**.

Also, similar to the existing condition, the minor approaches of Arlington St and Sparhawk St are failing with a LOS F in all the conditions and peak hours.

The Market Street / Bennett Street unsignalized intersection shows the AM peak hour to operate adequately, however similar to the existing condition, the Bennett St PM degrades to a LOS F. The high volumes on Market St., particularly southbound, inhibit the Bennett St. traffic from accessing Market St.

As we have seen throughout this section, the traffic impact to the existing transportation infrastructure is minimal. The effect of the 375 Market St generated traffic on the future year build condition does not increase the delay time of either intersection by more than 2 seconds. The LOS does not increase.

6.4.3 Public Transportation Impact Analysis

For the 2017 Build conditions, the additional transit trips expected to be generated by the proposed project (6 trips during the weekday morning peak hour and 5 trips during the weekday evening peak hour) are not anticipated to result in a significant impact on transit capacity in the area. Based on the peak period transit capacity and ridership information provided by the MBTA, adequate capacity exists in the area to serve the planned development.

6.4.4 Pedestrian Impact Analysis

For the 2017 Build conditions, the additional pedestrian trips expected to be generated by the proposed project (6 trips during the weekday morning peak hour and 5 trips during the weekday evening peak hour) are not expected to result in a significant impact on the capacity of pedestrian facilities in the area. The project site and the study area are currently served by an expansive network of pedestrian sidewalks, with controlled crossings provided at signalized intersections. In conjunction with the planned development, improved pedestrian access will be provided within the study area through the reconstruction of sidewalks along the project frontage on Market Street.

6.4.5 Project Access and Parking

Vehicular access to the proposed development will be provided from Market Street to a proposed subsurface parking garage. A single entrance and exit lane will provide access to the proposed garage.

The existing project site has two curb cuts into the site. The project will eliminate one of the driveways, making a single driveway entrance/exit located on the southern end of the site frontage. The proposed condition will provide a safer condition by removing one of the existing driveways.

The existing site has 3 - 4 parking spaces curb side on Market Street. The proposed condition will increase curb side parking to 5 spaces, creating 1 - 2 additional parking spaces. The proposed parking supply will provide a total of 63 spaces, 58 in the garage and 5 curb side. A parking ratio of almost 1.5 parking spaces per unit is achieved by providing the 58 garage spaces for 39 units. The total number of parking spaces is expected to be adequate. It is reflective of the availability of public transportation services in the area and the extensive network of pedestrian facilities linking the project site to the neighborhood and commercial services.

6.4.6 Loading and Deliveries

Loading for the retail portion of the site will be on street. The project team discussed making a newly created street space for loading, however the residents at the neighborhood meetings did not want to sacrifice street parking. Deliveries will be limited to off-peak periods as defined by the City of Boston Transportation Department. Deliveries to the site are expected to occur via single unit (SU) vehicles. Trash pick-up will use the driveway to the underground garage and partially block the sidewalk for a short time once or twice a week.

6.5 Transportation Mitigation Measures

As documented in this report, the redevelopment of the project site is expected to have a negligible impact on area traffic operations, resulting in minor increases to overall vehicle delay as compared to future No-Build conditions. Therefore, no specific off-site mitigation measures are warranted on the roadway network serving the project site.

In an effort to minimize the level of vehicular traffic arriving and departing the project site, the proponent is committed to implementing a comprehensive transportation demand management (TDM) plan as described below.

6.5.1 Transportation Demand Management Plan

The proponent is committed to developing and implementing a TDM program for the site that is targeted at reducing automobile dependency and that encourages travel by non-automobile modes. As the proposed development is proximate to transit services provided by the MBTA, it

is ideally situated to promote non-automobile travel. The proponent is committed to implementing measures to take advantage of the proximate transit access and to promote the use of transit by residents and employees of the facility, as well as to encourage the use of ridesharing, bicycling, and walking. The Specific elements of the TDM plan may include:

- On-site transit pass sales and distribution, including Charlie Cards & Charlie Tickets, will be provided on-site through the MBTA Corporate Pass program.

- Promotion of car sharing initiatives. Zip Car is a car sharing program which provides various membership types catered to the specific needs of individuals and businesses. Thought membership fees and benefits vary, all membership types include gas, insurance and up to 180 miles per day, as well as the freedom to use the vehicle for any desired time period. The Allston/Brighton neighborhood currently has sixteen (16) Zip Car pick-up/return locations with a total of forty (40) vehicles.

- Provision of an on-site transportation coordinator with the responsibility of ensuring that transit information is properly posted and updated, and purchase/distribution of transit passes for employees. The coordinator will also serve as the central point of contact with the BTD.

- Provision of on-site bicycle storage facilities for building tenants and employees. The proponent is committed to installing covered and secure bicycle racks to accommodate at least 12 bicycles within the proposed garage structure, to facilitate bicycle travel to and from the site by employees of the project.

6.5.2 Construction Management

The project proponent and the general contractor will use the following measures to minimize construction impacts on pedestrian and vehicular travel and to enhance safety during the project's construction phase.

- Construction worker parking will not be permitted on-site or immediately adjacent to the construction area. All construction workers will be required to access the site by public transportation, ridesharing, and/or by parking at off-site locations. A number of off-site parking facilities are located within a reasonable walking distance of the project site within the Fenway area.

- Coordinate construction activities with the BTD and the MBTA;

- Provide police details as required by the BTD;

- Coordinate with the BTD regarding all transportation-related construction impacts;

- Develop and enforce the use of designated truck routes approved by the BTD with the goal of minimizing the use of city streets to the extent possible;

- Secure fencing and sidewalk staging protection will be provided in areas affected by each phase of construction in order to protect nearby pedestrian and vehicular traffic. Gated entrances into construction areas will be determined jointly with the BTD;

- Full or partial street closures will be avoided to the extent possible. Any required street closures will be closely coordinated with businesses along Market Street, and the BTD. Should a partial street closure be necessary in order to off-load construction materials and/or complete construction-related activities, the closure will be limited to off-peak periods as defined by the BTD so as to minimize the impact on vehicular and pedestrian flow. Police details will be used as required by the BTD. Prior to the implementation of any planned construction activities within the public right-of-way, the contractor will submit to the BTD for review and approval a traffic and pedestrian management plan; and

- Secure on-site storage will be provided for tools and equipment in an effort to minimize construction-related vehicle trips to the site.

6.6 Conclusions

The 375 Market Street project is not expected to result in a significant impact to area traffic operations. In an effort to mitigate traffic impacts associated with the project, the proponent is committed to implementing a comprehensive traffic demand management plan aimed at reducing automobile dependency and encouraging healthy, clean modes of travel.

The proposed development will remove one of the two existing driveways into the site on Market Street. The reduction in curb cuts will create a safer condition and less inconvenience to the pedestrian and bicycle traffic.

The project will provide ample parking spaces for operations of the building, and one to two parking spaces will be added to the curb side parking on Market Street.

The study area intersections have crash rates well below the area and state wide averages. The project will not affect those conditions, hence the safe condition is maintained.

The Market Street area is well served by public transportation. Although the project transit generated trips is estimated to be low, the presence of ample public transportation may sway proposed residences to utilize the public transportation system and take more people out of their cars.

To promote bicycle usage covered, secured bicycle facilities will be provided. Market Street and the surrounding area have extensive bicycle route options. Again, the aim is to reduce vehicle use and promote healthy, clean modes of transportation.

7.0 INFRASTRUCTURE SYSTEMS

7.1 Introduction

The existing single story brick and metal structure is situated in the northwest corner of the 0.76+/- acre site with frontage and access on both Market and Bennett Streets. The structure with surrounding parking was the previous home to the Carpenters Union Apprenticeship program. The proposed development will involve the demolition of the existing building and surrounding bituminous pavement parking area to clear the area for a new, four-story, mixed use residential building with underground parking and ground floor commercial space.

The Proponent's Engineer will initiate contact with those responsible for the area's utility systems, including the Boston Water and Sewer Commission ("BWSC") to understand and evaluate each system and design the Project to prevent disruption of utility services. A Boston Water and Sewer Commission Site Plan and General Service Application is required for the proposed new water, sewer and drain connections. In addition, a Pollution Prevention Plan will be submitted specifying best management measures for protecting the BWSC drainage system during construction. A Drainage Discharge permit will also be required prior to discharge of any construction dewatering. Updated design information on the proposed utility connections, as appropriate, will be provided to the BWSC and other permitting agencies as required.

The following is a description of the existing utility systems in the area surrounding the project site and the proposed infrastructure to support the new development.

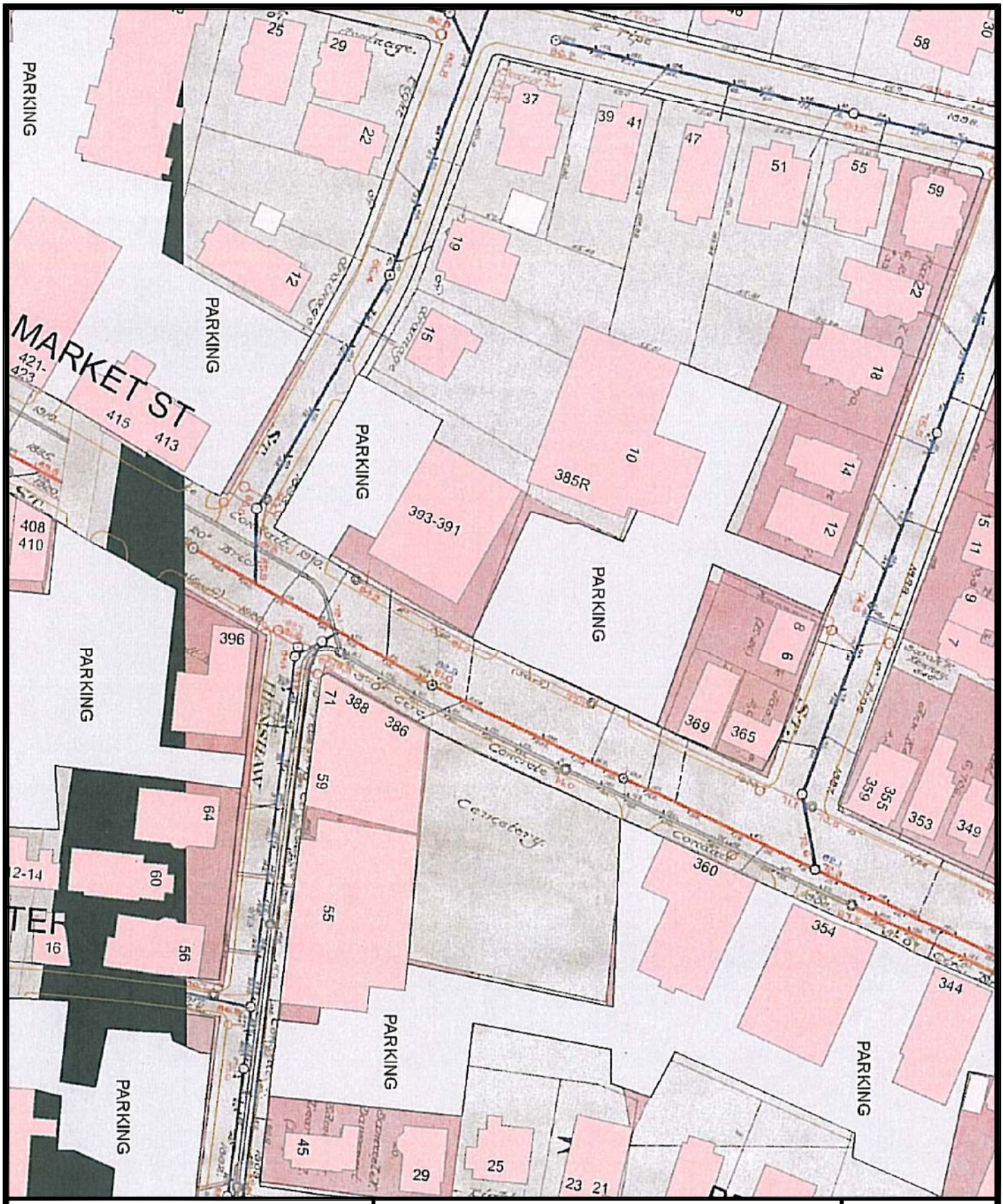
7.2 Sanitary Sewer System

7.2.1 Existing Sewer System

BWSC owns, operates, and maintains the sewer system in the area serving the proposed project. Currently the site is serviced by a sanitary sewer line connected to a 26"x20" sewer main line located in Market Street. The 26"x20" sanitary sewer line which runs in a northeasterly direction on the southerly side of the road, services both sides of Market Street and continues past Bennett Street where it picks up a 12" sanitary sewer line. **Figure 7-1. Existing Sanitary Sewer System** shows the sanitary sewer system in the project area.

7.2.2 Project-Generated Sewage Flow

The Project's sanitary sewage system will connect to the existing BWSC sanitary sewage system located in Market Street. The Proposed Project is estimated to generate approximately 8,855 gallons per day (gpd) based on sewage generation rates provided in 310 CMR 15.203 (Title V) and in 314 CMR 7.00 Sewer System Extension and Connection Permit Program of 50 gallons per



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EXISTING SANITARY SEWER SYSTEM

375 MARKET STREET
BRIGHTON, MASSACHUSETTS

FIGURE
7 – 1
7/26/11

day (gpd) per 1,000 square feet for retail space and 110 gallons per day for each bedroom. The Proponent's civil engineer, GEOD Consulting, Inc. will adjust and provide updated sewage flows to the BWSC when more exact residential and commercial uses are determined and the General Services Application is submitted for the Project.

79 bedrooms @ 110 gallons per day (gpd) per bedroom =	8,690 gpd
3,291 sf Retail Space @ 50 gallons per day (gpd) per /1,000 sf Retail Space =	165 gpd
Total gallons per day (gpd) =	**8,855 gpd**

The Project does not propose industrial uses and flows are expected to be under the 50,000 gpd that would require filing with the Massachusetts Department of Environmental Protection for a Sewer Connection Permit or Compliance Certificate, respectively.

7.2.3 Sanitary Sewage Connection

It is expected that the proposed connection from the development to the BWSC sanitary sewer system will be to the 26"x20" sanitary sewer line on Market Street. The existing sanitary sewer service from the site will be evaluated to assess its size and condition in order to determine if will be acceptable to support the proposed development. Depending upon the outcome of the analysis, the service will be either maintained or replaced. The Proponent's engineer will submit a Site Plan to the BWSC for review and approval. The capacity and the projected flows anticipated for potential connection will be reviewed with the BWSC and the preferred connection incorporated into the final analysis.

7.2.4 Proposed Effluent Quality

The Project is not anticipated to generate any industrial wastes. Floor drains in the lower level parking facility will be used to collect flows and direct them to oil and grease separators where they will be treated before discharging to the BWSC sanitary sewer system.

7.2.5 Sewer System Mitigation

The Project Proponent will investigate the use of water conservation devices such as low-flow toilets and flow restricting faucets in an effort to conserve water and reduce the amount of wastewater which the Project will generate.

7.3 Water System

7.3.1 Existing Water Service

The water mains in the vicinity of the Project Site are owned and maintained by the BWSC. The site is currently serviced by a water line that connects to a 12" water main located on the southerly side of Market Street. The water main passes Bennett Street where it connects to an 8"

water line and continues on Market Street as a 12" water main. The Proponent's engineer will determine if the existing lines are sufficient to meet the needs of the proposed domestic use with the BWSC. Fire hydrants are located on both Market and Bennett Streets. The Market Street hydrant is located on the southerly side of the street, directly across from the site, and ties into the same 12" water main as the domestic connection. The Bennett Street hydrant is located on the westerly side of the road, at the entrance to the site's Bennett Street frontage. The Bennett Street hydrant is connected to the 8" domestic water service. The Proponent's engineer will determine if these locations are sufficient for fire protection needs with the BWSC and Fire Department during the detailed project design phase.

7.3.2 Anticipated Water Consumption

The Maximum daily water demand is based on the sewage flow estimate identified in **Section 7.2.2** of 8,855 gallons per day.

Since the heating and cooling systems for the building have not yet been designed, the water usage estimates may be adjusted during the design phase of the Project.

The project's civil engineer, GEOD Consulting, Inc., will adjust and provide updated water consumption estimates to the BWSC when the residential and retail uses are finalized and the General Services Application is submitted for the Project.

7.3.3 Proposed Water Service

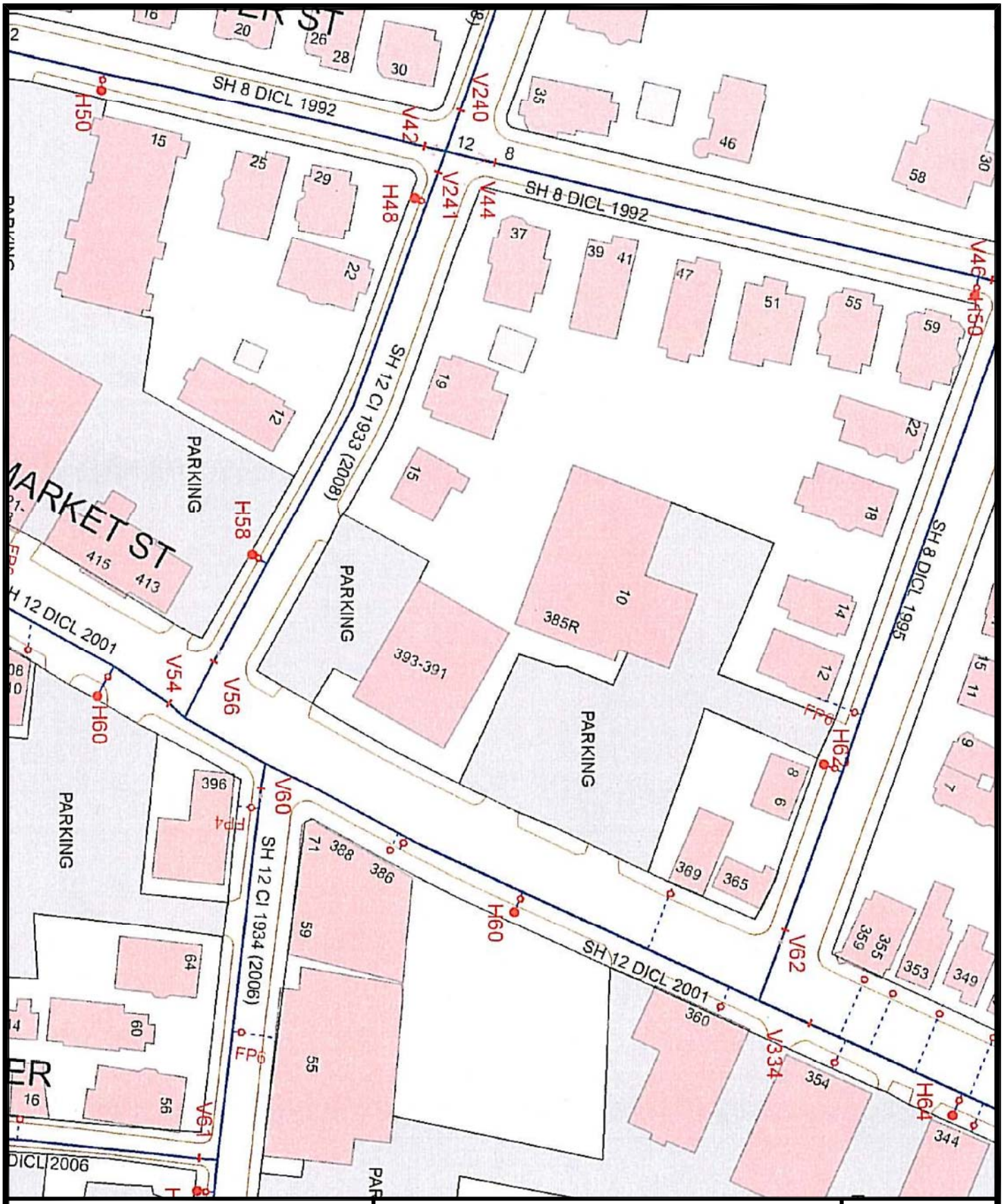
It is anticipated that the domestic water and fire service could be provided from the existing 12-inch water main in Market Street. It is anticipated that a 2-inch domestic service and a 4-inch fire protection service will connect to the existing 12-inch water main.

Figure 7-2. Existing Water Distribution System shows the existing water distribution system in the project area.

Flow tests will be performed for final design of the proposed building fire suppression system during the detailed design phase.

Water service to the building will be metered in accordance with the Commission's Site Plan Requirements. The Proponent will provide for the connection of the meter to the Commission's automatic meter reading system. The property owner will provide a meter transmission unit ("MTU"), approved by the Commission and mounted near the meter, a telephone line and jack near the meter, and an outside meter reading device.

A backflow preventer will be installed on the fire protection service. Fire protection connections for the proposed project will need approval by the Fire Chief. The Proponent's engineer will also submit a Site Plan to the BWSC for review and approval. In addition, a hydrant permit will be obtained if hydrant use is anticipated during the construction phase of the proposed project. The



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EXISTING WATER DISTRIBUTION SYSTEM

375 MARKET STREET
BRIGHTON, MASSACHUSETTS

FIGURE
7-2
7/26/11

Proponent will also provide the Commission with the breakdown of water usage during the design development phase.

In addition to the new building fire suppression system, the proposed structure will also continue to be serviced by an existing hydrant connected to the water main in Market Street and the hydrant connected to the water main in Bennett Street.

7.3.4 Water Supply System Mitigation

The State Building Code requires the use of water-conserving fixtures. The Proponent is evaluating water conservation measures such as low-flow toilets and restricted flow faucets which will help reduce the domestic water demand on the existing distribution system.

7.4 Storm Drainage System

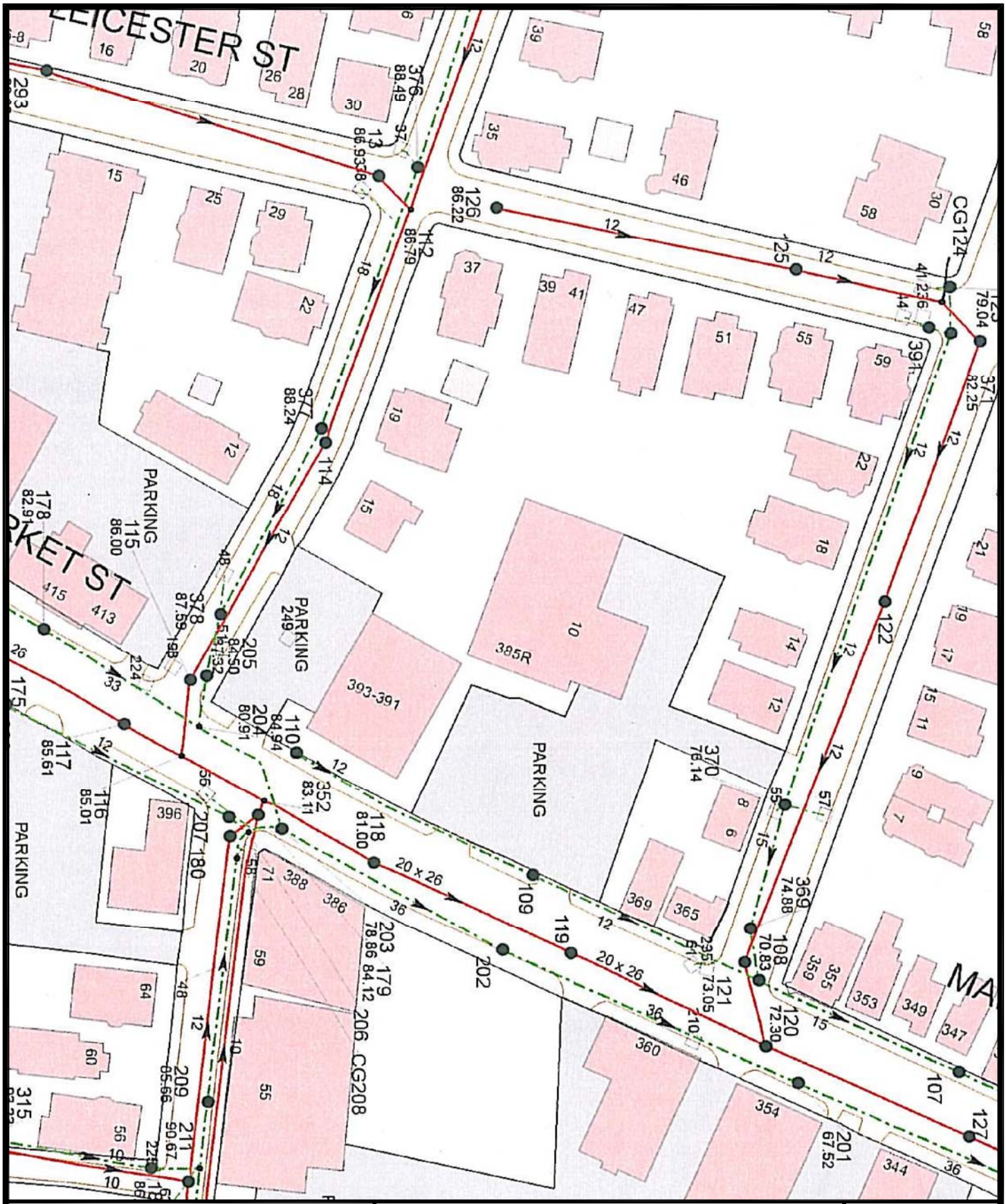
7.4.1 Existing Storm Drainage System

The existing site consists primarily of impervious areas associated with the building roof and parking area. The building and parking area cover the entire site. Based on these conditions and observation, it appears the existing site provides no stormwater recharge.

Runoff from the Project Site is currently collected and conveyed to the stormwater drain systems located in Market and Bennett Streets. The current terrain of the existing site is sloped from the southwest side of the property to the northeast. The southern portion of the site has sheetflow over the parking area from west to east and collects runoff in a series of on-site catchbasins that connects to Market Street via a 12" storm drain. The northern portion of the site also sheetflows from west of the property to the east, but continues across the portion of land that connects to Bennett Street directly into the street storm drain system. The Market Street drainage system is comprised of a 12" line located on the northerly side of the road under the sidewalk that collects street runoff and runoff from the project site via two catchbasins connected to a 12" line. A 36" pipe is located on the southerly side of the road with no apparent connection in the vicinity of the project site. Both lines flow in a northeasterly direction. The Bennett Street drainage system is a 12" line that primarily collects street drainage and includes runoff from the site. The line flows in a southeasterly direction and connects to Market Street then continues on as a 15" pipe.

Figure 7-3 Existing Storm Drain & Sanitary Sewer System shows existing stormwater system in the project area.

Currently, there appears to be no on-site stormwater management system that provides recharge, water quality measures, or attenuates peak flows. It appears the only water quality may be the on-site catchbasins with sumps and the Bennett Street catchbasin with sump that collects a portion of the site's runoff.



GEOD CONSULTING
ENGINEERING SITE DEVELOPMENT TRANSPORTATION
24 Ray Avenue, Burlington, MA 01803
Phone : 781-273-3434 Fax : 781-273-3430

EXISTING STORM DRAIN &
SANITARY SEWER SYSTEM

375 MARKET STREET
BRIGHTON, MASSACHUSETTS

FIGURE
7-3
7/26/11

7.4.2 Proposed Storm Drainage

The proposed building with below grade parking creates an area of open space on the site which will allow for stormwater management improvements. Although there will be an increase in building rooftop area, the overall proposed site improvements will result in a reduction in impervious space by the elimination of at-grade pavement parking areas and the development of landscaped areas. In order to mitigate the effects of stormwater runoff, a series of devices will be installed to improve water quality and to maintain or reduce peak flows and volume from the site. To accomplish this, a drain line will be installed around the perimeter of the building to collect small confined drainage areas and convey runoff to the Market Street drainage system. Deep sump catchbasins will be installed at low points around the perimeter of the building in order to prevent localized flooding and to provide Total Suspended Solid (TSS) removal. An infiltration unit will be installed to collect rooftop runoff and provide the necessary recharge required under stormwater management guidelines. An outlet control device will regulate peak flows and volume from the infiltration unit and the discharge will connect to the surface area drain line that conveys runoff to Market Street.

The stormwater management system will be designed in accordance with BWSC's design standards and BWSC Requirements for Site Plans. A Site Plan will be submitted for BWSC approval and a General Service Application will be completed prior to any on-site drain work.

7.4.3 Water Quality

No negative water quality impacts are expected as a result of the proposed project. Since the entire surface of the site is comprised of a building with rooftop and open landscaped area, the necessary TSS removal associated with parking areas is not required. The proposed roof runoff will be collected and recharged.

It is the intention of the MassDEP to apply the Stormwater Management Standards during Project review under the Wetlands Protection Act (MGL Ch. 31, s. 40). Since this Project does not require review under the Wetlands Protections Act, the Standards are not specifically addressed in this document.

7.4.4 Mitigation Measures

The Project will control sediment during construction through the use of hay bales, silt fence and catch basin filters.

A Drainage Calculations will be submitted to the BWSC with the Site Plan submittal. The calculations will compare existing and proposed hydrological conditions and will be used in the design of the Stormwater Management System. The Site Plan will also more specifically address the sediment and pollutant control measures and recommended maintenance proposed by the Project as well as indicate the storage or treatment of contaminated soils, if any.

The Proponent will also submit a dewatering plan and Drainage Discharge Permit Application if dewatering is required.

7.5 Electric Systems

Electric Service to the site is provided by NSTAR. Service is currently provided to a transformer located adjacent to the existing building from (2) manholes in Market Street, a third manhole in Market Street appears to have provided service to the site in the past but is currently not in use.

The electrical, space heating and energy systems for the proposed project have not yet been designed. Electrical power supply design will be coordinated with NSTAR as the project design progresses.

The proposed transformer for the project will be located above ground near Bennett Street. The final location of the transformer will be coordinated with NSTAR during the final design phase.

Energy conservation measures will be incorporated into the building design and construction. The Proponent will investigate the installation of energy efficient lighting, heating and cooling systems in the design for the building.

7.6 Street Lighting

Existing street light conduits and streetlights are owned, operated and maintained by the Boston Public Works Department, Street Lighting Division. Currently, there is existing street lighting in the vicinity of the project on both Market and Bennett Streets. No changes or modifications are anticipated to the lighting system.

The project engineer will coordinate any modifications to the existing system with the Boston Public Works Department.

7.7 Telephone Systems

Telephone service to the site is provided overhead by Verizon. A series of utility poles make their way from Surry Street through properties with frontage on Leicester and Bennett Streets and into the easterly side of the property where a line is feed from a utility pole to the existing building.

Verizon can provide service for the project address as needed. New overhead or underground telephone service connections will be determined and coordinated with Verizon as the project progresses.

7.8 Cable Systems

Cable service to the site is available by overhead from Comcast. As with telephone service, a series of utility poles make their way from Surry Street through properties with frontage on Leicester and Bennett Streets and into the easterly side of the property where a line is feed from a utility pole to the existing building.

Comcast can provide service for the project address as needed. New overhead or underground telephone service connections will be determined and coordinated with Comcast as the project progresses.

7.9 Gas Systems

Gas service to the site is provided by National Grid. Service is provided to the existing building by a 2 inch (low pressure) line that is fed from a 6 inch (low pressure) main that runs along Market Street.

The gas demand will be determined during the design phase of the Project. The project engineer will coordinate with National Grid to determine if a new gas service will be required.

7.10 Utility Protection During Construction

During construction, infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging, as required. The Contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the contractor will be required to coordinate the shutdown with the utility owners and project abutters to minimize impacts and inconveniences accordingly.

8.0 COORDINATION WITH GOVERNMENT AGENCIES

8.1 Architectural Access Board Requirements

This Project will comply with the requirements of the Architectural Access Board. The Project will also be designed to comply with the Standards of the Americans with Disabilities Act.

8.2 Massachusetts Environmental Policy Act

Based on information currently available, development of the Project will not result in a state permit/state agency action that meets a review threshold requiring filing with the MEPA Office of the Executive Office of Energy and Environmental Affairs.

8.3 Boston Civic Design Commission

The Project does not exceed the 100,000 square feet size threshold requirement for projects subject to review by the Boston Civic Design Commission.

9.0 PROJECT CERTIFICATION

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

Signature of Proponent

Date 11/1/11

Jeff Feuerman
Brookline Development Corp. Inc.
3 Craftsland Road
Brookline, MA 02467

Signature of Preparer

Date 11/1/11

Mitchell L. Fischman, AICP
Mitchell L. Fischman Consulting, LLC
41 Brush Hill Road
Newton, MA 02461

APPENDIX A – LETTER OF INTENT TO FILE PNF AND PUBLIC NOTICE OF PNF AVAILABILITY

McDERMOTT, QUILTY & MILLER LLP
131 OLIVER STREET - 5TH FLOOR
BOSTON, MASSACHUSETTS 02110

TELEPHONE: 617-946-4600
FACSIMILE: 617-946-4624

July 29, 2011

VIA HAND DELIVERY

Peter Meade, Director
Boston Redevelopment Authority
One City Hall Square, 9th Floor
Boston, MA 02201
Attn: Erico J. Lopez, Project Assistant

RE: Letter of Intent to File Project Notification Form
Article 80 Large Project Review
375-375C Market Street, Brighton, Massachusetts

Dear Director Meade:

This office represents Brighton Park Associates, LLC (the "Applicant"), owner of the real property located at 375-375C Market Street, Brighton, Massachusetts (the "Property"). The purpose of this letter is to notify the Boston Redevelopment Authority (the "BRA") of the Applicant's intent to file a Project Notification Form ("PNF") with the BRA pursuant to Article 80 of the Boston Zoning Code (Large Project Review).

The Applicant's proposed project (the "Project") involves the development of a new, four-story mixed use residential building with underground parking and ground floor commercial space, as well as related improvements in open space, landscaping and vehicular and pedestrian access at the Property. The Project will also remove an existing commercial building, which was most recently used as the former training facility for the New England Council of Carpenters Apprenticeship and Training Fund and has no special historic or architectural significance to the surrounding neighborhood. The new structure will contain approximately 65,727 square feet of building, with 39 residential units on four levels and 3,567 square feet of commercial space on the ground floor. The structure will also contain an underground parking garage containing approximately 22,425 square feet. The Applicant will also comply with the Mayor's Executive Order Relative to Affordable Housing, dated February 29, 2000, and as amended on May 16,

2006, with respect to affordable units.

The Project is located within the Neighborhood Shopping Subdistrict (NS-.5) of the Allston-Brighton Neighborhood District (Article 51) as defined by the Boston Zoning Code. After conducting extensive preliminary community outreach with neighbors and abutters of the Property, the Applicant filed a permit application with the City of Boston Inspectional Services Department ("ISD") on June 15, 2011. On July 5, 2011, ISD issued Zoning Code and Building Code refusal letters indicating that the Project would require variance and conditional use relief from the City of Boston Board of Appeal (the "Board") for certain use, dimensional, parking, and other violations. Following receipt of the above-referenced refusal letters, the Applicant filed the necessary appeals with the Board. Copies of the appeals will be included in the Project Notification Form.

By way of background, the Applicant began meeting with neighbors and abutters of the Property in July of 2010 and hosted several site meetings with residents of the immediate area. On April 7, 2011, the Applicant also appeared before the Brighton/Allston Improvement Association to make an initial presentation on the Project and, after fielding general concerns focused mostly on the size and scope of the Project, agreed to continue the discussion with the group once the Project was filed and under review. With guidance from the BRA's design staff, the Applicant then reduced the size and scope of the Project and held yet another site meeting on May 25, 2011 to present the revised plans and update the community on the status of the same. No concerns were raised by those in attendance upon the presentation of the updated and revised plans for the Project.

Based on the Applicant's extensive preliminary community outreach detailed above, and with design input from the BRA, the Project has now been reduced in size from a building area of 102,996 square feet (including an underground parking garage containing approximately 27,480), to the current size of 88,152 square feet (including 22,425 square feet of the underground parking garage); and the number of proposed residential units was reduced from 44 units to 39 units. The current Project represents nearly a year of extensive community outreach and significant reductions in size to achieve smart growth development which will properly integrate into the Brighton community.

As a result of the extensive community outreach and input described above, the Applicant is now prepared to submit a PNF for the Project and begin its Article 80 Large Project Review process. We look forward to working with the BRA, other city agencies and the community throughout the review process.

We greatly appreciate the opportunity to work with your staff and individuals from other city departments during the pre-submission process.

Very truly yours,

Joseph P. Hanley

cc: Jeff Feuerman, Brighton Park Associates, LLC
Daniel Roan, Mayor's Office of Neighborhood Services
District City Councilor Mark Ciommo

PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), pursuant to Article 80 of the Boston Zoning Code ("Code"), hereby gives notice that a Project Notification Form ("PNF") for Large Project Review, pursuant to Section 80B-2 of the Code, was submitted on November 1, 2011 by Brookline Development Corporation (the "Proponent") for a four-story mixed use residential building with approximately 65,727 square feet of building area including 39 residential units on four-levels, 3,567 square feet of commercial space at the ground floor, and an underground parking garage containing approximately 22,425 square feet with 58 spaces and accommodation for 12-bicycles as well as related improvements resulting in additional open space, landscaping and vehicular and pedestrian access at the Project Site ("Proposed Project"). The Proposed Project will also remove an existing commercial building, which was most recently used as training facility for the New England Council of Carpenters Apprenticeship and Training Fund, and will also provide a percentage of affordable housing units in compliance with the City of Boston's affordable housing requirements. The Project Site is composed of four city lots covering a total of 32,893 square feet. The largest lot is located behind two smaller lots which front on Market Street, and the fourth lot is a small lot (approximately 2,400 square feet) fronting on Bennett Street. Approvals are requested of the BRA pursuant to Article 80 for the issuance of a Certificate of Compliance by the Director of the BRA. The BRA in the Scoping Determination for such PNF may waive further review pursuant to Section 80B-5.3(d), if, after reviewing public comments, the BRA finds that such PNF adequately describes the Proposed Project's impacts. The PNF may be reviewed at the Office of the Secretary of the BRA, Room 910, Boston City Hall, Boston, MA 02201, between 9:00 AM and 5:00 PM, Monday through Friday except legal holidays. A copy of the PNF is on reserve at the Brighton Branch of the Boston Public Library, 40 Academy Hill Road, Brighton, MA 02135. Public comments on the PNF, including the comments of public agencies, should be submitted in writing to Erico Lopez, Project Manager, BRA, Boston City Hall, Boston, MA 02201 or to **Erico.Lopez.BRA@cityofboston.gov** by December 8, 2011.

BOSTON REDEVELOPMENT AUTHORITY
Brian Golden, Executive Director/Secretary
November 1, 2011

APPENDIX B – COPY OF BOARD OF APPEAL FILINGS

2011 JUL 26 P 9:14

Boston Inspectional Services Department
Building and Structures Division
1010 Massachusetts Avenue Boston, MA 02118 Telephone: (617) 635-5300

Thomas M. Menino
Mayor

Gary P. Moccia
Inspector of Buildings

BUILDING CODE REFUSAL

July 05, 2011

MATTHEW CALKINS
P.O. BOX 891
BROOKLINE, MA 02446

Re: Application # : **ERT81796**
Date Filed: June 15, 2011
Location: 375-375C MARKET ST ALLSTON / BRIGHTON MA 02135
Ward: 22
Purpose: Demolish existing Commercial Building. Erect a four story, Mixed-use Residential / Commercial Building. There will be Three (3) Commercial spaces along Market Street. There will be a total of Thirty-nine (39) Residential Units in the Building. There will be a 59 space Accessory Parking Garage under the Building.

Your application requires Building Code Relief, as same would be in violation of Massachusetts State Building Code 780 CMR - Eighth Edition, Chapter 802, acts of 1972, as amended to wit:

Violation	Violation Description	Violation Comments
Building	Building Code Refusal:	705.8.1 Allowable area of Openings. The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 705.8.

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b,c]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)	Not Permitted
	Protected (P)	Not Permitted
3 to less than 5[b,c]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)	15%
	Protected (P)	15%

Thomas White
for the Commissioner
(617)961-3275

Refusal of a permit may be appealed to the Board of Appeal within 45 days. Chapter 802, Acts of 1972, and Chapter 656, Acts of 1956, Section 19.

$900

242

This form must be completed and signed by the owner-of-record, their attorney and/or authorized agent. If form is not signed by property owner, please attach a signed letter of authorization designating the authorized agent.

BOSTONIA CONDITA A.D. 1630

APPEAL

under Boston Zoning Code

2011 JUL 26 P 9:09

Boston, Massachusetts July 20, 20 11

To the Board of Appeal in the Inspection Services Department of the City of Boston:

The undersigned, being the Owner
(The Owner(s) or authorized agent)

of the lot at 375-375C (number) Market Street (street) 22 (ward) Allston Brighton N.D. (district)

hereby appeal(s) under St. 1956, c. 665, s. 8, to the Board of Appeal in the Inspectional Services Department of the City of Boston the action taken by Inspectional Services Commissioner as outlined in the attached refusal letter.

DESCRIBE IN DETAIL THE REASON(S) FOR THIS APPEAL

Demolish existing commercial building and erect a four-story, mixed-use residential/commercial building with thirty-nine (39) residential units, commercial space on ground floor, and fifty-nine (59) parking spaces in an accessory parking garage under the building (see plans filed).

STATE REASONS FOR THIS PROPOSAL

Allowance of the within appeal will allow for the reasonable use of this unique property by enabling the Appellant to appropriately and reasonably re-develop the subject premises in a manner which will enhance its appearance and use, consistent with the character and concerns of the surrounding neighborhood.

PROVIDE REASONS WHY BOARD SHOULD GRANT RELIEF

Appellant submits that the Board should grant the requested relief, as the proposed building and use will not adversely affect the neighborhood, but provide additional high-quality housing and street level commercial space in the Allston Brighton neighborhood.

COMMENTS

For these and other reasons more precisely enumerated at the public hearing before the Board, the Appellant respectfully requests the allowance of the within appeal.

OWNER Jeff Feuerman, Brighton Park Associates, LLC

AUTHORIZED AGENT Joseph P. Hanley, Esq.

ADDRESS 131 Oliver Street, 5th Floor
Boston, Massachusetts 02110

TELEPHONE (617) 946-4600

FAX (617) 946-4624

BD 504a Revised 2005

Boston Inspectional Services Department
Planning and Zoning Division

1010 Massachusetts Avenue Boston, MA 02118 Telephone: (617) 635-5300

Thomas M. Menino
Mayor

ZONING CODE REFUSAL

Gary P. Moccia
Inspector of Buildings

MATTHEW CALKINS
P.O. BOX 891
BROOKLINE, MA 02446

July 05, 2011

Location:	375-375C MARKET ST ALLSTON / BRIGHTON MA 02135
Ward:	22
Zoning District:	Allston Brighton N.D
Zoning Subdistrict:	NS - .5
Appl. # :	**ERT81796**
Date Filed:	June 15, 2011
Purpose:	Demolish existing Commercial Building. Erect a four story, Mixed-use Residential / Commercial Building. There will be Three (3) Commercial spaces along Market Street. There will be a total of Thirty-nine (39) Residential Units in the Building. There will be a 59 space Accessory Parking Garage under the Building.

YOUR APPLICATION REQUIRES RELIEF FROM THE BOARD OF APPEAL AS SAME WOULD BE IN VIOLATION OF THE BOSTON ZONING CODE TO WIT: CHAPTER 665, ACTS OF 1956 AS AMENDED:

Violation	Violation Description	Violation Comments
Art. 51 Sec. 56	Off street parking requirements	Off-Street Parking Insufficient
Art.51 Sec.53	Screening&Buffering Req	Screening & Buffering Insufficient
Article 51, Section 16 **	Use Regulations	Use : MultiFamily Dwelling : Conditional
Article 51, Section 17 **	Dimensional Regulations	Floor Area Ratio Excessive
Article 51, Section 17 **	Dimensional Regulations	Building Height Excessive
Article 51, Section 17 **	Dimensional Regulations	Usable Open Space Insufficient

THIS DECISION MAY BE APPEALED TO THE BOARD OF APPEAL WITHIN FORTY-FIVE (45) DAYS PURSUANT TO CHAPTER 665 OF THE ACTS OF 1956, AS AMENDED. APPLICATIONS NOT APPEALED WITHIN THAT TIME PERIOD WILL BE DEEMED ABANDONED. IF YOU HAVE INQUIRIES REGARDING THE NEIGHBORHOOD PROCESS AND PUBLIC PARTICIPATION, PLEASE CONTACT THE MAYOR'S OFFICE OF NEIGHBORHOOD SERVICES AT 617-635-3485.

Thomas White
(617)961-3275
for the Commissioner

Refusal of a permit may be appealed to the Board of Appeal within 45 days. Chapter 802, Acts of 1972, and Chapter 656, Acts of 1956, Section 19.

8/50.

This form to be filed in duplicate with the Inspectional Services Department

(Form A)

APPEAL

BOSTON, July 20, 2011

TO THE INSPECTIONAL SERVICES COMMISSIONER OF THE CITY OF BOSTON:

The undersigned hereby appeals to the Board of Appeal from the following decision of the Inspectional Services Commission made July 5, 2011

Re: Application No. ERT81796
Filed: June 15, 2011
Location: 375-375C Market Street, Allston/Brighton, MA 02135 - Ward 22
Purpose: Demolish existing commercial building and erect a four-story, mixed-use residential/commercial building with thirty-nine (39) residential units, three (3) commercial units along Market Street, and fifty-nine (59) parking spaces in an accessory parking garage under the building (see plans filed).

Your application requires Building Code Relief, as same would be in violation of Massachusetts State Building Code 780 CMR (8th Edition), Chapter 802, acts of 1972, as amended to wit: 705.8.1 Allowable area of Openings. The maximum area of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the percentages specified in Table 705.8.

The appellant Brighton Park Associates, LLC here states briefly the grounds of and reasons for its appeal from the decision of the Inspectional Services Commissioner above referred to

The Appellant hereby appeals the referenced violations, as the scope of the work associated with this appeal is the most practical, appropriate and safe means to design and erect the subject structure. In this regard, the Appellant submits that the proposed work is consistent with the spirit and intent of the Building Code, as the project includes specific measures to assure proper fire safety, including state-of-the-art sprinkler design, and related fire safety elements. For these and other reasons more precisely enumerated at the public hearing before the Board, the Appellant respectfully requests the allowance of the within appeal.

Signature Joseph P. Hanley, Esq.
Authorized Agent for Brighton Park Associates, LLC
Address 131 Oliver St., 5th Floor
Boston, MA 02110

No. .....

APPEAL

BY

.....

19

APPENDIX C – AIR QUALITY APPENDIX

```
*****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                                *
* Input file: 3512_13.INP (file 1, run 1).                                  *
*****************************************************************************
* *** Winter 2013 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: 09NEWIM.D
* 15 Year Exemption Age
* New Annual OBD Exhaust I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Exhaust I/M program for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
* New Annual OBD Evap I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Evap I/M program for for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
  M601 Comment:
              User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions
```

```
     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D

  M616 Comment:
               User has supplied post-1999 sulfur levels.
  M614 Comment:
               User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2013 - Winter at 5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  5.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
 HDDV DEFEAT DEVICE EFFECTS ARE PRESENT. THE REBUILD FRACTION IS 0.10.

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2013
                             Month:  Jan.
                          Altitude:  Low
               Minimum Temperature:  70.4 (F)
               Maximum Temperature:  93.7 (F)
                 Absolute Humidity:   75. grains/lb
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  No
                  Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC    All
Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    -----
-
   VMT Distribution:    0.3030    0.4092    0.1607              0.0364    0.0002    0.0015    0.0852    0.0037
1.0000
  ------------------------------------------------------------------------------------------------------------------------
-
 Composite Emission Factors (g/mi):
     Composite CO  :      7.62      6.70      7.39      6.89     22.26     3.089     1.202     3.596     71.30
7.624
  ------------------------------------------------------------------------------------------------------------------------
```

```
  INDOOR GARAGE ANALYSIS PROGRAM

  PROJECT:  375 MARKET STREET GARAGE PEAK AM HOUR - YEAR: 2013


  DISTANCE IN:                59.0  METERS
  DISTANCE OUT:               59.0  METERS


  NUMBER OF EXIT LANES:          1  LANE(S)
  TOTAL EXIT VOLUME:            46  VEH/HOUR

                  CO RATE:     7.62  GRAMS CO/MILE

  SPEED IN GARAGE:             5.0  M.P.H.

  VENT CFM:                  19,385  CFM



  TOTAL CO EMISSIONS =    0.21 GRAMS/MIN  =  .0036 GRAMS/SEC
  TOTAL VENTILATION  =     549 CU. M/MIN


      PEAK 1-HOUR CO CONCENTRATION FROM VEHICLES:   0.34 PPM

*************************************************************************
***

PROJECT:  375 MARKET STREET GARAGE PEAK PM HOUR - YEAR: 2013


  DISTANCE IN:                59.0  METERS
  DISTANCE OUT:               59.0  METERS


  NUMBER OF EXIT LANES:          1  LANE(S)
  TOTAL EXIT VOLUME:            44  VEH/HOUR

                  CO RATE:     7.62  GRAMS CO/MILE

  SPEED IN GARAGE:             5.0  M.P.H.

  VENT CFM:                  19,385  CFM



  TOTAL CO EMISSIONS =    0.20 GRAMS/MIN  =  .0034 GRAMS/SEC
  TOTAL VENTILATION  =     549 CU. M/MIN


      PEAK 1-HOUR CO CONCENTRATION FROM VEHICLES:   0.33 PPM
```

```
 **MODELOPTs:  NonDFAULT CONC                                    FLAT
              NOCHKD              SCREEN

                                            ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses URBAN Dispersion Algorithm for the SBL for     1 Source(s),
   for Total of    1 Urban Area(s):
   Urban Population =     43877.0 ;  Urban Roughness Length =  1.000 m

 **Model Allows User-Specified Options:
         1. Stack-tip Downwash.
         2. Model Assumes Receptors on FLAT Terrain.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.
         6. Urban Roughness Length of 1.0 Meter Used.

 **Other Options Specified:
         NOCHKD   - Suppresses checking of date sequence in meteorology files
         SCREEN   - Use screening option
 which forces calculation of centerline values

 **Model Assumes No FLAGPOLE Receptor Heights.

 **Model Calculates  1 Short Term Average(s) of:   1-HR

 **This Run Includes:      1 Source(s);       1 Source Group(s); and     200 Receptor(s)

 **The Model Assumes A Pollutant Type of:  OTHER

 **Model Set To Continue RUNning After the Setup Testing.

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =      0.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.5 MB of RAM.

 **Input Runstream File:          CO_2010_OTHER.DTA
 **Output Print File:             CO_2010_OTHER.LST

 **File for Summary of Results:   W:\Apps\aermod\3512\CO_2010_OTHER.SUM
```

**MODELOPTs: NonDFAULT CONC FLAT
NOCHKD SCREEN

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

\

**MODELOPTs: NonDFAULT CONC FLAT
NOCHKD SCREEN

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: Urban.sfc Met Version: SCREEN
Profile file: Urban.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 11111 Upper air station no.: 22222
Name: UNKNOWN Name: UNKNOWN
Year: 2010 Year: 2010

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
10	01	01	1	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	10.	10.0	255.2	2.0
10	01	02	2	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	20.	10.0	255.2	2.0
10	01	03	3	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	30.	10.0	255.2	2.0
10	01	04	4	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	40.	10.0	255.2	2.0
10	01	05	5	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	50.	10.0	255.2	2.0
10	01	06	6	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	60.	10.0	255.2	2.0
10	01	07	7	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	70.	10.0	255.2	2.0
10	01	08	8	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	80.	10.0	255.2	2.0
10	01	09	9	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	90.	10.0	255.2	2.0
10	01	10	10	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	100.	10.0	255.2	2.0
10	01	11	11	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	110.	10.0	255.2	2.0
10	01	12	12	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	120.	10.0	255.2	2.0
10	01	13	13	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	130.	10.0	255.2	2.0
10	01	14	14	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	140.	10.0	255.2	2.0
10	01	15	15	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	150.	10.0	255.2	2.0
10	01	16	16	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	160.	10.0	255.2	2.0
10	01	17	17	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	170.	10.0	255.2	2.0
10	01	18	18	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	180.	10.0	255.2	2.0
10	01	19	19	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	190.	10.0	255.2	2.0
10	01	20	20	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	200.	10.0	255.2	2.0
10	01	21	21	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	210.	10.0	255.2	2.0
10	01	22	22	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	220.	10.0	255.2	2.0
10	01	23	23	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	230.	10.0	255.2	2.0
10	01	24	24	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	240.	10.0	255.2	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
10	01	01	01	10.0	1	10.	0.50	255.3	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

```
 **MODELOPTs:  NonDFAULT CONC                                    FLAT
               NOCHKD              SCREEN

                                              *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                  ** CONC OF OTHER    IN MICROGRAMS/M**3                          **

                                                       DATE                                                                NETWORK
GROUP ID                          AVERAGE CONC      (YYMMDDHH)              RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS     625.80319  ON 10071302: AT (  228588.20,   900089.70,     0.00,     0.00,    0.00)  DC
         HIGH   2ND HIGH VALUE IS     625.80319  ON 10071402: AT (  228588.20,   900089.70,     0.00,     0.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR

 *** AERMOD - VERSION  11103 ***   *** 375 Market Street Garage Vent Modeling                               ***        09/09/11
                                   *** CO Screening Modeling                                                ***        15:54:46
                                                                                                                       PAGE   5
 **MODELOPTs:  NonDFAULT CONC                                    FLAT
               NOCHKD              SCREEN

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of           0 Fatal Error Message(s)
 A Total of           0 Warning Message(s)
 A Total of           0 Informational Message(s)

 A Total of        18504 Hours Were Processed

 A Total of           0 Calm Hours Identified

 A Total of           0 Missing Hours Identified (  0.00 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

APPENDIX D – NOISE APPENDIX

Page **Contents**

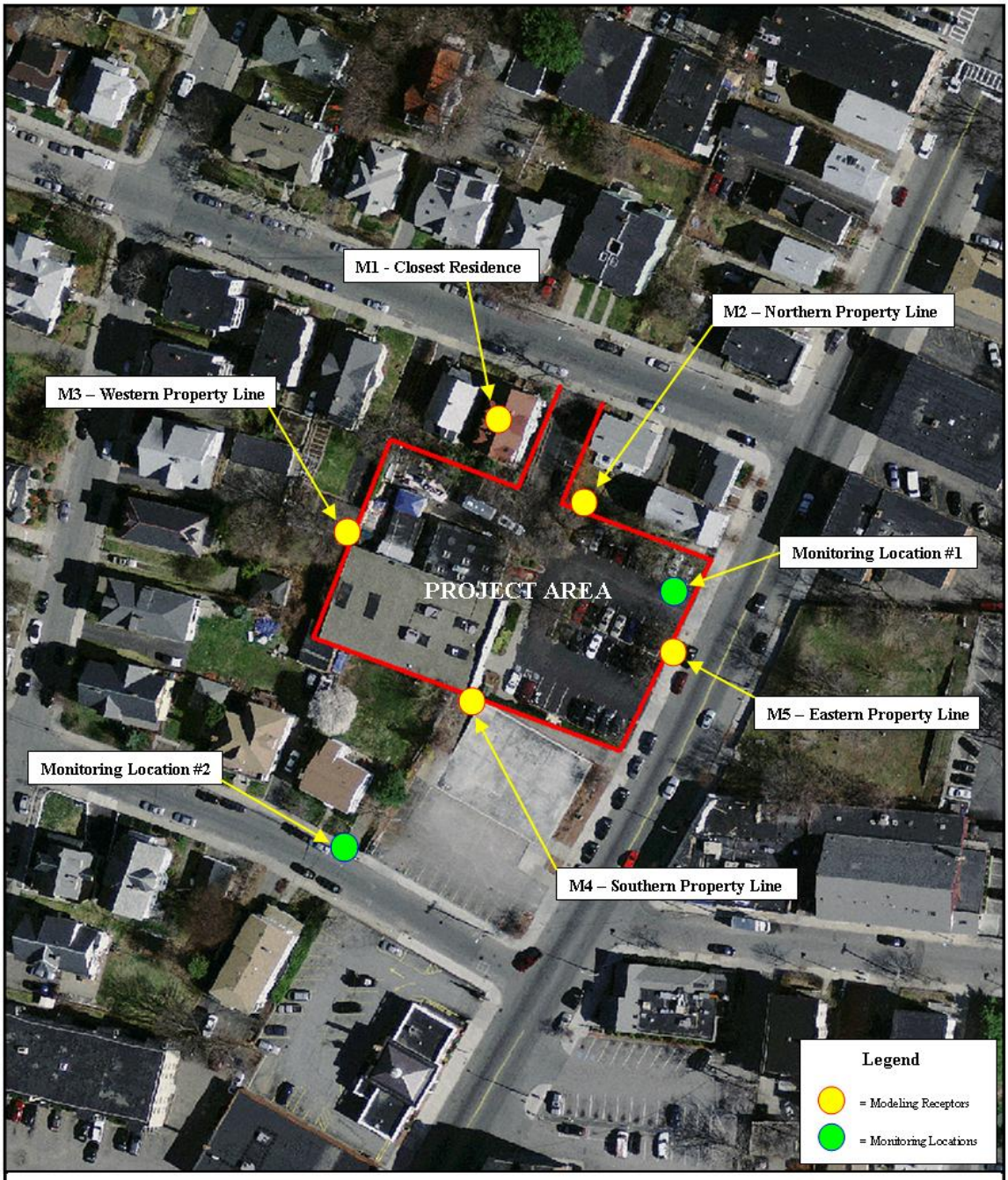


Figure 1

Modeling Receptor and Monitoring Locations
For the 375 Market Street Project
Brighton, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

Sound Monitoring Data

Location # 1 - 375 Market Street

- Period results -

Record number	1 : 1
Record start	8/24/11 12:01 AM
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN90.0% F (dB)
Broadband	L	61	75.4	56
Broadband	A	55.3	72.7	47
16	L	42	70	35
32	L	50.3	70.1	43
63	L	55.4	74.1	50
125	L	55.4	72.9	51
250	L	51.2	65.7	47
500	L	50.1	64.8	45
1k	L	52.2	68	43
2k	L	48.3	65.5	38
4k	L	41.4	71.1	31
8k	L	33.8	56.4	23
16k	L	24.5	49.4	16

Sound Monitoring Data

Location #2 - 3 Surrey Street

- Period results -

Record number	1 : 1
Record start	8/25/11 12:33 AM
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN90.0% F (dB)
Broadband	L	58.5	76.6	54
Broadband	A	50.2	74	46
16	L	40.5	65.7	34
32	L	48.9	67.1	43
63	L	54.6	74	49
125	L	52.4	74	47
250	L	48.2	68	44
500	L	47.3	71.2	43
1k	L	46.1	71.2	40
2k	L	42.6	65.3	38
4k	L	36	59.3	31
8k	L	28.8	52.4	23
16k	L	19.5	44.5	16

Cadna Modeling Output

Name	Level Lr Day (dBA)	Height (m)	Coordinates X (m)	Y (m)	Z (m)
Bennett Street	**48.2**	6.1	228575.38	900106.4	28.54
North PL	**46.2**	1.52	228588.41	900091.1	24.5
East PL	**45.8**	1.52	228545.13	900084.8	26.25
South PL	**47.3**	1.52	228562.99	900053.9	27.05
East PL	**47.9**	1.52	228609.21	900060.2	25.95

Bennett Street

Frequency (Hz)	***31.5***	***63***	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***
dB	66.8	65.4	61.4	50.1	40.7	35	25.3	15.5	12.2

North PL

Frequency (Hz)	***31.5***	***63***	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***
dB	67.1	64.5	59.5	47.2	37.9	32.8	25.9	18.3	16.2

East PL

Frequency (Hz)	***31.5***	***63***	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***
dB	67.1	64.6	58.8	46.7	37.5	32.2	25.4	17.4	15.4

South PL

Frequency (Hz)	***31.5***	***63***	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***
dB	68.1	65.8	60.6	48.4	38.7	33.1	26.1	18.3	15.9

East PL

Frequency (Hz)	***31.5***	***63***	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***
dB	68.4	64.8	61	49.4	40.1	36.5	28.5	21.9	21.6

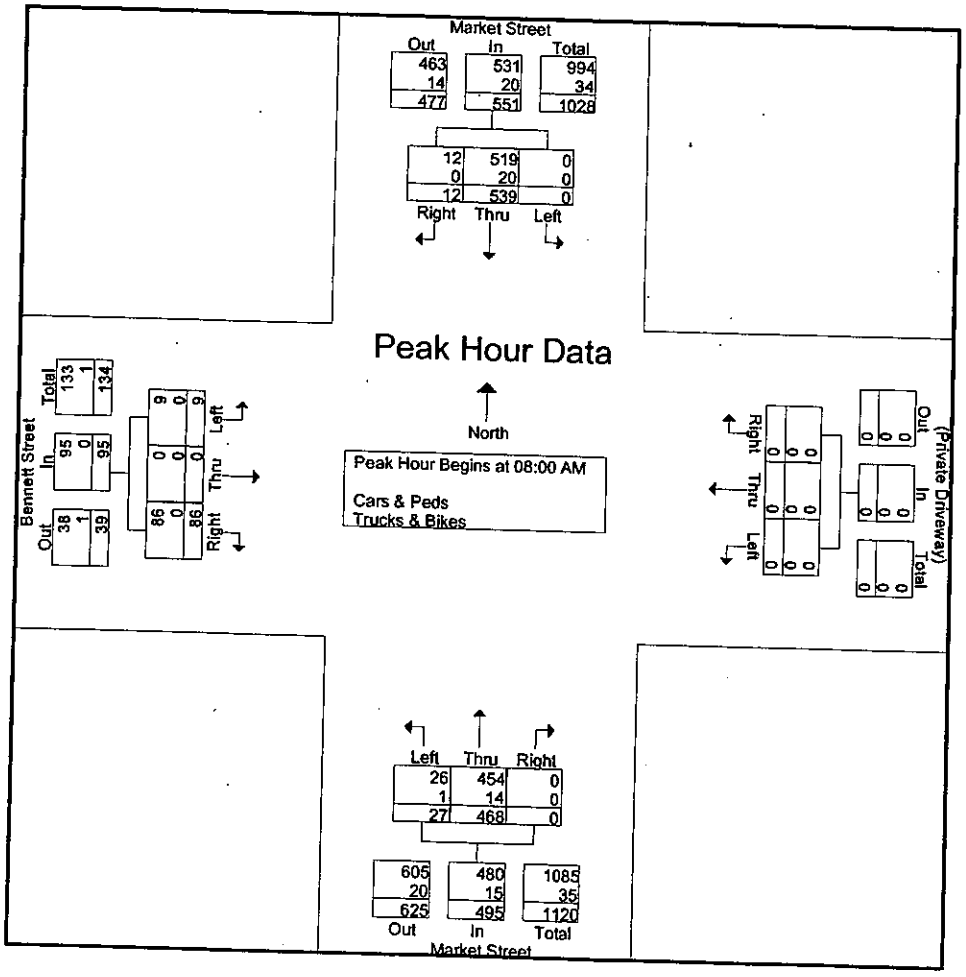
APPENDIX E – TRAFFIC COUNT DATA

Transportation Data Corporation
Mario Perone, mperone1@verizon.net
_t (781) 587-0086 f (781) 587-0089_

N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152A
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	125	0	126	0	0	0	0	0	122	3	125	20	0	1	21	272
08:15 AM	3	146	0	149	0	0	0	0	0	116	3	119	19	0	0	19	287
08:30 AM	5	144	0	149	0	0	0	0	0	106	13	119	24	0	5	29	297
08:45 AM	3	124	0	127	0	0	0	0	0	124	8	132	23	0	3	26	285
Total Volume	12	539	0	551	0	0	0	0	0	468	27	495	86	0	9	95	1141
% App. Total	2.2	97.8	0		0	0	0		0	94.5	5.5		90.5	0	9.5		
PHF	.600	.923	.000	.924	.000	.000	.000	.000	.000	.944	.519	.938	.896	.000	.450	.819	.960
Cars & Peds	12	519	0	531	0	0	0	0	0	454	26	480	86	0	9	95	1106
% Cars & Peds	100	96.3	0	96.4	0	0	0	0	0	97.0	96.3	97.0	100	0	100	100	96.9
Trucks & Bikes	0	20	0	20	0	0	0	0	0	14	1	15	0	0	0	0	35
% Trucks & Bikes	0	3.7	0	3.6	0	0	0	0	0	3.0	3.7	3.0	0	0	0	0	3.1



Transportation Data Corporation
Mario Perone, mperone1@verizon.net
t (781) 587-0086 f (781) 587-0089

N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152A
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
07:00 AM	2	93	0	1	0	0	0	6	0	96	4	0	20	0	1	9	16	216	232
07:15 AM	3	119	0	1	0	0	0	8	0	113	8	0	15	0	1	7	16	259	275
07:30 AM	3	109	0	0	0	0	0	11	0	117	2	0	18	0	5	9	20	254	274
07:45 AM	4	105	0	1	0	0	0	17	0	133	4	0	23	0	1	15	33	270	303
Total	12	426	0	3	0	0	0	42	0	459	18	0	76	0	8	40	85	999	1084
08:00 AM	1	125	0	2	0	0	0	9	0	122	3	0	20	0	1	12	23	272	295
08:15 AM	3	146	0	1	0	0	0	15	0	116	3	0	19	0	0	17	33	287	320
08:30 AM	5	144	0	2	0	0	0	7	0	106	13	0	24	0	5	11	20	297	317
08:45 AM	3	124	0	1	0	0	0	12	0	124	8	1	23	0	3	9	23	285	308
Total	12	539	0	6	0	0	0	43	0	468	27	1	86	0	9	49	99	1141	1240
09:00 AM	2	114	0	0	0	0	0	7	0	99	0	0	20	0	2	5	12	237	249
09:15 AM	0	124	0	0	0	0	0	5	0	116	4	1	19	0	1	8	14	264	278
09:30 AM	4	118	0	0	0	0	0	4	0	113	2	1	21	0	1	7	12	259	271
09:45 AM	1	115	0	1	0	0	0	2	0	119	6	0	13	0	1	4	7	255	262
Total	7	471	0	1	0	0	0	18	0	447	12	2	73	0	5	24	45	1015	1060
Grand Total	31	1436	0	10	0	0	0	103	0	1374	57	3	235	0	22	113	229	3155	3384
Apprch %	2.1	97.9	0		0	0	0		0	96	4		91.4	0	8.6				
Total %	1	45.5	0		0	0	0		0	43.5	1.8		7.4	0	0.7		6.8	93.2	
Cars & Peds	31	1390	0		0	0	0		0	1334	56		235	0	22		0	0	3246
% Cars & Peds	100	96.8	0	100	0	0	0	66	0	97.1	98.2	66.7	100	0	100	86.7	0	0	95.9
Trucks & Bikes	0	46	0		0	0	0		0	40	1		0	0	0		0	0	138
% Trucks & Bikes	0	3.2	0	0	0	0	0	34	0	2.9	1.8	33.3	0	0	0	13.3	0	0	4.1

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	125	0	126	0	0	0	0	0	122	3	125	20	0	1	21	272
08:15 AM	3	146	0	149	0	0	0	0	0	116	3	119	19	0	0	19	287
08:30 AM	5	144	0	149	0	0	0	0	0	106	13	119	24	0	5	29	297
08:45 AM	3	124	0	127	0	0	0	0	0	124	8	132	23	0	3	26	285
Total Volume	12	539	0	551	0	0	0	0	0	468	27	495	86	0	9	95	1141
% App. Total	2.2	97.8	0		0	0	0		0	94.5	5.5		90.5	0	9.5		
PHF	.600	.923	.000	.924	.000	.000	.000	.000	.000	.944	.519	.938	.896	.000	.450	.819	.960
Cars & Peds	12	519	0	531	0	0	0	0	0	454	26	480	86	0	9	95	1106
% Cars & Peds	100	96.3	0	96.4	0	0	0	0	0	97.0	96.3	97.0	100	0	100	100	96.9
Trucks & Bikes	0	20	0	20	0	0	0	0	0	14	1	15	0	0	0	0	35
% Trucks & Bikes	0	3.7	0	3.6	0	0	0	0	0	3.0	3.7	3.0	0	0	0	0	3.1

Transportation Data Corporation
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File Name : 04152A
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				Exclu Total	Inclu Total	Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds			
07:00 AM	2	87	0	1	0	0	0	5	0	95	4	0	20	0	1	8	14	209	223
07:15 AM	3	114	0	1	0	0	0	7	0	111	8	0	15	0	1	6	14	252	266
07:30 AM	3	105	0	0	0	0	0	7	0	112	2	0	18	0	5	8	15	245	260
07:45 AM	4	103	0	1	0	0	0	14	0	130	4	0	23	0	1	15	30	265	295
Total	12	409	0	3	0	0	0	33	0	448	18	0	76	0	8	37	73	971	1044
08:00 AM	1	119	0	2	0	0	0	5	0	120	3	0	20	0	1	11	18	264	282
08:15 AM	3	142	0	1	0	0	0	7	0	114	3	0	19	0	0	14	22	281	303
08:30 AM	5	138	0	2	0	0	0	3	0	101	12	0	24	0	5	9	14	285	299
08:45 AM	3	120	0	1	0	0	0	6	0	119	8	0	23	0	3	5	12	276	288
Total	12	519	0	6	0	0	0	21	0	454	26	0	86	0	9	39	66	1106	1172
09:00 AM	2	112	0	0	0	0	0	4	0	95	0	0	20	0	2	5	9	231	240
09:15 AM	0	124	0	0	0	0	0	4	0	112	4	1	19	0	1	7	12	260	272
09:30 AM	4	114	0	0	0	0	0	4	0	110	2	1	21	0	1	6	11	252	263
09:45 AM	1	112	0	1	0	0	0	2	0	115	6	0	13	0	1	4	7	248	255
Total	7	462	0	1	0	0	0	14	0	432	12	2	73	0	5	22	39	991	1030
Grand Total	31	1390	0	10	0	0	0	68	0	1334	56	2	235	0	22	98	178	3068	3246
Apprch %	2.2	97.8	0		0	0	0		0	96	4		91.4	0	8.6				
Total %	1	45.3	0		0	0	0		0	43.5	1.8		7.7	0	0.7		5.5	94.5	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	119	0	120	0	0	0	0	0	120	3	123	20	0	1	21	264
08:15 AM	3	142	0	145	0	0	0	0	0	114	3	117	19	0	0	19	281
08:30 AM	5	138	0	143	0	0	0	0	0	101	12	113	24	0	5	29	285
08:45 AM	3	120	0	123	0	0	0	0	0	119	8	127	23	0	3	26	276
Total Volume	12	519	0	531	0	0	0	0	0	454	26	480	86	0	9	95	1106
% App. Total	2.3	97.7	0		0	0	0		0	94.6	5.4		90.5	0	9.5		
PHF	.600	.914	.000	.916	.000	.000	.000	.000	.000	.946	.542	.945	.896	.000	.450	.819	.970

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N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152A
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	6	0	0	0	0	0	1	0	1	0	0	0	0	0	1	2	7	9
07:15 AM	0	5	0	0	0	0	0	1	0	2	0	0	0	0	0	1	2	7	9
07:30 AM	0	4	0	0	0	0	0	4	0	5	0	0	0	0	0	1	5	9	14
07:45 AM	0	2	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	5	8
Total	0	17	0	0	0	0	0	9	0	11	0	0	0	0	0	3	12	28	40
08:00 AM	0	6	0	0	0	0	0	4	0	2	0	0	0	0	0	1	5	8	13
08:15 AM	0	4	0	0	0	0	0	8	0	2	0	0	0	0	0	3	11	6	17
08:30 AM	0	6	0	0	0	0	0	4	0	5	1	0	0	0	0	2	6	12	18
08:45 AM	0	4	0	0	0	0	0	6	0	5	0	1	0	0	0	4	11	9	20
Total	0	20	0	0	0	0	0	22	0	14	1	1	0	0	0	10	33	35	68
09:00 AM	0	2	0	0	0	0	0	3	0	4	0	0	0	0	0	0	3	6	9
09:15 AM	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0	1	2	4	6
09:30 AM	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	1	1	7	8
09:45 AM	0	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	7	7
Total	0	9	0	0	0	0	0	4	0	15	0	0	0	0	0	2	6	24	30
Grand Total	0	46	0	0	0	0	0	35	0	40	1	1	0	0	0	15	51	87	138
Apprch %	0	100	0		0	0	0		0	97.6	2.4		0	0	0				
Total %	0	52.9	0		0	0	0		0	46	1.1		0	0	0		37	63	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	6	0	6	0	0	0	0	0	2	0	2	0	0	0	0	8
08:15 AM	0	4	0	4	0	0	0	0	0	2	0	2	0	0	0	0	6
08:30 AM	0	6	0	6	0	0	0	0	0	5	1	6	0	0	0	0	12
08:45 AM	0	4	0	4	0	0	0	0	0	5	0	5	0	0	0	0	9
Total Volume	0	20	0	20	0	0	0	0	0	14	1	15	0	0	0	0	35
% App. Total	0	100	0		0	0	0		0	93.3	6.7		0	0	0		
PHF	.000	.833	.000	.833	.000	.000	.000	.000	.000	.700	.250	.625	.000	.000	.000	.000	.729

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File Name : 04152AA
Site Code : 04152
Start Date : 9/13/2011
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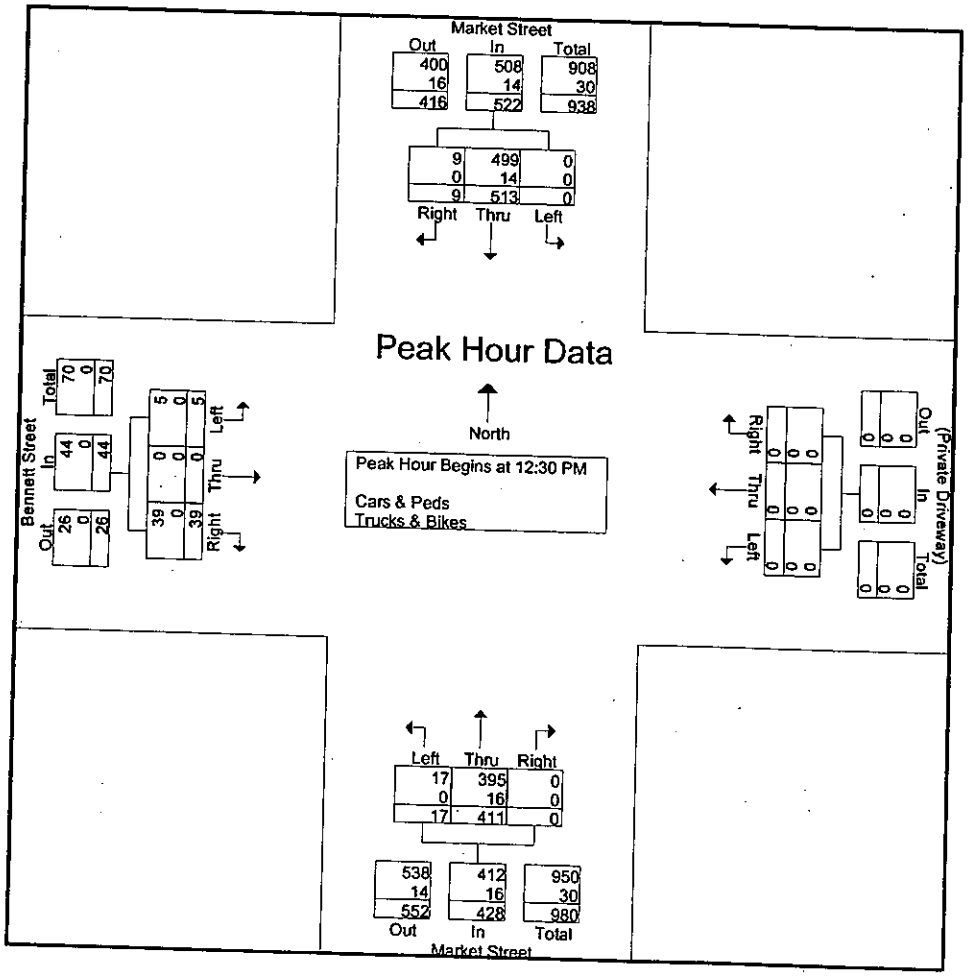
	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	3	129	0	132	0	0	0	0	0	108	5	113	16	0	1	17	262
12:45 PM	1	122	0	123	0	0	0	0	0	104	3	107	5	0	0	5	235
01:00 PM	2	135	0	137	0	0	0	0	0	95	6	101	12	0	3	15	253
01:15 PM	3	127	0	130	0	0	0	0	0	104	3	107	6	0	1	7	244
Total Volume	9	513	0	522	0	0	0	0	0	411	17	428	39	0	5	44	994
% App. Total	1.7	98.3	0		0	0	0		0	96	4		88.6	0	11.4		
PHF	.750	.950	.000	.953	.000	.000	.000	.000	.000	.951	.708	.947	.609	.000	.417	.647	.948
Cars & Peds	9	499	0	508	0	0	0	0	0	395	17	412	39	0	5	44	964
% Cars & Peds	100	97.3	0	97.3	0	0	0	0	0	96.1	100	96.3	100	0	100	100	97.0
Trucks & Bikes	0	14	0	14	0	0	0	0	0	16	0	16	0	0	0	0	30
% Trucks & Bikes	0	2.7	0	2.7	0	0	0	0	0	3.9	0	3.7	0	0	0	0	3.0



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File Name : 04152AA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
10:00 AM	2	99	0	0	0	0	0	8	0	106	1	0	14	0	3	9	17	225	242
10:15 AM	4	135	0	1	0	0	0	9	0	112	3	0	5	0	2	10	20	261	281
10:30 AM	3	118	0	0	0	0	0	6	0	88	5	0	5	0	2	12	18	221	239
10:45 AM	3	100	0	0	0	0	0	3	0	107	4	1	8	0	0	15	19	222	241
Total	12	452	0	1	0	0	0	26	0	413	13	1	32	0	7	46	74	929	1003
11:00 AM	2	86	0	0	0	0	0	4	0	118	4	0	11	0	2	9	13	223	236
11:15 AM	1	120	0	1	0	0	0	2	0	94	3	0	7	0	2	3	6	227	233
11:30 AM	3	106	0	0	0	0	0	1	0	101	2	0	14	0	2	3	4	228	232
11:45 AM	2	121	0	0	0	0	0	5	0	99	5	0	4	0	2	6	11	233	244
Total	8	433	0	1	0	0	0	12	0	412	14	0	36	0	8	21	34	911	945
12:00 PM	3	106	0	0	0	0	0	6	0	99	3	0	13	0	3	12	18	227	245
12:15 PM	2	106	0	0	0	0	0	4	0	102	4	0	13	0	1	4	8	228	236
12:30 PM	3	129	0	0	0	0	0	4	0	108	5	0	16	0	1	12	16	262	278
12:45 PM	1	122	0	0	0	0	0	7	0	104	3	0	5	0	0	8	15	235	250
Total	9	463	0	0	0	0	0	21	0	413	15	0	47	0	5	36	57	952	1009
01:00 PM	2	135	0	0	0	0	0	3	0	95	6	1	12	0	3	5	9	253	262
01:15 PM	3	127	0	0	0	0	0	2	0	104	3	0	6	0	1	7	9	244	253
01:30 PM	4	127	0	0	0	0	0	7	0	99	8	0	13	0	2	3	10	253	263
01:45 PM	4	110	0	0	0	0	0	6	0	101	6	0	6	0	0	4	10	227	237
Total	13	499	0	0	0	0	0	18	0	399	23	1	37	0	6	19	38	977	1015
Grand Total	42	1847	0	2	0	0	0	77	0	1637	65	2	152	0	26	122	203	3769	3972
Apprch %	2.2	97.8	0		0	0	0		0	96.2	3.8		85.4	0	14.6				
Total %	1.1	49	0		0	0	0		0	43.4	1.7		4	0	0.7		5.1	94.9	
Cars & Peds	41	1804	0		0	0	0		0	1577	65		152	0	26		0	0	3821
% Cars & Peds	97.6	97.7	0	100	0	0	0	72.7	0	96.3	100	100	100	0	100	78.7	0	0	96.2
Trucks & Bikes	1	43	0		0	0	0		0	60	0		0	0	0		0	0	151
% Trucks & Bikes	2.4	2.3	0	0	0	0	0	27.3	0	3.7	0	0	0	0	0	21.3	0	0	3.8

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	3	129	0	132	0	0	0	0	0	108	5	113	16	0	1	17	262
12:45 PM	1	122	0	123	0	0	0	0	0	104	3	107	5	0	0	5	235
01:00 PM	2	135	0	137	0	0	0	0	0	95	6	101	12	0	3	15	253
01:15 PM	3	127	0	130	0	0	0	0	0	104	3	107	6	0	1	7	244
Total Volume	9	513	0	522	0	0	0	0	0	411	17	428	39	0	5	44	994
% App. Total	1.7	98.3	0		0	0	0		0	96	4		88.6	0	11.4		
PHF	.750	.950	.000	.953	.000	.000	.000	.000	.000	.951	.708	.947	.609	.000	.417	.647	.948
Cars & Peds	9	499	0	508	0	0	0	0	0	395	17	412	39	0	5	44	964
% Cars & Peds	100	97.3	0	97.3	0	0	0	0	0	96.1	100	96.3	100	0	100	100	97.0
Trucks & Bikes	0	14	0	14	0	0	0	0	0	16	0	16	0	0	0	0	30
% Trucks & Bikes	0	2.7	0	2.7	0	0	0	0	0	3.9	0	3.7	0	0	0	0	3.0

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File Name : 04152AA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds			
10:00 AM	2	97	0	0	0	0	0	7	0	105	1	0	14	0	3	7	14	222	236
10:15 AM	4	133	0	1	0	0	0	7	0	110	3	0	5	0	2	7	15	257	272
10:30 AM	3	114	0	0	0	0	0	5	0	87	5	0	5	0	2	10	15	216	231
10:45 AM	3	97	0	0	0	0	0	3	0	104	4	1	8	0	0	12	16	216	232
Total	12	441	0	1	0	0	0	22	0	406	13	1	32	0	7	36	60	911	971
11:00 AM	2	85	0	0	0	0	0	3	0	108	4	0	11	0	2	7	10	212	222
11:15 AM	1	117	0	1	0	0	0	1	0	91	3	0	7	0	2	3	5	221	226
11:30 AM	3	103	0	0	0	0	0	1	0	99	2	0	14	0	2	3	4	223	227
11:45 AM	1	119	0	0	0	0	0	4	0	97	5	0	4	0	2	3	7	228	235
Total	7	424	0	1	0	0	0	9	0	395	14	0	36	0	8	16	26	884	910
12:00 PM	3	104	0	0	0	0	0	4	0	92	3	0	13	0	3	11	15	218	233
12:15 PM	2	104	0	0	0	0	0	2	0	98	4	0	13	0	1	4	6	222	228
12:30 PM	3	126	0	0	0	0	0	3	0	100	5	0	16	0	1	9	12	251	263
12:45 PM	1	117	0	0	0	0	0	4	0	102	3	0	5	0	0	7	11	228	239
Total	9	451	0	0	0	0	0	13	0	392	15	0	47	0	5	31	44	919	963
01:00 PM	2	132	0	0	0	0	0	2	0	94	6	1	12	0	3	4	7	249	256
01:15 PM	3	124	0	0	0	0	0	2	0	99	3	0	6	0	1	4	6	236	242
01:30 PM	4	125	0	0	0	0	0	4	0	95	8	0	13	0	2	2	6	247	253
01:45 PM	4	107	0	0	0	0	0	4	0	96	6	0	6	0	0	3	7	219	226
Total	13	488	0	0	0	0	0	12	0	384	23	1	37	0	6	13	26	951	977
Grand Total	41	1804	0	2	0	0	0	56	0	1577	65	2	152	0	26	96	156	3665	3821
Apprch %	2.2	97.8	0		0	0	0		0	96	4		85.4	0	14.6				
Total %	1.1	49.2	0		0	0	0		0	43	1.8		4.1	0	0.7		4.1	95.9	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	3	126	0	129	0	0	0	0	0	100	5	105	16	0	1	17	251
12:45 PM	1	117	0	118	0	0	0	0	0	102	3	105	5	0	0	5	228
01:00 PM	2	132	0	134	0	0	0	0	0	94	6	100	12	0	3	15	249
01:15 PM	3	124	0	127	0	0	0	0	0	99	3	102	6	0	1	7	236
Total Volume	9	499	0	508	0	0	0	0	0	395	17	412	39	0	5	44	964
% App. Total	1.8	98.2	0		0	0	0		0	95.9	4.1		88.6	0	11.4		
PHF	.750	.945	.000	.948	.000	.000	.000	.000	.000	.968	.708	.981	.609	.000	.417	.647	.960

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File Name : 04152AA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu. Total	Int. Total
10:00 AM	0	2	0	0	0	0	0	1	0	1	0	0	0	0	0	2	3	3	6
10:15 AM	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	3	5	4	9
10:30 AM	0	4	0	0	0	0	0	1	0	1	0	0	0	0	0	2	3	5	8
10:45 AM	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	6	9
Total	0	11	0	0	0	0	0	4	0	7	0	0	0	0	0	10	14	18	32
11:00 AM	0	1	0	0	0	0	0	1	0	10	0	0	0	0	0	2	3	11	14
11:15 AM	0	3	0	0	0	0	0	1	0	3	0	0	0	0	0	0	1	6	7
11:30 AM	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5	5
11:45 AM	1	2	0	0	0	0	0	1	0	2	0	0	0	0	0	3	4	5	9
Total	1	9	0	0	0	0	0	3	0	17	0	0	0	0	0	5	8	27	35
12:00 PM	0	2	0	0	0	0	0	2	0	7	0	0	0	0	0	1	3	9	12
12:15 PM	0	2	0	0	0	0	0	2	0	4	0	0	0	0	0	0	2	6	8
12:30 PM	0	3	0	0	0	0	0	1	0	8	0	0	0	0	0	3	4	11	15
12:45 PM	0	5	0	0	0	0	0	3	0	2	0	0	0	0	0	1	4	7	11
Total	0	12	0	0	0	0	0	8	0	21	0	0	0	0	0	5	13	33	46
01:00 PM	0	3	0	0	0	0	0	1	0	1	0	0	0	0	0	1	2	4	6
01:15 PM	0	3	0	0	0	0	0	0	0	5	0	0	0	0	0	3	3	8	11
01:30 PM	0	2	0	0	0	0	0	3	0	4	0	0	0	0	0	1	4	6	10
01:45 PM	0	3	0	0	0	0	0	2	0	5	0	0	0	0	0	1	3	8	11
Total	0	11	0	0	0	0	0	6	0	15	0	0	0	0	0	6	12	26	38
Grand Total	1	43	0	0	0	0	0	21	0	60	0	0	0	0	0	26	47	104	151
Apprch %	2.3	97.7	0		0	0	0		0	100	0		0	0	0				
Total %	1	41.3	0		0	0	0		0	57.7	0		0	0	0		31.1	68.9	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	2	0	2	0	0	0	0	0	7	0	7	0	0	0	0	9
12:15 PM	0	2	0	2	0	0	0	0	0	4	0	4	0	0	0	0	6
12:30 PM	0	3	0	3	0	0	0	0	0	8	0	8	0	0	0	0	11
12:45 PM	0	5	0	5	0	0	0	0	0	2	0	2	0	0	0	0	7
Total Volume	0	12	0	12	0	0	0	0	0	21	0	21	0	0	0	0	33
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.600	.000	.600	.000	.000	.000	.000	.000	.656	.000	.656	.000	.000	.000	.000	.750

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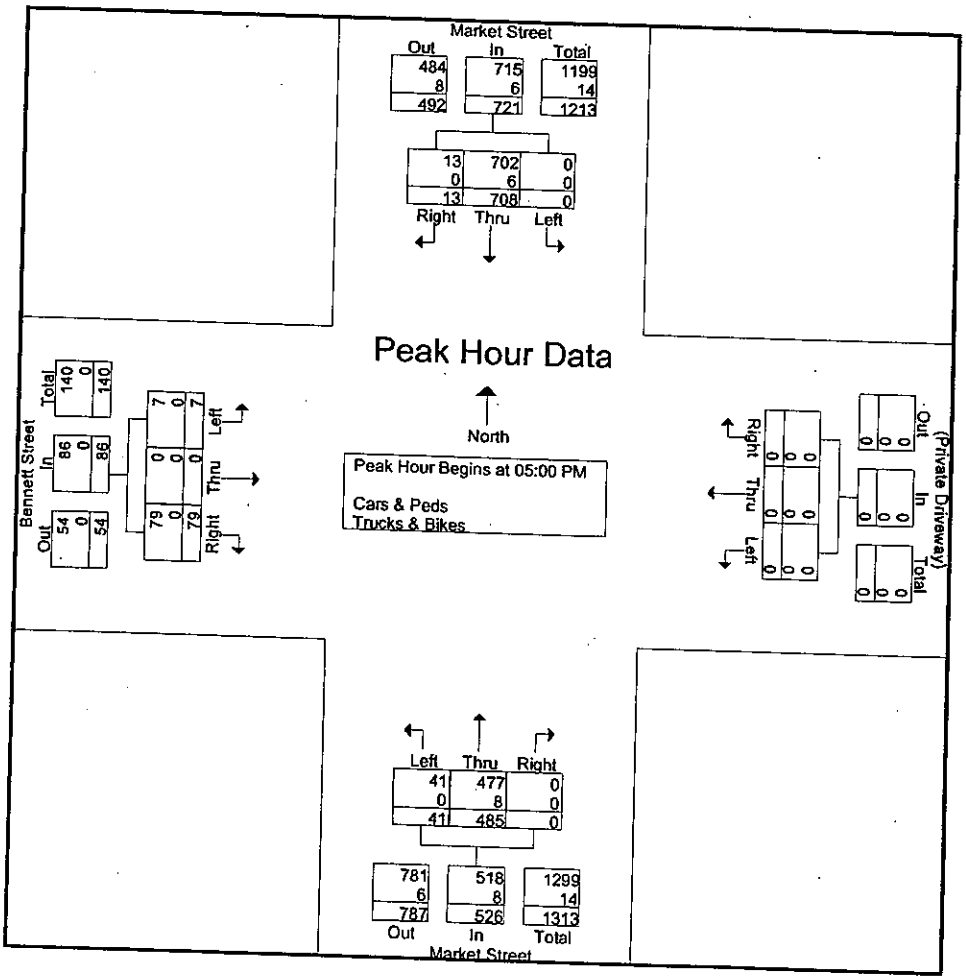
N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152AAA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	5	168	0	173	0	0	0	0	0	132	10	142	26	0	1	27	342
05:15 PM	1	187	0	188	0	0	0	0	0	117	11	128	13	0	2	15	331
05:30 PM	5	169	0	174	0	0	0	0	0	115	14	129	17	0	2	19	322
05:45 PM	2	184	0	186	0	0	0	0	0	121	6	127	23	0	2	25	338
Total Volume	13	708	0	721	0	0	0	0	0	485	41	526	79	0	7	86	1333
% App. Total	1.8	98.2	0		0	0	0		0	92.2	7.8		91.9	0	8.1		
PHF	.650	.947	.000	.959	.000	.000	.000	.000	.000	.919	.732	.926	.760	.000	.875	.796	.974
Cars & Peds	13	702	0	715	0	0	0	0	0	477	41	518	79	0	7	86	1319
% Cars & Peds	100	99.2	0	99.2	0	0	0	0	0	98.4	100	98.5	100	0	100	100	98.9
Trucks & Bikes	0	6	0	6	0	0	0	0	0	8	0	8	0	0	0	0	14
% Trucks & Bikes	0	0.8	0	0.8	0	0	0	0	0	1.6	0	1.5	0	0	0	0	1.1



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N/S: Market Street
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City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152AAA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
02:00 PM	5	123	0	0	0	0	0	6	0	109	4	0	12	0	2	4	10	255	265
02:15 PM	3	120	0	0	0	0	0	7	0	115	3	0	17	0	4	3	10	262	272
02:30 PM	3	133	0	0	0	0	0	1	0	97	8	0	23	0	2	16	17	266	283
02:45 PM	4	149	0	0	0	0	0	9	0	104	5	2	20	0	1	11	22	283	305
Total	15	525	0	0	0	0	0	23	0	425	20	2	72	0	9	34	59	1066	1125
03:00 PM	2	147	0	1	0	0	0	9	0	132	5	0	13	0	1	13	23	300	323
03:15 PM	0	141	0	0	0	0	0	10	0	131	4	1	23	0	1	5	16	300	316
03:30 PM	4	143	0	0	0	0	0	8	0	130	2	0	9	0	3	6	14	291	305
03:45 PM	4	145	0	0	0	0	0	3	0	113	5	1	17	0	3	13	17	287	304
Total	10	576	0	1	0	0	0	30	0	506	16	2	62	0	8	37	70	1178	1248
04:00 PM	2	137	0	0	0	0	0	2	0	126	6	0	17	0	1	8	10	289	299
04:15 PM	4	151	0	0	0	0	0	3	0	110	8	0	18	0	2	6	9	293	302
04:30 PM	6	165	0	1	0	0	0	6	0	117	6	2	22	0	0	9	18	316	334
04:45 PM	6	161	0	2	0	0	0	13	0	131	10	0	17	0	1	8	23	326	349
Total	18	614	0	3	0	0	0	24	0	484	30	2	74	0	4	31	60	1224	1284
05:00 PM	5	168	0	1	0	0	0	2	0	132	10	1	26	0	1	13	17	342	359
05:15 PM	1	187	0	0	0	0	0	6	0	117	11	0	13	0	2	15	21	331	352
05:30 PM	5	169	0	0	0	0	0	4	0	115	14	0	17	0	2	13	17	322	339
05:45 PM	2	184	0	0	0	0	0	3	0	121	6	0	23	0	2	14	17	338	355
Total	13	708	0	1	0	0	0	15	0	485	41	1	79	0	7	55	72	1333	1405
Grand Total	56	2423	0	5	0	0	0	92	0	1900	107	7	287	0	28	157	261	4801	5062
Apprch %	2.3	97.7	0		0	0	0		0	94.7	5.3		91.1	0	8.9				
Total %	1.2	50.5	0		0	0	0		0	39.6	2.2		6	0	0.6		5.2	94.8	
Cars & Peds	56	2390	0		0	0	0		0	1861	107		287	0	28		0	0	4924
% Cars & Peds	100	98.6	0	100	0	0	0	69.6	0	97.9	100	42.9	100	0	100	78.3	0	0	97.3
Trucks & Bikes	0	33	0		0	0	0		0	39	0		0	0	0		0	0	138
% Trucks & Bikes	0	1.4	0	0	0	0	0	30.4	0	2.1	0	57.1	0	0	0	21.7	0	0	2.7

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	5	168	0	173	0	0	0	0	0	132	10	142	26	0	1	27	342
05:15 PM	1	187	0	188	0	0	0	0	0	117	11	128	13	0	2	15	331
05:30 PM	5	169	0	174	0	0	0	0	0	115	14	129	17	0	2	19	322
05:45 PM	2	184	0	186	0	0	0	0	0	121	6	127	23	0	2	25	338
Total Volume	13	708	0	721	0	0	0	0	0	485	41	526	79	0	7	86	1333
% App. Total	1.8	98.2	0		0	0	0		0	92.2	7.8		91.9	0	8.1		
PHF	.650	.947	.000	.959	.000	.000	.000	.000	.000	.919	.732	.926	.760	.000	.875	.796	.974
Cars & Peds	13	702	0	715	0	0	0	0	0	477	41	518	79	0	7	86	1319
% Cars & Peds	100	99.2	0	99.2	0	0	0	0	0	98.4	100	98.5	100	0	100	100	98.9
Trucks & Bikes	0	6	0	6	0	0	0	0	0	8	0	8	0	0	0	0	14
% Trucks & Bikes	0	0.8	0	0.8	0	0	0	0	0	1.6	0	1.5	0	0	0	0	1.1

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N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152AAA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
02:00 PM	5	121	0	0	0	0	0	6	0	105	4	0	12	0	2	4	10	249	259
02:15 PM	3	118	0	0	0	0	0	5	0	113	3	0	17	0	4	3	8	258	266
02:30 PM	3	129	0	0	0	0	0	1	0	96	8	0	23	0	2	14	15	261	276
02:45 PM	4	146	0	0	0	0	0	5	0	102	5	0	20	0	1	7	12	278	290
Total	15	514	0	0	0	0	0	17	0	416	20	0	72	0	9	28	45	1046	1091
03:00 PM	2	146	0	1	0	0	0	7	0	128	5	0	13	0	1	12	20	295	315
03:15 PM	0	138	0	0	0	0	0	8	0	124	4	1	23	0	1	4	13	290	303
03:30 PM	4	142	0	0	0	0	0	3	0	127	2	0	9	0	3	4	7	287	294
03:45 PM	4	143	0	0	0	0	0	2	0	109	5	0	17	0	3	12	14	281	295
Total	10	569	0	1	0	0	0	20	0	488	16	1	62	0	8	32	54	1153	1207
04:00 PM	2	134	0	0	0	0	0	1	0	126	6	0	17	0	1	7	8	286	294
04:15 PM	4	149	0	0	0	0	0	3	0	108	8	0	18	0	2	6	9	289	298
04:30 PM	6	163	0	1	0	0	0	4	0	116	6	2	22	0	0	7	14	313	327
04:45 PM	6	159	0	2	0	0	0	10	0	130	10	0	17	0	1	7	19	323	342
Total	18	605	0	3	0	0	0	18	0	480	30	2	74	0	4	27	50	1211	1261
05:00 PM	5	166	0	1	0	0	0	2	0	129	10	0	26	0	1	9	12	337	349
05:15 PM	1	186	0	0	0	0	0	2	0	117	11	0	13	0	2	13	15	330	345
05:30 PM	5	167	0	0	0	0	0	4	0	111	14	0	17	0	2	6	10	316	326
05:45 PM	2	183	0	0	0	0	0	1	0	120	6	0	23	0	2	8	9	336	345
Total	13	702	0	1	0	0	0	9	0	477	41	0	79	0	7	36	46	1319	1365
Grand Total	56	2390	0	5	0	0	0	64	0	1861	107	3	287	0	28	123	195	4729	4924
Apprch %	2.3	97.7	0		0	0	0		0	94.6	5.4		91.1	0	8.9				
Total %	1.2	50.5	0		0	0	0		0	39.4	2.3		6.1	0	0.6		4	96	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	5	166	0	171	0	0	0	0	0	129	10	139	26	0	1	27	337
05:15 PM	1	186	0	187	0	0	0	0	0	117	11	128	13	0	2	15	330
05:30 PM	5	167	0	172	0	0	0	0	0	111	14	125	17	0	2	19	316
05:45 PM	2	183	0	185	0	0	0	0	0	120	6	126	23	0	2	25	336
Total Volume	13	702	0	715	0	0	0	0	0	477	41	518	79	0	7	86	1319
% App. Total	1.8	98.2	0		0	0	0		0	92.1	7.9		91.9	0	8.1		
PHF	.650	.944	.000	.956	.000	.000	.000	.000	.000	.924	.732	.932	.760	.000	.875	.796	.978

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N/S: Market Street
W: Bennett Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152AAA
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Trucks & Bikes

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu. Total	Int. Total
02:00 PM	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	6	6
02:15 PM	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	4	6
02:30 PM	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	5	7
02:45 PM	0	3	0	0	0	0	0	4	0	2	0	2	0	0	0	4	10	5	15
Total	0	11	0	0	0	0	0	6	0	9	0	2	0	0	0	6	14	20	34
03:00 PM	0	1	0	0	0	0	0	2	0	4	0	0	0	0	0	1	3	5	8
03:15 PM	0	3	0	0	0	0	0	2	0	7	0	0	0	0	0	1	3	10	13
03:30 PM	0	1	0	0	0	0	0	5	0	3	0	0	0	0	0	2	7	4	11
03:45 PM	0	2	0	0	0	0	0	1	0	4	0	1	0	0	0	1	3	6	9
Total	0	7	0	0	0	0	0	10	0	18	0	1	0	0	0	5	16	25	41
04:00 PM	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	3	5
04:15 PM	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	4
04:30 PM	0	2	0	0	0	0	0	2	0	1	0	0	0	0	0	2	4	3	7
04:45 PM	0	2	0	0	0	0	0	3	0	1	0	0	0	0	0	1	4	3	7
Total	0	9	0	0	0	0	0	6	0	4	0	0	0	0	0	4	10	13	23
05:00 PM	0	2	0	0	0	0	0	0	0	3	0	1	0	0	0	4	5	5	10
05:15 PM	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	2	6	1	7
05:30 PM	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	7	7	6	13
05:45 PM	0	1	0	0	0	0	0	2	0	1	0	0	0	0	0	6	8	2	10
Total	0	6	0	0	0	0	0	6	0	8	0	1	0	0	0	19	26	14	40
Grand Total	0	33	0	0	0	0	0	28	0	39	0	4	0	0	0	34	66	72	138
Apprch %	0	100	0		0	0	0		0	100	0		0	0	0				
Total %	0	45.8	0		0	0	0		0	54.2	0		0	0	0		47.8	52.2	

Start Time	Market Street From North				(Private Driveway) From East				Market Street From South				Bennett Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	0	4	0	4	0	0	0	0	0	1	0	1	0	0	0	0	5
02:45 PM	0	3	0	3	0	0	0	0	0	2	0	2	0	0	0	0	5
03:00 PM	0	1	0	1	0	0	0	0	0	4	0	4	0	0	0	0	5
03:15 PM	0	3	0	3	0	0	0	0	0	7	0	7	0	0	0	0	10
Total Volume	0	11	0	11	0	0	0	0	0	14	0	14	0	0	0	0	25
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.688	.000	.688	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.625

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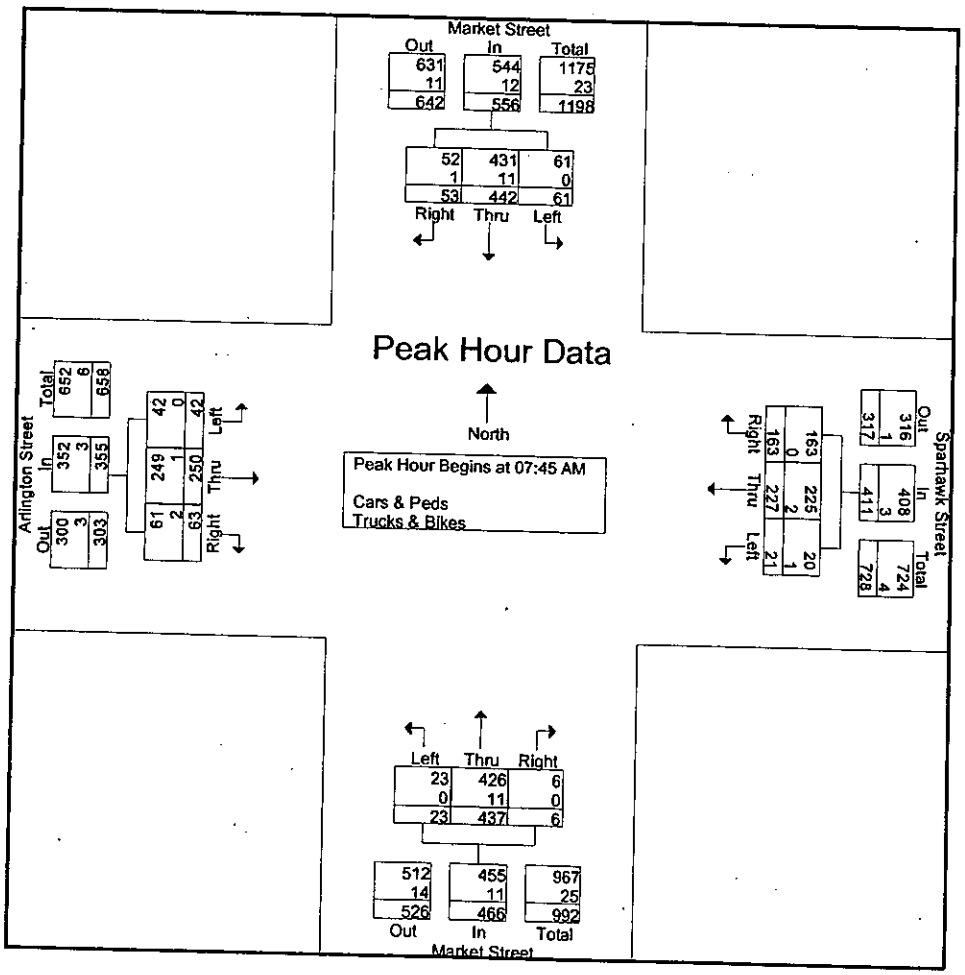
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152B
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	19	85	16	120	48	50	3	101	2	116	5	123	19	57	12	88	432
08:00 AM	14	117	11	142	39	61	4	104	3	112	5	120	8	53	7	68	434
08:15 AM	13	118	23	154	43	58	7	108	1	111	3	115	20	71	10	101	478
08:30 AM	7	122	11	140	33	58	7	98	0	98	10	108	16	69	13	98	444
Total Volume	53	442	61	556	163	227	21	411	6	437	23	466	63	250	42	355	1788
% App. Total	9.5	79.5	11		39.7	55.2	5.1		1.3	93.8	4.9		17.7	70.4	11.8		
PHF	.697	.906	.663	.903	.849	.930	.750	.951	.500	.942	.575	.947	.788	.880	.808	.879	.935
Cars & Peds	52	431	61	544	163	225	20	408	6	426	23	455	61	249	42	352	1759
% Cars & Peds	98.1	97.5	100	97.8	100	99.1	95.2	99.3	100	97.5	100	97.6	96.8	99.6	100	99.2	98.4
Trucks & Bikes	1	11	0	12	0	2	1	3	0	11	0	11	2	1	0	3	29
% Trucks & Bikes	1.9	2.5	0	2.2	0	0.9	4.8	0.7	0	2.5	0	2.4	3.2	0.4	0	0.8	1.6



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E/W: Sparhawk Street/Arlington Street
City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152B
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
07:00 AM	3	86	10	2	17	30	1	8	0	93	1	6	11	50	5	6	22	307	329
07:15 AM	7	107	16	4	27	44	1	10	2	97	1	7	18	53	6	12	33	379	412
07:30 AM	12	91	17	10	35	58	1	15	1	103	4	8	15	49	8	13	46	394	440
07:45 AM	19	85	16	8	48	50	3	15	2	116	5	15	19	57	12	12	50	432	482
Total	41	369	59	24	127	182	6	48	5	409	11	36	63	209	31	43	151	1512	1663
08:00 AM	14	117	11	4	39	61	4	5	3	112	5	4	8	53	7	11	24	434	458
08:15 AM	13	118	23	4	43	58	7	12	1	111	3	9	20	71	10	13	38	478	516
08:30 AM	7	122	11	1	33	58	7	6	0	98	10	1	16	69	13	4	12	444	456
08:45 AM	2	104	9	2	30	47	14	14	2	115	8	3	12	77	8	9	28	428	456
Total	36	461	54	11	145	224	32	37	6	436	26	17	56	270	38	37	102	1784	1886
09:00 AM	2	104	13	5	45	49	2	5	3	100	3	5	9	63	8	7	22	401	423
09:15 AM	2	110	9	3	37	36	1	4	1	113	1	5	11	48	7	6	18	376	394
09:30 AM	3	110	16	1	16	27	1	5	4	99	5	7	15	43	9	7	20	348	368
09:45 AM	3	109	22	4	29	36	2	2	3	111	7	1	10	40	5	5	12	377	389
Total	10	433	60	13	127	148	6	16	11	423	16	18	45	194	29	25	72	1502	1574
Grand Total	87	1263	173	48	399	554	44	101	22	1268	53	71	164	673	98	105	325	4798	5123
Apprch %	5.7	82.9	11.4		40	55.6	4.4		1.6	94.4	3.9		17.5	72	10.5				
Total %	1.8	26.3	3.6		8.3	11.5	0.9		0.5	26.4	1.1		3.4	14	2		6.3	93.7	
Cars & Peds	85	1219	172		397	551	42		22	1228	53		162	669	98		0	0	4943
% Cars & Peds	97.7	96.5	99.4	66.7	99.5	99.5	95.5	68.3	100	96.8	100	77.5	98.8	99.4	100	84.8	0	0	96.5
Trucks & Bikes	2	44	1		2	3	2		0	40	0		2	4	0		0	0	180
% Trucks & Bikes	2.3	3.5	0.6	33.3	0.5	0.5	4.5	31.7	0	3.2	0	22.5	1.2	0.6	0	15.2	0	0	3.5

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	19	85	16	120	48	50	3	101	2	116	5	123	19	57	12	88	432
08:00 AM	14	117	11	142	39	61	4	104	3	112	5	120	8	53	7	68	434
08:15 AM	13	118	23	154	43	58	7	108	1	111	3	115	20	71	10	101	478
08:30 AM	7	122	11	140	33	58	7	98	0	98	10	108	16	69	13	98	444
Total Volume	53	442	61	556	163	227	21	411	6	437	23	466	63	250	42	355	1788
% App. Total	9.5	79.5	11		39.7	55.2	5.1		1.3	93.8	4.9		17.7	70.4	11.8		
PHF	.697	.906	.663	.903	.849	.930	.750	.951	.500	.942	.575	.947	.788	.880	.808	.879	.935
Cars & Peds	52	431	61	544	163	225	20	408	6	426	23	455	61	249	42	352	1759
% Cars & Peds	98.1	97.5	100	97.8	100	99.1	95.2	99.3	100	97.5	100	97.6	96.8	99.6	100	99.2	98.4
Trucks & Bikes	1	11	0	12	0	2	1	3	0	11	0	11	2	1	0	3	29
% Trucks & Bikes	1.9	2.5	0	2.2	0	0.9	4.8	0.7	0	2.5	0	2.4	3.2	0.4	0	0.8	1.6

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N/S: Market Street
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City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152B
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds

Start Time	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
07:00 AM	3	80	10	1	17	30	1	6	0	93	1	6	11	50	5	5	18	301	319
07:15 AM	6	102	16	3	27	44	1	8	2	96	1	7	18	52	6	12	30	371	401
07:30 AM	12	87	17	7	34	58	1	12	1	98	4	8	15	49	8	11	38	384	422
07:45 AM	19	84	16	7	48	49	3	13	2	114	5	13	19	57	12	11	44	428	472
Total	40	353	59	18	126	181	6	39	5	401	11	34	63	208	31	39	130	1484	1614
08:00 AM	13	112	11	3	39	61	4	2	3	109	5	1	8	53	7	11	17	425	442
08:15 AM	13	116	23	3	43	58	6	6	1	110	3	5	20	71	10	9	23	474	497
08:30 AM	7	119	11	0	33	57	7	2	0	93	10	1	14	68	13	2	5	432	437
08:45 AM	2	101	9	1	30	46	13	9	2	110	8	1	12	76	8	5	16	417	433
Total	35	448	54	7	145	222	30	19	6	422	26	8	54	268	38	27	61	1748	1809
09:00 AM	2	102	13	4	45	49	2	2	3	96	3	3	9	63	8	6	15	395	410
09:15 AM	2	107	8	0	36	36	1	3	1	107	1	5	11	47	7	6	14	364	378
09:30 AM	3	103	16	1	16	27	1	5	4	95	5	5	15	43	9	6	17	337	354
09:45 AM	3	106	22	2	29	36	2	1	3	107	7	0	10	40	5	5	8	370	378
Total	10	418	59	7	126	148	6	11	11	405	16	13	45	193	29	23	54	1466	1520
Grand Total	85	1219	172	32	397	551	42	69	22	1228	53	55	162	669	98	89	245	4698	4943
Apprch %	5.8	82.6	11.7		40.1	55.7	4.2		1.7	94.2	4.1		17.4	72	10.5				
Total %	1.8	25.9	3.7		8.5	11.7	0.9		0.5	26.1	1.1		3.4	14.2	2.1		5	95	

Start Time	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	19	84	16	119	48	49	3	100	2	114	5	121	19	57	12	88	428
08:00 AM	13	112	11	136	39	61	4	104	3	109	5	117	8	53	7	68	425
08:15 AM	13	116	23	152	43	58	6	107	1	110	3	114	20	71	10	101	474
08:30 AM	7	119	11	137	33	57	7	97	0	93	10	103	14	68	13	95	432
Total Volume	52	431	61	544	163	225	20	408	6	426	23	455	61	249	42	352	1759
% App. Total	9.6	79.2	11.2		40	55.1	4.9		1.3	93.6	5.1		17.3	70.7	11.9		
PHF	.684	.905	.663	.895	.849	.922	.714	.953	.500	.934	.575	.940	.763	.877	.808	.871	.928

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Client: GEOD/J. Lyons

File Name : 04152B
Site Code : 04152
Start Date : 9/13/2011
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Groups Printed- Trucks & Bikes

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
07:00 AM	0	6	0	1	0	0	0	2	0	0	0	0	0	0	0	1	4	6	10
07:15 AM	1	5	0	1	0	0	0	2	0	1	0	0	0	1	0	0	3	8	11
07:30 AM	0	4	0	3	1	0	0	3	0	5	0	0	0	0	0	2	8	10	18
07:45 AM	0	1	0	1	0	1	0	2	0	2	0	2	0	0	0	1	6	4	10
Total	1	16	0	6	1	1	0	9	0	8	0	2	0	1	0	4	21	28	49
08:00 AM	1	5	0	1	0	0	0	3	0	3	0	3	0	0	0	0	7	9	16
08:15 AM	0	2	0	1	0	0	1	6	0	1	0	4	0	0	0	4	15	4	19
08:30 AM	0	3	0	1	0	1	0	4	0	5	0	0	2	1	0	2	7	12	19
08:45 AM	0	3	0	1	0	1	1	5	0	5	0	2	0	1	0	4	12	11	23
Total	1	13	0	4	0	2	2	18	0	14	0	9	2	2	0	10	41	36	77
09:00 AM	0	2	0	1	0	0	0	3	0	4	0	2	0	0	0	1	7	6	13
09:15 AM	0	3	1	3	1	0	0	1	0	6	0	0	0	1	0	0	4	12	16
09:30 AM	0	7	0	0	0	0	0	0	0	4	0	2	0	0	0	1	3	11	14
09:45 AM	0	3	0	2	0	0	0	1	0	4	0	1	0	0	0	0	4	7	11
Total	0	15	1	6	1	0	0	5	0	18	0	5	0	1	0	2	18	36	54
Grand Total	2	44	1	16	2	3	2	32	0	40	0	16	2	4	0	16	80	100	180
Apprch %	4.3	93.6	2.1		28.6	42.9	28.6		0	100	0		33.3	66.7	0				
Total %	2	44	1		2	3	2		0	40	0		2	4	0		44.4	55.6	

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:30 AM																	
08:30 AM	0	3	0	3	0	1	0	1	0	5	0	5	2	1	0	3	12
08:45 AM	0	3	0	3	0	1	1	2	0	5	0	5	0	1	0	1	11
09:00 AM	0	2	0	2	0	0	0	0	0	4	0	4	0	0	0	0	6
09:15 AM	0	3	1	4	1	0	0	1	0	6	0	6	0	1	0	1	12
Total Volume	0	11	1	12	1	2	1	4	0	20	0	20	2	3	0	5	41
% App. Total	0	91.7	8.3		25	50	25		0	100	0		40	60	0		
PHF	.000	.917	.250	.750	.250	.500	.250	.500	.000	.833	.000	.833	.250	.750	.000	.417	.854

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File Name : 04152BB
Site Code : 04152
Start Date : 9/13/2011
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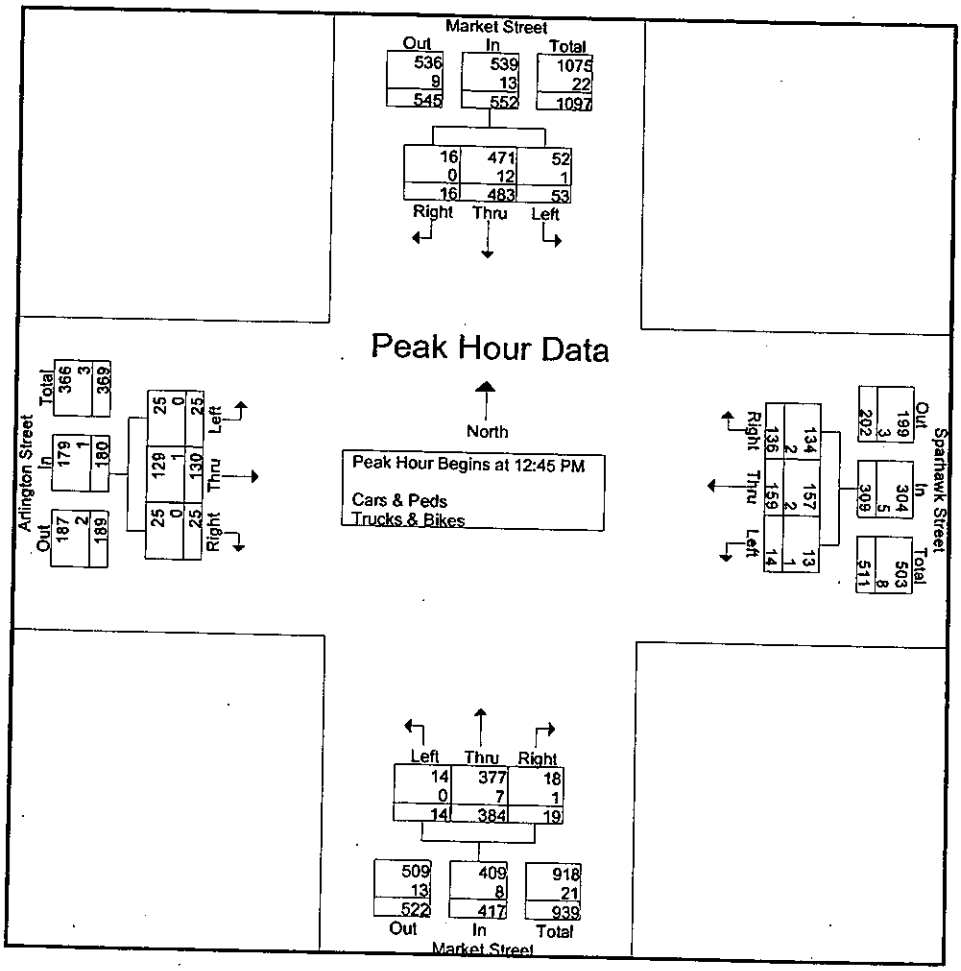
	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	2	114	21	137	25	43	3	71	10	93	4	107	6	30	6	42	357
01:00 PM	7	122	11	140	35	39	6	80	3	92	5	100	8	41	6	55	375
01:15 PM	3	123	9	135	40	36	3	79	2	106	2	110	6	26	5	37	361
01:30 PM	4	124	12	140	36	41	2	79	4	93	3	100	5	33	8	46	365
Total Volume	16	483	53	552	136	159	14	309	19	384	14	417	25	130	25	180	1458
% App. Total	2.9	87.5	9.6		44	51.5	4.5		4.6	92.1	3.4		13.9	72.2	13.9		
PHF	.571	.974	.631	.986	.850	.924	.583	.966	.475	.906	.700	.948	.781	.793	.781	.818	.972
Cars & Peds	16	471	52	539	134	157	13	304	18	377	14	409	25	129	25	179	1431
% Cars & Peds	100	97.5	98.1	97.6	98.5	98.7	92.9	98.4	94.7	98.2	100	98.1	100	99.2	100	99.4	98.1
Trucks & Bikes	0	12	1	13	2	2	1	5	1	7	0	8	0	1	0	1	27
% Trucks & Bikes	0	2.5	1.9	2.4	1.5	1.3	7.1	1.6	5.3	1.8	0	1.9	0	0.8	0	0.6	1.9



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File Name : 04152BB
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int Total
10:00 AM	5	91	11	4	23	25	5	11	1	104	5	2	11	28	5	9	26	314	340
10:15 AM	1	121	19	2	33	28	4	7	3	103	7	5	16	49	7	7	21	391	412
10:30 AM	4	126	12	0	18	29	2	6	4	84	5	5	9	36	4	9	20	333	353
10:45 AM	4	99	13	4	29	28	4	6	2	100	8	6	5	40	8	7	23	340	363
Total	14	437	55	10	103	110	15	30	10	391	25	18	41	153	24	32	90	1378	1468
11:00 AM	6	88	10	0	21	31	3	5	0	107	9	0	4	39	4	5	10	322	332
11:15 AM	3	112	13	2	24	40	3	2	3	87	7	2	8	21	5	2	8	326	334
11:30 AM	7	97	18	2	27	42	7	2	2	98	2	3	5	27	4	2	9	336	345
11:45 AM	4	107	17	1	22	20	7	4	2	93	4	0	10	30	8	4	9	324	333
Total	20	404	58	5	94	133	20	13	7	385	22	5	27	117	21	13	36	1308	1344
12:00 PM	1	99	15	3	28	20	4	5	4	90	5	2	9	34	4	4	14	313	327
12:15 PM	4	94	14	0	27	46	5	2	5	97	3	1	12	28	3	1	4	338	342
12:30 PM	4	121	10	3	22	23	1	3	3	105	4	3	7	27	4	11	20	331	351
12:45 PM	2	114	21	1	25	43	3	3	10	93	4	1	6	30	6	3	8	357	365
Total	11	428	60	7	102	132	13	13	22	385	16	7	34	119	17	19	46	1339	1385
01:00 PM	7	122	11	2	35	39	6	4	3	92	5	4	8	41	6	2	12	375	387
01:15 PM	3	123	9	6	40	36	3	1	2	106	2	2	6	26	5	6	15	361	376
01:30 PM	4	124	12	4	36	41	2	8	4	93	3	0	5	33	8	2	14	365	379
01:45 PM	5	109	15	2	31	47	4	6	1	91	4	1	4	30	5	3	12	346	358
Total	19	478	47	14	142	163	15	19	10	382	14	7	23	130	24	13	53	1447	1500
Grand Total	64	1747	220	36	441	538	63	75	49	1543	77	37	125	519	86	77	225	5472	5697
Apprch %	3.2	86	10.8		42.3	51.6	6		2.9	92.5	4.6		17.1	71.1	11.8				
Total %	1.2	31.9	4		8.1	9.8	1.2		0.9	28.2	1.4		2.3	9.5	1.6		3.9	96.1	
Cars & Peds	64	1697	217		433	535	60		48	1488	76		123	515	86		0	0	5505
% Cars & Peds	100	97.1	98.6	80.6	98.2	99.4	95.2	74.7	98	96.4	98.7	64.9	98.4	99.2	100	70.1	0	0	96.6
Trucks & Bikes	0	50	3		8	3	3		1	55	1		2	4	0		0	0	192
% Trucks & Bikes	0	2.9	1.4	19.4	1.8	0.6	4.8	25.3	2	3.6	1.3	35.1	1.6	0.8	0	29.9	0	0	3.4

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	2	114	21	137	25	43	3	71	10	93	4	107	6	30	6	42	357
01:00 PM	7	122	11	140	35	39	6	80	3	92	5	100	8	41	6	55	375
01:15 PM	3	123	9	135	40	36	3	79	2	106	2	110	6	26	5	37	361
01:30 PM	4	124	12	140	36	41	2	79	4	93	3	100	5	33	8	46	365
Total Volume	16	483	53	552	136	159	14	309	19	384	14	417	25	130	25	180	1458
% App. Total	2.9	87.5	9.6		44	51.5	4.5		4.6	92.1	3.4		13.9	72.2	13.9		
PHF	.571	.974	.631	.986	.850	.924	.583	.966	.475	.906	.700	.948	.781	.793	.781	.818	.972
Cars & Peds	16	471	52	539	134	157	13	304	18	377	14	409	25	129	25	179	1431
% Cars & Peds	100	97.5	98.1	97.6	98.5	98.7	92.9	98.4	94.7	98.2	100	98.1	100	99.2	100	99.4	98.1
Trucks & Bikes	0	12	1	13	2	2	1	5	1	7	0	8	0	1	0	1	27
% Trucks & Bikes	0	2.5	1.9	2.4	1.5	1.3	7.1	1.6	5.3	1.8	0	1.9	0	0.8	0	0.6	1.9

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File Name : 04152BB
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Groups Printed- Cars & Peds

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
10:00 AM	5	88	11	3	22	25	5	9	1	102	5	1	11	28	5	7	20	308	328
10:15 AM	1	117	19	2	32	28	4	5	3	101	7	4	16	49	7	4	15	384	399
10:30 AM	4	123	12	0	17	29	2	5	4	83	5	3	9	35	4	6	14	327	341
10:45 AM	4	94	13	2	29	27	3	2	2	95	7	6	5	40	8	4	14	327	341
Total	14	422	55	7	100	109	14	21	10	381	24	14	41	152	24	21	63	1346	1409
11:00 AM	6	83	10	0	21	31	2	4	0	96	9	0	4	39	4	3	7	305	312
11:15 AM	3	109	13	2	24	40	3	2	3	84	7	2	8	21	5	2	8	320	328
11:30 AM	7	94	18	2	26	42	7	1	2	96	2	1	5	27	4	2	6	330	336
11:45 AM	4	105	16	1	21	20	7	3	2	91	4	0	9	29	8	3	7	316	323
Total	20	391	57	5	92	133	19	10	7	367	22	3	26	116	21	10	28	1271	1299
12:00 PM	1	97	15	3	28	20	4	4	4	83	5	2	9	34	4	4	13	304	317
12:15 PM	4	93	14	0	26	46	5	2	5	92	3	0	11	28	3	1	3	330	333
12:30 PM	4	117	9	3	22	23	1	2	3	97	4	1	7	26	4	8	14	317	331
12:45 PM	2	110	20	1	25	42	2	3	9	92	4	1	6	30	6	2	7	348	355
Total	11	417	58	7	101	131	12	11	21	364	16	4	33	118	17	15	37	1299	1336
01:00 PM	7	118	11	2	33	38	6	4	3	91	5	1	8	40	6	1	8	366	374
01:15 PM	3	121	9	2	40	36	3	1	2	101	2	1	6	26	5	3	7	354	361
01:30 PM	4	122	12	4	36	41	2	5	4	93	3	0	5	33	8	2	11	363	374
01:45 PM	5	106	15	2	31	47	4	4	1	91	4	1	4	30	5	2	9	343	352
Total	19	467	47	10	140	162	15	14	10	376	14	3	23	129	24	8	35	1426	1461
Grand Total	64	1697	217	29	433	535	60	56	48	1488	76	24	123	515	86	54	163	5342	5505
Apprch %	3.2	85.8	11		42.1	52	5.8		3	92.3	4.7		17	71.1	11.9				
Total %	1.2	31.8	4.1		8.1	10	1.1		0.9	27.9	1.4		2.3	9.6	1.6		3	97	

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	2	110	20	132	25	42	2	69	9	92	4	105	6	30	6	42	348
01:00 PM	7	118	11	136	33	38	6	77	3	91	5	99	8	40	6	54	366
01:15 PM	3	121	9	133	40	36	3	79	2	101	2	105	6	26	5	37	354
01:30 PM	4	122	12	138	36	41	2	79	4	93	3	100	5	33	8	46	363
Total Volume	16	471	52	539	134	157	13	304	18	377	14	409	25	129	25	179	1431
% App. Total	3	87.4	9.6		44.1	51.6	4.3		4.4	92.2	3.4		14	72.1	14		
PHF	.571	.965	.650	.976	.838	.935	.542	.962	.500	.933	.700	.974	.781	.806	.781	.829	.977

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N/S: Market Street
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City, State: Brighton, MA
Client: GEOD/J. Lyons

File Name : 04152BB
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Trucks & Bikes

Start Time	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu. Total	Int. Total
10:00 AM	0	3	0	1	1	0	0	2	0	2	0	1	0	0	0	2	6	6	12
10:15 AM	0	4	0	0	1	0	0	2	0	2	0	1	0	0	0	3	6	7	13
10:30 AM	0	3	0	0	1	0	0	1	0	1	0	2	0	1	0	3	6	6	12
10:45 AM	0	5	0	2	0	1	1	4	0	5	1	0	0	0	0	3	9	13	22
Total	0	15	0	3	3	1	1	9	0	10	1	4	0	1	0	11	27	32	59
11:00 AM	0	5	0	0	0	0	1	1	0	11	0	0	0	0	0	2	3	17	20
11:15 AM	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	6	6
11:30 AM	0	3	0	0	1	0	0	1	0	2	0	2	0	0	0	0	3	6	9
11:45 AM	0	2	1	0	1	0	0	1	0	2	0	0	1	1	0	1	2	8	10
Total	0	13	1	0	2	0	1	3	0	18	0	2	1	1	0	3	8	37	45
12:00 PM	0	2	0	0	0	0	0	1	0	7	0	0	0	0	0	0	1	9	10
12:15 PM	0	1	0	0	1	0	0	0	0	5	0	1	1	0	0	0	1	8	9
12:30 PM	0	4	1	0	0	0	0	1	0	8	0	2	0	1	0	3	6	14	20
12:45 PM	0	4	1	0	0	1	1	0	1	1	0	0	0	0	0	1	1	9	10
Total	0	11	2	0	1	1	1	2	1	21	0	3	1	1	0	4	9	40	49
01:00 PM	0	4	0	0	2	1	0	0	0	1	0	3	0	1	0	1	4	9	13
01:15 PM	0	2	0	4	0	0	0	0	0	5	0	1	0	0	0	3	8	7	15
01:30 PM	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	2	5
01:45 PM	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3	3	6
Total	0	11	0	4	2	1	0	5	0	6	0	4	0	1	0	5	18	21	39
Grand Total	0	50	3	7	8	3	3	19	1	55	1	13	2	4	0	23	62	130	192
Apprch %	0	94.3	5.7		57.1	21.4	21.4		1.8	96.5	1.8		33.3	66.7	0				
Total %	0	38.5	2.3		6.2	2.3	2.3		0.8	42.3	0.8		1.5	3.1	0		32.3	67.7	

Start Time	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:15 AM																	
10:15 AM	0	4	0	4	1	0	0	1	0	2	0	2	0	0	0	0	7
10:30 AM	0	3	0	3	1	0	0	1	0	1	0	1	0	1	0	1	6
10:45 AM	0	5	0	5	0	1	1	2	0	5	1	6	0	0	0	0	13
11:00 AM	0	5	0	5	0	0	1	1	0	11	0	11	0	0	0	0	17
Total Volume	0	17	0	17	2	1	2	5	0	19	1	20	0	1	0	1	43
% App. Total	0	100	0		40	20	40		0	95	5		0	100	0		
PHF	.000	.850	.000	.850	.500	.250	.500	.625	.000	.432	.250	.455	.000	.250	.000	.250	.632

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Client: GEOD/J. Lyons

File Name : 04152BBB
Site Code : 04152
Start Date : 9/13/2011
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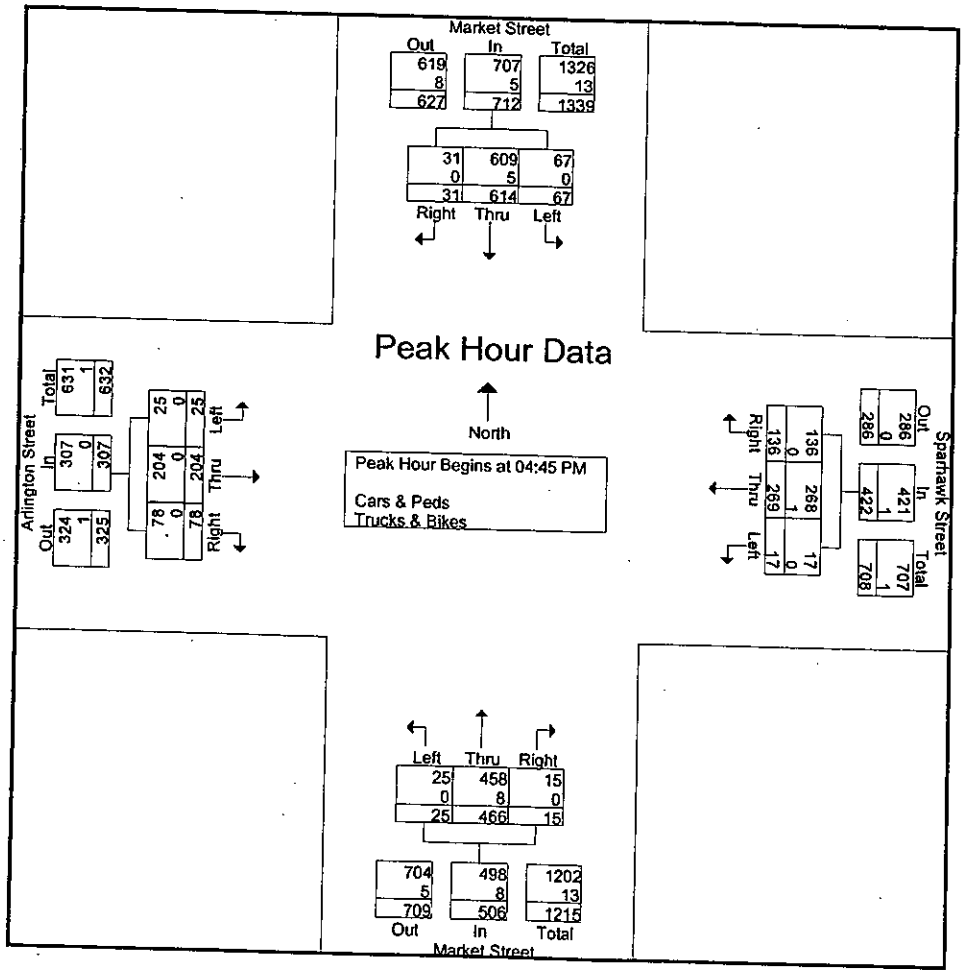
Start Time	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	6	149	24	179	35	69	8	112	9	126	2	137	15	61	6	82	510
05:00 PM	8	146	12	166	40	65	4	109	3	121	12	136	22	48	5	75	486
05:15 PM	12	167	16	195	25	67	2	94	1	115	4	120	16	47	9	72	481
05:30 PM	5	152	15	172	36	68	3	107	2	104	7	113	25	48	5	78	470
Total Volume	31	614	67	712	136	269	17	422	15	466	25	506	78	204	25	307	1947
% App. Total	4.4	86.2	9.4		32.2	63.7	4		3	92.1	4.9		25.4	66.4	8.1		
PHF	.646	.919	.698	.913	.850	.975	.531	.942	.417	.925	.521	.923	.780	.836	.694	.936	.954
Cars & Peds	31	609	67	707	136	268	17	421	15	458	25	498	78	204	25	307	1933
% Cars & Peds	100	99.2	100	99.3	100	99.6	100	99.8	100	98.3	100	98.4	100	100	100	100	99.3
Trucks & Bikes	0	5	0	5	0	1	0	1	0	8	0	8	0	0	0	0	14
% Trucks & Bikes	0	0.8	0	0.7	0	0.4	0	0.2	0	1.7	0	1.6	0	0	0	0	0.7



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File Name : 04152BBB
Site Code : 04152
Start Date : 9/13/2011
Page No : 1

Groups Printed- Cars & Peds - Trucks & Bikes

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu Total	Inclu Total	Int. Total
02:00 PM	7	124	14	4	35	54	2	11	4	105	5	1	6	29	9	4	20	394	414
02:15 PM	4	109	14	7	45	64	5	5	2	116	3	3	8	27	4	1	16	401	417
02:30 PM	17	117	19	10	28	58	3	3	3	86	3	2	8	33	17	11	26	392	418
02:45 PM	17	137	18	17	33	53	6	10	1	95	7	3	11	53	7	14	44	438	482
Total	45	487	65	38	141	229	16	29	10	402	18	9	33	142	37	30	106	1625	1731
03:00 PM	7	140	17	5	25	51	5	6	2	129	3	2	3	44	9	4	17	435	452
03:15 PM	2	130	18	5	50	57	6	8	5	125	5	0	10	51	6	4	17	465	482
03:30 PM	8	133	20	2	28	58	13	7	2	126	4	2	10	60	5	3	14	467	481
03:45 PM	9	130	16	4	28	50	8	4	3	100	14	3	6	45	6	7	18	415	433
Total	26	533	71	16	131	216	32	25	12	480	26	7	29	200	26	18	66	1782	1848
04:00 PM	7	129	14	3	35	57	5	2	3	115	8	2	8	39	8	4	11	428	439
04:15 PM	10	141	12	2	44	70	4	5	2	100	6	5	11	37	16	7	19	453	472
04:30 PM	9	145	16	2	36	58	3	7	4	106	11	8	22	38	10	10	27	458	485
04:45 PM	6	149	24	1	35	69	8	11	9	126	2	5	15	61	6	8	25	510	535
Total	32	564	66	8	150	254	20	25	18	447	27	20	56	175	40	29	82	1849	1931
05:00 PM	8	146	12	4	40	65	4	0	3	121	12	3	22	48	5	13	20	486	506
05:15 PM	12	167	16	4	25	67	2	3	1	115	4	4	16	47	9	8	19	481	500
05:30 PM	5	152	15	3	36	68	3	6	2	104	7	3	25	48	5	12	24	470	494
05:45 PM	10	170	19	6	19	63	3	2	2	114	10	4	10	46	10	11	23	476	499
Total	35	635	62	17	120	263	12	11	8	454	33	14	73	189	29	44	86	1913	1999
Grand Total	138	2219	264	79	542	962	80	90	48	1783	104	50	191	706	132	121	340	7169	7509
Apprch %	5.3	84.7	10.1		34.2	60.7	5.1		2.5	92.1	5.4		18.6	68.6	12.8				
Total %	1.9	31	3.7		7.6	13.4	1.1		0.7	24.9	1.5		2.7	9.8	1.8		4.5	95.5	
Cars & Peds	138	2193	263		539	954	79		48	1740	103		191	705	132		0	0	7353
% Cars & Peds	100	98.8	99.6	86.1	99.4	99.2	98.8	72.2	100	97.6	99	82	100	99.9	100	77.7	0	0	97.9
Trucks & Bikes	0	26	1		3	8	1		0	43	1		0	1	0		0	0	156
% Trucks & Bikes	0	1.2	0.4	13.9	0.6	0.8	1.2	27.8	0	2.4	1	18	0	0.1	0	22.3	0	0	2.1

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	6	149	24	179	35	69	8	112	9	126	2	137	15	61	6	82	510
05:00 PM	8	146	12	166	40	65	4	109	3	121	12	136	22	48	5	75	486
05:15 PM	12	167	16	195	25	67	2	94	1	115	4	120	16	47	9	72	481
05:30 PM	5	152	15	172	36	68	3	107	2	104	7	113	25	48	5	78	470
Total Volume	31	614	67	712	136	269	17	422	15	466	25	506	78	204	25	307	1947
% App. Total	4.4	86.2	9.4		32.2	63.7	4		3	92.1	4.9		25.4	66.4	8.1		
PHF	.646	.919	.698	.913	.850	.975	.531	.942	.417	.925	.521	.923	.780	.836	.694	.936	.954
Cars & Peds	31	609	67	707	136	268	17	421	15	458	25	498	78	204	25	307	1933
% Cars & Peds	100	99.2	100	99.3	100	99.6	100	99.8	100	98.3	100	98.4	100	100	100	100	99.3
Trucks & Bikes	0	5	0	5	0	1	0	1	0	8	0	8	0	0	0	0	14
% Trucks & Bikes	0	0.8	0	0.7	0	0.4	0	0.2	0	1.7	0	1.6	0	0	0	0	0.7

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Groups Printed- Cars & Peds

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu. Total	Inclu. Total	Int. Total
02:00 PM	7	122	14	4	35	52	2	9	4	100	5	1	6	28	9	4	18	384	402
02:15 PM	4	107	14	6	44	64	5	4	2	114	3	3	8	27	4	1	14	396	410
02:30 PM	17	114	19	10	28	57	3	2	3	86	3	1	8	33	17	9	22	388	410
02:45 PM	17	135	18	15	33	53	5	8	1	93	7	3	11	53	7	11	37	433	470
Total	45	478	65	35	140	226	15	23	10	393	18	8	33	141	37	25	91	1601	1692
03:00 PM	7	139	17	4	25	50	5	4	2	123	2	1	3	44	9	4	13	426	439
03:15 PM	2	127	18	4	49	56	6	8	5	118	5	0	10	51	6	4	16	453	469
03:30 PM	8	132	19	2	28	58	13	4	2	122	4	1	10	60	5	1	8	461	469
03:45 PM	9	129	16	3	28	50	8	1	3	96	14	3	6	45	6	5	12	410	422
Total	26	527	70	13	130	214	32	17	12	459	25	5	29	200	26	14	49	1750	1799
04:00 PM	7	126	14	3	35	57	5	2	3	115	8	2	8	39	8	4	11	425	436
04:15 PM	10	139	12	2	43	69	4	2	2	98	6	3	11	37	16	5	12	447	459
04:30 PM	9	145	16	1	36	58	3	5	4	104	11	7	22	38	10	8	21	456	477
04:45 PM	6	147	24	1	35	68	8	9	9	126	2	4	15	61	6	7	21	507	528
Total	32	557	66	7	149	252	20	18	18	443	27	16	56	175	40	24	65	1835	1900
05:00 PM	8	145	12	4	40	65	4	0	3	118	12	2	22	48	5	10	16	482	498
05:15 PM	12	167	16	4	25	67	2	2	1	114	4	4	16	47	9	7	17	480	497
05:30 PM	5	150	15	2	36	68	3	5	2	100	7	3	25	48	5	8	18	464	482
05:45 PM	10	169	19	3	19	62	3	0	2	113	10	3	10	46	10	6	12	473	485
Total	35	631	62	13	120	262	12	7	8	445	33	12	73	189	29	31	63	1899	1962
Grand Total	138	2193	263	68	539	954	79	65	48	1740	103	41	191	705	132	94	268	7085	7353
Apprch %	5.3	84.5	10.1		34.3	60.7	5		2.5	92	5.4		18.6	68.6	12.8				
Total %	1.9	31	3.7		7.6	13.5	1.1		0.7	24.6	1.5		2.7	10	1.9		3.6	96.4	

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	6	147	24	177	35	68	8	111	9	126	2	137	15	61	6	82	507
05:00 PM	8	145	12	165	40	65	4	109	3	118	12	133	22	48	5	75	482
05:15 PM	12	167	16	195	25	67	2	94	1	114	4	119	16	47	9	72	480
05:30 PM	5	150	15	170	36	68	3	107	2	100	7	109	25	48	5	78	464
Total Volume	31	609	67	707	136	268	17	421	15	458	25	498	78	204	25	307	1933
% App. Total	4.4	86.1	9.5		32.3	63.7	4		3	92	5		25.4	66.4	8.1		
PHF	.646	.912	.698	.906	.850	.985	.531	.948	.417	.909	.521	.909	.780	.836	.694	.936	.953

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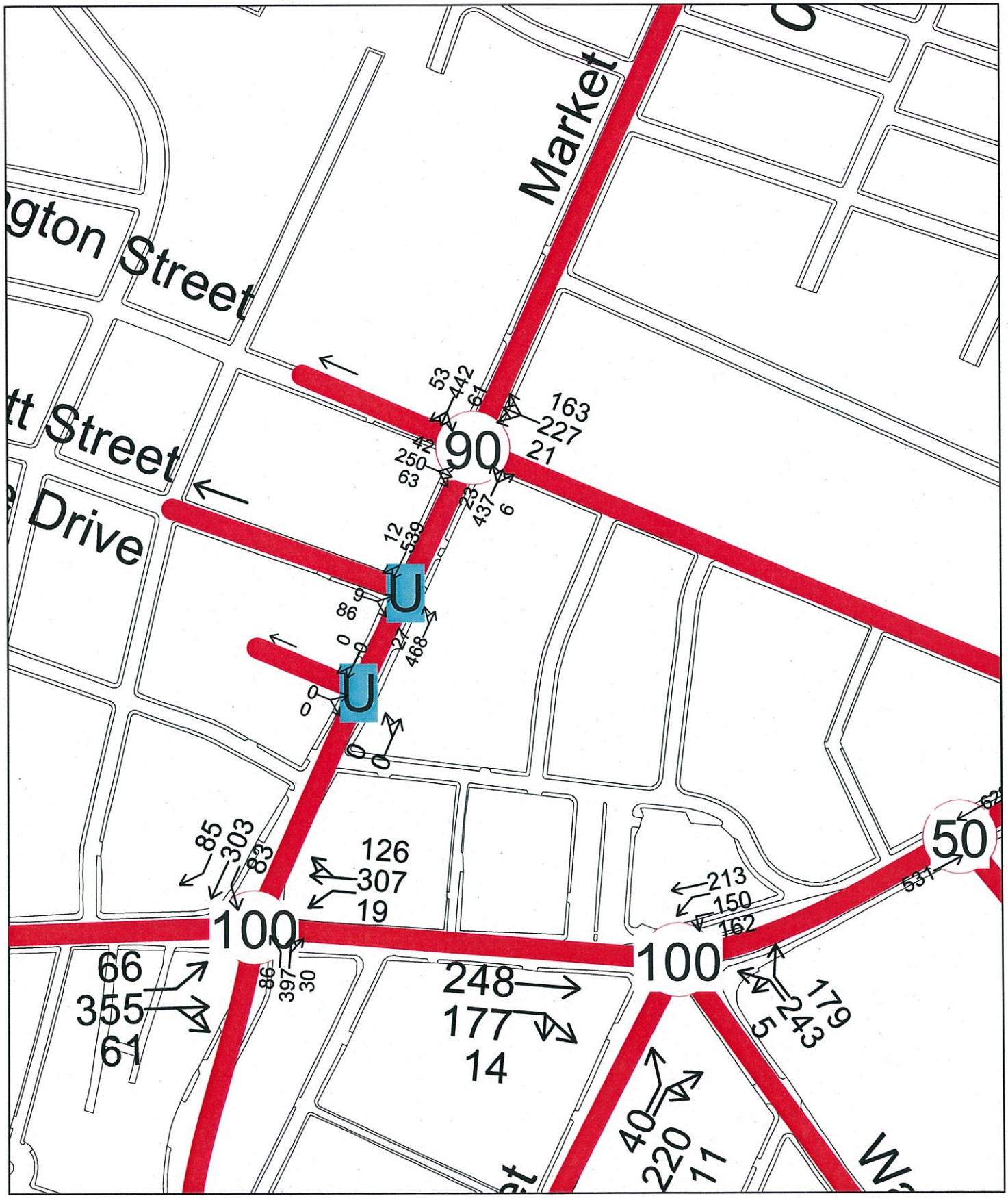
Groups Printed- Trucks & Bikes

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West						
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Exclu. Total	Inclu. Total	Int. Total
02:00 PM	0	2	0	0	0	2	0	2	0	5	0	0	0	1	0	0	2	10	12
02:15 PM	0	2	0	1	1	0	0	1	0	2	0	0	0	0	0	0	2	5	7
02:30 PM	0	3	0	0	0	1	0	1	0	0	0	1	0	0	0	2	4	4	8
02:45 PM	0	2	0	2	0	0	1	2	0	2	0	0	0	0	0	3	7	5	12
Total	0	9	0	3	1	3	1	6	0	9	0	1	0	1	0	5	15	24	39
03:00 PM	0	1	0	1	0	1	0	2	0	6	1	1	0	0	0	0	4	9	13
03:15 PM	0	3	0	1	1	1	0	0	0	7	0	0	0	0	0	0	1	12	13
03:30 PM	0	1	1	0	0	0	0	3	0	4	0	1	0	0	0	2	6	6	12
03:45 PM	0	1	0	1	0	0	0	3	0	4	0	0	0	0	0	2	6	5	11
Total	0	6	1	3	1	2	0	8	0	21	1	2	0	0	0	4	17	32	49
04:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
04:15 PM	0	2	0	0	1	1	0	3	0	2	0	2	0	0	0	2	7	6	13
04:30 PM	0	0	0	1	0	0	0	2	0	2	0	1	0	0	0	2	6	2	8
04:45 PM	0	2	0	0	0	1	0	2	0	0	0	1	0	0	0	1	4	3	7
Total	0	7	0	1	1	2	0	7	0	4	0	4	0	0	0	5	17	14	31
05:00 PM	0	1	0	0	0	0	0	0	0	3	0	1	0	0	0	3	4	4	8
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	2	1	3
05:30 PM	0	2	0	1	0	0	0	1	0	4	0	0	0	0	0	4	6	6	12
05:45 PM	0	1	0	3	0	1	0	2	0	1	0	1	0	0	0	5	11	3	14
Total	0	4	0	4	0	1	0	4	0	9	0	2	0	0	0	13	23	14	37
Grand Total	0	26	1	11	3	8	1	25	0	43	1	9	0	1	0	27	72	84	156
Apprch %	0	96.3	3.7		25	66.7	8.3		0	97.7	2.3		0	100	0				
Total %	0	31	1.2		3.6	9.5	1.2		0	51.2	1.2		0	1.2	0		46.2	53.8	

	Market Street From North				Sparhawk Street From East				Market Street From South				Arlington Street From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	0	2	0	2	0	0	1	1	0	2	0	2	0	0	0	0	5
03:00 PM	0	1	0	1	0	1	0	1	0	6	1	7	0	0	0	0	9
03:15 PM	0	3	0	3	1	1	0	2	0	7	0	7	0	0	0	0	12
03:30 PM	0	1	1	2	0	0	0	0	0	4	0	4	0	0	0	0	6
Total Volume	0	7	1	8	1	2	1	4	0	19	1	20	0	0	0	0	32
% App. Total	0	87.5	12.5		25	50	25		0	95	5		0	0	0		
PHF	.000	.583	.250	.667	.250	.500	.250	.500	.000	.679	.250	.714	.000	.000	.000	.000	.667

APPENDIX F – EXISTING CONDITIONS-OPERATIONAL ANALYSIS CALCULATIONS


Market
gton Street
tt Street
e Drive
90
100
100
50
U
U
53
442
61
163
227
21
42
250
63
23
437
6
12
539
9
86
0
0
27
468
0
0
85
303
83
126
307
19
213
150
162
531
66
355
61
86
397
30
248
177
14
179
243
5
40
220
11

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	425	477	537	651
v/c Ratio	1.26	1.07	0.83	0.94
Control Delay	169.5	95.0	35.5	45.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	169.5	95.0	35.5	45.1
Queue Length 50th (ft)	~306	~304	228	213
Queue Length 95th (ft)	#486	#491	#593	#714
Internal Link Dist (ft)	271	1305	221	1172
Turn Bay Length (ft)				
Base Capacity (vph)	337	446	650	690
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.26	1.07	0.83	0.94

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.97			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1513			1613			1731			1641	
Flt Permitted		0.74			0.92			0.90			0.89	
Satd. Flow (perm)		1124			1487			1561			1474	
Volume (vph)	42	250	63	21	227	163	23	437	6	61	442	53
Peak-hour factor, PHF	0.67	0.92	0.70	0.58	0.92	0.84	0.45	0.92	0.56	0.89	0.90	0.58
Adj. Flow (vph)	63	272	90	36	247	194	51	475	11	69	491	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	425	0	0	477	0	0	537	0	0	646	0
Confl. Peds. (#/hr)	33		33	23		23	20		20	13		13
Confl. Bikes (#/hr)			7			15			9			4
Heavy Vehicles (%)	6%	2%	5%	0%	2%	5%	0%	5%	0%	8%	8%	7%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		26.0			26.0			38.8			42.8	
Effective Green, g (s)		27.0			27.0			39.8			43.8	
Actuated g/C Ratio		0.30			0.30			0.44			0.49	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		337			446			690			725	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		c0.38			0.32			0.34			c0.39	
v/c Ratio		1.26			1.07			0.78			0.89	
Uniform Delay, d1		31.5			31.5			21.3			20.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		139.3			62.4			8.4			12.9	
Delay (s)		170.8			93.9			29.8			33.8	
Level of Service		F			F			C			C	
Approach Delay (s)		170.8			93.9			29.8			33.8	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	74.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	9	86	27	468	539	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	93	29	509	586	13
Pedestrians	6			39	39	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				701	301	
pX, platoon unblocked	0.71	0.71	0.71			
vC, conflicting volume	1205	637	605			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1289	489	443			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	76	96			
cM capacity (veh/h)	119	395	788			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	103	538	599
Volume Left	10	29	0
Volume Right	93	0	13
cSH	324	788	1700
Volume to Capacity	0.32	0.04	0.35
Queue Length 95th (ft)	33	3	0
Control Delay (s)	21.2	1.0	0.0
Lane LOS	C	A	
Approach Delay (s)	21.2	1.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

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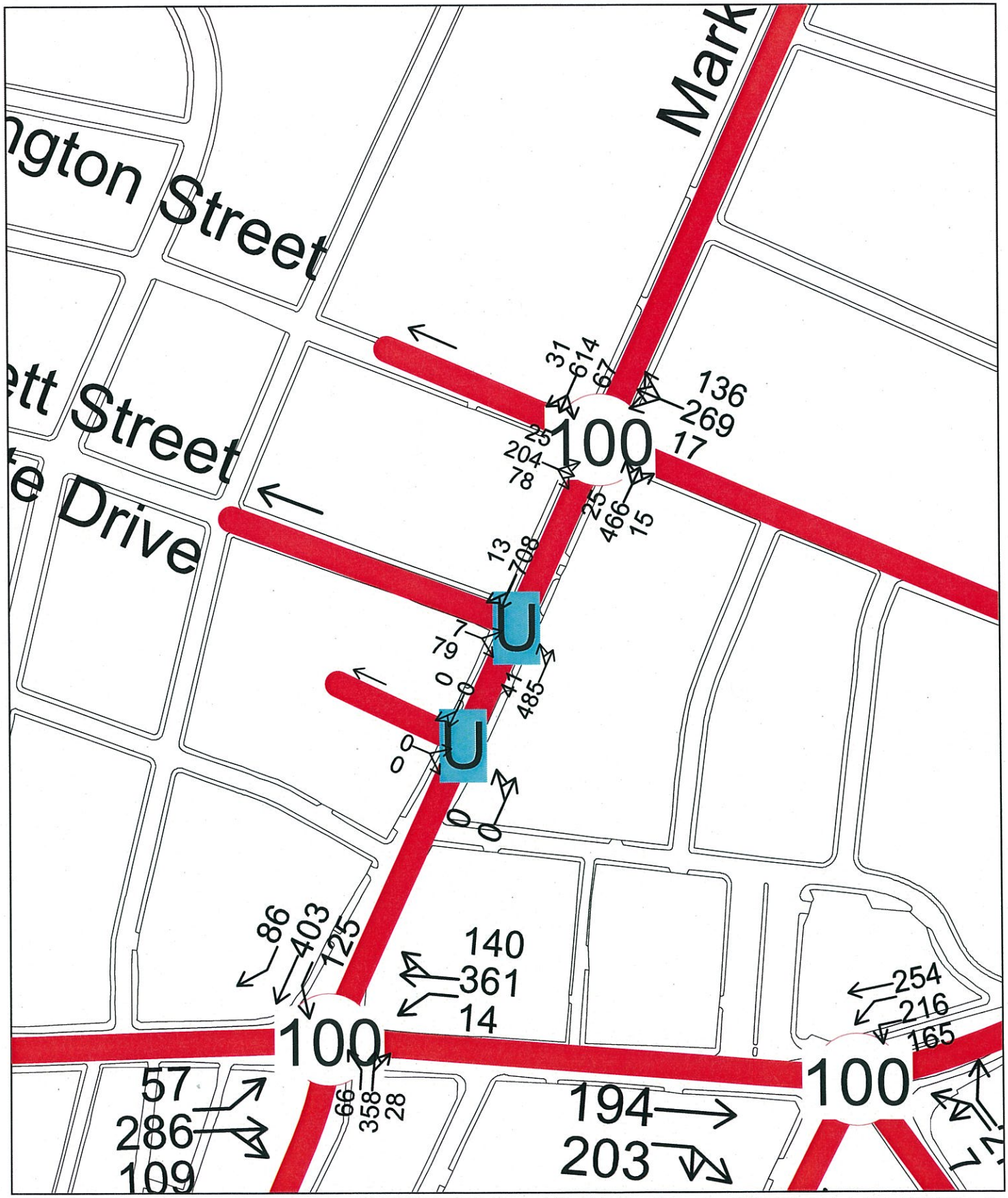
10/13/2011



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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	367	470	567	815
v/c Ratio	1.00	1.03	0.78	1.06
Control Delay	84.0	93.0	33.9	76.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	84.0	93.0	33.9	76.8
Queue Length 50th (ft)	234	~306	239	315
Queue Length 95th (ft)	#422	#514	#598	#901
Internal Link Dist (ft)	271	1305	230	1172
Turn Bay Length (ft)				
Base Capacity (vph)	368	456	730	766
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.00	1.03	0.78	1.06

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.98			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.95			0.99			0.99	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1507			1682			1737			1763	
Flt Permitted		0.87			0.97			0.93			0.89	
Satd. Flow (perm)		1313			1631			1615			1572	
Volume (vph)	25	204	78	17	269	136	25	466	15	67	614	31
Peak-hour factor, PHF	0.86	0.92	0.67	0.81	0.93	0.85	0.73	0.95	0.36	0.90	0.88	0.72
Adj. Flow (vph)	29	222	116	21	289	160	34	491	42	74	698	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	367	0	0	470	0	0	567	0	0	813	0
Confl. Peds. (#/hr)	32		32	16		16	13		13	11		11
Confl. Bikes (#/hr)			9			4			2			1
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	0%	3%	10%	4%	2%	0%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		27.0			27.0			44.6			48.6	
Effective Green, g (s)		28.0			28.0			45.6			49.6	
Actuated g/C Ratio		0.28			0.28			0.46			0.50	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		368			457			736			787	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		0.28			c0.29			0.35			c0.47	
v/c Ratio		1.00			1.03			0.77			1.03	
Uniform Delay, d1		36.0			36.0			22.8			25.2	
Progression Factor		1.00			1.25			1.00			1.00	
Incremental Delay, d2		45.8			48.1			7.6			41.1	
Delay (s)		81.8			93.0			30.4			66.3	
Level of Service		F			F			C			E	
Approach Delay (s)		81.8			93.0			30.4			66.3	
Approach LOS		F			F			C			E	

Intersection Summary			
HCM Average Control Delay	65.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.4
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

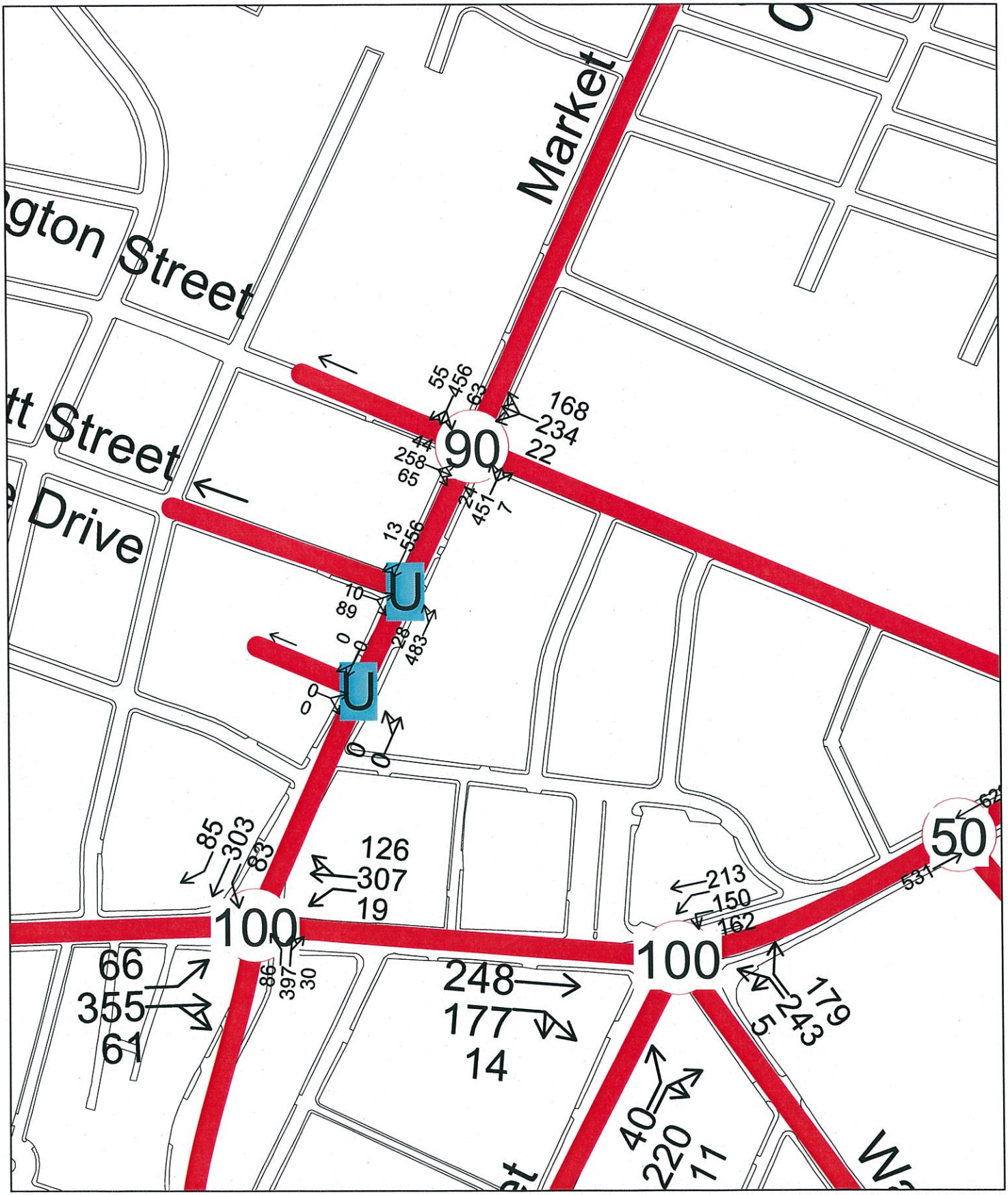
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	7	79	41	485	708	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	86	45	527	770	14
Pedestrians	1			36	36	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				692	310	
pX, platoon unblocked	0.58	0.58	0.58			
vC, conflicting volume	1430	814	785			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1743	678	628			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	66	92			
cM capacity (veh/h)	49	254	552			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	572	784
Volume Left	8	45	0
Volume Right	86	0	14
cSH	189	552	1700
Volume to Capacity	0.49	0.08	0.46
Queue Length 95th (ft)	61	7	0
Control Delay (s)	41.2	2.2	0.0
Lane LOS	E	A	
Approach Delay (s)	41.2	2.2	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

APPENDIX G – FUTURE CONDITIONS-OPERATIONAL ANALYSIS CALCULATIONS

10/13/2011



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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	439	492	555	673
v/c Ratio	1.33	1.12	0.87	0.99
Control Delay	199.1	110.2	39.8	55.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	199.1	110.2	39.8	55.0
Queue Length 50th (ft)	~328	~324	245	226
Queue Length 95th (ft)	#510	#514	#622	#748
Internal Link Dist (ft)	271	1305	221	1172
Turn Bay Length (ft)				
Base Capacity (vph)	329	441	637	680
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.33	1.12	0.87	0.99

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.97			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1512			1612			1730			1641	
Flt Permitted		0.72			0.91			0.89			0.89	
Satd. Flow (perm)		1096			1471			1547			1462	
Volume (vph)	44	258	65	22	234	168	24	451	7	63	456	55
Peak-hour factor, PHF	0.67	0.92	0.70	0.58	0.92	0.84	0.45	0.92	0.56	0.89	0.90	0.58
Adj. Flow (vph)	66	280	93	38	254	200	53	490	12	71	507	95
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	439	0	0	492	0	0	555	0	0	668	0
Confl. Peds. (#/hr)	34		34	24		24	21		21	13		13
Confl. Bikes (#/hr)			7			15			9			4
Heavy Vehicles (%)	6%	2%	5%	0%	2%	5%	0%	5%	0%	8%	8%	7%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		26.0			26.0			38.8			42.8	
Effective Green, g (s)		27.0			27.0			39.8			43.8	
Actuated g/C Ratio		0.30			0.30			0.44			0.49	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		329			441			684			719	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		c0.40			0.33			0.36			c0.41	
v/c Ratio		1.33			1.12			0.81			0.93	
Uniform Delay, d1		31.5			31.5			21.8			21.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		169.8			78.2			10.1			17.9	
Delay (s)		201.3			109.7			32.0			39.6	
Level of Service		F			F			C			D	
Approach Delay (s)		201.3			109.7			32.0			39.6	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM Average Control Delay	86.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	89	28	483	556	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	97	30	525	604	14
Pedestrians	6			40	40	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				701	301	
pX, platoon unblocked	0.69	0.69	0.69			
vC, conflicting volume	1243	657	624			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1352	504	456			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	74	96			
cM capacity (veh/h)	105	377	759			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	108	555	618
Volume Left	11	30	0
Volume Right	97	0	14
cSH	299	759	1700
Volume to Capacity	0.36	0.04	0.36
Queue Length 95th (ft)	40	3	0
Control Delay (s)	23.6	1.1	0.0
Lane LOS	C	A	
Approach Delay (s)	23.6	1.1	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

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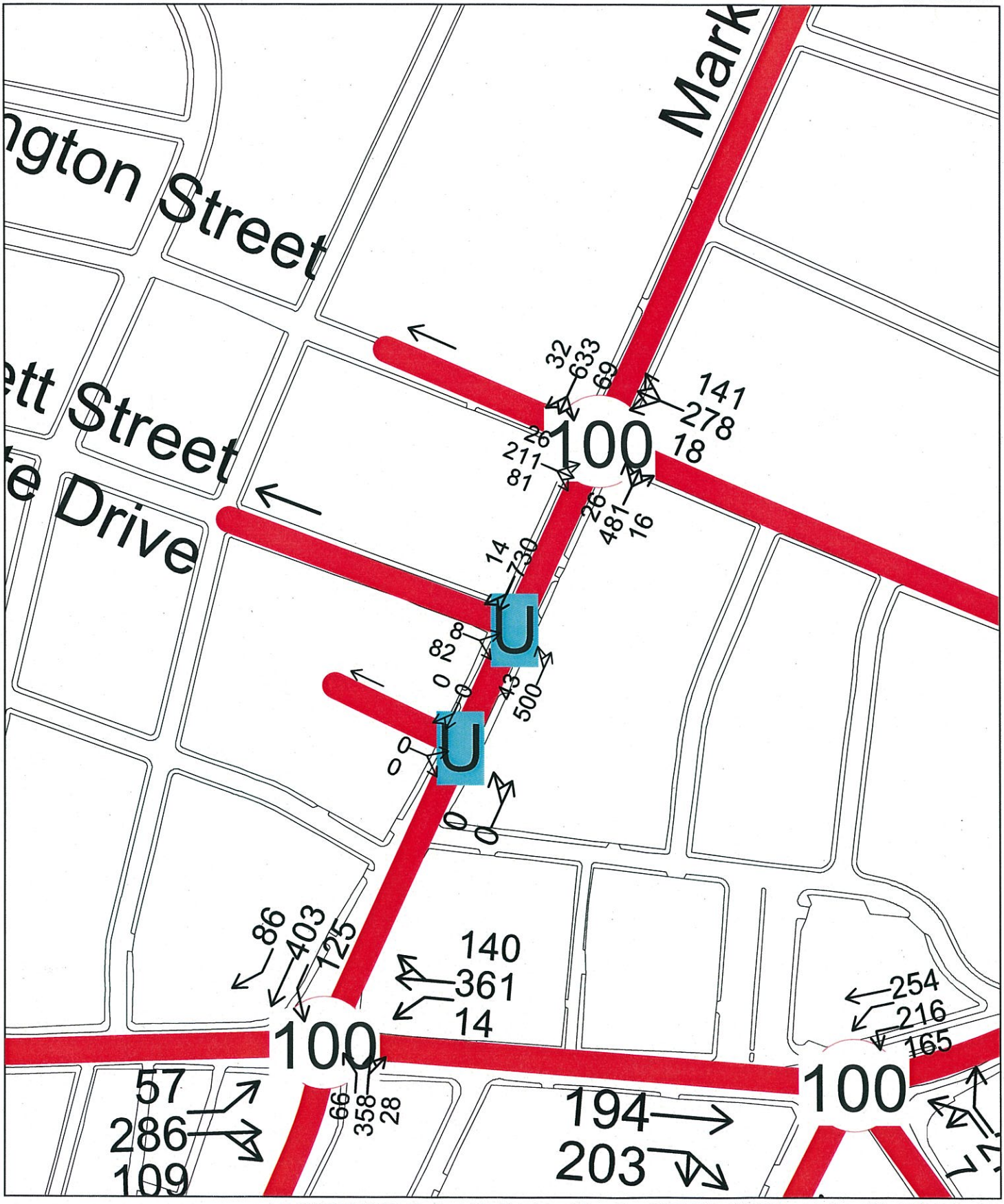

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	380	487	586	840
v/c Ratio	1.05	1.07	0.81	1.11
Control Delay	97.6	104.5	36.4	93.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	97.6	104.5	36.4	93.8
Queue Length 50th (ft)	~266	~335	254	333
Queue Length 95th (ft)	#446	#539	#631	#942
Internal Link Dist (ft)	271	1305	230	1172
Turn Bay Length (ft)				
Base Capacity (vph)	362	454	720	754
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.05	1.07	0.81	1.11

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.98			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.95			0.99			0.99	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1505			1682			1737			1763	
Flt Permitted		0.85			0.96			0.92			0.88	
Satd. Flow (perm)		1292			1623			1601			1554	
Volume (vph)	26	211	81	18	278	141	26	481	16	69	633	32
Peak-hour factor, PHF	0.86	0.92	0.67	0.81	0.93	0.85	0.73	0.95	0.36	0.90	0.88	0.72
Adj. Flow (vph)	30	229	121	22	299	166	36	506	44	77	719	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	380	0	0	487	0	0	586	0	0	838	0
Confl. Peds. (#/hr)	33		33	16		16	13		13	11		11
Confl. Bikes (#/hr)			9			4			2			1
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	0%	3%	10%	4%	2%	0%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		27.0			27.0			44.6			48.6	
Effective Green, g (s)		28.0			28.0			45.6			49.6	
Actuated g/C Ratio		0.28			0.28			0.46			0.50	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		362			454			730			779	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		0.29			c0.30			0.37			c0.49	
v/c Ratio		1.05			1.07			0.80			1.08	
Uniform Delay, d1		36.0			36.0			23.3			25.2	
Progression Factor		1.00			1.24			1.00			1.00	
Incremental Delay, d2		60.9			61.7			9.1			54.8	
Delay (s)		96.9			106.3			32.4			80.0	
Level of Service		F			F			C			E	
Approach Delay (s)		96.9			106.3			32.4			80.0	
Approach LOS		F			F			C			E	

Intersection Summary			
HCM Average Control Delay	76.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.4
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	8	82	43	500	730	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	89	47	543	793	15
Pedestrians	1			37	37	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				692	310	
pX, platoon unblocked	0.55	0.55	0.55			
vC, conflicting volume	1476	839	810			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1861	709	656			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	62	91			
cM capacity (veh/h)	39	232	515			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	98	590	809
Volume Left	9	47	0
Volume Right	89	0	15
cSH	162	515	1700
Volume to Capacity	0.61	0.09	0.48
Queue Length 95th (ft)	82	7	0
Control Delay (s)	56.6	2.6	0.0
Lane LOS	F	A	
Approach Delay (s)	56.6	2.6	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

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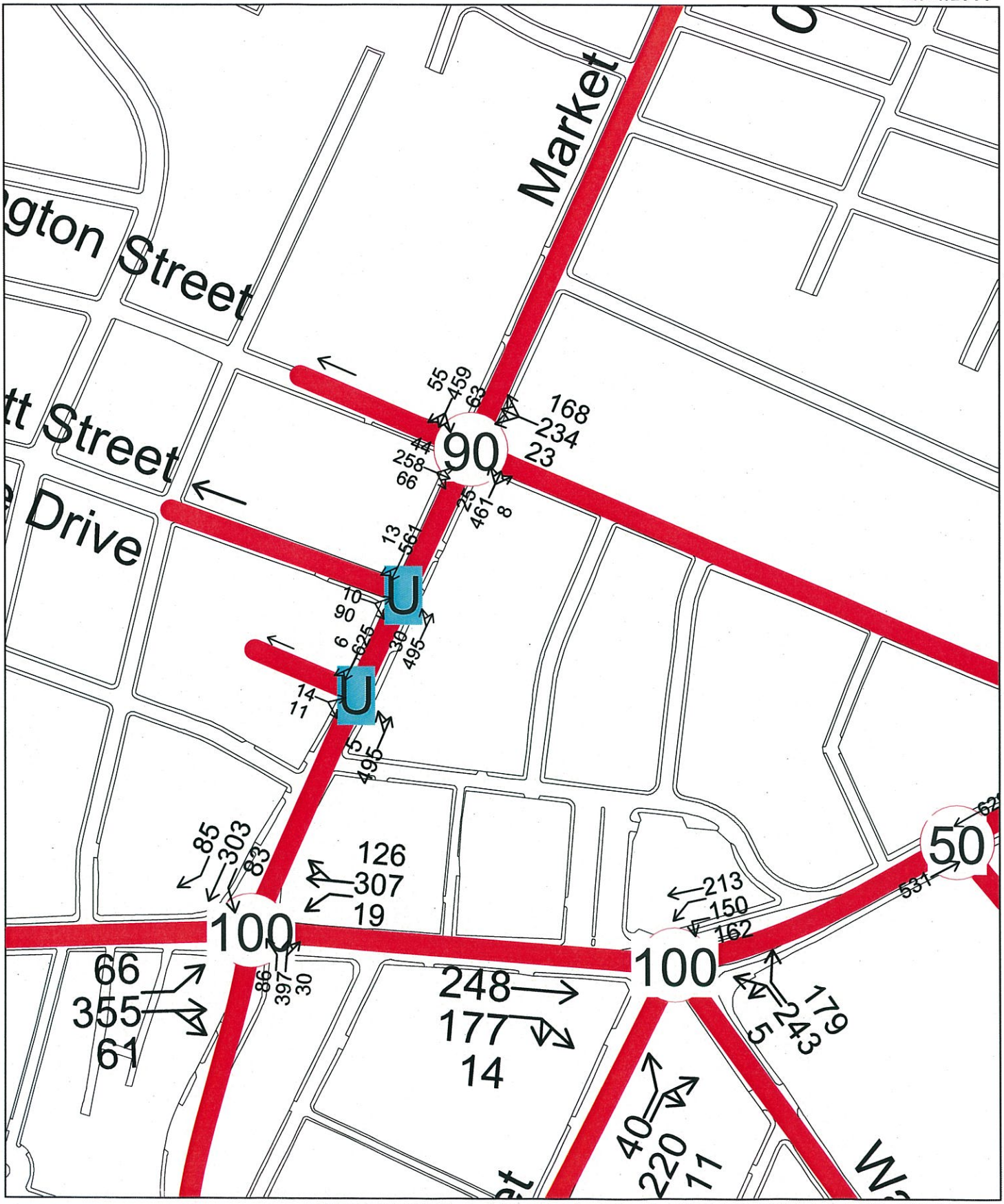

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	440	494	571	676
v/c Ratio	1.34	1.13	0.91	1.00
Control Delay	200.4	115.4	44.7	58.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	200.4	115.4	44.7	58.0
Queue Length 50th (ft)	~329	~329	260	228
Queue Length 95th (ft)	#511	#519	#646	#754
Internal Link Dist (ft)	271	1305	221	1172
Turn Bay Length (ft)				
Base Capacity (vph)	329	437	628	676
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.34	1.13	0.91	1.00

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.97			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		1511			1613			1730			1641	
Flt Permitted		0.72			0.90			0.88			0.88	
Satd. Flow (perm)		1096			1459			1533			1456	
Volume (vph)	44	258	66	23	234	168	25	461	8	63	459	55
Peak-hour factor, PHF	0.67	0.92	0.70	0.58	0.92	0.84	0.45	0.92	0.56	0.89	0.90	0.58
Adj. Flow (vph)	66	280	94	40	254	200	56	501	14	71	510	95
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	440	0	0	494	0	0	571	0	0	671	0
Confl. Peds. (#/hr)	35		35	24		24	22		22	13		13
Confl. Bikes (#/hr)			7			15			9			4
Heavy Vehicles (%)	6%	2%	5%	0%	2%	5%	0%	5%	0%	8%	8%	7%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		26.0			26.0			38.8			42.8	
Effective Green, g (s)		27.0			27.0			39.8			43.8	
Actuated g/C Ratio		0.30			0.30			0.44			0.49	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		329			438			678			717	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		c0.40			0.34			0.37			c0.41	
v/c Ratio		1.34			1.13			0.84			0.94	
Uniform Delay, d1		31.5			31.5			22.3			21.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		171.1			82.7			12.1			19.2	
Delay (s)		202.6			114.2			34.4			41.0	
Level of Service		F			F			C			D	
Approach Delay (s)		202.6			114.2			34.4			41.0	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM Average Control Delay	88.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	90	30	495	561	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	98	33	538	610	14
Pedestrians	6			42	42	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			4	4	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				701	301	
pX, platoon unblocked	0.78	0.69	0.69			
vC, conflicting volume	1268	665	630			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	985	512	461			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	74	96			
cM capacity (veh/h)	197	371	752			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	571	624
Volume Left	11	33	0
Volume Right	98	0	14
cSH	341	752	1700
Volume to Capacity	0.32	0.04	0.37
Queue Length 95th (ft)	34	3	0
Control Delay (s)	20.4	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	20.4	1.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	14	11	5	495	625	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	12	5	538	679	7
Pedestrians				45	45	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				4	4	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				491	511	
pX, platoon unblocked	0.85	0.74	0.74			
vC, conflicting volume	1277	728	686			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	941	631	574			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	96	99			
cM capacity (veh/h)	236	342	737			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	543	686
Volume Left	15	5	0
Volume Right	12	0	7
cSH	273	737	1700
Volume to Capacity	0.10	0.01	0.40
Queue Length 95th (ft)	8	1	0
Control Delay (s)	19.6	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	19.6	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

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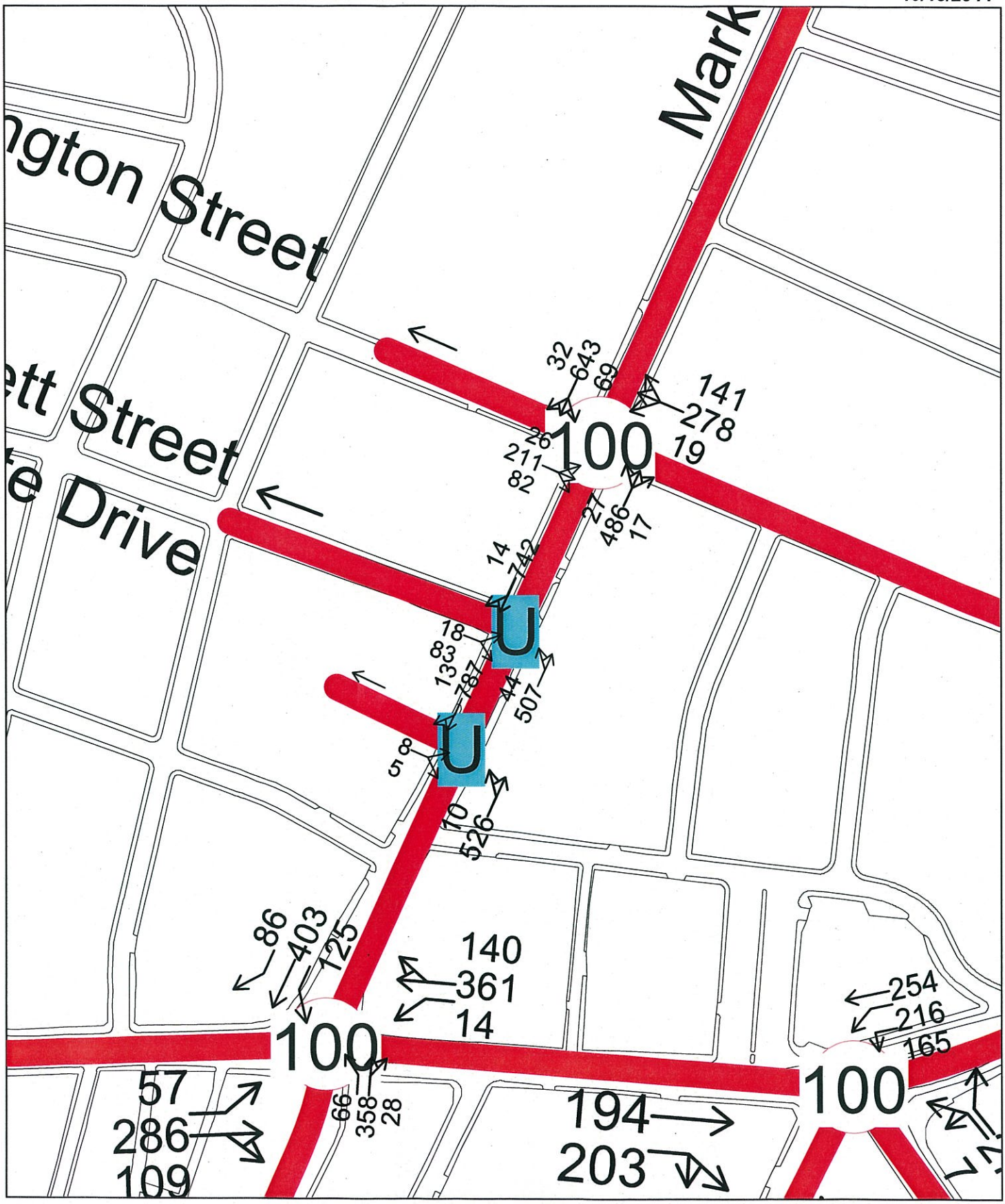

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	381	488	596	852
v/c Ratio	1.06	1.08	0.84	1.13
Control Delay	99.3	105.8	31.6	100.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	99.3	105.8	31.6	100.6
Queue Length 50th (ft)	~267	~339	279	342
Queue Length 95th (ft)	#449	#543	#653	#960
Internal Link Dist (ft)	271	1305	230	1172
Turn Bay Length (ft)				
Base Capacity (vph)	361	453	713	753
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	1.08	0.84	1.13

Intersection Summary

~ 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.

Movement	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	12	11	12	12	14	12	12	14	12	12	14	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.98			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.95			0.99			0.99	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1504			1682			1735			1763	
Flt Permitted		0.85			0.96			0.91			0.88	
Satd. Flow (perm)		1291			1617			1592			1552	
Volume (vph)	26	211	82	19	278	141	27	486	17	69	643	32
Peak-hour factor, PHF	0.86	0.92	0.67	0.81	0.93	0.85	0.73	0.95	0.36	0.90	0.88	0.72
Adj. Flow (vph)	30	229	122	23	299	166	37	512	47	77	731	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	381	0	0	488	0	0	596	0	0	850	0
Confl. Peds. (#/hr)	34		34	16		16	14		14	11		11
Confl. Bikes (#/hr)			9			4			2			1
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	0%	3%	10%	4%	2%	0%
Turn Type	Perm			Perm			Perm			D.P+P		
Protected Phases		5			5			1		6	1 6	
Permitted Phases	5			5			1			1		
Actuated Green, G (s)		27.0			27.0			44.6			48.6	
Effective Green, g (s)		28.0			28.0			45.6			49.6	
Actuated g/C Ratio		0.28			0.28			0.46			0.50	
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		361			453			726			778	
v/s Ratio Prot											c0.04	
v/s Ratio Perm		0.30			c0.30			0.37			c0.50	
v/c Ratio		1.06			1.08			0.82			1.09	
Uniform Delay, d1		36.0			36.0			23.7			25.2	
Progression Factor		1.00			1.23			0.79			1.00	
Incremental Delay, d2		62.7			63.3			7.8			60.7	
Delay (s)		98.7			107.7			26.5			85.9	
Level of Service		F			F			C			F	
Approach Delay (s)		98.7			107.7			26.5			85.9	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	77.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.4
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	18	83	44	507	742	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	90	48	551	807	15
Pedestrians	1			39	39	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				692	310	
pX, platoon unblocked	0.63	0.54	0.54			
vC, conflicting volume	1501	854	823			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1351	730	672			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	59	90			
cM capacity (veh/h)	92	220	496			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	110	599	822
Volume Left	20	48	0
Volume Right	90	0	15
cSH	176	496	1700
Volume to Capacity	0.62	0.10	0.48
Queue Length 95th (ft)	87	8	0
Control Delay (s)	54.3	2.8	0.0
Lane LOS	F	A	
Approach Delay (s)	54.3	2.8	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	8	5	10	526	787	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	5	11	572	855	14
Pedestrians				41	41	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				3	3	
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				495	507	
pX, platoon unblocked	0.67	0.56	0.56			
vC, conflicting volume	1497	904	870			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1285	829	768			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	98			
cM capacity (veh/h)	114	202	476			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	583	870
Volume Left	9	11	0
Volume Right	5	0	14
cSH	137	476	1700
Volume to Capacity	0.10	0.02	0.51
Queue Length 95th (ft)	8	2	0
Control Delay (s)	34.3	0.7	0.0
Lane LOS	D	A	
Approach Delay (s)	34.3	0.7	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		