Arlington Zoning Board of Appeals

Date: Tuesday, January 12, 2021
Time: 7:30 PM
Location: Conducted by remote participation
Additional Details:

Agenda Items

Administrative Items

1. **Remote Participation Details**

   In accordance with the Governor's Order Suspending Certain Provisions of the Open Meeting Law, G. L. c. 30A, § 20 relating to the COVID-19 emergency, the Arlington Zoning Board of Appeals meetings shall be physically closed to the public to avoid group congregation until further notice. The meeting shall instead be held virtually using Zoom.

   Please read Governor Baker's Executive Order Suspending Certain Provision of Open Meeting Law for more information regarding virtual public hearings and meetings: https://www.mass.gov/doc/open-meeting-law-order-march-12-2020/download

   The Legal Department is inviting you to a scheduled Zoom meeting.
   Topic: Zoning Board of Appeals, Meeting/Hearing
   Time: January 12, 2021, 7:30 PM Eastern Time (US and Canada)

   You are invited to a Zoom meeting.
   When: Jan 12, 2021 07:30 PM Eastern Time (US and Canada)
   Register in advance for this meeting:
   https://town-arlington-ma-us.zoom.us/meeting/register/tJApfu-vqTssH9Ok--O1AzMxfxTVQmb1e6Tq
   After registering, you will receive a confirmation email containing information about joining the meeting.

   Meeting ID: 944 9677 0657

   Find your local number: https://town-arlington-ma-us.zoom.us/u/adNWeNXzLr

   Dial by Location: 1-646-876-9923 US (New York)

2. **Members Vote: Approval of Meeting Minutes from January 05, 2021**

Hearings

3. **Docket #3641 - 69 Epping Street**
4. **Docket #3642 - 64 Brattle Street**

Comprehensive Permits

5. **Thorndike Place - Review of Traffic Impact Study**
6. **Thorndike Place - AFD ISD**
7. **Thorndike Place - Department of Planning and Community Development**
8. **Thorndike Place - Town Engineer's Memorandum and Planning**
9. **Thorndike Place - Public Comments**
10. **Thorndike Place - Previous Correspondence Received**

Meeting Adjourn

Town of Arlington, Massachusetts

Remote Participation Details

Summary:
In accordance with the Governor's Order Suspending Certain Provisions of the Open Meeting Law, G. L. c. 30A, § 20 relating to the COVID-19 emergency, the Arlington Zoning Board of Appeals meetings shall be physically closed to the public to avoid group congregation until further notice. The meeting shall instead be held virtually using Zoom.

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Town of Arlington, Massachusetts

Docket #3641 - 69 Epping Street

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	ZBA_PACKAGE__69_EPPING_STREET.pdf	ZBA PACKAGE, 69 EPPING STREET
🗋	Memorandum	3641_69_Epping_St.pdf	DPCD Memo regarding #3641 - 69 Epping St



Town of Arlington
Zoning Board of Appeals
51 Grove Street
Arlington, Massachusetts 02476
781-316-3396
www.arlingtonma.gov

LEGAL NOTICE

Notice is herewith given in accordance with the provisions of Section 3.2.3A of the Zoning Bylaws that there has been filed by **Derek and Emina Kelly** of Arlington, Massachusetts on December 11, 2020, a petition seeking permission to alter their property located at **69 Epping Street - Block Plan 092.0-0005-0004.0** Said petition would require a Special Permit under **Section 5.3.9 (A) (Projections into Minimum Yards)** of the Zoning Bylaw for the Town of Arlington.

Hearing in regard to the said petition will be remotely conducted via "Zoom" **Tuesday evening January 12, 2021 at 7:30 P.M or as soon thereafter as the petitioner may be heard. Please visit the Town of Arlington website for hearing information.**

DOCKET NO **3641**

Zoning Board of Appeals
Christian Klein, RA, Chair

For information contact: **ZBA@town.arlington.ma.us**

REQUEST FOR SPECIAL PERMIT

TOWN OF ARLINGTON

In the matter of the Application of Derek and Emina Kelly to the Zoning Board of Appeals for the Town of Arlington: Application for a Special Permit is herewith made, in accordance with Section 10.11 of the Zoning Bylaw for the Town of Arlington, seeking relief from the following specific provisions of the Zoning Bylaw, and as described fully in the attached form, Special Permit Criteria: Addition of an enclosed, single story entrance within the requited front yard setback. Seeking a Special Permit per Section 5.3.9.A of the Zoning Bylaw.

The Petitioner/Applicant states he/she/they is/are the owner - occupant of the land in Arlington located at 69 Epping Street with respect to such relief is sought; that no unfavorable action has been taken by the Zoning Board of Appeals or its predecessors upon a similar petition regarding this property within the two (2) years next immediately prior to the filing hereof. The applicant expressly agrees to full compliance with any and all conditions and qualifications imposed upon this permission, whether by the Zoning Bylaw or by the Zoning Board of Appeals, should the same be granted. The Applicant represents that the grounds for the relief sought are as follows: The proposed addition is to an existing structure on a small lot, and is in keeping with similar entrance structures in the neighborhood.

E-Mail derekwkelley@gmail.com Signed [signature] Date: 11/20/2020

Telephone 781-572-5832 Address 69 Epping Street

Special Permit Criteria- The following standards must be addressed and met for the grant of a Special Permit:

1). Indicate where the use requested is listed in the Table of Use Regulations as a Special Permit in the district for which the application is made or is so designated elsewhere in the Arlington Zoning Bylaw.

5.3.9.A

2). Describe how the requested use is essential or desirable to the public convenience or welfare.

Currently there is no covering at the front door. A new mudroom and overhang will allow for use in inclement weather.

825

830

3). Describe how the requested use will not create undue traffic congestion, or unduly impair pedestrian safety.

There is no change to the public right of way

4). Describe how the requested use will not overload any public water, drainage or sewer system, or any other municipal system to such an extent that the requested use or any developed use in the immediate area or any other area of the Town will be unduly subjected to hazards affecting health, safety or the general welfare.

N/A

5). Describe how any special regulations for the use, set forth in Article 11, are fulfilled.

6). Describe how the requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals, or welfare.

The proposed addition is very similar to existing entrances to many surrounding houses and is in keeping with the character of the district and

the immediate neighbors

7). Describe how the requested use will not, by its addition to a neighborhood, cause an excess of that particular use that could be detrimental to the character of said neighborhood.

many of the surrounding houses already have covered entrances.

TOWN OF ARLINGTON

Dimensional and Parking Information

For application to The Zoning Board of Appeals

1. Property Location: 69 Epping Street Zoning District: R1

2. Present Use/Occupancy: Single Family Dwelling No. of dwelling units (if residential) 1

3. Existing Gross Floor Area (see definition of Gross Floor Area (GFA) in Article 2 of the Town of Arlington Zoning Bylaw and provide supporting documentation (worksheet) showing dimensions of GFA by floor: 2366

4. Proposed Use/Occupancy: Single Family Dwelling No. of dwelling units (if residential) 1

5. Proposed Gross Floor Area (see definition of Gross Floor Area in Article 2 of the Town of Arlington Zoning Bylaw and provide supporting documentation (worksheet) showing dimensions of GFA by floor): 2423

		Present Conditions	Proposed Conditions	Min. or max Required by Zoning
6.	Lot size (sq. ft.)	5600	5600	min. 6000
7.	Frontage (ft.)			min.
8.	Floor area ratio			max.
9.	Lot Coverage (%)			max
10.	Lot Area per Dwelling Unit (Sq. ft.)			min.
11.	Front Yard Depth (ft.)	23.5	18.9	min. 25.0
12.	Left Side Yard Depth (ft.)	25.9	25.9	min. 10.0
13.	Right Side Yard Depth (ft.)	22.0	22.0	min. 10.0
14.	Rear Side Yard Depth (ft.)	20.8	20.8	min. 14.0
15.	Height (stories)			max.
16.	Height (ft.)			max.
17.	Landscaped Open Space (% of GFA) Sq. ft. _____			min.
18.	Usable Open Space (% of GFA) Sq. ft. _____			min.
19.	Parking Spaces (number)			min.
20.	Parking area setbacks			min.
21.	Loading Spaces (if applicable)			min.
22.	Type of construction			

OPEN SPACE/GROSS FLOOR AREA

Refer to Zoning Bylaw Article 2, Definitions and Article 6, Dimensional Regulations

Address 69 Epping Street **Zoning District** R1

OPEN SPACE	**EXISTING**	**PROPOSED**
Total lot area		
Open Space (Usable)*		
Open Space (Landscaped)		

*Usable Open Space must be at least 75% open to the sky, free of automotive, traffic and parking, and readily accessible. Open space shall be deemed usable only if : 1) at least 75% of the area has a grade of less than 8% and no horizontal dimension less than 25 feet.

GROSS FLOOR AREA (GFA)		
Accessory building	104	104
Basement or cellar (>5' excluding mechanical area)	664	664
1st Floor	768	825
2nd Floor	830	830
3rd Floor		
4th Floor		
5th Floor		
Attic (>7'3" in height, excluding elevator, mechanical)		
Parking garages (except as used for accessory Parking garages or off street loading purposes)		
All weather habitable porches and balconies		
Total Gross Floor Area (GFA)	2366	2423

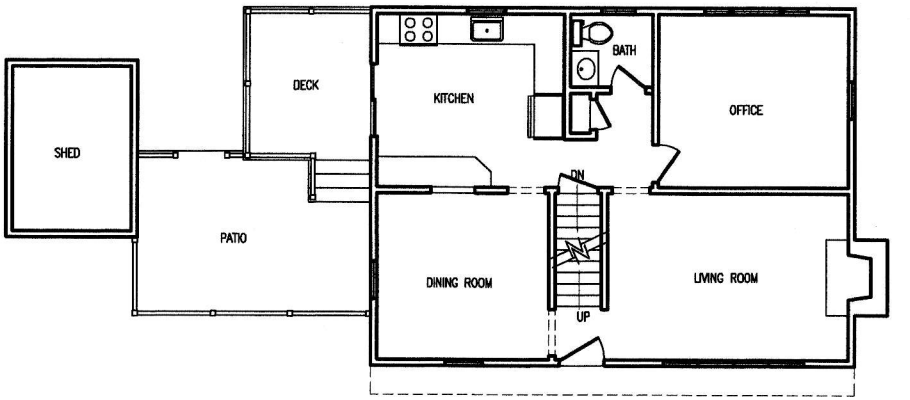
REQUIRED MINIMUM OPEN SPACE AREA

Proposed Usable Open Space Percent of GFA

Proposed Landscaped Open Space Percent of GFA

This worksheet applies to plans dated 9/2/20 designed by Legault Design LLC

Reviewed by Inspectional Services Date:



FIRST FLOOR PLAN
EXISTING

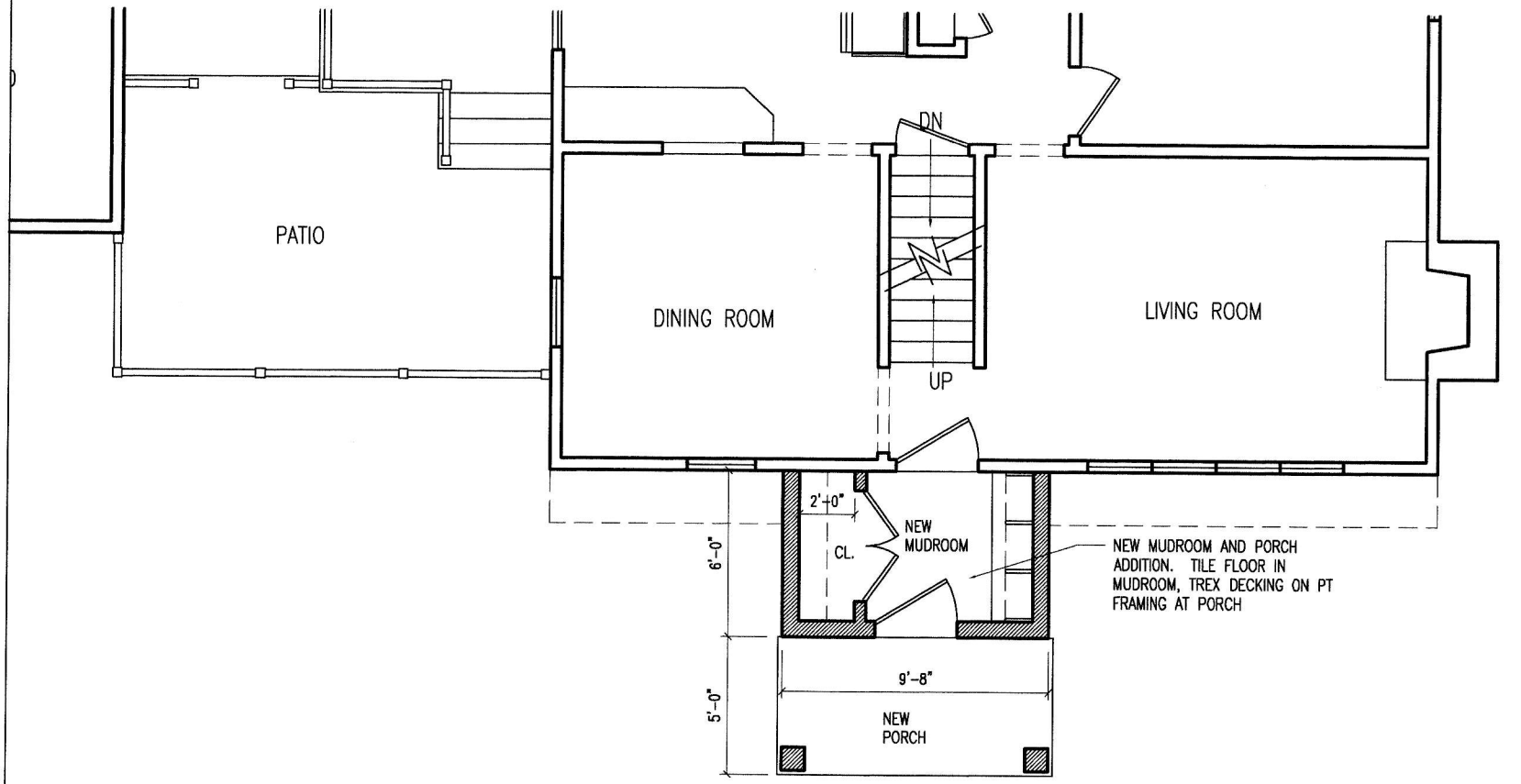


FRONT ELEVATION
EXISTING

LEGAULT DESIGN LLC
ARCHITECTURAL SOLUTIONS
242 Monsen Road, Concord, MA 01742
339.227.0237 www.legaultdesign.com

KELLY RESIDENCE

69 EPPING STREET ARLIGNTON, MA
SCALE: 1/8" = 1'-0"
DATE: SEPTEMBER 2, 2020



LEGAULT DESIGN LLC
ARCHITECTURAL SOLUTIONS
242 Monsen Road, Concord, MA 01742
339.227.0237 www.legaultdesign.com

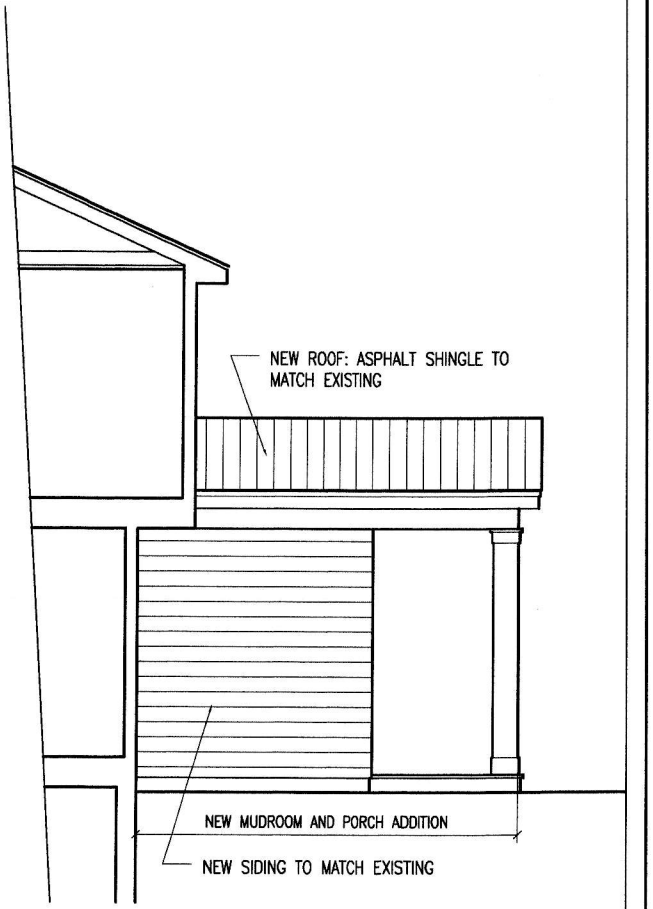
FIRST FLOOR PLAN
PROPOSED

KELLY RESIDENCE

69 EPPING STREET ARLIGNTON, MA
SCALE: 1/4" = 1'-0"
DATE: SEPTEMBER 2, 2020



FRONT ELEVATION
PROPOSED



SIDE ELEVATION
PROPOSED

LEGAULT DESIGN LLC
ARCHITECTURAL SOLUTIONS
242 Monsen Road, Concord, MA 01742
339.227.0237 www.legaultdesign.com

KELLY RESIDENCE

69 EPPING STREET ARLIGNTON, MA
SCALE: 1/4" = 1'-0"
DATE: SEPTEMBER 2, 2020

SITE PLAN

69 EPPING STREET

ARLINGTON, MASSACHUSETTS

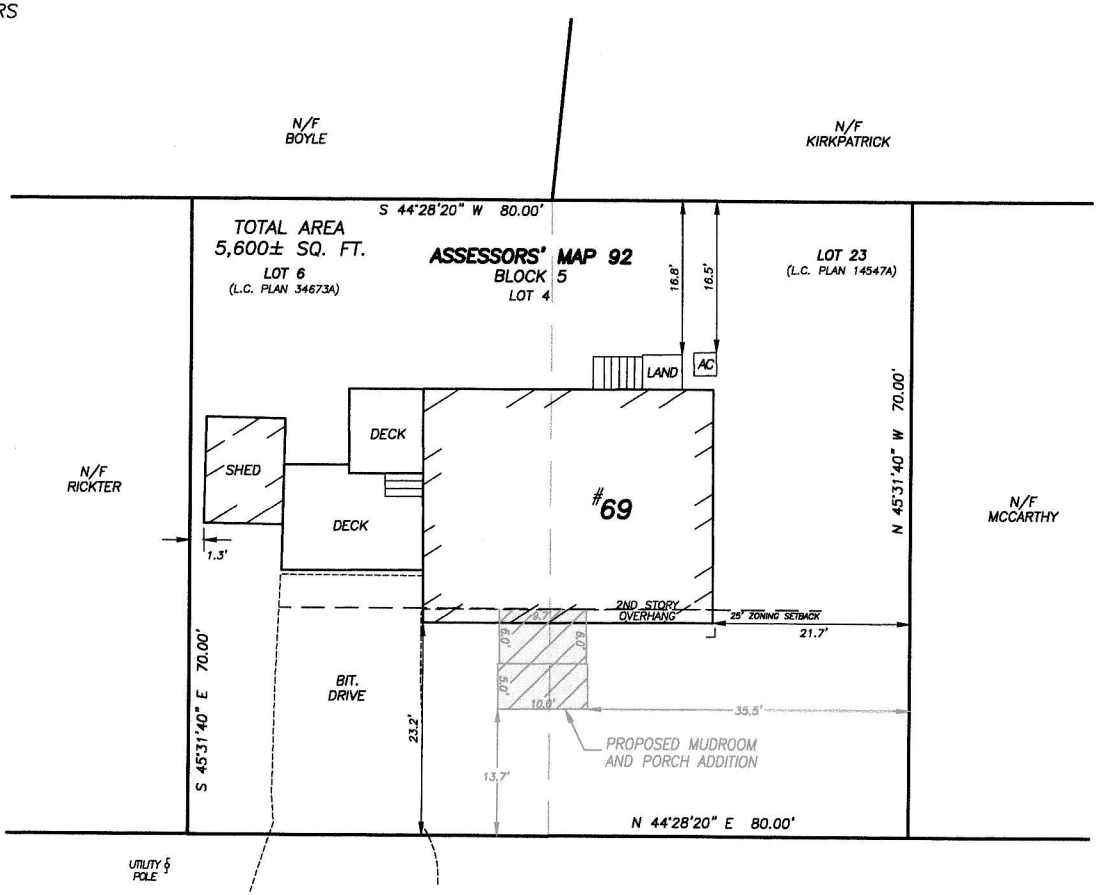
1 INCH = 10 FEET OCTOBER 21, 2020

SNELLING AND HAMEL ASSOCIATES, INC
PROFESSIONAL LAND SURVEYORS & ENGINEERS
10 LEWIS STREET P.O. BOX 102
LINCOLN, MASSACHUSETTS 01773
(781)259-0071

OWNERS OF RECORD:
DEREK W KELLEY
&
EMINA Z KELLEY
BK.1294 PG.43

SCALE 1" = 10'

0 10 20 30 40



LAND COURT PLAN 34673A

EPPING STREET
(40' WIDE)

S.BOUND
W/LEAD PLUG
(FOUND)

REFERENCES:
1. LAND COURT PLAN 14547A
2. LAND COURT PLAN 34673A

I HEREBY STATE THAT THE LOCATION OF THE FEATURES SHOWN HEREON IS THE RESULT OF A FIELD SURVEY PERFORMED AS OF MAY 15, 2018, WITH THE USE OF A TOPCON TOTAL STATION.

JOHN R. HAMEL
PROFESSIONAL
LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
JOHN R. HAMEL
#35029
PROFESSIONAL LAND SURVEYOR

OCTOBER 21, 2020
DATE

16557.DWG
OCTOBER 21, 2020

TOWN OF ARLINGTON
DEPARTMENT OF PLANNING and
COMMUNITY DEVELOPMENT

TOWN HALL, 730 MASSACHUSETTS AVENUE
ARLINGTON, MASSACHUSETTS 02476
TELEPHONE 781-316-3090

MEMORANDUM

To: Zoning Board of Appeals
From: Jennifer Raitt, Director, Dept. of Planning and Community Development/kl
Date: 1/11/2021
RE: Docket 3641 – 69 Epping Street; Special Permit under Zoning Bylaw Section 5.3.9 Projections into Minimum Yards (A)

The applicants, Derek and Emina Kelly, seek a Special Permit in accordance with Section 5.3.9 (Projections into Minimum Yards (A)). The applicants are seeking to construct an addition of an enclosed, single-story mudroom and portico within the front yard setback of their single-family home, which is in the R1 Zoning District. The petitioners seek to construct a 57 square foot mudroom on the front façade of the structure, which exceeds the maximum 25 square foot projection into a minimum yard allowable by right in the zoning bylaw (Section 5.3.9 – Projections into Minimum Yards (A)). The purpose of the project is to improve the convenience and safety of the front primary entrance to the dwelling.

The pre-existing home is nonconforming with the Zoning Bylaw's lot area and front yard depth requirements. The proposal would increase the existing nonconformance of the front yard setback by reducing it from 23.5 feet to 18.9 feet. Note: The applicants did not submit frontage, landscaped open space, or usable open space information, so it is unclear whether any other dimensional aspects of the property would become nonconforming through the proposal.

The following is an application of the Special Permit criteria (Zoning Bylaw Section 3.3.3):

Criterion #1: Requested Use
The requested use is permitted in the R-1 Zoning District through the granting of a special permit.

Criterion #2: Public Convenience/Welfare
This proposal would improve the convenience and safety of the owners' and occupants' entrance to their home.

Criterion #3: Undue Traffic Congestion/Impairment of Public Safety
There would not be an increase in traffic congestion or an impairment of public safety.

Criterion #4: Undue Burden on Municipal Systems
There would not be an undue burden on municipal systems.

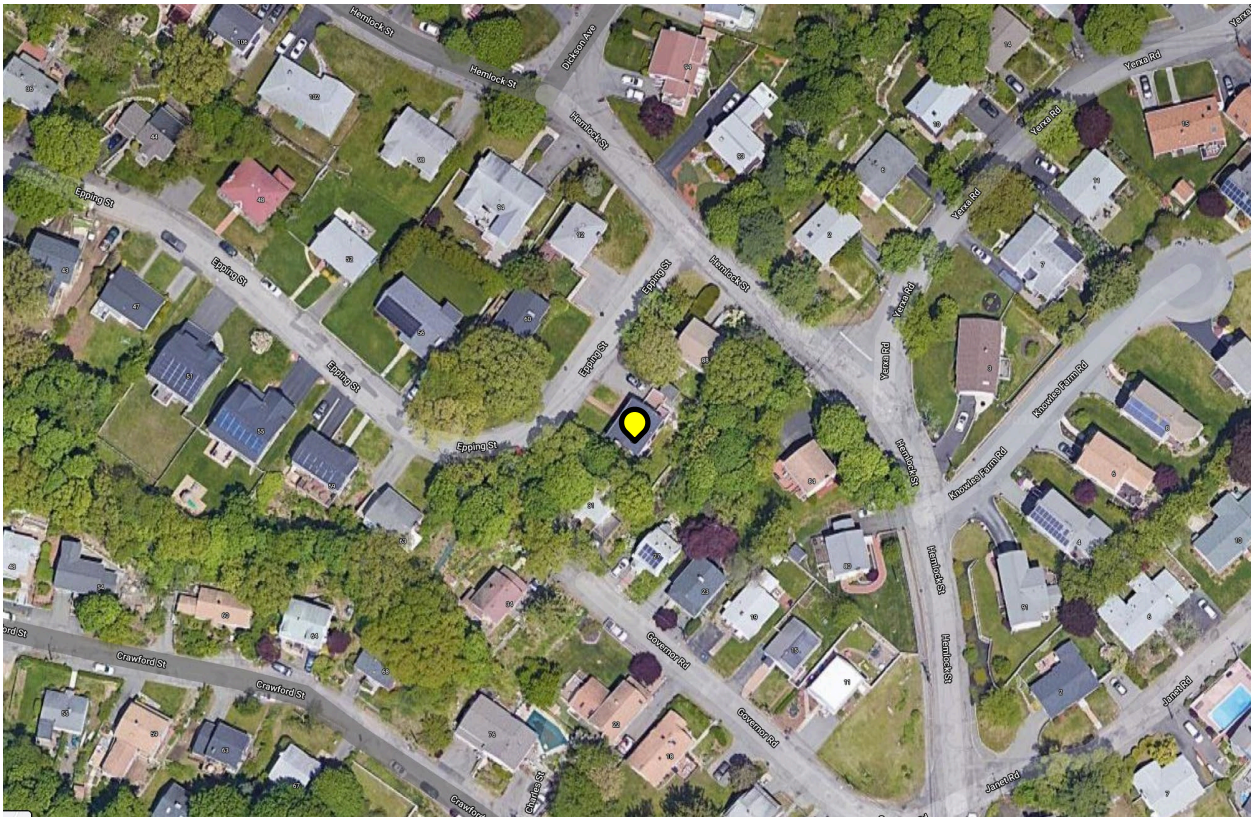
Criterion #5: Special regulations
This proposal would not result in the need for special regulations.

Criterion #6: Integrity/Character of District; Detrimental to Health, Morals, Welfare
While the proposed porch exceeds the maximum square footage allowable by right, the overall proposal is not substantially more detrimental to the neighborhood than the existing nonconforming dwelling. A number of structures along Epping and Hemlock Streets have enclosed entries that project into the front yard setback, although whether those entries exceed the allowable dimensional requirements is unknown.

The application materials note that the siding and roofing will be selected to match the materials on the remainder of the structure. Overall, this proposal would not detrimentally impact the neighborhood character of the district or adjoining districts, nor will it be detrimental to the health, morals, or welfare of the neighbors of the property.

Criterion #7: Detrimental Excess in Particular Use
This proposal would not cause any detrimental excesses.

Below are aerial and street-based photos of the current building:







Recommendation:

The Department of Planning and Community Development maintains that this proposal is consistent with the Zoning Bylaw, and recommends that the Zoning Board of Appeals approve this application.



Town of Arlington, Massachusetts

Docket #3642 - 64 Brattle Street

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	ZBA_PACKAGE__64_BRATTLE_STREET.pdf	ZBA PACKAGE, 64 BRATTLE STREET



Town of Arlington
Zoning Board of Appeals
51 Grove Street
Arlington, Massachusetts 02476
781-316-3396
www.arlingtonma.gov

LEGAL NOTICE

Notice is herewith given in accordance with the provisions of Section 3 (3.1.3) of the Zoning Bylaws that there has been filed by **FTO Realty Trust**, of Arlington, Massachusetts on **December 11, 2020** for a hearing before the Zoning Board of Appeals. The appeal addresses the issue of whether the existing structure located at **64 Brattle Street**, **(Plan 079.A-0002-0006.0)** could be razed and re-built. Said petition would require **"Appeal from the Building Inspector"** of the Zoning Bylaw for the Town of Arlington.

Hearing in regard to the said petition will be remotely conducted via "Zoom" **Tuesday evening, January 12, 2021 at 7:30 P.M or as soon thereafter as the petitioner may be heard. Please visit the Town of Arlington website for hearing information.**

DOCKET NO **3642**

Zoning Board of Appeals
Christian Klein RA, Chair

For Information Contact: **ZBA@town.arlington.ma.us**

DEPARTMENT OF COMMUNITY SAFETY

Inspections Division

51 Grove Street
Telephone (781) 316-3390

Town of Arlington
MASSACHUSETTS
02476

APPEAL FROM DECISION OF BUILDING INSPECTOR

TOWN OF ARLINGTON

In the Matter of the Appeal of FTO Realty Trust

To the Zoning Board of Appeals for the Town of Arlington David B. Mack

Respectfully represents FTO Realty Trust of Arlington, that he is/are the owner of certain land in Arlington, located at 64 Brattle Street

That he/she made application of the Inspector of Buildings for a decision with respect thereto, to wit:

Whether the existing structure a two-family residence, may be demolished and reconstructed.

that he has/have been aggrieved by the decision of the Inspector of Buildings on November 10, 2020 on the grounds of noncompliance with the Zoning By law; that no unfavorable action has been taken by the Zoning Board of Appeals upon similar appeal regarding this property within the two (2) years next immediately prior to the filing hereof. Wherefore appeal is claimed from the decision of the Inspector of Buildings in accordance with the provisions of Section 10.10 (e.) of he Zoning By law for the Town of Arlington and as grounds therefore, your appellant states as follows:

Please see attached statement with Exhibits.

Signed by: [signature]

Address: 1 van de Graaff Dr.
Suite 104
Burlington MA 01803
O'Connor Carnathan and Mack

Arlington, Massachusetts

Telephone # 781-359-9005

20 of 504

Statement in Support of Appeal of Zoning Determination

Pursuant to G.L. c. 40A, §15, Stephen Doherty, Trustee of the FTO Realty Trust ("FTO"), appeals the November 10, 2020 determination of Michael Byrne, Director of Inspections "Director"), in which the Director determined that the proposed demolition of a non-conforming structure at 64 Brattle Street (the "Property") would render the lot non-buildable. A copy of the Director's decision is attached as Exhibit A.

The Property is in the R2 zone, and there exists a two-family residence, which was constructed in approximately 1920. See Existing Conditions Plan dated July 8, 2020 attached as Exhibit B. The structure is nonconforming because it is within the ten feet side yard setback required by the Zoning Ordinance. FTO proposes to demolish the structure and rebuild a new two-family structure that would eliminate the existing nonconformity. The existing structure is approximately 8.2 feet from the side lot line. The proposed new structure would be approximately 10.3 feet from the side lot line. See Proposed Plot Plan dated July 8, 2020 attached as Exhibit C. In other words, the proposed construction would render a nonconforming structure a conforming structure.

The lot has slightly less than 20 feet of frontage on Brattle Street. For at least the last 57 years, and likely longer, access to the Property has been by via a driveway on Brattle Street, with one part consisting of the Property's frontage (about 19') and the other part consisting of an approximately 11 foot wide right of way owned by an abutter. In 1963, the Zoning Board of Appeals approved the creation of two lots, one being the Property (Lot K-3 on the 1963 Plan, enclosed), and the other lot being Lot K-4, with frontage on Summer Street. The ZBA's 1963 decision thereby approved a lot with less than the required 60 feet of frontage. See Exhibit D.

The Director determined that the razing of the building would extinguish FTO's right to rebuild because the ZBA in 1963 did not expressly authorize the right to build on a lot with insufficient frontage. Respectfully, for the following reasons, FTO believes that the Director erred and that FTO is entitled, as of right, to a building permit for the proposed project because the proposed reconstruction of the nonconforming structure on a nonconforming lot would not increase the nonconforming nature of the existing structure, but would rather eliminate the nonconforming nature altogether.

Section 8.1.3 of the Bylaw governs alterations of Nonconforming Single-Family or Two-Dwellings. Specifically, §8.1.3.B provides (emphasis added):

> No alteration, *reconstruction,* extension or structural change to a single or two-family residential structure that increases the nonconforming nature of said structure shall be permitted under there is a finding by the [ZBA] that the proposed alteration, reconstruction, extension or structural change will not be substantially more detrimental to the neighborhood.

On its face, Section 8.1.3 permits reconstruction of nonconforming structures even where the nonconformity is increased, provided the ZBA first makes the requisite finding of no substantial detriment to the neighborhood. Here, FTO's proposed project will eliminate the

nonconformity by reconstructing the residence greater than ten feet from the side lot line. Therefore, no finding by the ZBA is needed at all.

Section 8.1.3 is consistent with the so-called "second except" clause of paragraph 1 of G.L. c. 40A, §6, which provides (emphasis added):

> Except as hereinafter provided, a zoning ordinance or by-law shall not apply to structures or uses lawfully in existence or lawfully begun, or to a building or special permit issued before the first publication of notice of the public hearing on such ordinance or by-law required by section five, but shall apply to any change or substantial extension of such use, to a building or special permit issued after the first notice of said public hearing, to any *reconstruction,* extension or structural change of such structure and to any alteration of a structure begun after the first notice of said public hearing to provide for its use for a substantially different purpose or for the same purpose in a substantially different manner or to a substantially greater extent *except where alteration, reconstruction, extension or structural change to a single or two-family residential structure does not increase the* ***nonconforming*** *nature of said structure. . .*

As explained recently in Comstock v. Zoning Board of Appeals of Gloucester, 98 Mass. App. Ct. 168, 173 (2020) (citations omitted) (emphasis added):

> Generally speaking, preexisting nonconforming structures lose the protection provided by [G.L. c. 40A, §6] when the structures are extended or structural changes are made to them. However, if the structure in question is a single- or two-family residence, the statute provides an additional layer of protection. Such structures can be modified, extended, *or reconstructed as of right* "so long as the 'extended or altered' structure 'does not increase' its 'nonconforming nature.'" Moreover, even where the changes do increase the nonconforming nature of a protected residence, they still can be undertaken by special permit so long as the permit granting authority finds "that the proposed modification would not be 'substantially more detrimental' to the neighborhood than is the existing nonconformity."

Comstock did not change the law. More than thirty years ago, the Appeals Court declared that "reconstruction of a nonconforming single-family residential structure is legitimated under the second except cause of the first sentence of [G.L. c. 40A, §6] if it does not increase the nonconforming nature of said structure; otherwise . . . it must be submitted to the special permit procedure of the second sentence for the determination by the board of the question whether it is substantially more detrimental than the existing nonconforming use [or structure] to the neighborhood." Fitzsimonds v. Board of Appeals of Chatham, 21 Mass. App. Ct. 53, 55 (1985).

In a subsequent email from the Director, the Director referenced Section 5.4.2B(1), which provides, in part:

> The following applies to any lot show on a subdivision plan approved by the Board of Survey or on a plan or deed recorded with the Registry of Deeds prior to May 15, 1924. If such lot did not contain a principal building . . . the minimum lot size, frontage, open

space and side yard requirements for a residential use shall not apply, and the lot may be built upon with a single- or two-family residential use if permitted in the applicable district, provided that:

- the lot contains at least 5,000 square feet aof area and 50 feet of frontage.,

This provision mirrors the fourth paragraph of G.L. c. 40A, §6. The courts have interpreted that paragraph to apply to vacant land, not land on which a nonconforming structure is altered. Moreover, the Appeals Court in Dial Away Co. v. Zoning Bd. of Appeals, 41 Mass. App. Ct. 165 (1996) and Willard v. Bd. of Appeals of Orleans, 25 Mass. App. Ct. 15 (1987), held that the second except clause in Section 6 applies where the nonconforming structure is razed and reconstructed, unless the ordinance states it applies only to alterations. The Arlington ordinance (section 8.1.3) specifically includes "reconstruction."

Respectfully, the fact that the lot has less than 60 feet of frontage on Brattle Street does not change the analysis. The 1963 ZBA decision approved the lot (Lot K3) with less than the required frontage. The approval of Lot K3 with an existing nonconforming structure did not eliminate the protections afforded said nonconforming structure under G.L. c. 40A, §6. Even if Lot K3 is considered a nonconforming lot, there is nothing in the Bylaw which would prohibit, with or without a special permit, the demolition of an existing nonconforming structure and the reconstruction of either a conforming structure or a nonconforming structure without an increase in the nonconforming nature.

Similarly, there is nothing in Section 8.1.7 of the Bylaw, which addresses restoration, abandonment or non-use, that applies to the situation here, i.e. a voluntarily demolition of a nonconforming structure. Section 8.1.7.A does not apply as it pertains to nonconforming structures damaged by fire or natural cause. Subsection B applies to nonconforming *uses* of a conforming structure and lot, and therefore does not apply since the Property is used as a two-family, in compliance with current zoning. Subsection C applies to abandonment of a nonconforming *use.*

Critically, Section 8.1.7 does not address abandonment of a non-conforming structure. As noted in Dial-Away, "our cases seem to distinguish between non-conforming uses and structures." 41 Mass. App. Ct. at 171 (1996), Therefore, while the Dial-Away court did declare that "when a building is totally demolished, the use to which it was put is necessarily discontinued," the abandonment provision in the Arlington Bylaw, just like the abandonment provision in the Auburn Bylaw, cannot be applied to demolition of non-conforming structures. Moreover, even if somehow the Bylaw's abandonment provision were to apply, FTO would be permitted to proceed with its proposed project, as of right, as long as it met the applicable time parameters in whatever subsection of 8.1.7 were deemed applicable.

For the foregoing reasons, FTO respectfully requests that the Board overturn the Director's decision and direct him to issue a building permit for the proposed project.

EXHIBIT A

Town of Arlington
Inspectional Services Department
51 Grove Street
Arlington, Massachusetts 02476
781-316-3390
www.arlingtonma.gov

Mr. James F. Mackey
P.O. Box 216
Tewksbury, MA 01876

November 10, 2020

Dear Mr. Mackey,

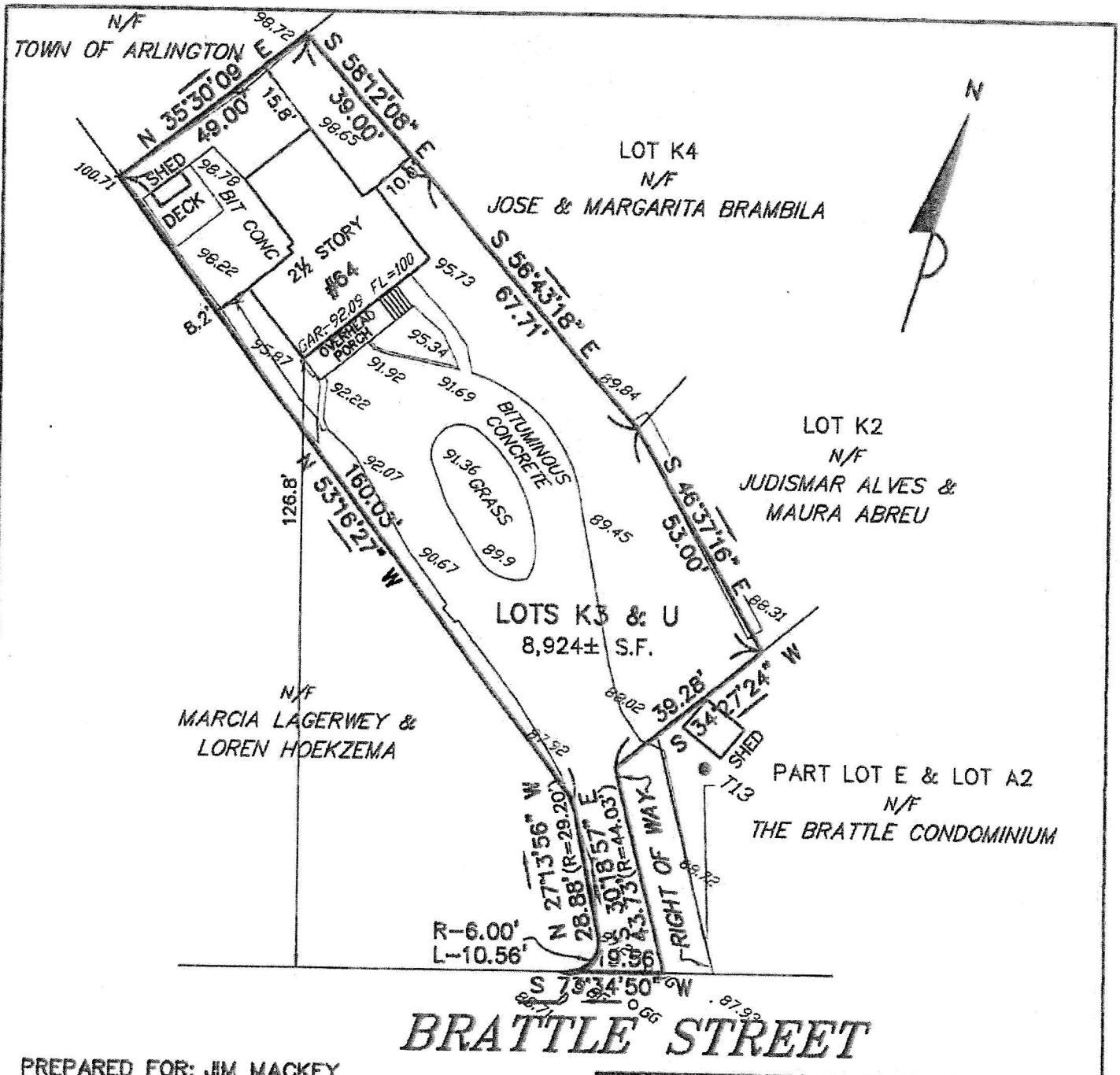
After reviewing Zoning Board of Appeal Special Permit Docket no. 790 regarding 64 Brattle St. dated June 1963 and consulting with Town Counsel, unfortunately we find the lot in question K3 is nonconforming due to insufficient frontage and yard setback concerns. Furthermore, if the structure was to be razed the right to rebuild a new structure would be extinguished. The Board in its decision did allow a single family dwelling to be built on the lot K4, but remained silent on Lot K3.

Respectfully,

Michael F. Byrne
Director of Inspections

cc,
D.Heim
M.Ciampa
R.Vallarelli

EXHIBIT B



PREPARED FOR: JIM MACKEY

I HEREBY CERTIFY THAT THE BUILDING IS LOCATED AS SHOWN.

CLIFFORD E. ROBER, PLS DATE

THIS PLAN MAY HAVE BEEN ALTERED IF THE SIGNATURE IS NOT SIGNED IN BLUE.

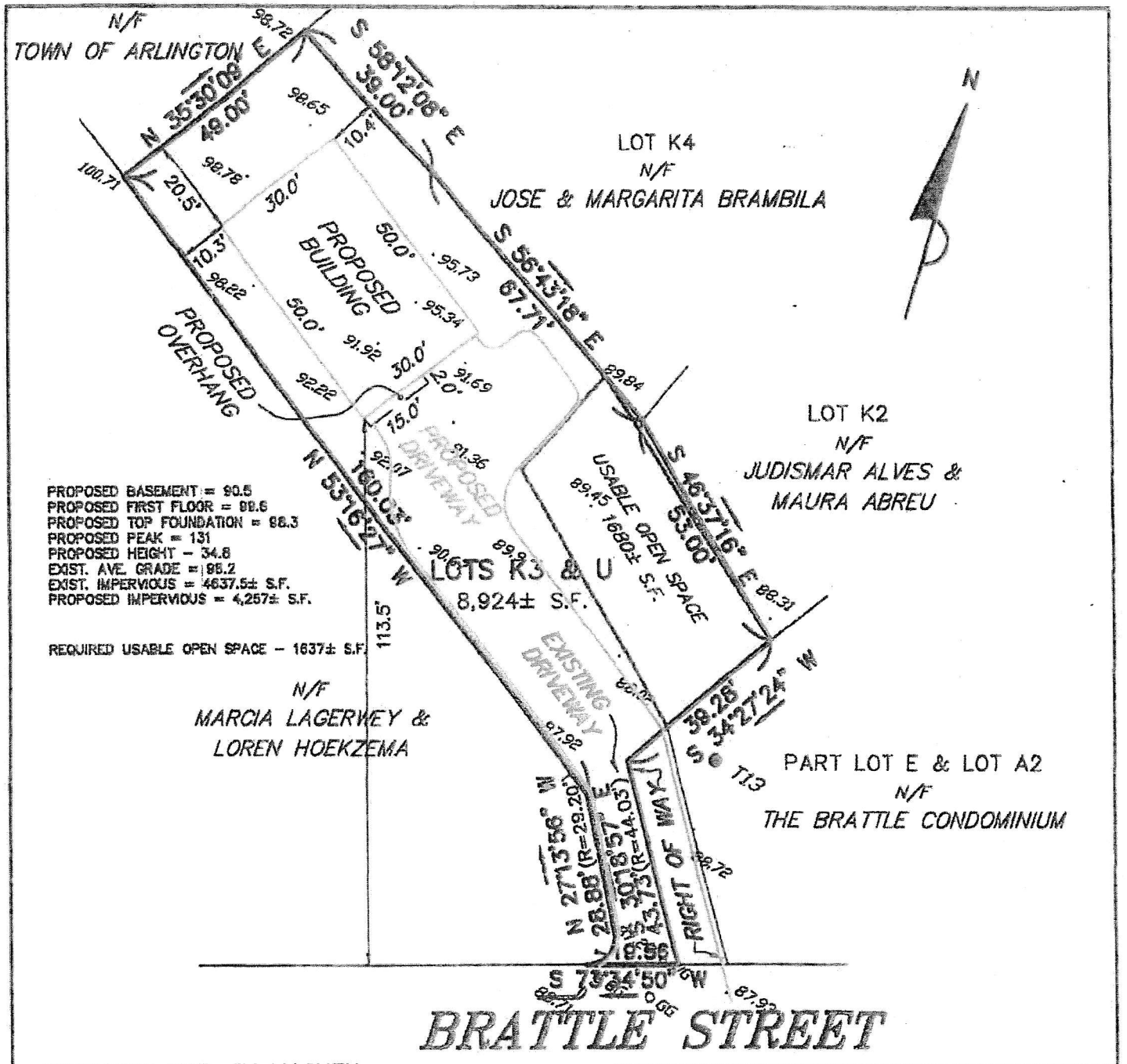
EXISTING CONDITIONS
#64 BRATTLE STREET
IN
ARLINGTON, MA
(MIDDLESEX COUNTY)

SCALE: 1"= 30' DATE: 7/8/2020

0 30 60 90 ft

ROBER SURVEY
1072A MASSACHUSETTS AVENUE
ARLINGTON, MA 02476
(781) 648-5533

6178CP1.DWG



PREPARED FOR: JIM MACKEY

I HEREBY CERTIFY THAT THE BUILDING IS LOCATED AS SHOWN.

CLIFFORD E. ROBER, PLS DATE

THIS PLAN MAY HAVE BEEN ALTERED IF THE SIGNATURE IS NOT SIGNED IN BLUE.

PROPOSED PLOT PLAN
#64 BRATTLE STREET
IN
ARLINGTON, MA
(MIDDLESEX COUNTY)

SCALE: 1"= 30' DATE: 7/8/2020

0 30 60 90 ft

ROBER SURVEY
1072A MASSACHUSETTS AVENUE
ARLINGTON, MA 02476
(781) 648-5533

6178PP1.DWG

TOWN OF ARLINGTON

ZONING

BOARD OF APPEALS

PETITION NO. 790

of Owen J. Nolan

Statement of Facts.

The Zoning Board of Appeals, hereinafter called the "Board" conducted a public hearing on the petition of Owen J. Nolan of Arlington seeking permission to subdivide the land located at 64 Brattle Street. The proposed subdivision would create a lot having less than the sixty feet of frontage required by Section 14-A of the Zoning By-Law.

The petition was filed in the office of the Inspector of Buildings on June 21, 1963. The hearing was held at the Town Hall on Tuesday evening July 23, 1963 after due notice had been given by publication in the Arlington Advocate on June 27 and July 5, 1963 and by mail, postage prepaid, to owners of real estate opposite to and abutting on the property in question, and to other parties in interest whose names and addresses are recorded on a separate list which forms a part of the official record of these proceedings, and by posting the property.

The members of the Board present were:

Ralph F. Tuller, Chairman
Alfred C. Bridgens, Secretary
John J. Bilafer

The petitioner's wife, Margaret Nolan, and son-in-law John Whitney, attended the hearing. Also present were Frederick R. Joyce, Registered Land Surveyor, and Mr. and Mrs. Lawrence S. Page of 66 Brattle Street.

The property involved in this petition is shown on Block Plan #79 as 64 Brattle Street, containing approximately 15,400 sq. ft. of land.

This is a large lot, with 97.5 feet of frontage on Summer Street. In actual fact, however, the Summer Street frontage is not used by the residence which presently is located on the lot. This residence faces Brattle Street, it is numbered on Brattle Street and the only egress at present is onto Brattle Street.

Petitioner proposes to divide the land into two lots in accordance with a plan prepared by Mr. Joyce and dated June 1963. One lot, designated "K3" on the plan, would have approximately 8,200 sq. ft. of area; the existing dwelling is located on this lot, and the only egress from the lot is to Brattle Street. The other new lot,

designated "K4, would have approximately 7,200 sq. ft. of area and would have the entire 97.5 feet of Summer Street frontage.

The proposed subdivision would leave the new Lot K3 without the sixty-feet of frontage required by the By-Law. However, there would be no change in the manner in which the existing dwelling is used, since the present manner of access to Brattle Street would continue.

Access to Brattle Street is obtained by two narrow strips of land which border each other and which together constitute a paved driveway about 50 feet long running from Lot K3 to Brattle Street. One such strip is designated Lot U; it is owned by the petitioner and is approximately 11 feet wide, with a throat opening which gives 19.56 feet of frontage on Brattle Street. The other strip is owned by the owners of 66 Brattle Street, Mr. and Mrs. Page, but subject to an easement whereby the petitioner as owner of 64 Brattle Street has a right of way over it; this strip also is approximately 11 feet wide, with frontage on Brattle Street of 10.3 feet.

It therefore appears that the proposed Lot K3 would have effective frontage, including Lot U and the right of way, of 29.86 ft.

At the time of the hearing, most of the information recited above was not available to the Board. At the petitioner's request a decision on this case was delayed until more precise information could be obtained. The Board acknowledges the valued assistance rendered to it on behalf of the petitioner by Daniel J. Buckley, Jr. Esq.

Since this property is located in a two-family Residence B district, the petitioner's original proposal was to construct a rather large duplex house, fronting on Summer Street, in the new Lot K4. Although this lot would be 7,200 sq. ft. in area, its shape is such that variances in the yard space requirements of the By-Law would be required for a house of this size; such variances the Board is not prepared to grant.

It also should be noted that the Board previously had authorized the owners of the residence at 280 Summer Street to construct a side porch addition closer than the required 10' from the property line of Lot K4. Any new house contructed on Lot K4 therefore should be located as far as possible from the boundary line of 280 Summer Street.

After considerable delay, Mr. Robert Stevens, a builder with offices at 733 Massachusetts Avenue, advised the Board that he was desirous of purchasing Lot K4 from the petitioner for the purpose of constructing a single-family residence on it. Mr. Stevens gave his assurance to the Board that he would build a house which would be in keeping with the neighborhood, that it would be single-family, that its dimensions would not exceed 24 feet by 39 feet, that it would comply with all yard requirements of the By-Law, that sufficient fill would be put in the lot to bring the house up to a reasonable level in relation to surrounding Homes and Summer Street, and that the house would be situated so as to provide as much space as possible between it and the home at 280 Summer Street.

It is the opinion of the Board that the proposed subdivision, coupled with Mr. Stevens' plans for construction on Lot K4, provide the best possible program for effective utilization of the existing over-sized lot. It is the unanimous decision of the Board that the petition for subdivision shall be allowed in accordance with this decision and the submitted plan of Frederick R. Joyce dated June 1963.

Chairman

TOWN OF ARLINGTON
Dimensional and Parking Information
for application to
The Zoning Board of Appeals or the Arlington Redevelopment Board

1. Property Location 64 BRATTLE ST Zone R-2
2. Owner FTO REALTY TRUST Address 109 BLANCHARD ST LAWRENCE MA
3. Present Use/Occupancy: No. of Dwelling Units 2 Use(s) and their Gross Floor Area
2 FAMILY 2562.24
4. Proposed Use/Occupancy: No. of Dwelling Units 2 Use(s) and their Gross Floor Area
2 FAMILY 4,528

		Present Conditions	Proposed Conditions	Min. or Max. Required for Proposed Use by zoning
5.	Lot Size (Sq. Ft.)	8924	8924	min. 6000
6.	Frontage (Ft.)	19.56	19.56	min. 60
7.	Floor Area Ratio	34.1%	61.1%	max. NA
8.	Lot Coverage (%) (where applicable)	10.4%	16.8%	max. 35%
9.	Lot Area per Dwelling Unit (Sq. Ft.)	-	-	min. NA
10.	Front Yard Depth (Ft.)	126.8	113.5	min. 20
11.	Side Yard Width (Ft.)	8.2	10.3	min. 10
12.	Rear Yard Depth (Ft.)	15.8	20.5	min. 20
13.	Height: Stories:	2.5	2.5	max. 2.5
	Feet:	32.8	34.8	max. 35
14.	Open Space: (% of G.F.A.)			
	Landscaped: (Sq. Ft.)	3625	4666	min. 545.9
	Usable: (Sq. Ft.)	1246	1680	min. 1637
15.	Parking Spaces (No.)	-	-	min. -
16.	Parking Area Setbacks (Ft.)	-	-	min. -
17.	Loading Spaces (No.)	-	-	min. -
18.	Type of Construction	Wood	Wood	-
19.	Distance to Nearest Principal Building (Ft.)			min.

10/88

INFORMATION FOR BOARD OF APPEALS RECORD

To be completed by OWNER, signed, and returned to Secretary of the Board of Appeals:

FTO REALTY TRUST
(Owner or Petitioner)

Address: 109 BLANCHARD ST

City or Town: LAWRENCE MA 01843

Premises: BRATTLE #64 2 FAMILY ARLINGTON MA.
(Street & Number) (Identify Land Affected) (City)

the record title standing in the name of: STEPHEN E DOHERTY

whose address is: 109 BLANCHARD ST LAWRENCE MA 01843
(Street) (City or Town) (State)

by a deed duly recorded in the Middlesex South County Registry of Deeds in Book: 75232 Page: 144, Middlesex South Registry District of the Land Court Certificate NO. 124373 Book 75232 Page 144.

Stephen E Doherty
(Signature, by Land Owner)

Thorndike Place - Review of Traffic Impact Study

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	2020-12-01_BETA_Thorndike_Place_Traffic_Review.pdf	2020-12-01 BETA Thorndike Place Traffic Review
🗋	Reference Material	8451_TIA_111320.pdf	8451 TIA 111320
🗋	Reference Material	DPCD_comments_to_ZBA_Re_Thorndike_Place_010821.pdf	DPCD comments to ZBA Re Thorndike Place 010821
🗋	Reference Material	TAC_Comment_Letter_21_0106.pdf	TAC_Comment_Letter 21_0106

December 1, 2020

Jennifer Raitt
Director of Planning and Community Development
Town of Arlington
730 Massachusetts Avenue Annex
Arlington, MA 02476

Re: Thorndike Place – Arlington, MA
Traffic Peer Review *(November 2020 Submission)*

Dear Ms. Raitt:

BETA Group, Inc. (BETA) has reviewed documents for the proposed multi-unit housing development known as Thorndike Place proposed for the Mugar Parcel off Dorothy Road in East Arlington, MA (the Site). It is noted that this Project has been previously reviewed by BETA in their letter dated July 29, 2020. The documents reviewed herein provide an updated traffic evaluation in accordance with updated design plans. This letter is provided to outline BETA's findings, comments, and recommendations relative to **Traffic** issues. Any outstanding comments issued in BETA's previous letter that were not addressed as part of the updated documents are reiterated.

BASIS OF REVIEW

BETA reviewed the following documents:

- ***Transportation Impact Assessment (TIA), Thorndike Place, Arlington Massachusetts***, dated November 2020 prepared by Vanasse & Associates, Inc. (VAI) of Andover, MA
- Plans (15 Sheets) entitled: ***Thorndike Place Comprehensive Permit, Dorothy Road, Arlington Massachusetts*** dated March 13, 2020 and revised November 3, 2020 by BSC Group of Boston, MA
- Architectural Plans (9 Sheets) entitled: ***Thorndike Apartments*** dated November 3, 2020 by Bruce Ronayne Hamilton Architects of New Ipswich, NH

Review by BETA included the above items for conformance with the following, as applicable:

- ***Town of Arlington Zoning Bylaw,*** Adopted by Town Meeting on April 22, 2019
    - ***Section 5 District Regulations***
    - ***Section 6 Site Development Standards***
- ***Town of Arlington Zoning Bylaw,*** Adopted October 8, 1975 through Town Meeting of April 2016
    - ***Article 6 General Regulations***
    - ***Article 8 Off Street Parking and Loading***
- ***Transportation impact Assessment (TIA) Guidelines,*** by MassDOT dated March 2014
- ***Manual on Uniform Traffic Control Devices (MUTCD) 2009 and Revisions****, Federal Highway Administration*
- ***Trip Generation Manual, 10th Edition (and Supplement),*** Institute of Transportation Engineers (ITE)
- ***Parking Generation Manual, 5th Edition,*** ITE

PROJECT DESCRIPTION

The Project Site (the Site), commonly known as the Mugar parcel, comprises approximately 17 acres bounded by Route 2, Dorothy Road, Burch Street and Thorndike Field in Arlington, Massachusetts. The Site currently contains undeveloped land.

The Project proposes the construction of 176 residential units within one structure and parking for 239 vehicles, including: 204 garage spaces, 8 courtyard spaces, and 27 surface lot spaces. The Project also proposes to provide 144 bicycle parking spaces within the garage. Full access to the Site will be provided via one full-access driveway on the corner of Littlejohn Street and Dorothy Road and one U-Shaped driveway serving the eight angled courtyard spaces off Dorothy Road. The Site is proposed to provide emergency vehicle circulation around the building via structural soil. Other on-site amenities include a playground and seating/courtyard areas.

SITE ACCESS, CIRCULATION, AND PARKING

The Project Site Plan was updated in accordance with the change in Project Program. The following comments are offered based on the updated Site Plans.

T1. Include dimensioning of parking stalls and drive aisles for the parking garage.

T2. Identify snow storage areas and verify that snow storage will not reduce parking capacity.

T3. Clarify whether visitor parking spaces will be designated, and the suggested number of visitor spaces and resident spaces.

T4. Long term, presumed tenant, bicycle parking is designated within the garage. Recommend designating exterior bike racks for visitor/short term use near a location of public building access, such as within the proposed parking courtyard area.

T5. Include swept path analysis on Site Plans to ensure Municipal Fire vehicles can adequately maneuver the Site.

T6. The Site Plan should define pedestrian connections to the Minuteman Commuter Bikeway. If an on-site connection is not provided, clarify the shortest route to/from the bikeway.

T7. An existing pedestrian bridge over Route 2 is located on the southern frontage of the Site. If the bridge is structurally sound, recommend providing an on-site pedestrian pathway between the bridge, the Project, and the Commuter Bikeway/Thorndike Field. This would allow direct connection between residential uses and commercial/office/medical space south of Route 2.

T8. Verify locations of accessible entrances. Accessible spaces in the surface lot may be closer to an accessible entrance if they are relocated to the courtyard parking area.

T9. Verify intended circulation of the courtyard parking area.

TRAFFIC IMPACT ASSESSMENT REVIEW

The TIA was generally found to have been prepared in accordance with MassDOT guidelines and provides an updated traffic assessment for the re-envisioned Site Plan and Project Program. Detailed comments are presented herein.

STUDY AREA

The study area includes the following intersections:

- Route 2 at Route 16
- Lake Street at Route 2 Eastbound Ramps
- Lake Street at Route 2 Westbound Ramps
- Lake Street at Wilson Avenue
- Lake Street at Littlejohn Street
- Lake Street at Homestead Road
- Lake Street at Burch Street and Alfred Road
- Lake Street at Margaret Street and Lakehill Avenue
- Lake Street at Minuteman Commuter Bikeway
- Lake Street at Brooks Avenue
- Massachusetts Avenue at Lake Street

BETA finds the above study area to be appropriate. The TIA discussed roadway lane widths, lane configurations, sidewalks, bike accommodation, intersection geometry and configuration.

T10. Figure 2 and all subsequent volume diagrams show the Alewife Station Access Road as one-way southbound, though lane uses are shown traveling northbound. Revise orientation of the one-way arrow.

T11. Diagrams suggest there is no connection between Dorothy Road and Margaret Street. Revise accordingly.

TRAFFIC VOLUMES

Typically, new traffic volume data would be collected for the study area in conjunction with a wholly new TIA supplanting the April 2014 Traffic Impact and Access Study (TIAS). Due to the ongoing COVID-19 pandemic, traffic volume data for the study area were instead compiled from various sources and years dating back to the April 2014 TIAS. A summary of the intersection data is provided in Table 1.

Table 1: Data Date Summary

Location	Month	Year
Route 2 at Route 16	May	2019
Lake Street at Route 2 Eastbound Ramps	September	2016
Lake Street at Route 2 Westbound Ramps	September	2016
Lake Street at Wilson Avenue	September	2020
Lake Street at Littlejohn Street	**March**	**2014**
Lake Street at Homestead Road	September	2020
Lake Street at Burch Street and Alfred Road	September	2020
Lake Street at Margaret Street and Lakehill Avenue	September	2020
Lake Street at Minuteman Commuter Bikeway		2019
Lake Street at Brooks Avenue	**September**	**2020**
Massachusetts Avenue at Lake Street	**March**	**2014**

T12. Backup traffic volume information is not presented in the appendix for highlighted intersections. Backup data should justify the peak hour factor and heavy vehicle percentages utilized in the traffic analysis.

BETA notes that use of adjusted historical data is accepted for planning study as part of MassDOT Engineering Directive E-20-005, which provides a guidance memorandum to estimate existing and future traffic volume data. Where historical data is not available, current industry practice is to collect current 2020 data and adjust it based on pre-COVID historical conditions. The Applicant adjusted the traffic data to estimate September 2020 (Non-COVID) conditions based on MassDOT Continuous Count Station 4065 volumes on Interstate 95 south of Route 2. It is generally understood that peak hour volumes collected in March and May were seasonally adjusted to represent September volumes within their respective count year. The adjusted September volumes were then grown to represent September 2020 Conditions. Data collected in September 2020 were adjusted based on a COVID correction factor, estimated by comparing count station data in August 2019 and August 2020. It was noted that the COVID correction factor resulted in volumes significantly lower than the grown (2014/2016) volumes at neighboring intersections. As such, the network was balanced in accordance with the higher volume intersections.

As stated in the TIAS, BETA did discuss and confirm the Applicant's traffic consultant's approach to traffic data collection, adjustments, and application of specific development projects. The approach is adequate and appropriate based on general industry practice.

In addition to seasonal adjustment, COVID-19 adjustment, and growth, the TIA included projected traffic volumes from four nearby planned or recently completed developments: Vox on Two, Residence at Alewife Station, Belmont Highlands, Discovery Park Hotel. This methodology is consistent with industry standards.

T13. Transportation trends throughout the months of COVID-19 have shown increased recreational pedestrian and bicycle activity with decreased commuting vehicular activity. Given the proximity to Alewife Station, it is presumed that significant Bikeway activity is related to commuter trips. With more employees working from home, clarify the validity of the pedestrian and bike volumes utilized for this study.

The TIA estimated peak hour volumes along Lake Street of approximately 1,662 vehicles per hour in the morning and 1,351 vehicles pe hour in the evening. Traffic patterns generally suggest westbound traffic to Route 2 in the morning, with returning traffic in the evening.

PEDESTRIAN AND BICYCLE FACILITIES

The TIA briefly summarized the surrounding pedestrian and bicycle facilities within the study area. The summary did not discuss facility condition or recommend any specific improvements to existing facilities.

T14. Recommend the Applicant summarize the condition of nearby pedestrian and bicycle facilities and specify if improvements are required to safely accommodate added non-motorized traffic to/from the Site.

THORNDIKE PARK

The TIA briefly summarized the nearby Thorndike Field located south of Margaret Street. The park provides athletic fields, a dog park, and a small parking lot. The Minuteman Commuter Bikeway bisects Thorndike Field and Magnolia Park. Non-motorized access is also provided via Varnum Street and Thorndike Street. This summary is acceptable.

T15. The intersection of Lake Street and Margaret Street was counted in September 2020, during the current COVID-19 pandemic. As this intersection is likely most heavily influenced by Thorndike Field activity, identify whether additional adjustments to the September 2020 data are appropriate to account for typical Field activity, which may not have been present due to the pandemic.

PUBLIC TRANSPORTATION

A summary of available public transportation was summarized to include four MBTA local bus routes (67, 77, 70, and 350). The nearest Route 67 stop is located on Lake Street at Route 2 (0.3 miles west of the Site). The remaining three bus routes are all accessible on Massachusetts Avenue (0.7 miles east of the Site). Rapid transit (MBTA Red Line) is available within 0.8 miles (southeast) at Alewife Station. While the heavy rail terminal provides a large parking garage accessible from Route 2 and Route 16, it is noted that the Minuteman Commuter Bikeway provides a direct connection between Dorothy Road and Alewife Station.

T16. Note there is a discrepancy in Table 2 of the TIA stating Alewife Station is southwest of the Site.

MOTOR VEHICLE CRASH DATA

A summary of MassDOT Crash Information was provided for the most recent five years (2013-2017) at all study area intersections. The complex signalized intersection of Route 2 at Route 16 experienced the most reported crashes (88), followed by Massachusetts Avenue at Lake Street (22), and Lake Street at the Minuteman Commuter Bikeway (18). While crash activity was apparent, all other intersections were found to have less than three crashes per year on average. Signalized intersections were generally found to have angle, rear-end, and sideswipe type crashes consistent with the congested conditions within the study area. Seven of the bikeway crashes were reported involving a pedestrian or a bicycle. Motor vehicle crash rates were calculated and compared to the MassDOT District 4 average crash rates. The TIA determined that all of the study area intersections have calculated crash rates lower than the district average. BETA generally finds this analysis to be appropriate but offers the following comments.

T17. The Massachusetts Avenue Corridor through which Lake Street intersects is within a 2008-2017 MassDOT HSIP Bicycle Cluster. It is noted that the Minuteman Commuter Bikeway and the Alewife Greenway Bike Path serve as an appropriate alternative to points South on Massachusetts Avenue.

T18. Crash Rate worksheets utilize a K-Factor of 0.082 for all intersections. Clarify the origin of this K-Factor.

T19. Crash rate worksheets utilize the PM Peak Hour volumes, despite higher volumes in the AM peak hour at some locations. This provides a higher calculated crash rate which is conservative.

FUTURE TRAFFIC GROWTH

A 0.5 percent per year compounded annual growth rate was applied to the Adjusted September 2020 Existing traffic volumes for seven years to represent 2027 future conditions. The Appendix listed Count Station 4925 for Waverly Oaks Road near Beaver Street (Waltham) which found volumes to be decreasing approximately 2% per year from 2013 to 2019. This is slightly different than presented in the TIA (-0.15 percent per year). That said, given the nearby count station data it is expected that the 0.5% used is conservative.

Development traffic from two nearby planned projects; Hardy School Expansion and Discovery Park Buildings 400/500; were added to the grown volumes to establish the 2027 No-Build conditions. BETA finds this methodology to be in accordance with industry standards.

PLANNED ROADWAY IMPROVEMENTS

The future conditions (No-Build and Build) incorporate the signalization of the Minuteman Commuter Bikeway at Lake Street. It is noted that the new signal will be coordinated with the existing signal at Brooks Avenue.

T20. Clarify/confirm the future (no-build/build) traffic signal phasing for Lake Street at Brooks Avenue and Lake Street at Minuteman Bikeway. As currently evaluated, the pedestrian phase would activate at both the Bikeway and Brooks Avenue at the same time. It is expected that the Bikeway would call more frequently, potentially causing worse operations at Brooks Avenue.

It is noted that bicycle and pedestrian volumes were not grown as part of the forecasting exercise. For analysis purposes, this is acceptable as the current volume is large enough such that the pedestrian phase at the proposed signal is expected to be called/activated nearly every cycle.

PROJECT GENERATED TRAFFIC

Project trip generation was estimated using the Institute of Transportation Engineers' *Trip Generation Manual* for Land Use Code 221: Multifamily Housing (Mid-Rise) and 176 residential units. This exercise estimated the project would generate approximately 958 weekday vehicle trips, 60 weekday morning peak hour vehicle trips, and 76 weekday evening peak hour vehicle trips.

The estimated vehicle trips were adjusted for modal split given the proximity to nearby pedestrian, bicycle, and transit facilities. For the purposes of the TIA, it was assumed that the modal split for the Project Site would be similar to that of the Vox on Two, located south of Route 2 in Cambridge, MA. The Vox on Two impact study found the following:

Mode	Split
Single Occupancy Vehicle	39%
High Occupancy Vehicle	6%
Transit	35%
Bike	5%
Walk	14%
Other	1%

Modal split requires the estimated vehicle trips be converted to person trips. The TIA used a vehicle occupancy rate of 1.13 persons per vehicle based on American Community Survey data for Census Tract 3561. The modal split percentages were applied to the estimated total person trips. The resulting vehicle trips were calculated by applying the 1.13 vehicle occupancy rate to the sum of Single Occupancy Vehicle and High Occupancy Vehicle person trips. This methodology found approximately 430 weekday vehicle trips, 27 weekday morning peak hour vehicle trips, and 33 weekday evening peak hour vehicle trips. In general, accounting for modal split reduces the estimated vehicle trip generation per ITE by 55%. BETA finds this methodology to be appropriate and in accordance with industry standards.

T21. Recommend providing backup Vehicle Occupancy information in the Appendix for review.

T22. Recommend proving backup Modal Split data in the Appendix.

T23. Modal split includes a 35% transit split in addition to bicycling and walking. Given the proximity to Alewife Station (0.8 miles), it is assumed that all transit trips will initially be Walk/Bike trips. Provide additional justification for walk/bike trips outside of transit trips.

T24. "Other" most likely represents taxi and/or rideshare. It is noted that these trips should be included within the vehicle trip category. Given the small percentage, peak hour estimates are not projected to change.

T25. Clarify and provide detail for the connection between the Site and the Minuteman Bikeway, including interface with Thorndike Field and its parking area.

T26. Provide graphics showing the expected walking path between the Site and both the Red Line and bus platforms within Alewife Station, including an estimation of walking travel time.

T27. Provide detail regarding the connection between the Site to the existing pedestrian overpass of Route 2, and provide detail regarding the connectivity that the pedestrian overpass affords between the Site and facilities on the south side of Route 2.

T28. Consult with MassDOT on any available structural assessment of the existing pedestrian overpass, and provide comment on its suitability for future use.

TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution was estimated based on Journey to Work data for Arlington as reported by the US Census. The data displays the percentage of Arlington residents who commute to various municipalities. This methodology found 15% to/from the north on Massachusetts Avenue, 20% to/from the south on Massachusetts Avenue, 10% to/from the south on Alewife Brook Parkway (Route 16), 45% to/from the west on Route 2, and 10% to/from the west on Lake Street.

T29. The Journey To Work evaluation includes commuter trips to both Towns/Cities and Counties. Discuss whether the inclusion of counties over-weights percentages for previously included municipalities.

Project generated vehicle trips were assigned to the network based on the above distribution percentages. Vehicles to/from the south were generally assigned as right/left turns at Littlejohn Street, while vehicles to/from the north were assigned as right/left turns at Burch Street.

T30. Clarify why this Burch Street is preferred for northern vehicles rather than Littlejohn Street, Homestead Road, and Margaret Street which are also accessible for similar movements. Mapping services often suggest using Margaret Street instead of Burch Street.

Vehicles to/from points south along Route 16 were assigned to the Route 2 ramps at Lake Street. While an alternative route is available via Massachusetts Avenue, mapping services typically recommend Route 2 as the faster route.

T31. The TIA routes Route 2 eastbound vehicles to turn left onto Frontage Road towards Acorn Park Drive and Route 2 East. This is conservative as Route 2 Eastbound can also be accessed with a right turn ramp approximately 500 feet to the west on Lake Street.

BUILD CONDITION VOLUMES

The 2027 Build condition volumes were established by adding the assigned project trips to the 2027 No-Build volume networks. It was noted that the traffic volume from the Project resulted in an increase of 0.1 to 0.8 percent during peak hours on study area roadways. It is noted that this percentage is substantially higher, more than tripling, for local roadways in the Littlejohn Street and Dorothy Road neighborhood, despite the relatively low Project increase in hourly vehicle volumes. This is generally due to the very small existing volume during the peak hour in this neighborhood. It is not immediately clear if the existing Do Not Enter signs are the reasoning for the lower volumes.

T32. Existing signed turning restrictions exist from 7-9 AM and from 4-7 PM on weekdays from Lake Street onto Wilson Avenue, Littlejohn Street, Homestead Road, and Burch Street. Assess the impact of this restriction and clarify whether discontinuance of this restriction is proposed.

T33. Minor discrepancies were found in the 2027 Build networks (Figure 10 and Figure 11) that did not accurately incorporate the assigned Project volumes (Figure 8 and Figure 9). This discrepancy does not appear within the operations analysis worksheets.

PARKING ANALYSIS

The TIA evaluated the required parking for the Project based on the Town of Arlington Zoning Bylaw. According to the Project Program, the Site would accommodate: 11 Studio Units, 87 Single Bedroom Units, 58 Two Bedroom Units, and 20 Three Bedroom Units. The Zoning Bylaw specifies varying parking rates for each unit size from One Space per Studio to Two Spaces per Three Bedroom Unit. The exercise found the Project to require 239 Parking spaces, which is specified as bring provided per the Site Plan.

The TIA compared this evaluation with data presented in ITE's *Parking Generation Manual* for Land Use Code 221: Multifamily Housing (Mid-Rise) which suggests an average parking rate of 1.31 spaces per unit (231 Total Spaces). BETA finds this evaluation to be acceptable, particularly given the access to the commuter bikeway, Alewife Station, and 144 interior bicycle parking spaces.

OPERATIONS ANALYSIS

Study area traffic operations analysis was performed for the 2020 Existing, 2027 No-Build, and 2027 Build conditions for each of the study area intersections using Synchro software. The evaluation summarized intersection and lane use Level of Service (LOS), delays, volume to capacity ratio (v/c), and Queue. It was noted that unsignalized lane uses operating with over 50 seconds of delay per vehicle or signalized lane uses operating with over 80 seconds of delay per vehicle are considered as LOS F (over capacity/failing). These instances are labeled in Table 11 and Table 12 as either ">50" or ">80" despite the lane use operating at larger delays. It is also noted that lane uses are also considered as operating with LOS F if the calculated v/c is greater than 1.0, even if the delay suggests a better LOS.

UNSIGNALIZED INTERSECTIONS

In general, all unsignalized intersections were found to retain or slightly improve upon the LOS reported under No-Build conditions. It is noted that delays slightly improve for the northbound Burch Street movements in the Build conditions give a projected increase in right turning volume which drives down (±3 seconds) the average delay per vehicle. The projected increase in northbound left turns from Littlejohn Street to Lake Street was found to increase delays ±66 seconds per vehicle and queues by 40 feet (two cars) in the weekday morning peak hour. A milder increase of 7 seconds per vehicle was reported in the evening peak hour.

Margaret Street was found to have the highest existing delays per vehicle (±140 seconds) in the morning peak hour, which is expected given that it has the highest turning volume of the unsignalized intersections along Lake Street, likely due to its direct access to Thorndike Field and parking adjacent to the Minuteman Commuter Bikeway. Despite no Project volume assigned to the STOP sign, Margaret Street delays increase by ±22 seconds per vehicle in the morning peak hour. This is generally related to increases in Lake Street cross traffic destined to Massachusetts Avenue and points east/north.

T34. Should vehicle volume from the Project travel along Margaret Street instead of Burch Street, these delays would likely further increase. See Comment T30 and T32.

SIGNALIZED INTERSECTIONS

Overall, signalized intersections were generally found to retain their LOS reported under No-Build conditions given the added Project traffic. However, it is noted that individual lane uses experience independent increases in delays and queues given increased turning movements.

The complex signalized intersection of Route 2 at Route 16 was analyzed as four independent signalized intersections operating under one controller. While this cluster of intersections was found to have existing queueing and congestion problems, the small number of projected vehicle trips (±3) to/from the Site was not found to significantly alter operations when compared to the No-Build conditions.

T35. The four signalized intersections within the Route 2 at Route 16 intersection were the only intersections evaluated as an Area Type of "Central Business District" which generally suggests a lower saturation flow rate given multiple driveways, parking activity, and pedestrian activity. Given the interchange configuration, this area type does not necessarily apply. It is expected that this methodology was expected to estimate conditions related to blocked intersections consistent with the existing "DO NOT BLOCK THE BOX" markings. Clarify accordingly.

T36. "Signal 2" analysis worksheets are listed with an error stating a "Phase conflict between lane groups." This is expected as both Alewife Station Access Road (WB) and Alewife Brook Parkway/Route 16 (NB) vehicles receive a green at the same time. The receiving leg to the west provides three dedicated through lanes which accommodates this phasing configuration.

Left turns from the Route 2 Eastbound Off-Ramp to Lake Street were found to operate at LOS F in the No-Build and Build peak hour conditions given their higher delays and v/c ratios. As increased turns are not Projected for the Site, these delays did not significantly change between No-Build and Build.

At the Route 2 Westbound Ramp, Lake Street experiences higher westbound delays in the morning (LOS F) and eastbound in the evening (LOS F). Project related traffic resulted in an increase of 3-4 seconds per vehicle for these movements, granted both experience over 130 seconds of delay in the No-Build condition.

The commuter bikeway was found to operate at LOS E delays for westbound traffic in the morning peak hour that improve to LOS D with the proposed signal implementation. While delays are generally consistent between the No-Build and Build, queues increased about one vehicle length as a result of the Project. **See Comment T20**.

Lake Street at Brooks Avenue was found to have minor increases to delays and queues as a result of the Project. That said, the westbound 95th percentile queues reported in the morning peak hour exceed 1,000 feet which would stretch almost to Massachusetts Avenue. **See Comment T20.**

Massachusetts Avenue at Lake Street suffers the largest overall delay within the study area given the high demand and activity along this roadway. In particular, Lake Street was found to consistently operate with LOS F in both peak hours for all analysis conditions. Site generated trips were found to increase Lake Street eastbound delays by approximately 4-6 seconds per vehicle.

T37. Minor discrepancies in the labeling of Lane Uses and intersections are apparent throughout Table 12. Recommend updating the table for clarity.

T38. Several lane uses were reported operating with v/c greater than 1.0 despite delays suggesting Level of Service of acceptable levels. The larger v/c suggests the movement/lane is over capacity and should be reported as LOS F.

T39. Lake Street through volumes at the Minuteman Bikeway presented in the 2027 No-Build evening analysis were found to be lower than those presented on Figure 6 of the TIA. Update accordingly.

T40. Lake Street at Massachusetts Avenue flares out to provide a wide area that could be used as two lanes but was modeled as a single lane. Consider modifying analyses to represent actual field conditions.

CONSTRUCTION IMPACTS

The TIA does not include any discussion related to the traffic impact of site construction.

T41. Quantify and analyze the effect of construction on the Dorothy Road neighborhood. It is expected that the earthwork required for the site will result in a significant number of trips for large dump trucks, in addition to other construction vehicles related to the grading and construction of the Site building. Verify turning path of large construction vehicles at affected intersections within the neighborhood and to/from Lake Street.

RECOMMENDATIONS

The TIA recommended the installation of a 23 dock Bluebikes Station in the vicinity of an existing Bluebikes Station at Thorndike Field. BETA finds this recommendation to be appropriate.

On-Site recommendations included improving/maintaining sight lines and providing STOP sign control for the Site Driveway. BETA finds these recommendations to be appropriate.

A Transportation Demand Management (TDM) program was recommended to include:

- On-Site Transportation Coordinator to oversee marketing and promoting transportation options
- Information packets for residents including sustainable transportation options
- Transitscreen installation in the building lobby to depict real-time information for transit, Bluebikes, and Uber/Lyft Services
- Provide information on available pedestrian and bicycle facilities/routes in the vicinity of the Site
- Investigate joining the 128 Business Council or the Alewife TMA, which could provide ridematching services for residents and employers in the area

BETA generally supports these TDM measures.

CONCLUSIONS

The TIA conclusion states that the Project is expected to produce a minor increase in traffic volumes in the vicinity of the site and “minor but manageable” increases to delays in various movements within the

study area. While the operational analysis results presented in the TIA generally support this conclusion, the Applicant should provide update and/or response to the recommendations contained herein.

T42. Provide additional commentary on the impact of the Project on the Dorothy Road neighborhood, including summarizing expected increases in daily and peak hourly traffic on Littlejohn Street, Dorothy Road, Burch Street and Margaret Street.

The conclusion also states that the proposed addition of a Bluebikes station adjacent to the existing station at Thorndike Field and the 144 sheltered bike parking spaces will encourage the use of bicycling as a sustainable commuting measure over the use of personal vehicles; BETA concurs with this assessment, but suggests that the Applicant provide additional clarification on pedestrian, bicycle, and transit connections between the Site and Alewife station, as recommended through the comments contained herein.

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.

Greg Lucas, PE, PTOE, RSP
Senior Associate

Tyler de Ruiter, PE, PTOE
Project Engineer

Transportation Impact Assessment

Thorndike Place
Arlington, Massachusetts

Prepared for:

Arlington Land Realty, LLC
Cambridge, Massachusetts

November 2020

Prepared by:

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
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TRANSPORTATION IMPACT ASSESSMENT

THORNDIKE PLACE
ARLINGTON, MASSACHUSETTS

Prepared for:

Arlington Land Realty, LLC
84 Sherman Street
Cambridge, MA 02138

November 2020

Prepared by:

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EXECUTIVE SUMMARY

DESCRIPTION OF PROJECT

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) to identify traffic impacts associated with a proposed Thorndike Place residential development to be located on the Mugar Parcel in Arlington, Massachusetts (the "Project"). The purpose of this TIA is to review existing and future traffic conditions in the vicinity of the site, determine the traffic impacts from the proposed Project at key intersections expected to experience increased traffic levels from the Project, and review the need for improvements to mitigate the Project's traffic impact.

PROPOSED PROJECT

The site is bounded by Dorothy Road to the north, Burch Street to the east, and Route 2 to the west and south. The Project consists of constructing a building containing 176 residential units. Parking will be provided on-site for 239 vehicles. A parking garage below the units will provide 204 spaces while 8 spaces are provided in the courtyard. The remaining 27 spaces will be provided via a surface parking lot on-site. Approximately 144 bicycle parking spaces will be provided in the garage. Access to the site is proposed via one full-access driveway onto Dorothy Road at the intersection with Littlejohn Street.

EXISTING CONDITIONS

A comprehensive field inventory was conducted to collect existing roadway geometrics, operating characteristics, speed limits, and sight distances, as well as land use information. Traffic volumes were obtained for the intersections expected to receive the traffic impact from the Project. These are listed below:

- Route 2 at Route 16
- Lake Street at Route 2 eastbound On/Off-ramps
- Lake Street at Route 2 westbound On/Off -ramps
- Lake Street at Wilson Avenue
- Lake Street at Littlejohn Street
- Lake Street at Homestead Road

- Lake Street at Burch Street and Alfred Road
- Lake Street at Margaret Street and Lakehill Avenue
- Lake Street at Brooks Avenue
- Massachusetts Avenue at Lake Street

2020 BASELINE TRAFFIC VOLUMES CONDITIONS

In order to develop 2020 Baseline traffic-volume conditions, the historic data obtained required adjustment for passage of time, while the new data collected required adjustment due to the effects of the COVID-19 pandemic. The counts conducted in 2020 were done in the month of September. Therefore, for practicality it was determined the other existing data should be corrected to September 2020 conditions. The 2014 counts were conducted in March 2014 and therefore were seasonally adjusted to September 2014 volumes using traffic count data from the Massachusetts Department of Transportation (MassDOT) permanent count station ID 4065[1] located on I-95 south of the ramp to Route 2 eastbound. Using the same permanent count station, the September 2014 volumes were grown to September 2016 volumes. The September 2016 volumes were subsequently grown to September 2019 using the same count station data. The 2019 data collected by VAI were conducted in May 2019 and were adjusted to September 2019 using the permanent count station information. The traffic volumes were then representative of September 2019 volumes. These volumes were then grown by 0.5 percent to raise them from 2019 to 2020 conditions. The next step was to develop a COVID-19 correction factor to apply to the counts conducted in September 2020. These factors were calculated comparing the August 2019 counts to the August 2020 counts from the permanent count station. Even with the COVID-19 correction factor, the counted September 2020 volumes were significantly lower than the derived September 2020 volumes. To correct for the difference, the networks were balanced upwards along Lake Street, and traffic volumes from specific developments that were occupied after 2014 but before 2020 were added to develop the 2020 Baseline traffic volumes.

FUTURE CONDITIONS

Traffic volumes within the study area were projected to 2027, which reflects a seven-year planning horizon consistent with State traffic study guidelines. These conditions incorporate traffic growth due to general background traffic increases as well as development projects currently being proposed/permitted or under construction and expected to generate traffic in the future. This condition is referred to as the No-Build condition.

PROJECT-GENERATED TRAFFIC

The Project is expected to generate 430 vehicle trips on an average weekday (two-way, 24-hour volume), with 27 vehicle trips (7 entering and 20 exiting) expected during the weekday morning peak hour. During the weekday evening peak hour, the Project is expected to generate 33 vehicle trips (20 entering and 13 exiting).

The projected vehicle trips were distributed onto area roadways based on existing travel patterns and U.S. Census Journey-to-Work data for Arlington. Traffic-volume increases due to the Project

[1]MassDOT Transportation Data Management System; Location ID 4065; Located on I-95 south of ramp to Route 2 eastbound.

were shown to range from 0.1 to 0.8 percent during peak hours and are expected to be less during other hours of the day.

TRAFFIC OPERATIONS ANALYSIS

In future conditions, operations are generally preserved with minor but manageable increases to delay on the various approaches. The addition of Project-related traffic to the study area roadways and intersections is not anticipated to significantly impact traffic operations within the study area over No-Build conditions.

RECOMMENDATIONS AND CONCLUSION

Bluebikes Station

- Subject to receiving the necessary approvals from the Town, the Project will commit to providing a large (23 dock) Bluebikes station in the vicinity of the existing Bluebikes station at Thorndike Field. This will serve to accommodate demand for Bluebikes in this area adjacent to the Minuteman Bikeway.

Site Recommendations

- The existing vegetation on the site frontage should be removed to provide adequate sight distance at the proposed site driveway location.

- The site driveway onto Dorothy Road should be placed under STOP-sign control with painted STOP-bars on the driveway at the STOP-sign location.

- At the vicinity of the site driveway, any new landscaping or building features should not exceed 24 inches in height or should be placed out of the lines of sight for motorists exiting the site and for those approaching the driveway on Dorothy Road.

Transportation Demand Management Measures

- Designate an on-site employee as the site's Transportation Coordinator to oversee marketing and promoting of transportation options at the site.

- Provide new residents transportation information packets with information on getting around Arlington sustainably.

- Provide Transitscreen installation in the building lobby which depicts accurate real-time information for area transit, Bluebikes stations, and Uber/Lyft services in the area.

- The property management team will provide information on available pedestrian and bicycle facilities in the vicinity of the Project site. This information will be posted in a centralized location.

- The property management team will investigate joining either the 128 Business Council or the Alewife Transportation Management Association (TMA). Either TMA could provide a ridematching program among residents of the Project and employers of the area.

The Project is expected to produce a minor increase in traffic volume in the vicinity of the site and minor but manageable increases in delay to various movements within the study area. No changes to critical movement levels of service occur as a result of the addition of Project volumes under 2027 Build conditions. The level of service does go from D to E during the weekday morning peak hour under 2027 Build conditions at the intersection of Lake Street with Brooks Avenue but the average delay only increases 1 second from 35 to 36 seconds.

The proposed addition of a large Bluebikes station adjacent to the existing station at Thorndike Field will help to alleviate demand for Bluebikes in this area, adjacent to the Minuteman Bikeway. This in combination with the proposal to include 144 sheltered bike parking spaces will encourage the use of bicycling as a sustainable commuting measure over the use of personal vehicles. Based on the above, VAI has concluded that the Project can be safely accommodated with minimal impact on the area road network.

INTRODUCTION

VAI has prepared this TIA in order to identify the traffic impacts associated with the proposed Thorndike Place residential development to be located on the Mugar Parcel in Arlington, Massachusetts. This report identifies and analyzes existing and future traffic conditions both with and without the Project and reviews access requirements, potential off-site improvements, and safety considerations.

STUDY METHODOLOGY

This study was prepared in coordination with the Town of Arlington and in accordance with the State guidelines for TIAs; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometry, observations of traffic flow, and collection of peak-period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for these analyses consistent with State guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any are necessary, based on the results from stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in September 2020. The field investigation consisted of an inventory of existing roadway geometrics; and operating characteristics; as well as posted speed limits, and land use information within the study area. The study area for the Project contains the major roadways which provide access to the Project, as well as the intersections which are expected to accommodate the majority of Project-related traffic. The study area is listed below and graphically depicted in Figure 1.

- Route 2 at Route 16
- Lake Street at Route 2 eastbound On/Off-ramps
- Lake Street at Route 2 westbound On/Off-ramps
- Lake Street at Wilson Avenue
- Lake Street at Littlejohn Street
- Lake Street at Homestead Road
- Lake Street at Burch Street and Alfred Road
- Lake Street at Margaret Street and Lakehill Avenue
- Lake Street at Minuteman Commuter Bikeway
- Lake Street at Brooks Avenue
- Massachusetts Avenue at Lake Street

The following describes the study area roadways and intersections which are also shown in Figure 2 which summarizes existing lane use, travel lane widths, and sidewalk and crosswalk locations at the study area intersections.

GEOMETRY

Roadways

Lake Street

Lake Street is classified as an urban minor arterial roadway under the jurisdiction of the Town of Arlington. Lake Street runs in a general east-west alignment from Pleasant Street to Massachusetts Avenue. Direction of travel of Lake Street is separated by a double-yellow centerline. The land use along Lake Street generally consist of residential properties.

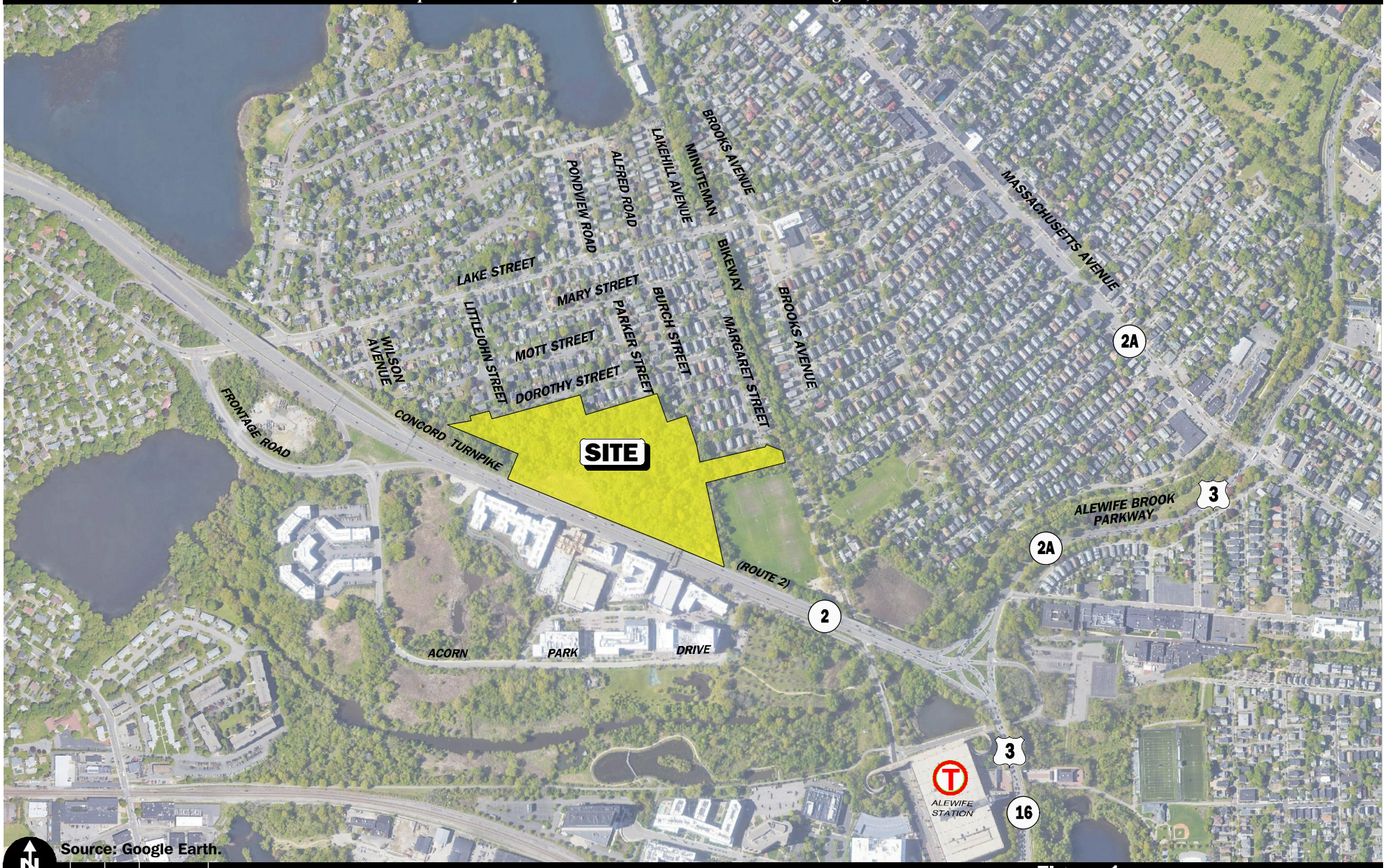


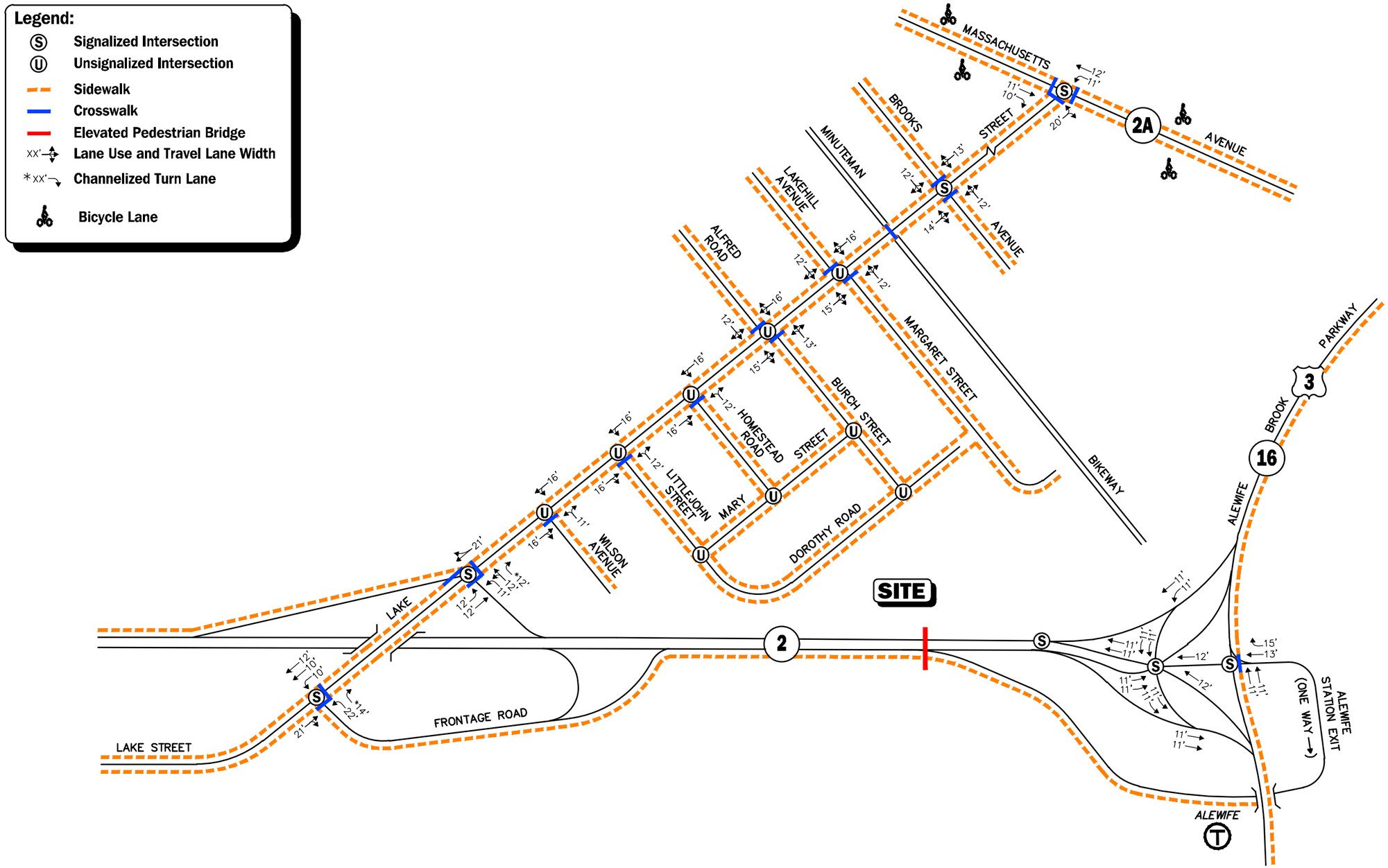
Figure 1

Site Location Map

Vanasse & Associates inc

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Not To Scale

Figure 2

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc

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Intersections

Route 2 at Route 16

Route 2 meets Route 16 to form four separate signalized intersections. Direction of travel on Route 2 is median divided while direction of travel of Route 16 is separated by a double-yellow centerline. Illumination is provided via streetlights mounted on metal poles. Land use in the vicinity of this intersection consists of the Alewife train station, wooded areas, and some office/research and development (R&D) space. This intersection is under the jurisdiction of the MassDOT.

Lake Street at Route 2 Eastbound On/Off-Ramps

Lake Street is intersected by the Route 2 eastbound on/off-ramps from the south to form this three-way intersection under traffic signal control. Direction of travel on the ramps is separated by a raised median while a faded double-yellow centerline separates direction of travel on Lake Street. Illumination is provided via streetlights mounted on metal poles. Land use in the vicinity of this intersection consists of residential properties and wooded areas. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Route 2 Westbound On/Off-Ramps

Lake Street is intersected by the Route 2 westbound off-ramp from the south and the Route 2 westbound on-ramp from the north to form this four-way intersection under traffic signal control. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles and metal poles. Land use in the vicinity of this intersection consists of residential properties and wooded areas. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Wilson Avenue

Lake Street is intersected by Wilson Avenue from the south to form this three-way intersection under STOP-sign control. Wilson Avenue is signed to discourage entering movements from Lake Street from 7:00 to 9:00 AM and 4:00 to 7:00 PM Monday through Friday. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Littlejohn Street

Lake Street is intersected by Littlejohn Street from the south to form this three-way intersection under STOP-sign control. Littlejohn Street is signed to discourage entering movements from Lake Street from 7:00 to 9:00 AM and 4:00 to 7:00 PM Monday through Friday. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Homestead Road

Lake Street is intersected by Homestead Road from the south to form this three-way intersection under STOP-sign control. Homestead Road is signed to discourage entering movements from Lake Street from 7:00 to 9:00 AM and 4:00 to 7:00 PM Monday through Friday. Direction of travel on

Lake Street is separated by a faded double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Burch Street and Alfred Road

Lake Street is intersected by the Burch Street from the south and Alfred Street from the north to form this skewed four-way intersection under STOP-sign control. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Burch Street and Alfred Street allow two-way travel. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Margaret Street and Lakehill Avenue

Lake Street is intersected by Lakehill Avenue from the north and Margaret Street from the south to form this skewed four-way intersection under STOP-sign control. Lakehill Avenue and Margaret Street have signs indicating NO ACCESS TO MASS AVE. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Lakehill Avenue and Margaret Street both allow two-way travel. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Minuteman Commuter Bikeway

Lake Street is intersected by the Minuteman Commuter Bikeway from the north and south to form this four-way intersection with the Bikeway currently under STOP-sign control. At the time of data collection in September 2020, this intersection was under construction to be signalized. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Direction of travel on the Minuteman Commuter Bikeway is separated by a faded single-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Lake Street at Brooks Avenue

Lake Street is intersected by Brooks Avenue from the north and south to form this four-way intersection under traffic signal control. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Brooks Avenue allows two-way travel. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of residential properties. This intersection is under the jurisdiction of the Town of Arlington.

Massachusetts Avenue at Lake Street

Massachusetts Avenue is intersected by the Lake Street from the west to form this three-way intersection under traffic signal control. Direction of travel on Massachusetts Avenue is separated by a double-yellow centerline. Direction of travel on Lake Street is separated by a faded double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of commercial properties. This intersection is under the jurisdiction of the Town of Arlington.

EXISTING TRAFFIC V OLUMES

Due to the COVID-19 pandemic, traffic volumes, pedestrian crossing volumes, and bicycle volumes were obtained from multiple sources. Data was obtained from the original April 2014 *Traffic Impact and Access Study*[2] conducted for the Project, the January 2017 *Transportation Impact Study*[3] conducted by VAI for a nearby project in Cambridge, data collected by VAI in May 2019 for another nearby project in Cambridge, data collected by the East Arlington Livable Street Coalition and the Eco Counter on the Minuteman Commuter Bikeway, and September 2020 counts conducted by VAI for the Project.

Traffic-Volume Adjustments

In order to develop 2020 Baseline traffic-volume conditions, the historic data obtained required adjustment for passage of time, while the new data collected required adjustment due to the effects of the COVID-19 pandemic. The counts conducted in 2020 were done in the month of September. Therefore, for practicality it was determined the other data should be corrected to September 2020 conditions. The 2014 counts were conducted in March 2014 and therefore were seasonally adjusted to September 2014 volumes using traffic count data from MassDOT permanent count station ID 4065[4] located on I-95 south of the ramp to Route 2 eastbound. Using the same permanent count station, the September 2014 volumes were grown to September 2016 volumes. The September 2016 volumes were subsequently grown to September 2019 using the same count station data. The 2019 data collected by VAI were collected in May 2019 and were adjusted to September 2019 using the permanent count station information. The traffic volumes were then representative of September 2019 volumes. These volumes were then grown by 0.5 percent to raise them from 2019 to 2020 conditions. The next step was to develop a COVID-19 correction factor to apply to the counts conducted in September 2020. These factors were calculated comparing the August 2019 counts to the August 2020 counts from the permanent count station. Even with the COVID-19 correction factor, the counted September 2020 volumes were significantly lower than the derived September 2020 volumes. To correct for the difference, the networks were balanced upwards along Lake Street.

In addition to the general growth in the area from 2014 to 2020, there were a number of specific developments mentioned for inclusion in the 2020 Baseline volumes. These developments were occupied after the 2014 counts but before the 2020 counts.

Vox on Two – This 227-unit residential development is located at 223, 225, and 231 Concord Turnpike (Route 2) in Cambridge, Massachusetts. Access to the site is through a right-turn only entrance driveway and one right-turn only exit driveway onto Route 2 eastbound. Volumes for this development were obtained from the *Transportation Impact Study*[5] conducted in 2010 and added to the 2020 baseline conditions.

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[2] *Traffic Impact and Access Study – Mugar Parcel 40B Residential Development;* MDM Transportation Consultants, Inc.; April 2014.

[3] *Transportation Impact Study – Proposed Residence at Alewife Station – Cambridge, Massachusetts;* Vanasse & Associates, Inc.; January 2017.

[4] MassDOT Transportation Data Management System; Location ID 4065; Located on I-95 south of ramp to Route 2 eastbound.

[5] *Transportation Impact Study – Proposed Residence at Alewife Station – Cambridge, Massachusetts;* Vanasse & Associates, Inc.; December 2010.

Residence at Alewife Station – This 320-unit residential development is located at 195-211 Concord Turnpike (Route 2) in Cambridge, Massachusetts. Access to the site is through a right-turn only entrance driveway and one right-turn only exit driveway onto Route 2 eastbound. Volumes for this development were obtained from the Transportation Impact Study[6] conducted in 2017 and added to the 2020 baseline conditions.

Belmont Highlands – This 300-unit residential development is located off Acorn Park Drive in Belmont, Massachusetts. Access to the site is through three driveways that intersect with Acorn Park Drive. Volumes for this development were obtained from the Traffic Impact and Access Study[7] conducted in 2007 and added to the 2020 baseline conditions.

Discovery Park Hotel – This 150-room hotel is located at Cambridge Discovery Park Drive in Cambridge, Massachusetts. Access to the site is through a driveway that intersects with Acorn Park Drive. Volumes for this development were obtained from the Memorandum[8] conducted in 2013 and added to the 2020 baseline conditions.

This practice was discussed and confirmed with BETA Group, the Town's traffic peer review consultant for the Project. The 2020 Baseline traffic volumes on Lake Street are summarized in Table 1.

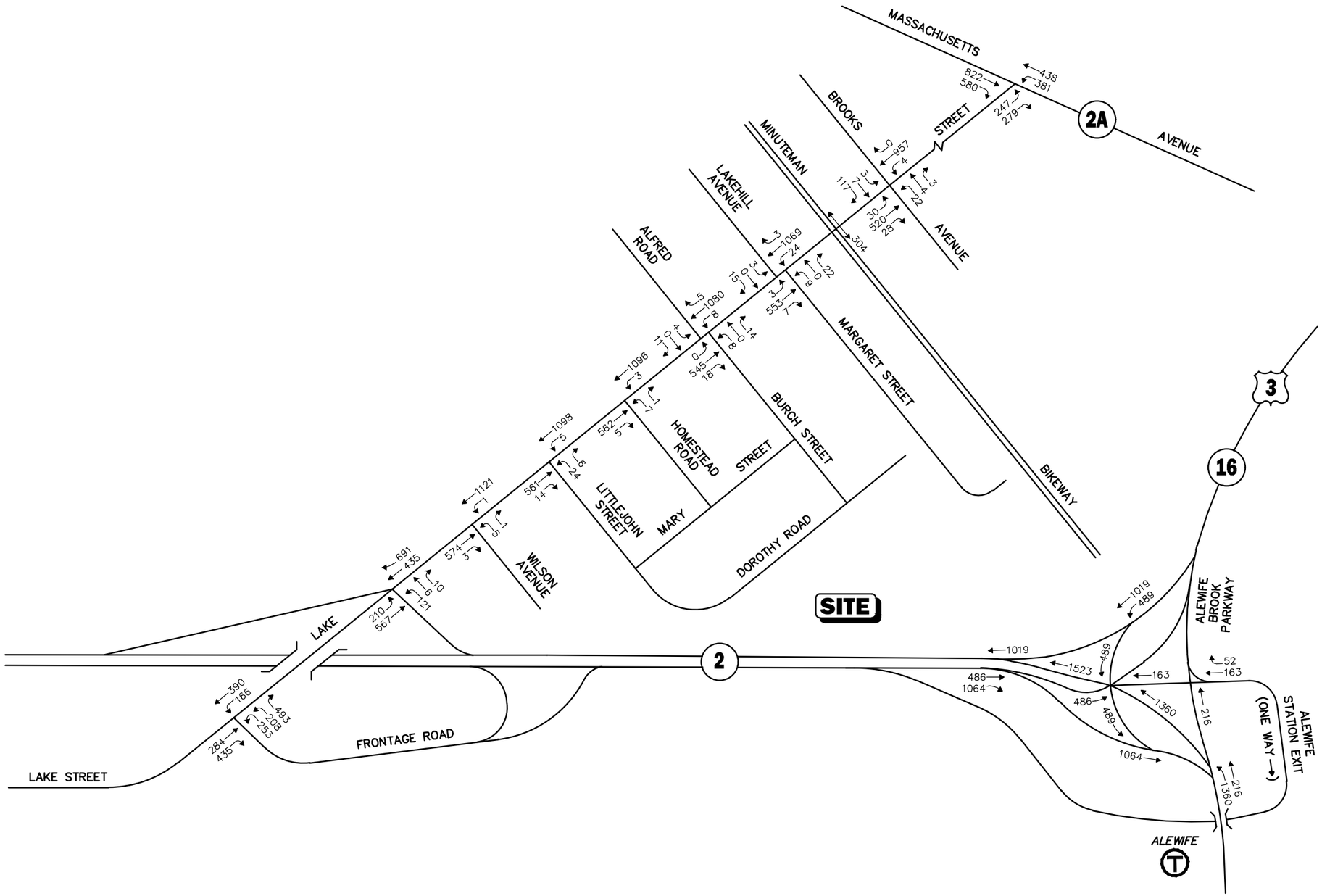
Table 1
2020 BASELINE ROADWAY TRAFFIC-VOLUME SUMMARY

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
Location	Volume (vph)[a]	Predominant Flow	Volume (vph)	Predominant Flow
Lake Street, west of Burch Street	1,662	66% WB	1,351	59% EB

[a]Two-way peak-hour volume expressed in vehicles per hour.
EB = eastbound; WB = westbound.

As can be seen in Table 1, Lake Street was found to accommodate approximately 1,662 vehicles per hour (vph) during the weekday morning peak hour and 1,351 vph during the weekday evening peak hour under 2020 Baseline conditions. During the weekday morning peak hour, 66 percent of the traffic is traveling westbound and during the weekday evening peak hour 59 percent of the traffic is traveling eastbound. The existing traffic volumes for all the study area intersections are graphically depicted in Figure 3 and Figure 4 for the weekday morning and weekday evening peak hours, respectively.

[6]*Transportation Impact Study – Proposed Residences at Alewife Station – Cambridge, Massachusetts;* Vanasse & Associates, Inc.; January 2017.
[7]*Traffic Impact and Access Study – Proposed Residential Development – Belmont, Massachusetts;* Vanasse & Associates, Inc.; March 2007.
[8]*Memorandum – Building 600 – Proposed 150-Room Hotel – Cambridge, Massachusetts;* Vanasse & Associates, Inc.; September 27, 2013.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

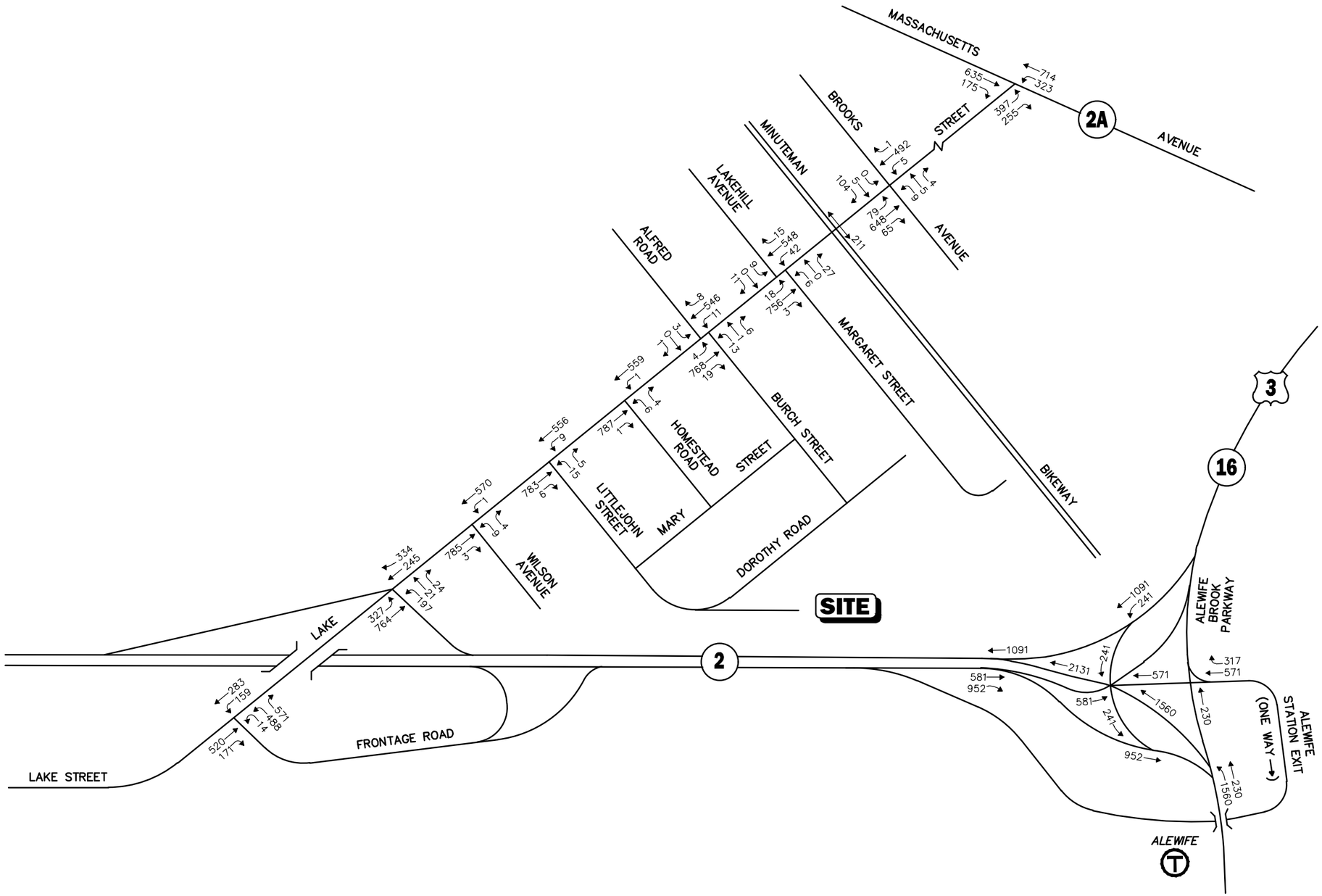
Figure 3

2020 Baseline
Weekday Morning
Peak Hour Traffic Volumes

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Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4

2020 Baseline
Weekday Evening
Peak Hour Traffic Volumes

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PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in September 2020. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of bicycle facilities. Generally, sidewalks are provided along both sides of the study area roadway. Exceptions include Alewife Brook Parkway (Route 16) that only provides a sidewalk on the east side of the road throughout the study area, Route 2 which only provides a sidewalk on the south side of the roadway, and Wilson Avenue which only provides a sidewalk on the east side of the roadway. Crosswalks are provided across the Alewife Station Access Road, across the Route 2 ramps at Lake Street, across Lake Street at the Route 2 ramps, across all side streets off of Lake Street, and across all the approaches to the intersection of Massachusetts Avenue with Lake Street. The Minuteman Commuter Bikeway crosses Lake Street between Margaret Street and Brooks Avenue. The bikeway runs from Bedford to Cambridge and provides direct access to Alewife Station.

THORNDIKE PARK

The Arlington Recreation Department was contacted to determine the uses of Thorndike Field located at the terminus of Margaret Street. There are multiple fields used for soccer and lacrosse and a dog park. The fields are open from April to November. From April through June, the fields are open from 3:00 PM to dusk on weekdays and from 9:00 AM to dusk on Saturdays and Sundays. Based on estimates from the Recreation Department, typical usage during peak hours for the field is approximately five teams at a time with 15 members per team, or 75 people, plus approximately 10 people at the dog park, or 85 people. From July through August, the fields are used for summer camps that are operated from 8:30 AM to 3:30 PM. The camps typically have between 50 and 100 children per session. From 6:00 PM to dusk the fields are used by adult soccer league teams which typically have about 24 players per game. From September to November the fields are again used for soccer but not lacrosse. The fields are open from 3:00 PM to dusk during weekdays and 9:00 AM to dusk on Saturday and Sunday. Activity is typically 75 percent of the spring activity so the peak hour generates approximately 64 people. To the extent that activity was underway at the field during the times that traffic counts were conducted, the trips generated by the field during the peak commuting periods are included in the counts.

All school uses accessing the fields are directed to use Varnum Street. The parking lot provides 65 parking spaces. Typically, when the parking lot capacity is exceeded people park at Hardy Elementary School and walk to the field. Currently, no sport tournaments are held at the fields.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA) for fixed-route bus and rapid transit services. Table 2 summarizes the characteristics of these services. Schedules and fare information for the fixed-route bus and rapid transit services are provided in the Appendix.

Table 2
PUBLIC TRANSPORTATION SERVICES

Service	Stop Closest to Site	Distance from Site	Weekday Hours of Operation	Weekday Headway (minutes)	Saturday Hours of Operation	Saturday Headway (minutes)	Sunday Hours of Operation	Sunday Headway (minutes)
Bus: Route 67: Turkey Hill – Alewife Station	West Service Road at Lake Street	0.3 mi. northwest	5:53 AM – 8:32 PM	25-50	**No Weekend Service**			
Bus: Route 77: Arlington Heights to Harvard Station	Mass Ave at Lake Street	0.7 mi. northeast	4:48 AM – 1:25 AM	9-20	4:48 AM – 1:26 AM	10-17	6:00 AM – 1:25 AM	10-20
Bus: Route 79: Arlington Heights – Alewife Station	Mass Ave at Lake Street	0.7 mi. northeast	6:35 AM – 7:24 PM	5-50	**No Weekend Service**			
Bus: Route 350: North Burlington – Alewife Station	Mass Ave at Lake Street	0.7 mi. northeast	5:53 AM – 11:08 PM	15-56	6:25 AM – 11:10 PM	40-60	7:05 AM – 7:35 PM	55-90
Rapid Transit: Red Line	Alewife Station	0.8 mi. southwest	5:16 AM – 12:30 AM	5-9	5:16 AM – 12:30 AM	12-16	6:00 AM – 12:30 AM	12-16

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2013 through 2017) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, weather condition, lighting condition, pavement condition, and severity.

As can be seen in Table 3, no fatalities were reported over the five-year period reviewed. The crash rates for the intersections were observed to be lower than the MassDOT District 4 crash rates for unsignalized and signalized intersections. The intersection of Route 2 with Route 16 experienced the most crashes in the five-year review period with 88, or an average of 17.6 crashes per year. The majority of the crashes were rear-end crashes (48 out of 88) which is consistent with the types of crashes expected at highly congested intersections. Few crashes occur along Lake Street from the Route 2 ramps through Margaret Street.

A number of crashes occurred at the intersection of Lake Street with the Minuteman Commuter Bikeway. A total of 18 crashes occurred at this intersection over the five-year review period with 8 rear-end crashes, 4 pedestrian crashes, and 3 bicyclist crashes. These types of crashes are expected at a highly congested crossing with a mixed-use path under unsignalized control. This intersection is under construction and will provide a signalized crossing which should increase safety.

The intersection of Lake Street at Brooks Avenue is also highly congested. Approximately 7 of the 11 crashes over the five-year review period were rear-end collisions. The intersection of Massachusetts Avenue with Lake Street experienced 22 crashes over the five-year review period averaging 4.4 crashes pear year. Half of the crashes were sideswipe collisions (11 out of 22). Massachusetts Avenue has parking on both sides which often leads to more sideswipe collisions.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY

Scenario	Route 2 at Route 16	Lake Street at Route 2 EB On/Off-Ramps	Lake Street at Route 2 WB On/Off-Ramps	Lake Street at Wilson Avenue	Lake Street at Littlejohn Street	Lake Street at Homestead Road
Year:						
2013	21	0	2	0	0	0
2014	22	3	0	1	1	0
2015	23	0	1	1	2	0
2016	16	0	1	0	1	0
2017	6	2	1	0	0	1
Total	88	5	5	2	4	1
Average[a]	17.6	1.0	1.0	0.4	0.8	0.2
Crash Rate[b]	0.71	0.10	0.12	0.07	0.13	0.03
Significant[c]	No	No	No	No	No	No
Type:						
Angle	21	1	0	1	2	0
Rear-End	48	0	1	1	0	0
Head-On	0	0	0	0	1	0
Sideswipe	13	1	1	0	0	1
Fixed Object	6	3	1	0	0	0
Pedestrian	0	0	0	0	0	0
Bicyclist	0	0	1	0	1	0
Unknown/Other	0	0	1	0	0	0
Total	88	5	5	2	4	1
Weather Conditions:						
Clear	64	3	5	1	4	0
Cloudy/Rain	16	0	0	1	0	1
Snow/Ice	2	1	0	0	0	0
Fog	0	0	0	0	0	0
Unknown/Other	6	1	0	0	0	0
Total	88	5	5	2	4	1
Lighting Conditions:						
Daylight	58	3	4	2	3	1
Dawn/Dusk	3	0	0	0	0	0
Dark (lit)	24	2	1	0	1	0
Dark (unlit)	3	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0
Total	88	5	5	2	4	1
Pavement Conditions:						
Dry	75	3	4	2	4	0
Wet	11	0	1	0	0	1
Snow/Ice	2	2	0	0	0	0
Unknown/Other	0	0	0	0	0	0
Total	88	5	5	2	4	1
Severity:						
Property Damage Only	67	5	1	2	2	1
Personal Injury	20	0	2	0	2	0
Fatality	0	0	0	0	0	0
Unknown/Other	1	0	2	0	0	0
Total	88	5	5	2	4	1

*See notes at end of table.

Table 3 Continued
MOTOR VEHICLE CRASH DATA SUMMARY

Scenario	Lake Street at Burch Street & Alfred Road	Lake Street at Margaret Street & Lakehill Avenue	Lake Street at Minuteman Bikeway	Lake Street at Brooks Avenue	Mass Ave at Lake Street
Year:					
2013	2	2	1	3	3
2014	0	1	5	4	3
2015	0	0	3	1	9
2016	0	2	6	1	2
2017	1	2	3	2	5
Total	3	7	18	11	22
Average[a]	0.6	1.4	3.6	2.2	4.4
Crash Rate[b]	0.10	0.22	0.50	0.35	0.40
Significant[c]	No	No	No	No	No
Type:					
Angle	1	2	2	1	4
Rear-End	1	2	8	7	6
Head-On	0	1	0	1	0
Sideswipe	1	2	1	1	11
Fixed Object	0	0	0	1	1
Pedestrian	0	0	4	0	0
Bicyclist	0	0	3	0	0
Unknown/Other	0	0	0	0	0
Total	3	7	18	11	22
Weather Conditions:					
Clear	1	3	15	8	12
Cloudy/Rain	2	4	2	1	10
Snow/Ice	0	0	0	2	0
Fog	0	0	0	0	0
Unknown/Other	0	0	1	0	0
Total	3	7	18	11	22
Lighting Conditions:					
Daylight	2	6	16	9	18
Dawn/Dusk	1	0	0	0	1
Dark (lit)	0	1	1	2	3
Dark (unlit)	0	0	0	0	0
Unknown/Other	0	0	1	0	0
Total	3	7	18	11	22
Pavement Conditions:					
Dry	2	5	14	8	20
Wet	1	2	2	1	2
Snow/Ice	0	0	1	2	0
Unknown/Other	0	0	1	0	0
Total	3	7	18	11	22
Severity:					
Property Damage Only	2	3	11	8	16
Personal Injury	0	1	4	0	1
Fatality	0	0	0	0	0
Unknown/Other	1	3	3	3	5
Total	3	7	18	11	22

[a]Average number of crashes over five-year period.
[b]Crash rate per million entering vehicles (mev).
[c]Significant if crash rate > 0.73 for signalized intersections or > 0.57 for unsignalized intersections (MassDOT District 4 rates).
Source: MassDOT Crash Data, 2013 through 2017.

FUTURE CONDITIONS

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2027. Traffic volumes on the roadway network at that time, in the absence of the Project (that is, the No-Build condition), would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific development by others expected to be completed by 2027. Inclusion of these factors resulted in the development of 2027 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop the 2027 Build traffic-volume conditions.

FUTURE TRAFFIC GROWTH

Traffic growth on area roadways is a function of the expected land development impacting the study area. Several methods are used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all existing traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

In addition, we identified the location and type of planned development affecting the study area, estimated the traffic to be generated by that development, and assigned it to the area roadway network. This produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used in this TIA.

General Background Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data and other area traffic studies, it was determined that the traffic volumes are fluctuating in the area. The average annual percent change was determined to be approximately -0.15 percent. To be conservative, a 0.5 percent per year compounded annual background traffic growth rate was used to account for future traffic growth including presently unforeseen development within the study area.

Specific Development by Others

The Town of Arlington was contacted in order to determine if there are any planned or approved specific development projects within the area that would have an impact on future traffic volumes at the study intersections. Based on these discussions the Hardy School Expansion and Buildings 400/500 at Discovery Park were identified for inclusion in this assessment.

Hardy School Expansion – The Hardy Elementary School located at 52 Lake Street began construction a three-story, six-classroom expansion in 2018. The construction is complete but enrollment in the school has remained generally the same since 2017 with approximately 450 students according to the Massachusetts Department of Elementary and Secondary Education (MDESE).[9] The MDESE indicates that the school has approximately 15 students per teacher. To calculate the expected number of trips due to the expansion, the average number of students per teacher (15) was multiplied by the number of new classrooms (6). Therefore, the expansion is assumed to increase student enrolment by 90 students. It is assumed that 60 percent of the new trips will be driving trips and 40 percent will be walking trips. Trip-generation statistics published by the Institute of Transportation Engineers (ITE)[10] for Land Use Code (LUC) 520, *Elementary School* were used to determine the number of trips associated with an increase of 90 students and these volumes were added to the future condition networks.

Discovery Park Buildings 400/500 – Buildings 400 and 500 at Discovery Park in Cambridge, Massachusetts are permitted for 278,000 square feet (sf) of office/R&D space. Access to the buildings is provided via the existing driveway off Acorn Park Drive. Since no traffic study was developed specifically for this component of Discovery Park, traffic volumes were obtained from initial traffic studies developed for that project and added to the future condition networks.

Planned Roadway Improvements

The Town of Arlington was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. Based on these discussions, no roadway improvement projects are planned within the study area beyond general maintenance except for the signalization of the intersection of Lake Streets with the Minuteman Commuter Bikeway.

Signalization of Lake Street at Minuteman Commuter Bikeway – The intersection of Lake Street with the Minuteman Commuter Bikeway was under construction to be signalized at the time data was collected. Therefore, under future conditions this intersection was assumed to be signalized and coordinated with the signal at the intersection of Lake Street with Brooks Avenue as reflected on design plans provided by the Town of Arlington.

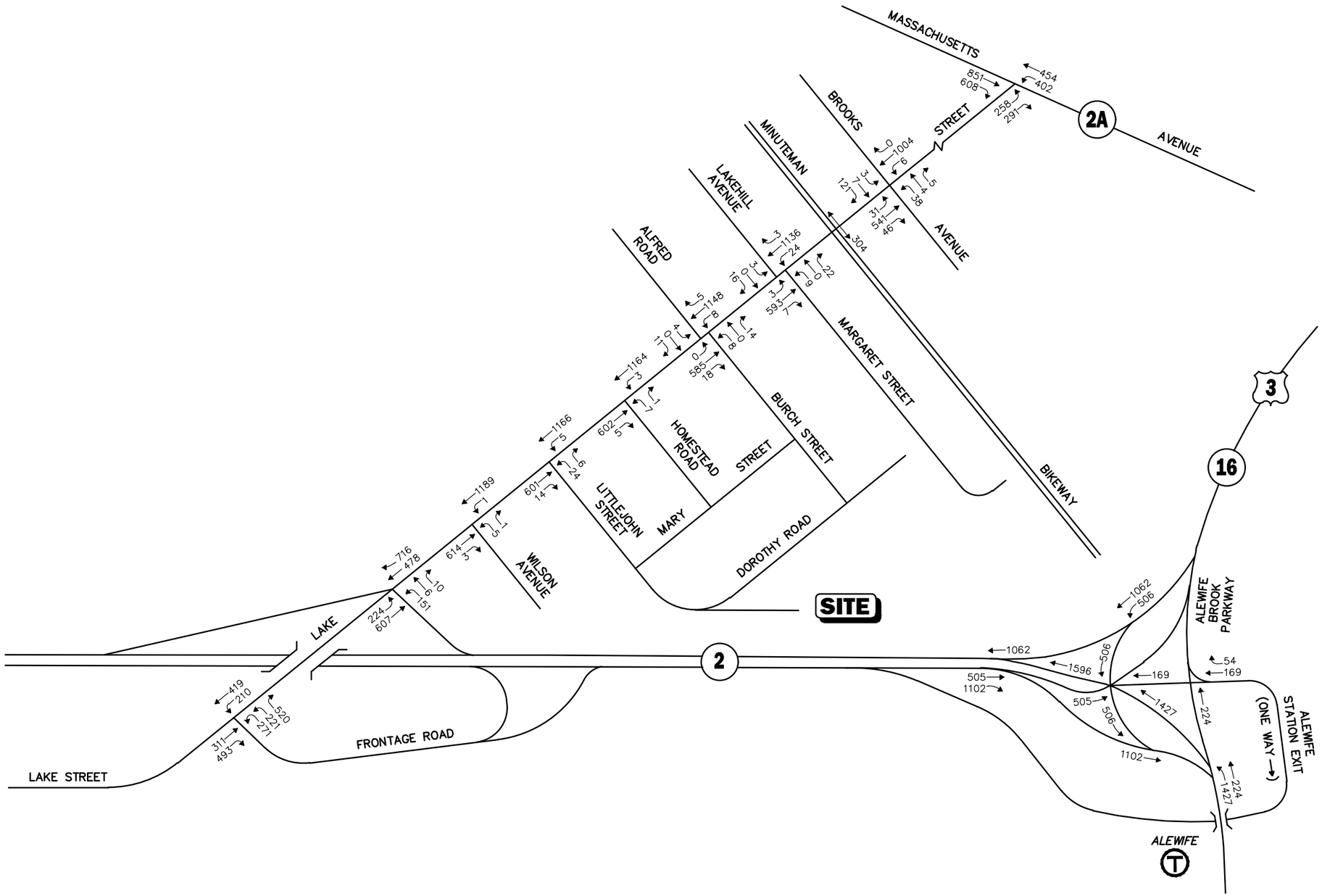
No-Build Traffic Volumes

The 2026 No-Build peak-hour traffic-volume networks were developed by applying the 0.5 percent per year compounded annual background traffic growth rate to the 2020 peak-hour traffic volumes and incorporating traffic projections from the identified background developments. The resulting 2027 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figure 5 and Figure 6, respectively.

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[9] *Massachusetts Department of Elementary and Secondary Education - Massachusetts School and District Profiles*; 2020; profiles.doe.mass.edu/general/general.aspx?topNavID=1.

[10] *Trip Generation,* Tenth Edition; Institute of Transportation Engineers; Washington, DC; 2017.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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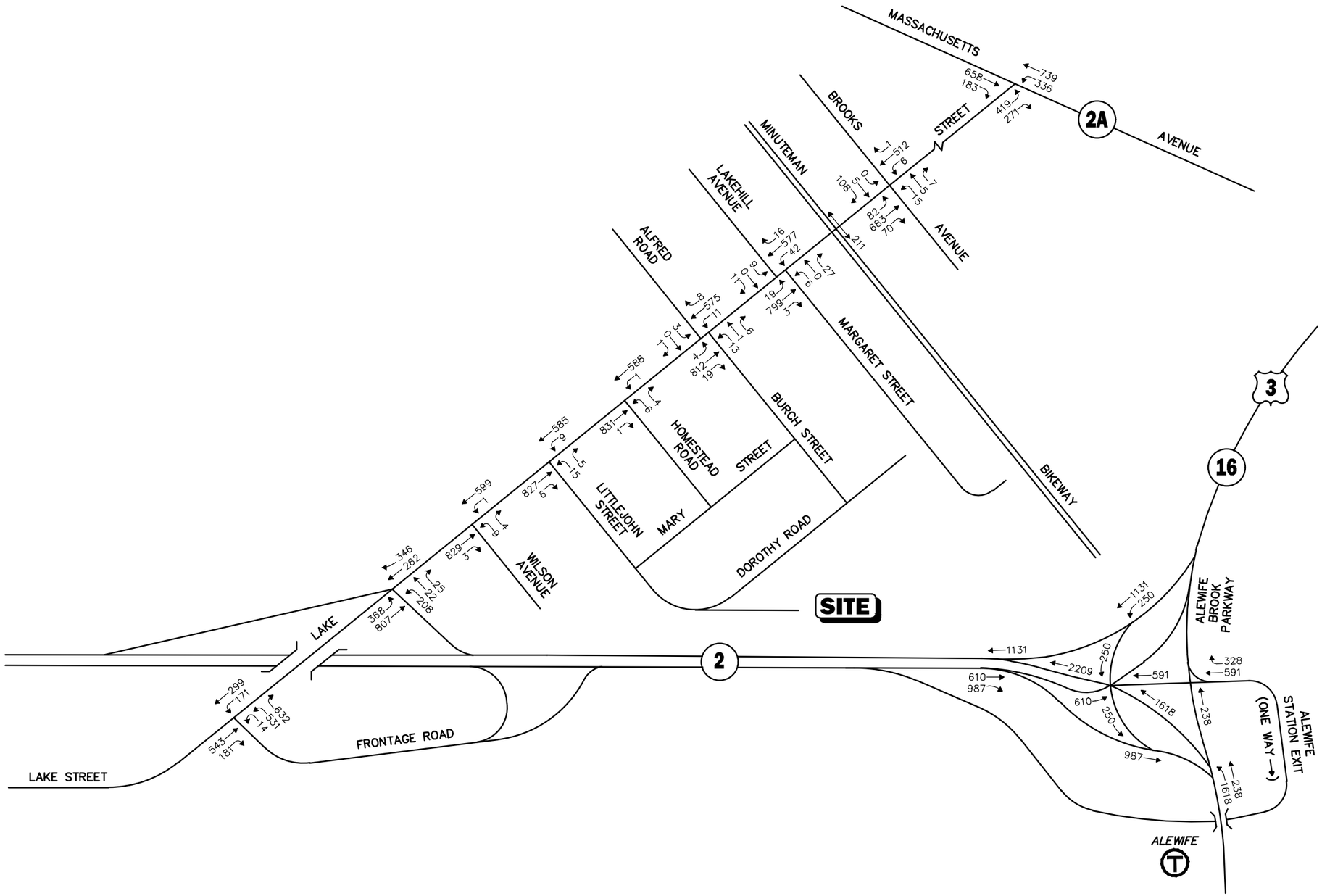
Figure 5

2027 No-Build
Weekday Morning
Peak Hour Traffic Volumes

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Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 6

2027 No-Build
Weekday Evening
Peak Hour Traffic Volumes

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PROJECT-GENERATED TRAFFIC

The Project entails constructing 176 residential units to be located on the Mugar Parcel in Arlington, Massachusetts. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published by the ITE for LUC 221, *Multifamily Housing (Mid-Rise)* were used in conjunction with mode split data from a traffic monitoring report prepared for the[11] report for the Vox on Two residential development located at 223 Concord Turnpike.

Vox on Two Mode Split Data

Mode split data from the Vox on Two residential development was used in trip-generation calculations. Vox on Two is located at 223 Concord Turnpike in Cambridge, Massachusetts. The Project is anticipated to have similar commuting characteristics as the Vox on Two site as they are in close proximity with one another, have similar access to transit and sustainable transportation facilities, and are likely to appeal to the same demographic tenant base. The Vox on Two 2019 mode split characteristics are provided in Table 4.

Table 4
VOX ON TWO: 2019 MODE SPLIT[a]

Mode	Percent
Single Occupancy Vehicle	39
High Occupancy Vehicle	6
Transit	35
Bike	5
Walk	14
Other	1
TOTAL	100

[a]From Vox on Two 2019 PTDM Report filed with the City of Cambridge Community Development Department.

Site-Generated Trips by Mode

The Vox on Two mode split data was then applied to the ITE trip-generation projections for LUC 221 to determine the site-generated trips by mode. A summary of the expected site-generated trips by mode is provided in Table 5.

[11]2019 *Parking and Transportation Demand Management* (PTDM) *Report;* Vox on Two; Cambridge, MA; 2019.

Table 5
PROJECT TRIP GENERATION SUMMARY

Time Period/ Directional Distribution	ITE Project Vehicle Trips[a]	Project Person Trips[b]	SOV Trips 39%	HOV Trips 6%	Transit Trips 35%	Bike Trips 5%	Walk Trips 14%	Other Trips 1%	Total Project Vehicle Trips[c]
Weekday Daily	958	1,082	422	64	378	54	152	12	430
Weekday Morning Peak Hour:									
Entering	16	18	7	1	6	1	3	0	7
Exiting	44	50	20	3	18	2	7	0	20
Total	60	68	27	4	24	3	10	0	27
Weekday Evening Peak Hour:									
Entering	46	52	20	3	18	3	7	1	20
Exiting	30	34	13	2	12	2	5	0	13
Total	76	86	33	5	30	5	12	1	33

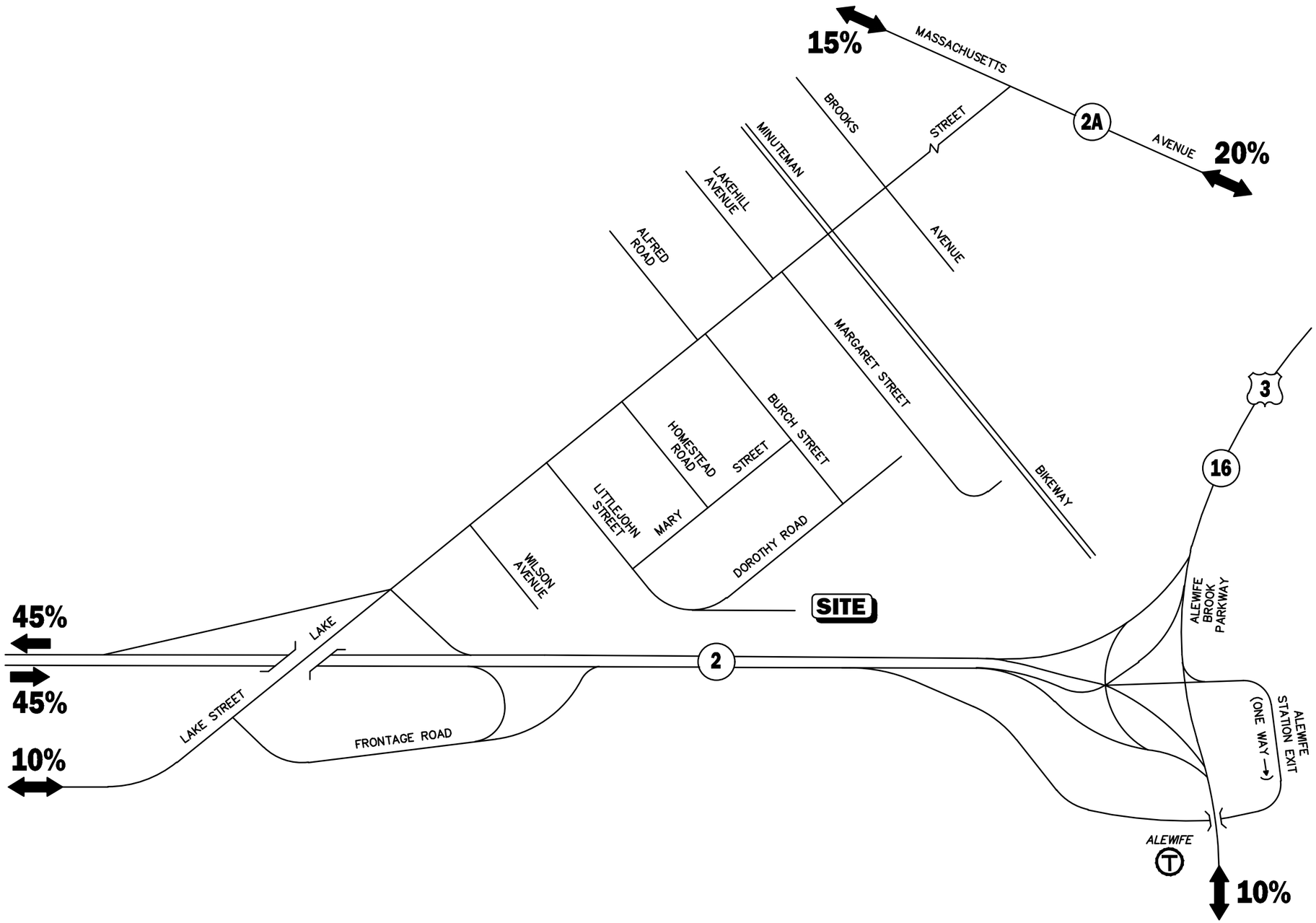
[a]Based on ITE LUC 221, Multifamily Housing (Mid-Rise); 176 units.
[b]ITE vehicle trips multiplied by VOR from American Community Survey 2018 5-year estimates for Census Tract 3561; VOR = 1.13
[c]SOV+HOV persons trips divided by VOR from American Community Survey 2018 5-year estimates for Census Tract 3561; VOR = 1.13

As can be seen in Table 5, the Project is expected to generate 430 vehicle trips on an average weekday (two-way, 24-hour volume), with 27 vehicle trips (7 entering and 20 exiting) expected during the weekday morning peak hour. During the weekday evening peak hour, the Project is expected to generate 33 vehicle trips (20 entering and 13 exiting). Transit, bike, and walking trips are expected to generate 37 weekday morning person trips and 47 weekday evening person trips.

TRIP DISTRIBUTION AND ASSIGNMENT

The Project trip distribution was based on a review of existing travel patterns at the study area intersections and Journey-to-Work data for Arlington obtained from the United States Census Bureau.[12] The trip distribution for the Project is summarized in Table 6 and graphically depicted on Figure 7. The weekday morning and weekday evening peak-hour traffic volumes expected to be generated by the Project were assigned on the study area roadway network as shown on Figure 8 and Figure 9, respectively.

[12]*2011-2015 5-Year American Community Survey;* U.S. Census Bureau; 2019.



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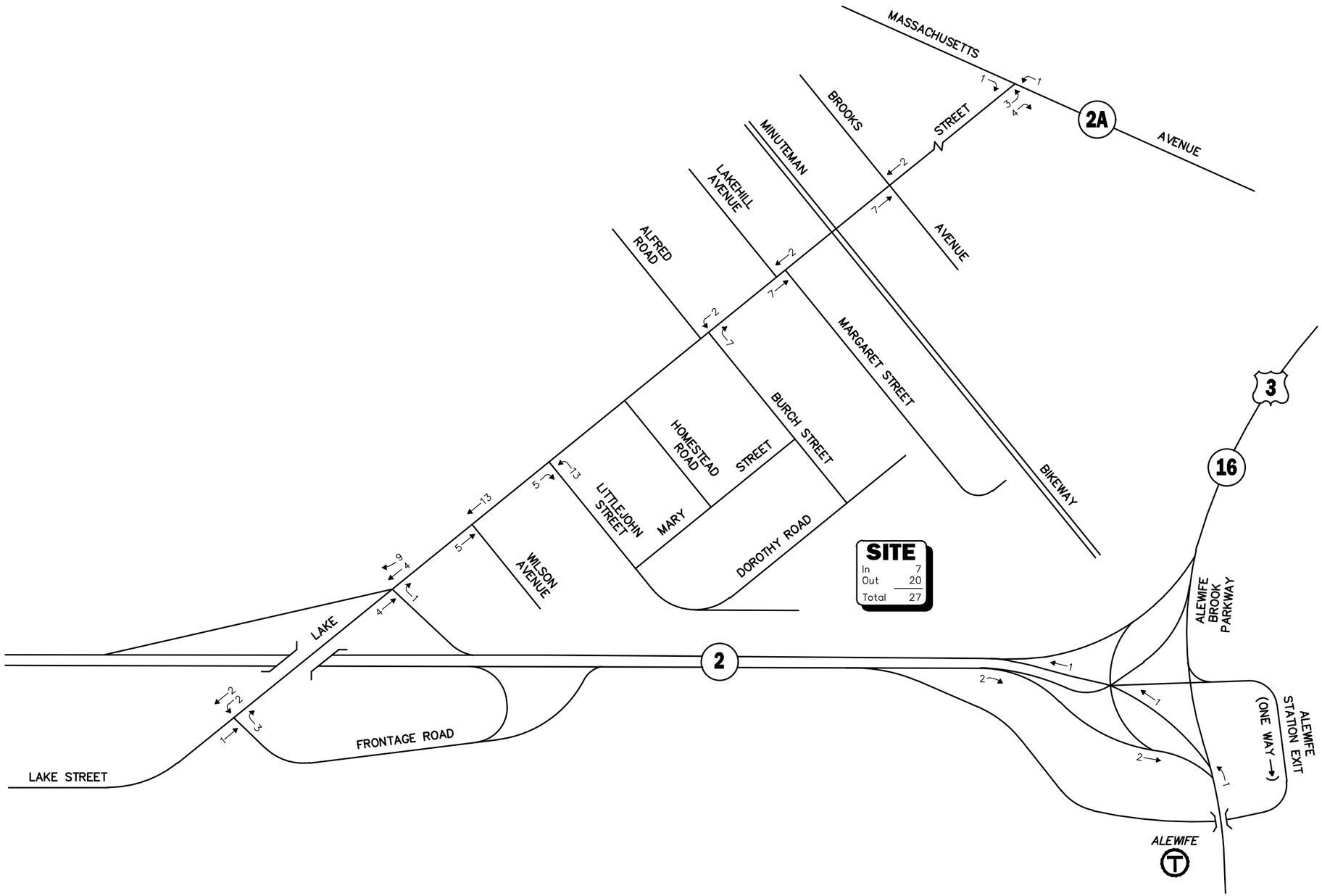
Figure 7

Trip Distribution Map

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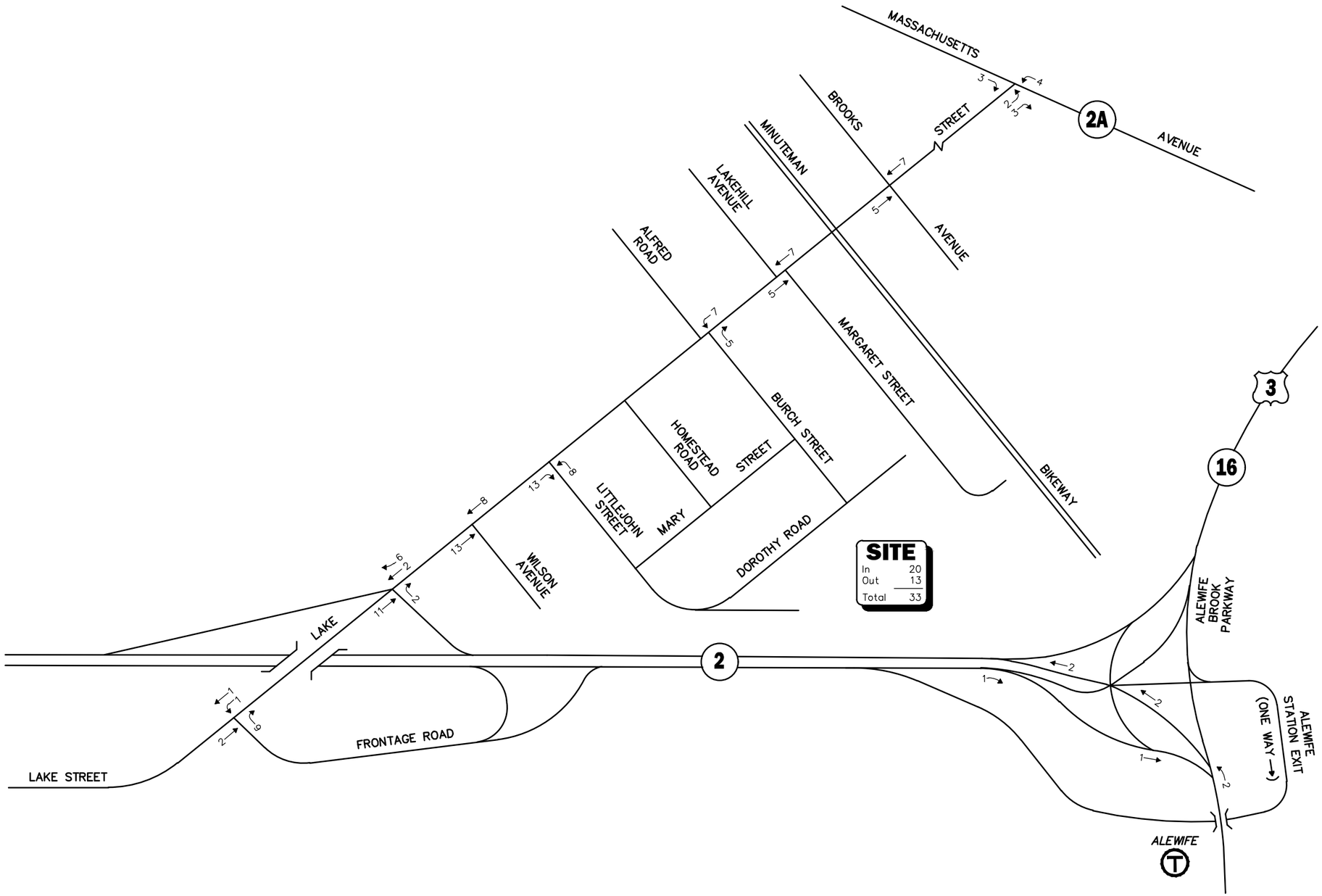
Figure 8

Site Generated
Weekday Morning
Peak Hour Traffic Volumes

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Figure 9

Site Generated
Weekday Evening
Peak Hour Traffic Volumes

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Table 6
TRIP-DISTRIBUTION SUMMARY

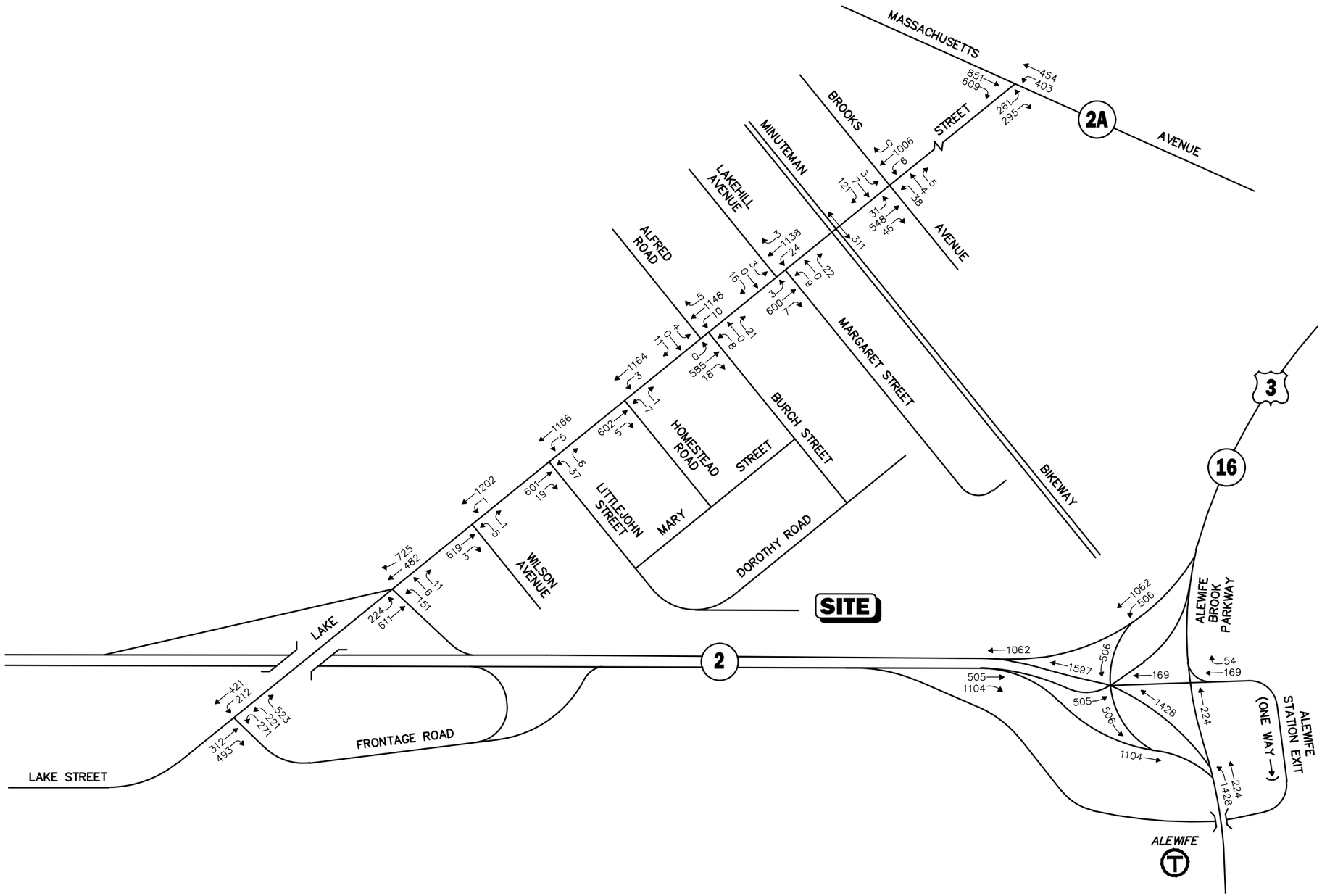
Roadway	Direction (To/From)	Percentage of Site Traffic
Route 2	West	45
Lake Street	West	10
Massachusetts Avenue	North	15
Massachusetts Avenue	South	20
Alewife Brook Parkway	South	10
TOTAL		100

FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2027 Build condition networks consist of the 2027 No-Build traffic volumes with the anticipated site-generated traffic added to them. The 2027 Build weekday morning and weekday evening peak-hour traffic-volume networks are graphically depicted on Figure 10 and Figure 11, respectively.

A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 7. These volumes are based on the expected increases from the Project.

As shown in Table 7, Project-related traffic-volume increases external to the study area relative to 2027 No-Build conditions are anticipated to range from 0.1 to 0.8 percent during the peak periods.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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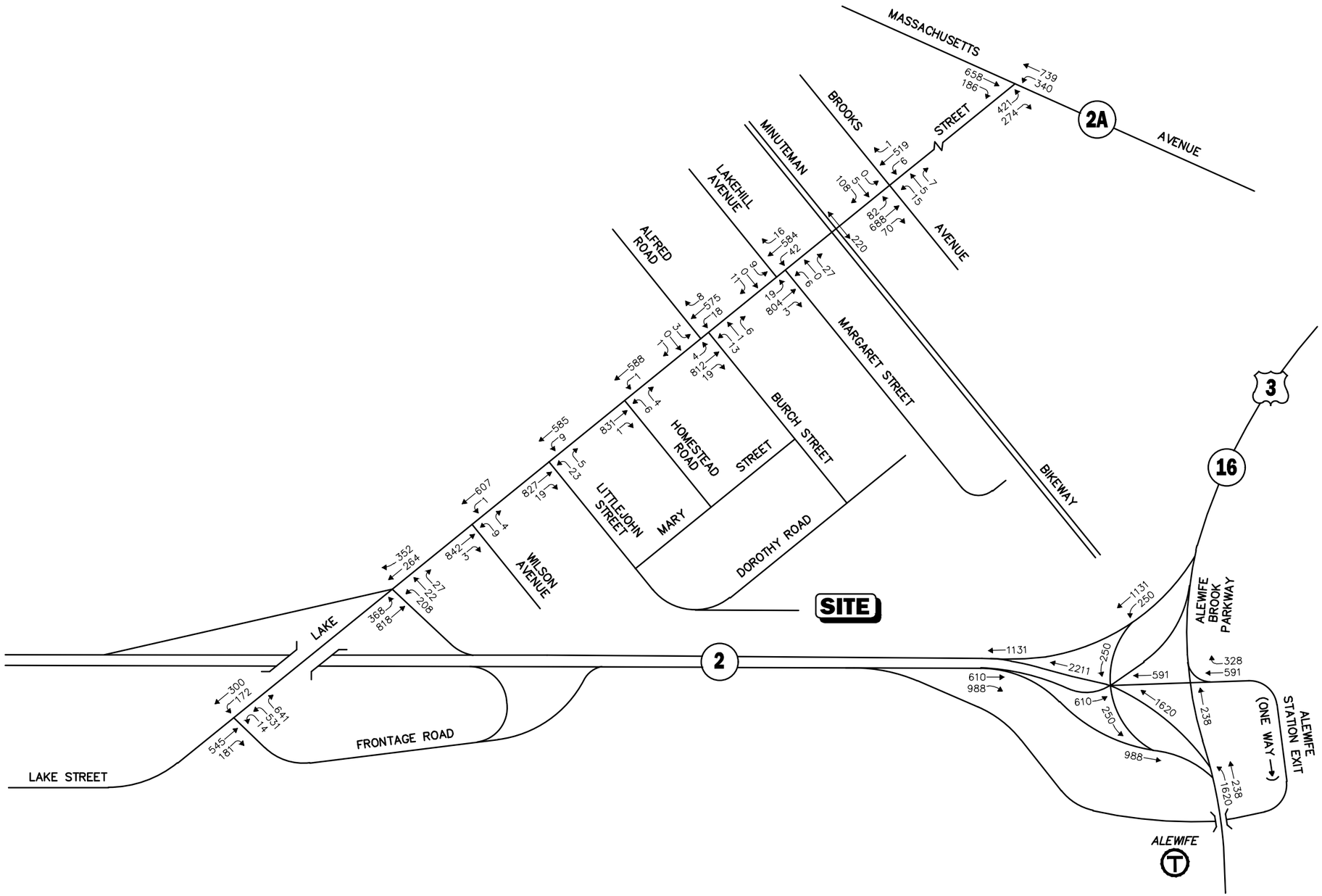
Figure 10

2027 Build
Weekday Morning
Peak Hour Traffic Volumes

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Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 11

2027 Build
Weekday Evening
Peak Hour Traffic Volumes

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Table 7
PEAK-HOUR TRAFFIC-VOLUME INCREASES[a]

Location/Peak Hour	2027 No-Build	2027 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
Route 2, west of Lake Street:				
Weekday Morning	1,958	1,970	12	0.6
Weekday Evening	1,913	1,928	15	0.8
Lake Street, west of Route 2 EB On/Off-Ramps:				
Weekday Morning	1,444	1,447	3	0.2
Weekday Evening	1,554	1,557	3	0.2
Massachusetts Avenue, north of Lake Street:				
Weekday Morning	2,171	2,175	4	0.2
Weekday Evening	1,999	2,004	5	0.3
Massachusetts Avenue, south of Lake Street:				
Weekday Morning	1,998	2,003	5	0.3
Weekday Evening	2,004	2,011	7	0.3
Alewife Brook Parkway, south of Route 2:				
Weekday Morning	3,259	3,262	3	0.1
Weekday Evening	3,093	3,096	3	0.1

[a]Two-way traffic total.

PARKING ANALYSIS

A parking analysis for the proposed development was conducted utilizing parking ratio requirements from the Town of Arlington Zoning Bylaw. Table 8 summarizes the parking analysis.

Table 8
PARKING ANALYSIS

Room Type	Number of Units	Required Rate	Required Spaces
Studio	11	1 space/unit	11
1-bedroom	87	1.15 spaces/unit	101
2-bedroom	58	1.5 spaces/unit	87
3-bedroom	20	2 spaces/unit	40
Total	176	--	239
		Spaces Provided	239

As can be seen from Table 8, the site is required to provide 239 parking spaces for the proposed 176 units. Accordingly, the Project proposes to construct 239 spaces onsite. This results in a ratio of 1.36 spaces per unit, which is generally consistent with data from the ITE *Parking Generation Manual*.[13] The ITE indicates that parking demand for this size development would be accommodated with a rate of 1.31 spaces per unit. Therefore, it is anticipated that adequate parking will be provided on site for the Project.

Both the Vox on Two and the recently completed Tempo apartment developments in Cambridge have been constructed with a parking ratio of 1 space per unit. In addition, based on the monitoring report, approximately 14 percent of Vox residents do not have any vehicles and therefore do not need any parking. Since the Project is in a similar location as the Vox on Two development with similar access to the Alewife MBTA Station and arguably better access to the Minuteman Bikeway, it is expected that similar parking usage will be the case for the Project.

In addition, the Project will also provide 144 bike parking spaces. These spaces will be located in the garage and as such will provide sheltered secure bike storage, which is typically viewed as critical to encouraging the use of this sustainable form of transportation. It is anticipated that with the bike parking on site, the proposed mitigation (identified later in this report), and the site's close proximity to the Minuteman Bikeway, the Project will appeal to an active resident demographic that is more focused on sustainable transportation than personal vehicle use.

[13] *Parking Generation Manual, 5th Edition*; ITE; Washington, D.C.; January 2019.

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[14] 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 congested or constrained operating conditions.

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.

[14]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 6th Edition;* Transportation Research Board; Washington, DC; 2016.

Unsignalized Intersections

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

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 6th Edition.*[15] 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 effects 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 *Highway Capacity Manual 6th Edition*. Table 9 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

Table 9
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

[a]Source: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 20-6.

[15]*Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016.

Signalized Intersections

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

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control 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 control 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 control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. 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 *Highway Capacity Manual 6th Edition*. 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 10 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.

Table 10
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[a]

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
A	F	≤10.0
B	F	10.1 to 20.0
C	F	20.1 to 35.0
D	F	35.1 to 55.0
E	F	55.1 to 80.0
F	F	>80.0

[a]Source: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 19-16.

ANALYSIS RESULTS

Level-of-service analyses were conducted for 2020 Baseline, 2027 No-Build, and 2027 Build conditions for the study area intersections. The results of the intersection capacity analysis within the study area are described below, with a tabular summary provided in Table 11 and Table 12.

Unsignalized Intersection Analysis Results

Lake Street at Wilson Avenue

Under all existing and future conditions, the critical movement at this intersection operates at LOS F during the weekday morning and at LOS E during the weekday evening peak hour.

Lake Street at Littlejohn Street

Under all existing and future conditions, the critical movement at this intersection operates at LOS F during the weekday morning peak hour. During the weekday evening peak hour, the critical movement at this intersection operates at LOS D under 2020 Baseline conditions and LOS E during 2027 No-Build and 2027 Build conditions.

Lake Street at Homestead Road

Under all existing and future conditions, the critical movement at this intersection operates at LOS F during the weekday morning and at LOS D during the weekday evening peak hour.

Lake Street at Burch Street and Alfred Road

The critical movements at this intersection operate at LOS E under the 2020 Baseline conditions during both the weekday morning and weekday evening peak hours. Under the 2027 No-Build condition the northbound movement operates at LOS F while the southbound movement operates at LOS E during both the weekday morning and weekday evening peak hours. Under the 2027 Build condition critical movements operate at LOS E during the weekday morning peak hour. The level of service remains unchanged during the weekday evening peak hour under 2027 Build conditions. The weekday morning peak hour level of service improves during the 2027 Build condition because project trips were added to the northbound right-turn movement which reduced the average delay for the approach.

Lake Street at Margaret Street and Lakehill Avenue

Under 2020 Baseline and 2027 No-Build conditions, the critical movements at this intersection operate at LOS F or better during the weekday morning and weekday evening peak hours. No changes to level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Dorothy Road/Littlejohn Street at Site Driveway

Under 2027 Build conditions, the critical movement at this intersection operates at LOS A during the weekday morning and weekday evening peak hours.

Table 11
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Intersection/	2020 Baseline				2027 No-Build				2027 Build			
Critical Movement/Peak Hour	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Lake Street at Wilson Avenue:												
Weekday Morning:												
Wilson Avenue NB LT/RT	0.11	>50	F	10	0.13	>50	F	10	0.14	>50	F	13
Weekday Evening:												
Wilson Avenue NB LT/RT	0.13	36	E	10	0.14	40	E	13	0.15	41	E	13
Lake Street at Littlejohn Street:												
Weekday Morning:												
Littlejohn Street NB LT/RT	0.47	>50	F	50	0.56	>50	F	60	0.86	>50	F	103
Weekday Evening:												
Littlejohn Street NB LT/RT	0.18	35	D	15	0.20	39	E	18	0.30	46	E	30
Lake Street at Homestead Road:												
Weekday Morning:												
Homestead Road NB LT/RT	0.13	>50	F	10	0.16	>50	F	13	0.16	>50	F	13
Weekday Evening:												
Homestead Road NB LT/RT	0.08	28	D	8	0.09	31	D	8	0.09	31	D	8
Lake Street at Burch Street and Alfred Road:												
Weekday Morning:												
Burch Street NB LT/TH/RT	0.23	43	E	20	0.27	>50	F	25	0.30	47	E	30
Alfred Road SB LT/TH/RT	0.13	38	E	10	0.15	44	E	13	0.16	46	E	13
Weekday Evening:												
Burch Street NB LT/TH/RT	0.24	47	E	23	0.27	>50	F	25	0.30	51	F	30
Alfred Road SB LT/TH/RT	0.05	41	E	5	0.06	47	E	5	0.06	50	E	5
Lake Street at Margaret Street and Lakehill Avenue:												
Weekday Morning:												
Margaret Street NB LT/TH/RT	0.67	>50	F	73	0.80	>50	F	83	0.84	>50	F	88
Lakehill Avenue SB LT/TH/RT	0.16	34	D	15	0.20	40	E	18	0.20	40	E	18
Weekday Evening:												
Margaret Street NB LT/TH/RT	0.47	>50	F	50	0.54	>50	F	58	0.54	>50	F	58
Lakehill Avenue SB LT/TH/RT	0.26	>50	F	23	0.31	>50	F	28	0.31	>50	F	30
Dorothy Road/Littlejohn Street at Site Driveway:												
Weekday Morning:												
Site Driveway NB TH/RT	**Intersection constructed under 2027 Build conditions**								0.02	9	A	3
Weekday Evening:												
Site Driveway NB TH/RT									0.01	9	A	0

[a]Volume to capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length in feet.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Signalized Intersection Analysis Results

Route 2 at Route 16

Signal 1

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS D or better during both the weekday morning and weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Signal 2

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS E during the weekday morning and overall LOS F during the weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Signal 3

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS C or better during both the weekday morning and weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Signal 4

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS A during both the weekday morning and weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Lake Street at Route 2 Eastbound On/Off-Ramps

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS D or better during both the weekday morning and weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Lake Street at Route 2 Westbound On/Off-Ramps

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS D or better during both the weekday morning and weekday evening peak hours. No changes to overall level of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Lake Street at Minuteman Commuter Bikeway

Though this intersection is currently unsignalized, it was modeled in Synchro as signalized under Existing conditions to provide a consistent basis for analysis. Under 2027 No-Build and 2027 Build conditions the signal is coordinated with the signal at the intersection of Lake Street with Brooks Avenue. Under 2020 Baseline conditions, this intersection operates at an overall LOS D during the weekday morning and an overall LOS A during the weekday evening peak hour. Under 2027 No-Build conditions, when the signal is coordinated with the Brooks Avenue intersection, this intersection operates at an overall LOS C during the weekday morning peak hour and an overall

LOS B during the weekday evening peak hour. No changes to overall levels of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Lake Street at Brooks Avenue

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS D or better during both the weekday morning and weekday evening peak hours. No changes to overall levels of service occur as a result of the addition of Project volumes under 2027 Build conditions during the weekday evening peak hour. The level of service changes from D to E during the weekday morning peak hour under 2027 Build conditions but the average delay only increases 1 second from 35 to 36 seconds.

Massachusetts Avenue at Lake Street

Under 2020 Baseline and 2027 No-Build conditions, this intersection operates at an overall LOS F or better during both the weekday morning and weekday evening peak hours. No changes to overall levels of service occur as a result of the addition of Project volumes under 2027 Build conditions.

Table 12
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Intersection/ Critical Movement/Peak Hour	2020 Baseline V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	2027 No-Build V/C	Delay	LOS	Queue 50th/95th	2027 Build V/C	Delay	LOS	Queue 50th/95th
ROUTE 2 AT ROUTE 16 (4 SIGNALS)												
Signal 1: Route 2 WB at Route 16 SB:												
Weekday Morning:												
Route 2 EB LT	0.81	8	A	41/40	0.85	10	B	43/40	0.85	10	B	43/40
Route 2 SB RT	0.98	53	D	502/613	1.02	63	E	581/659	1.02	63	E	581/659
Overall	--	**27**	**C**	--	--	**32**	**C**	--	--	**32**	**C**	--
Weekday Evening:												
Route 2 WB TH	1.04	31	C	656/52	1.08	48	D	702/57	1.08	49	D	704/56
Route 16 SB RT	0.91	42	D	442/606	0.95	47	D	472/644	0.95	47	D	472/644
Overall	--	**35**	**C**	--	--	**48**	**D**	--	--	**48**	**D**	--
Signal 2: Route 2 EB at Route 16 NB/SB/Alewife Station Access Road:												
Weekday Morning:												
Route 2 EB LT	0.89	67	E	197/291	0.92	72	E	206/308	0.92	72	E	206/308
Alewife Station Access Road WB TH	0.25	17	B	82/134	0.26	17	B	86/138	0.26	17	B	86/138
Route 16 NB LT	1.04	69	E	665/804	1.09	>80	F	728/868	1.09	>80	F	730/868
Route 16 SB TH	0.70	46	D	213/259	0.72	47	D	223/269	0.72	47	D	223/269
Overall	--	**61**	**E**	--	--	**73**	**E**	--	--	**73**	**E**	--
Weekday Evening:												
Route 2 EB LT	1.14	>80	F	300/418	1.19	>80	F	326/446	1.19	>80	F	326/446
Alewife Station Access Road WB TH	0.82	29	C	399/578	0.85	33	C	422/639	0.85	33	C	422/639
Route 16 NB LT	1.10	89	F	741/880	1.14	>80	F	792/931	1.14	>80	F	794/933
Route 16 SB TH	0.30	38	D	81/119	0.31	38	D	84/123	0.31	38	D	84/123
Overall	--	**>80**	**F**	--	--	**>80**	**F**	--	--	**>80**	**F**	--
Signal 3: Route 16 NB/SB at Alewife Station Access Road:												
Weekday Morning:												
Alewife Station Access Road WB TH	0.17	8	A	48/78	0.17	9	A	50/81	0.17	9	A	50/81
Alewife Station Access Road WB RT	0.06	8	A	15/30	0.07	8	A	15/31	0.07	8	A	15/31
Route 16 NB TH	0.30	38	D	80/117	0.32	38	D	83/121	0.32	38	D	83/121
Overall	--	**23**	**C**	--	--	**23**	**C**	--	--	**23**	**C**	--
Weekday Evening:												
Alewife Station Access Road WB TH	0.54	15	B	227/320	0.56	16	B	239/337	0.56	16	B	239/337
Alewife Station Access Road WB RT	0.35	10	B	106/159	0.36	11	B	110/165	0.36	11	B	110/165
Route 16 NB TH	0.29	38	D	78/115	0.30	38	D	81/119	0.30	38	D	81/119
Overall	--	**18**	**B**	--	--	**19**	**B**	--	--	**19**	**B**	--

See notes at end of table.

Table 12 (Continued)
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Intersection/ Critical Movement/Peak Hour	2020 Baseline				2027 No-Build				2027 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
Signal 4: Route 2 EB at Route 16 SB:												
Weekday Morning:												
Route 2 EB RT	0.50	11	B	209/258	0.52	12	B	220/272	0.52	12	B	221/272
Route 16 SB TH	0.59	3	A	5/0	0.62	4	A	5/0	0.62	4	A	5/0
Overall	--	**9**	**A**	--	--	**9**	**A**	--	--	**9**	**A**	--
Weekday Evening:												
Route 2 EB RT	0.48	11	B	198/245	0.50	11	B	209/255	0.50	11	B	210/258
Route 16 SB TH	0.25	1	A	0/0	0.26	1	A	0/1	0.26	1	A	0/1
Overall	--	**9**	**A**	--	--	**10**	**A**	--	--	**10**	**A**	--
LAKE STREET AT ROUTE 2 EB ON/OFF-RAMPS:												
Weekday Morning:												
Lake Street EB TH	0.59	25	C	95/176	0.64	28	C	118/204	0.65	28	C	119/205
Lake Street EB RT	0.26	0	A	0/0	0.30	0	A	0/0	0.30	0	A	0/0
Lake Street WB LT	0.56	28	C	62/116	0.58	27	C	83/151	0.58	27	C	84/152
Lake Street WB TH	0.25	7	A	39/53	0.25	7	A	42/57	0.25	7	A	43/57
Route 2 EB Off-Ramp NB LT	0.89	44	D	167/400	1.04	79	E	234/482	1.04	>80	F	236/482
Route 2 EB Off-Ramp NB RT	0.70	12	B	36/191	0.78	17	B	54/243	0.78	17	B	55/246
Overall	--	**18**	**B**	--	--	**26**	**C**	--	--	**27**	**C**	--
Weekday Evening:												
Lake Street EB TH	0.73	26	C	196/335	0.75	27	C	214/360	0.75	27	C	215/361
Lake Street EB RT	0.11	0	A	0/0	0.12	0	A	0/0	0.12	0	A	0/0
Lake Street WB LT	0.59	35	C	71/142	0.61	36	D	79/156	0.61	36	D	80/157
Lake Street WB TH	0.15	5	A	26/37	0.16	5	A	27/40	0.16	5	A	27/40
Route 2 EB Off-Ramp NB LT	1.08	>80	F	253/556	>1.20	>80	F	314/633	>1.20	>80	F	315/634
Route 2 EB Off-Ramp NB RT	0.81	19	B	57/279	0.90	28	C	90/362	0.90	29	C	92/367
Overall	--	**35**	**C**	--	--	**49**	**D**	--	--	**49**	**D**	--

See notes at end of table.

Table 12 (Continued)
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Intersection/ Critical Movement/Peak Hour	2020 Baseline				2027 No-Build				2027 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
LAKE STREET AT ROUTE 2 WB ON/OFF-RAMPS:												
Weekday Morning:												
Lake Street EB LT	0.73	38	D	81/164	0.77	41	D	88/179	0.77	41	D	88/179
Lake Street EB TH	0.65	14	B	150/238	0.69	15	B	167/265	0.70	15	B	168/268
Lake Street WB TH	0.96	57	E	168/335	1.05	>80	F	214/378	1.06	>80	F	217/381
Lake Street WB RT	0.96	34	C	80/314	1.03	51	D	135/357	1.04	55	D	169/364
Route 2 WB Off-Ramp NB LT	0.18	18	B	22/47	0.23	19	B	28/56	0.23	19	B	28/56
Route 2 WB Off-Ramp NB LT/TH	0.19	18	B	23/48	0.22	19	B	28/55	0.22	19	B	28/55
Route 2 WB Off-Ramp NB RT	0.02	0	A	0/0	0.02	0	A	0/0	0.02	0	A	0/0
Overall	--	**32**	**C**	--	--	**44**	**D**	--	--	**45**	**D**	--
Weekday Evening:												
Lake Street EB LT	1.04	>80	F	155/289	1.18	>80	F	191/331	1.19	>80	F	191/331
Lake Street EB TH	0.89	27	C	246/461	0.93	32	C	274/502	0.94	34	C	281/513
Lake Street WB TH	0.62	27	C	84/149	0.64	27	C	90/160	0.64	27	C	91/161
Lake Street WB RT	0.58	7	A	0/55	0.59	7	A	0/56	0.59	7	A	0/57
Route 2 WB Off-Ramp NB LT	0.25	19	B	33/72	0.27	19	B	35/75	0.27	19	B	35/75
Route 2 WB Off-Ramp NB LT/TH	0.24	19	B	34/72	0.26	19	B	36/76	0.26	19	B	36/76
Route 2 WB Off-Ramp NB RT	0.04	0	A	0/0	0.04	0	A	0/0	0.05	0	A	0/0
Overall	--	**33**	**C**	--	--	**44**	**D**	--	--	**45**	**D**	--
LAKE STREET AT MINUTEMAN COMMUTER BIKEWAY:												
Weekday Morning:												
Lake Street EB TH	0.54	8	A	101/149	0.59	15	B	245/378	0.60	15	B	249/384
Lake Street WB TH	0.84	65	E	232/517	0.92	44	D	121/405	0.92	44	D	122/427
Overall	--	**43**	**D**	--	--	**33**	**C**	--	--	**33**	**C**	--
Weekday Evening:												
Lake Street EB LT/TH/RT	0.66	9	**A**	170/251	0.75	16	B	326/460	0.76	16	**B**	339/477
Lake Street WB LT/TH/RT	0.41	8	**A**	86/141	0.47	4	A	53/98	0.48	4	**A**	53/98
Overall	--	**9**	**A**	--	--	**11**	**B**	--	--	**11**	**B**	--
LAKE STREET AT BROOKS AVENUE:												
Weekday Morning:												
Lake Street EB LT/TH/RT	0.59	19	B	55/408	0.62	4	A	9/3	0.62	4	A	8/3
Lake Street WB LT/TH/RT	0.98	38	D	147/772	0.99	63	E	618/1013	0.99	64	E	621/1017
Brooks Avenue NB LT/TH/RT	0.18	19	B	6/28	0.57	58	E	32/59	0.57	58	E	32/59
Brooks Avenue SB LT/TH/RT	0.42	9	A	2/35	0.47	14	B	7/41	0.47	14	B	7/41
Overall	--	**29**	**C**	--	--	**40**	**D**	--	--	**40**	**D**	--
Weekday Evening:												
Lake Street EB LT/TH/RT	0.85	71	E	97/636	0.82	8	A	33/38	0.83	8	A	29/57
Lake Street WB LT/TH/RT	0.50	10	B	43/286	0.47	10	A	147/234	0.48	10	A	150/237
Brooks Avenue NB LT/TH/RT	0.10	18	B	4/20	0.46	49	D	14/36	0.46	49	D	14/36
Brooks Avenue SB LT/TH/RT	0.38	9	A	1/30	0.55	16	B	3/37	0.55	16	B	3/37
Overall	--	**44**	**D**	--	--	**10**	**B**	--	--	**10**	**B**	--

See notes at end of table.

Table 12 (Continued)
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Intersection/ Critical Movement/Peak Hour	2020 Baseline				2027 No-Build				2027 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
MASSACHUSETTS AVENUE AT LAKE STREET:												
Weekday Morning:												
Lake Street EB LT/RT	1.12	>80	F	306/659	1.17	>80	F	335/698	1.18	>80	F	343/709
Massachusetts Avenue NB LT	>1.20	>80	F	211/512	>1.20	>80	F	250/559	>1.20	>80	F	251/562
Massachusetts Avenue NB TH	0.49	18	B	133/317	0.51	18	B	140/332	0.51	18	B	140/332
Massachusetts Avenue SB TH	0.75	32	C	198/371	0.77	33	C	208/409	0.77	33	C	208/409
Massachusetts Avenue SB RT	0.96	48	D	213/561	1.00	59	E	237/604	1.00	57	E	237/606
Overall	--	**76**	**E**	--	--	**91**	**F**	--	--	**>80**	**F**	--
Weekday Evening:												
Lake Street EB LT/RT	>1.20	>80	F	498/887	>1.20	>80	F	546/949	>1.20	>80	F	551/955
Massachusetts Avenue NB LT	0.96	58	E	89/359	1.02	75	E	93/393	1.04	79	E	95/402
Massachusetts Avenue NB TH	0.80	28	C	278/702	0.83	30	C	294/740	0.83	30	C	294/740
Massachusetts Avenue SB TH	0.58	28	C	142/265	0.60	28	C	148/277	0.60	28	C	148/277
Massachusetts Avenue SB RT	0.33	16	B	37/113	0.34	16	B	40/119	0.35	16	B	40/121
Overall	--	**>80**	**F**	--	--	**>80**	**F**	--	--	**>80**	**F**	--

[a]Volume to capacity ratio.
[b]Average stopped delay per vehicle (in seconds).
[c]Level-of-service.
[d]Queue length in feet.

RECOMMENDATIONS AND CONCLUSIONS

RECOMMENDATIONS

The traffic assessment contained herein indicates that the Project will not have substantial impacts at the study area intersections and Project-related traffic increases are expected to be between 0.1 percent and 0.8 percent during the peak hours depending on location. VAI recommends the following:

Bluebikes Station

- Subject to receiving the necessary approvals from the Town, the Project will commit to providing a large (23 dock) Bluebikes station in the vicinity of the existing Bluebikes station at Thorndike Field. This will serve to accommodate demand for Bluebikes in this heavily traveled bike corridor adjacent to the Minuteman Bikeway.

Site Recommendations

- The existing vegetation on the site frontage should be removed to provide adequate sight distance at the proposed site driveway location.

- The site driveway onto Dorothy Road should be placed under STOP-sign control, with painted STOP bars on the driveway at the STOP-sign location.

- At the site driveway, any new landscaping or building features should not exceed 24 inches in height or should be placed out of the lines of sight for motorists exiting the site and for those approaching the driveways on Dorothy Road.

Transportation Demand Management Measures

- Designate an on-site employee as the site's Transportation Coordinator to oversee marketing and promoting of transportation options at the site.

- Provide new residents transportation information packets with information on getting around Arlington sustainably.

- Provide Transitscreen installation in the building lobby which depicts accurate real-time information for area transit, Bluebikes stations, and Uber/Lyft services in the area.

- The property management team will provide information on available pedestrian and bicycle facilities in the vicinity of the Project site. This information will be posted in a centralized location.

- The property management team will investigate joining either the 128 Business Council or the Alewife TMA. Either TMA could provide a ridematching program among residents of the Project and employers of the area.

CONCLUSIONS

VAI has completed a transportation assessment of the potential impacts on the surrounding transportation infrastructure associated with the proposed Thorndike Place residential development to be located on the Mugar Parcel in Arlington, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project.

The Project is expected to produce a minor increase in traffic volumes in the vicinity of the site and minor but manageable increases in delays to various movements within the study area. No changes to critical movement levels of service occur as a result of the addition of Project volumes under 2027 Build conditions. The level of service does go from D to E during the weekday morning peak hour under 2027 Build conditions at the intersection of Lake Street with Brooks Avenue but the average delay only increases 1 second from 35 to 36 seconds.

The proposed addition of a large Bluebikes station adjacent to the existing station at Thorndike Field will help to alleviate demand for Bluebikes in this area, adjacent to the Minuteman Bikeway. This in combination with the proposal to include 144 sheltered bike parking spaces will encourage the use of bicycling as a sustainable commuting measure over the use of personal vehicles.

Based on the above, VAI has concluded that the Project can be safely accommodated with minimal impact on the area road network.

APPENDIX

TRAFFIC COUNT DATA
MINUTEMAN COMMUTER BIKEWAY DATA
SEASONAL ADJUSTMENT DATA
COVID-19 ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
MOTOR VEHICLE CRASH DATA
GROWTH RATE DATA
TRIP GENERATION CALCULATIONS
JOURNEY TO WORK DATA
CAPACITY ANALYSIS

TRAFFIC COUNT DATA

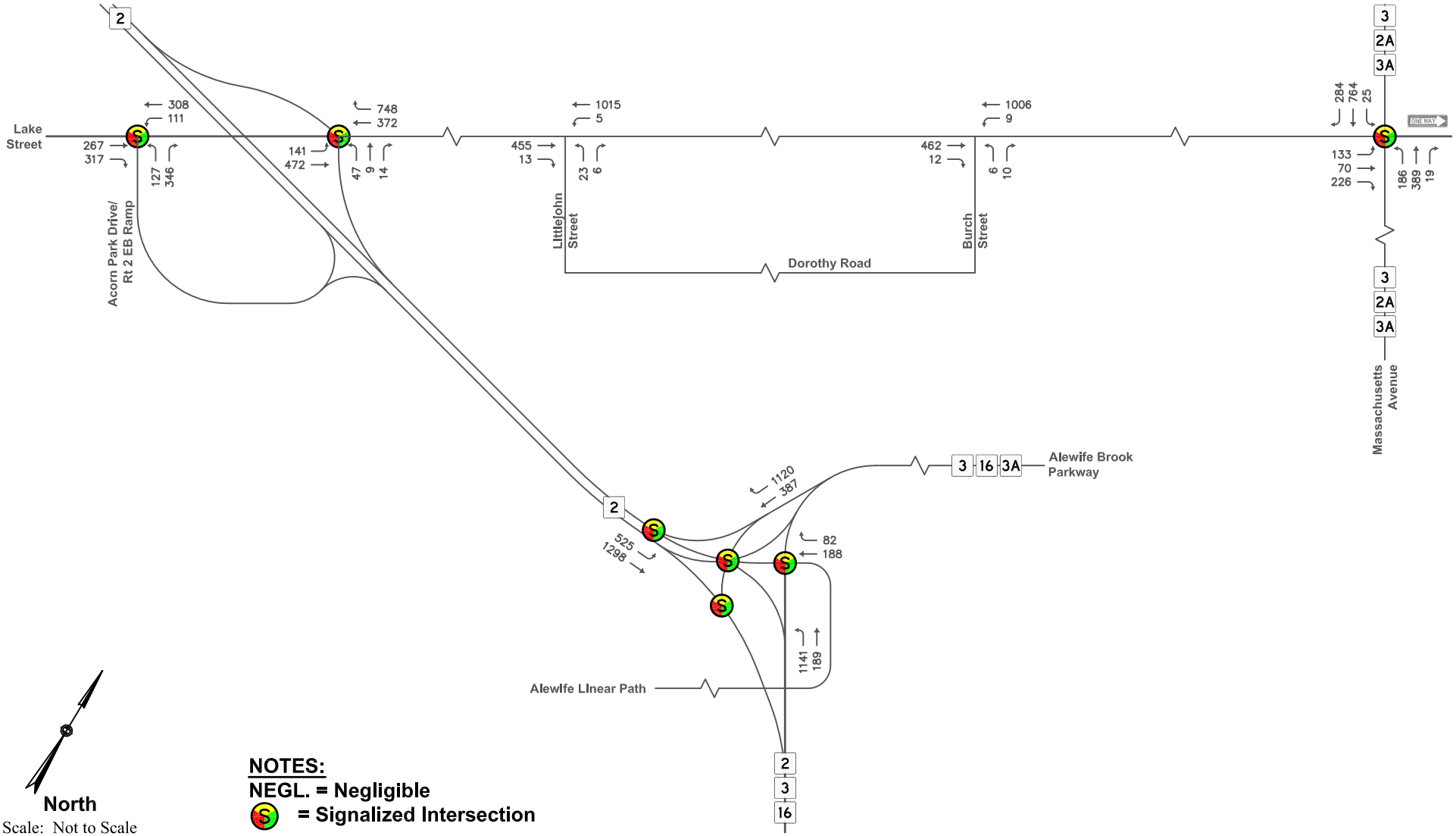


Figure 3

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

2014 Existing Conditions
Weekday Morning Peak Hour Traffic Volumes

Date: February 2014
Dwg No. 754 TIAS.dwg
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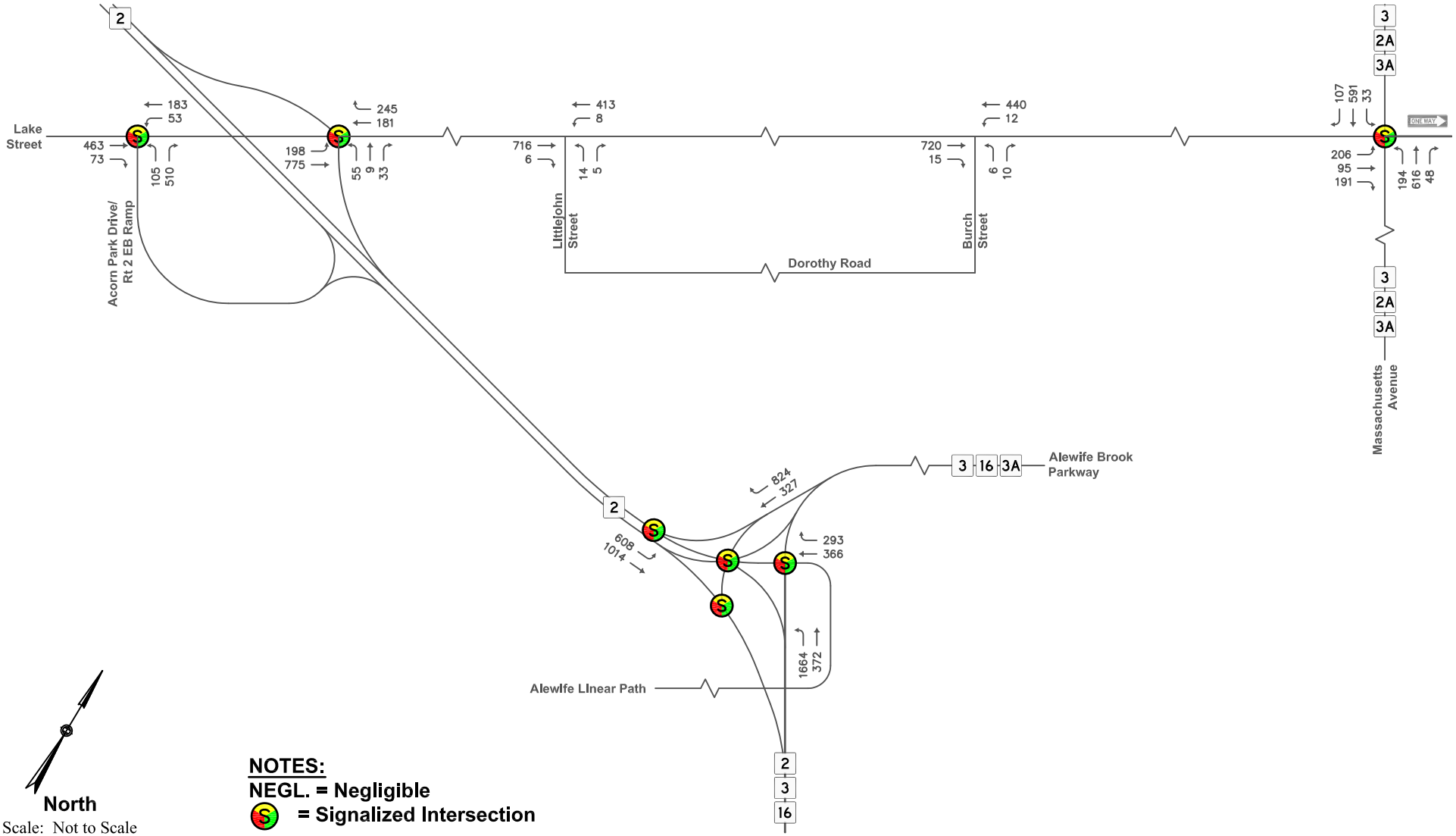


Figure 4

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

2014 Existing Conditions
Weekday Evening Peak Hour Traffic Volumes

Date: February 2014
Dwg No. 754 TIAS.dwg
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Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Cars - Trucks - Buses

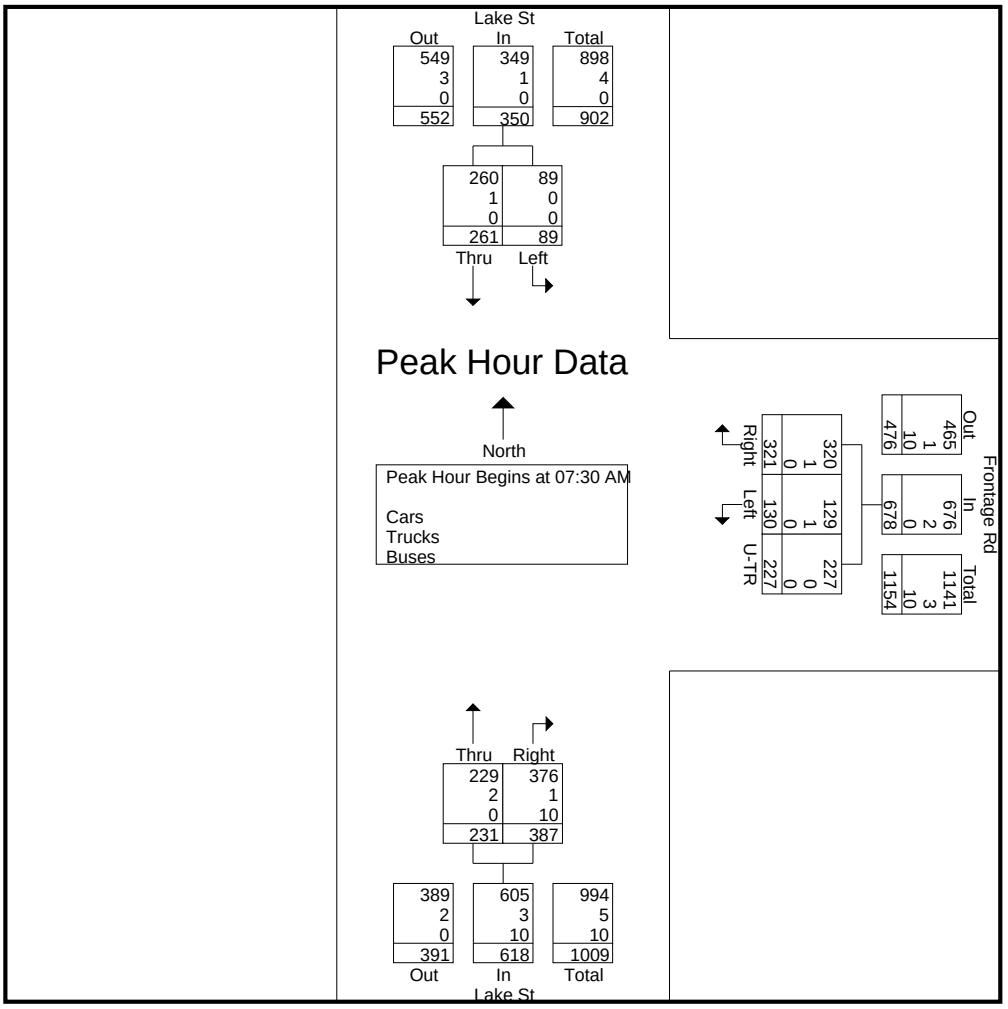
	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
07:30 AM	21	58	24	102	60	63	75	403
07:45 AM	19	67	36	83	63	48	95	411
Total	40	125	60	185	123	111	170	814
08:00 AM	19	62	33	64	46	59	108	391
08:15 AM	30	74	37	72	58	61	109	441
08:30 AM	25	72	33	86	44	65	77	402
08:45 AM	28	65	30	75	50	44	70	362
Total	102	273	133	297	198	229	364	1596
09:00 AM	25	70	35	92	50	57	49	378
09:15 AM	17	71	21	85	19	41	29	283
Grand Total	184	539	249	659	390	438	612	3071
Apprch %	25.4	74.6	19.2	50.8	30	41.7	58.3	
Total %	6	17.6	8.1	21.5	12.7	14.3	19.9	
Cars	183	537	248	658	390	435	589	3040
% Cars	99.5	99.6	99.6	99.8	100	99.3	96.2	99
Trucks	1	2	1	1	0	3	2	10
% Trucks	0.5	0.4	0.4	0.2	0	0.7	0.3	0.3
Buses	0	0	0	0	0	0	21	21
% Buses	0	0	0	0	0	0	3.4	0.7

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 2

	Lake St From North			Frontage Rd From East				Lake St From South			
Start Time	Left	Thru	App. Total	Left	Right	U-TR	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 09:15 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:30 AM											
07:30 AM	21	58	79	24	102	60	186	63	75	138	403
07:45 AM	19	67	86	36	83	63	182	48	95	143	411
08:00 AM	19	62	81	33	64	46	143	59	108	167	391
08:15 AM	30	74	104	37	72	58	167	61	109	170	441
Total Volume	89	261	350	130	321	227	678	231	387	618	1646
% App. Total	25.4	74.6		19.2	47.3	33.5		37.4	62.6		
PHF	.742	.882	.841	.878	.787	.901	.911	.917	.888	.909	.933
Cars	89	260	349	129	320	227	676	229	376	605	1630
% Cars	100	99.6	99.7	99.2	99.7	100	99.7	99.1	97.2	97.9	99.0
Trucks	0	1	1	1	1	0	2	2	1	3	6
% Trucks	0	0.4	0.3	0.8	0.3	0	0.3	0.9	0.3	0.5	0.4
Buses	0	0	0	0	0	0	0	0	10	10	10
% Buses	0	0	0	0	0	0	0	0	2.6	1.6	0.6



Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Trucks

	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
07:30 AM	0	1	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	1	1
Total	0	1	0	0	0	0	1	2
08:00 AM	0	0	0	0	0	0	0	0
08:15 AM	0	0	1	1	0	2	0	4
08:30 AM	0	1	0	0	0	1	0	2
08:45 AM	0	0	0	0	0	0	0	0
Total	0	1	1	1	0	3	0	6
09:00 AM	1	0	0	0	0	0	1	2
09:15 AM	0	0	0	0	0	0	0	0
Grand Total	1	2	1	1	0	3	2	10
Apprch %	33.3	66.7	50	50	0	60	40	
Total %	10	20	10	10	0	30	20	

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Buses

	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
07:30 AM	0	0	0	0	0	0	3	3
07:45 AM	0	0	0	0	0	0	3	3
Total	0	0	0	0	0	0	6	6
08:00 AM	0	0	0	0	0	0	3	3
08:15 AM	0	0	0	0	0	0	1	1
08:30 AM	0	0	0	0	0	0	3	3
08:45 AM	0	0	0	0	0	0	3	3
Total	0	0	0	0	0	0	10	10
09:00 AM	0	0	0	0	0	0	3	3
09:15 AM	0	0	0	0	0	0	2	2
Grand Total	0	0	0	0	0	0	21	21
Apprch %	0	0	0	0	0	0	100	
Total %	0	0	0	0	0	0	100	

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016

Groups Printed- Bikes Peds

	Lake St From North			Frontage Rd From East			Lake St From South					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:30 AM	0	1	2	2	1	2	1	2	0	4	7	11
07:45 AM	0	1	0	0	0	3	0	0	0	3	1	4
Total	0	2	2	2	1	5	1	2	0	7	8	15
08:00 AM	0	0	0	0	0	0	0	1	0	0	1	1
08:15 AM	0	0	2	1	0	1	0	0	0	3	1	4
08:30 AM	0	1	0	0	0	0	0	0	0	0	1	1
08:45 AM	0	1	0	0	0	0	2	0	0	0	3	3
Total	0	2	2	1	0	1	2	1	0	3	6	9
09:00 AM	0	1	0	0	0	0	0	1	0	0	2	2
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	5	4	3	1	6	3	4	0	10	16	26
Apprch %	0	100		75	25		42.9	57.1				
Total %	0	31.2		18.8	6.2		18.8	25		38.5	61.5	

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Cars - Trucks - Buses

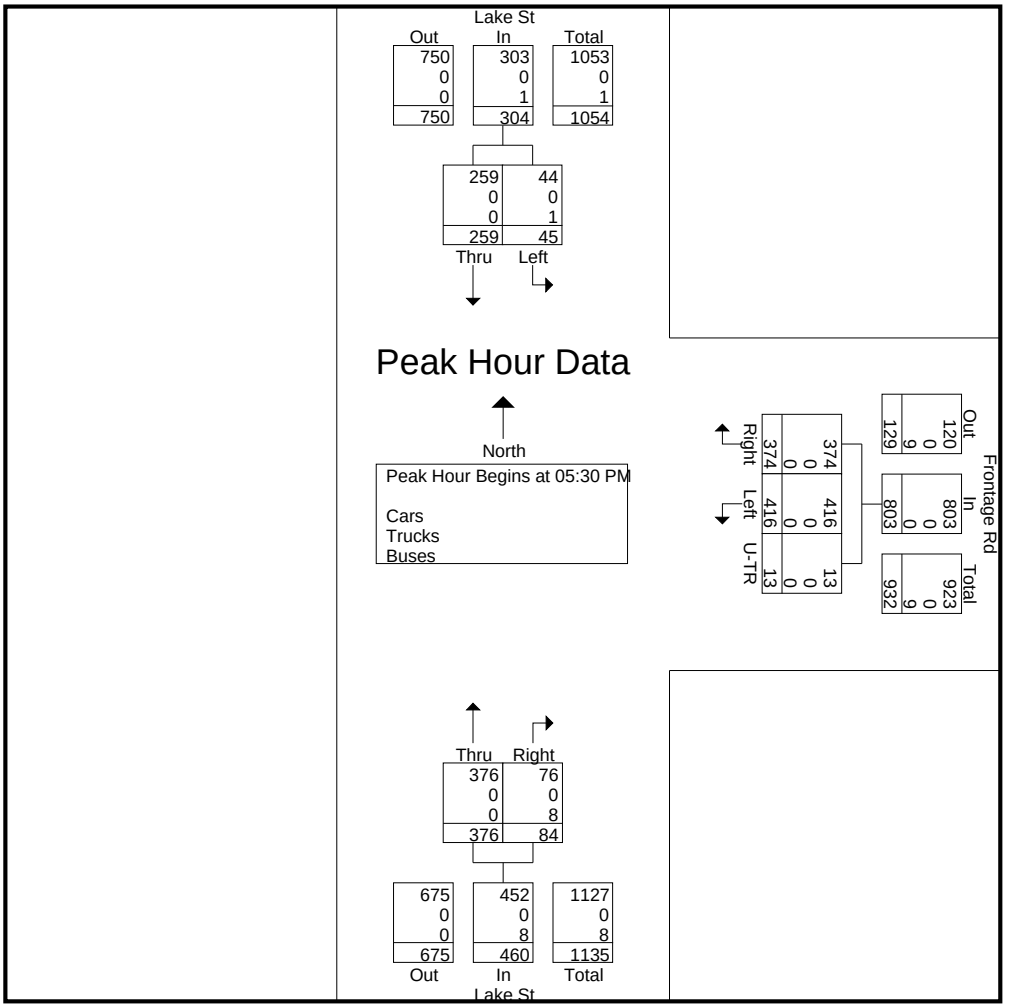
	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
04:30 PM	11	60	23	127	0	109	11	341
04:45 PM	9	49	24	140	0	80	14	316
Total	20	109	47	267	0	189	25	657
05:00 PM	8	49	40	127	1	89	22	336
05:15 PM	9	58	87	94	0	97	14	359
05:30 PM	10	64	118	82	1	95	26	396
05:45 PM	17	70	94	112	4	102	18	417
Total	44	241	339	415	6	383	80	1508
06:00 PM	8	60	104	91	2	74	22	361
06:15 PM	10	65	100	89	6	105	18	393
Grand Total	82	475	590	862	14	751	145	2919
Apprch %	14.7	85.3	40.2	58.8	1	83.8	16.2	
Total %	2.8	16.3	20.2	29.5	0.5	25.7	5	
Cars	81	474	590	862	14	751	132	2904
% Cars	98.8	99.8	100	100	100	100	91	99.5
Trucks	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0
Buses	1	1	0	0	0	0	13	15
% Buses	1.2	0.2	0	0	0	0	9	0.5

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 2

	Lake St From North			Frontage Rd From East				Lake St From South			
Start Time	Left	Thru	App. Total	Left	Right	U-TR	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 05:30 PM											
05:30 PM	10	64	74	118	82	1	201	95	26	121	396
05:45 PM	17	70	87	94	112	4	210	102	18	120	417
06:00 PM	8	60	68	104	91	2	197	74	22	96	361
06:15 PM	10	65	75	100	89	6	195	105	18	123	393
Total Volume	45	259	304	416	374	13	803	376	84	460	1567
% App. Total	14.8	85.2		51.8	46.6	1.6		81.7	18.3		
PHF	.662	.925	.874	.881	.835	.542	.956	.895	.808	.935	.939
Cars	44	259	303	416	374	13	803	376	76	452	1558
% Cars	97.8	100	99.7	100	100	100	100	100	90.5	98.3	99.4
Trucks	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0
Buses	1	0	1	0	0	0	0	0	8	8	9
% Buses	2.2	0	0.3	0	0	0	0	0	9.5	1.7	0.6



Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Trucks

	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
04:30 PM	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	
Total %								

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016
Page No : 1

Groups Printed- Buses

	Lake St From North		Frontage Rd From East			Lake St From South		
Start Time	Left	Thru	Left	Right	U-TR	Thru	Right	Int. Total
04:30 PM	0	0	0	0	0	0	1	1
04:45 PM	0	1	0	0	0	0	3	4
Total	0	1	0	0	0	0	4	5
05:00 PM	0	0	0	0	0	0	1	1
05:15 PM	0	0	0	0	0	0	0	0
05:30 PM	1	0	0	0	0	0	2	3
05:45 PM	0	0	0	0	0	0	2	2
Total	1	0	0	0	0	0	5	6
06:00 PM	0	0	0	0	0	0	3	3
06:15 PM	0	0	0	0	0	0	1	1
Grand Total	1	1	0	0	0	0	13	15
Apprch %	50	50	0	0	0	0	100	
Total %	6.7	6.7	0	0	0	0	86.7	

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Frontage Road
City/State : Cambridge, MA
Weather : Clear

File Name : 7277A002
Site Code : 7277A002
Start Date : 9/14/2016

Groups Printed- Bikes Peds

	Lake St From North			Frontage Rd From East			Lake St From South					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	2	0	0	0	2	2
Total	0	0	0	0	0	0	2	0	0	0	2	2
05:00 PM	0	0	0	0	1	0	0	0	0	0	1	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	2	0	0	0	0	2	1	0	0	5	5
05:45 PM	0	1	1	0	0	1	1	0	0	2	2	4
Total	0	3	1	0	1	1	3	1	0	2	8	10
06:00 PM	0	0	0	0	0	1	2	1	0	1	3	4
06:15 PM	0	0	1	1	0	1	0	0	0	2	1	3
Grand Total	0	3	2	1	1	3	7	2	0	5	14	19
Apprch %	0	100		50	50		77.8	22.2				
Total %	0	21.4		7.1	7.1		50	14.3		26.3	73.7	

5

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 1

Groups Printed- Cars - Trucks - Buses

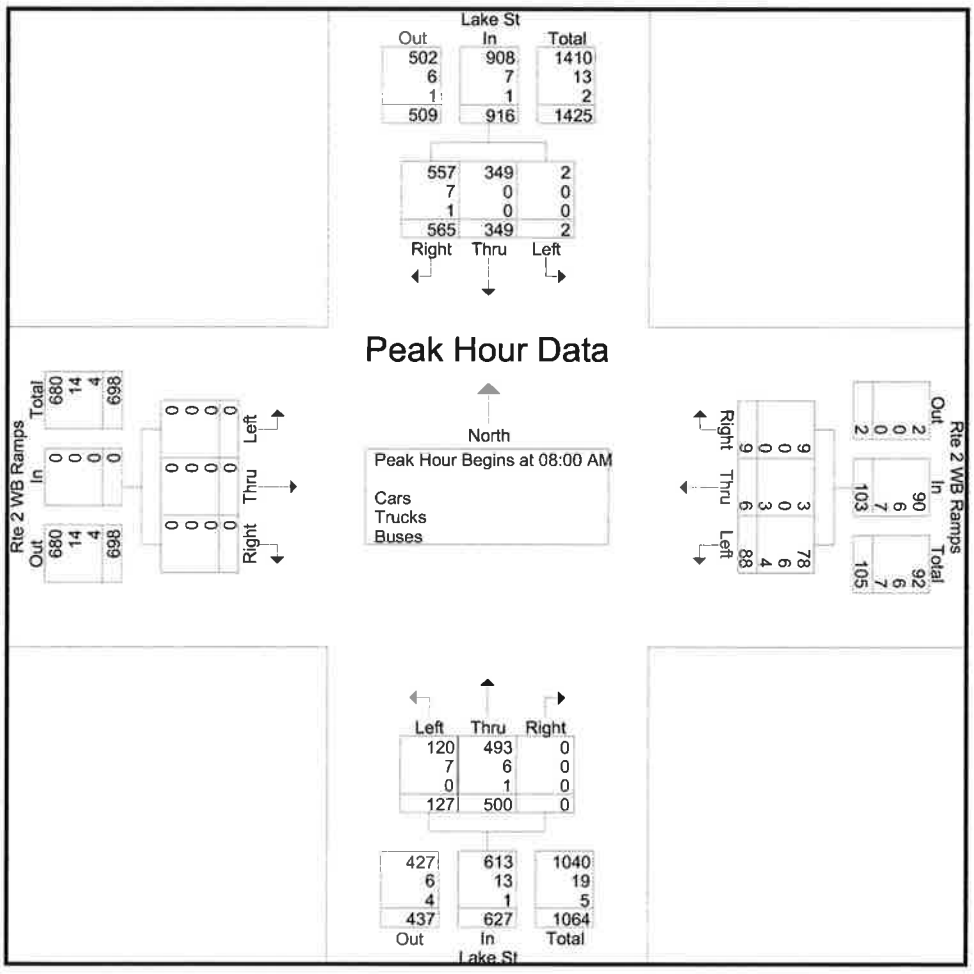
	Lake St From North			Rte 2 WB Ramps From East			Lake St From South			Rte 2 WB Ramps From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:30 AM	0	78	222	16	2	3	32	124	0	0	0	0	477
07:45 AM	0	68	170	13	2	2	27	95	0	0	0	0	377
Total	0	146	392	29	4	5	59	219	0	0	0	0	854
08:00 AM	0	73	137	16	1	3	37	89	0	0	0	0	356
08:15 AM	1	81	137	28	3	1	33	122	0	0	0	0	406
08:30 AM	0	99	150	23	1	1	31	148	0	0	0	0	453
08:45 AM	1	96	141	21	1	4	26	141	0	0	0	0	431
Total	2	349	565	88	6	9	127	500	0	0	0	0	1646
09:00 AM	0	88	109	23	1	1	21	103	0	0	0	0	346
09:15 AM	0	74	93	18	2	2	17	110	0	0	0	0	316
Grand Total	2	657	1159	158	13	17	224	932	0	0	0	0	3162
Apprch %	0.1	36.1	63.8	84	6.9	9	19.4	80.6	0	0	0	0	
Total %	0.1	20.8	36.7	5	0.4	0.5	7.1	29.5	0	0	0	0	
Cars	2	654	1147	142	6	17	210	916	0	0	0	0	3094
% Cars	100	99.5	99	89.9	46.2	100	93.8	98.3	0	0	0	0	97.8
Trucks	0	3	11	10	0	0	14	14	0	0	0	0	52
% Trucks	0	0.5	0.9	6.3	0	0	6.2	1.5	0	0	0	0	1.6
Buses	0	0	1	6	7	0	0	2	0	0	0	0	16
% Buses	0	0	0.1	3.8	53.8	0	0	0.2	0	0	0	0	0.5

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 2

	Lake St From North				Rte 2 WB Ramps From East				Lake St From South				Rte 2 WB Ramps From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 09:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	73	137	210	16	1	3	20	37	89	0	126	0	0	0	0	356
08:15 AM	1	81	137	219	28	3	1	32	33	122	0	155	0	0	0	0	406
08:30 AM	0	99	150	249	23	1	1	25	31	148	0	179	0	0	0	0	453
08:45 AM	1	96	141	238	21	1	4	26	26	141	0	167	0	0	0	0	431
Total Volume	2	349	565	916	88	6	9	103	127	500	0	627	0	0	0	0	1646
% App. Total	0.2	38.1	61.7		85.4	5.8	8.7		20.3	79.7	0		0	0	0		
PHF	.500	.881	.942	.920	.786	.500	.563	.805	.858	.845	.000	.876	.000	.000	.000	.000	.908
Cars	2	349	557	908	78	3	9	90	120	493	0	613	0	0	0	0	1611
% Cars	100	100	98.6	99.1	88.6	50.0	100	87.4	94.5	98.6	0	97.8	0	0	0	0	97.9
Trucks	0	0	7	7	6	0	0	6	7	6	0	13	0	0	0	0	26
% Trucks	0	0	1.2	0.8	6.8	0	0	5.8	5.5	1.2	0	2.1	0	0	0	0	1.6
Buses	0	0	1	1	4	3	0	7	0	1	0	1	0	0	0	0	9
% Buses	0	0	0.2	0.1	4.5	50.0	0	6.8	0	0.2	0	0.2	0	0	0	0	0.5



Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 1

Groups Printed- Bikes Peds

	Lake St From North				Rte 2 WB Ramps From East				Lake St From South				Rte 2 WB Ramps From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10	10	1	11
07:45 AM	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	8	9	2	11
Total	0	1	2	0	0	0	0	1	0	0	0	0	0	0	0	18	19	3	22
08:00 AM	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	2	3
08:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
08:30 AM	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	4	0	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	0	0	0	2	0	1	0	1	1	0	0	1	6	2	8
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	2	2	0	0	0	3	0	1	0	1	1	0	0	19	25	5	30
Apprch %	0	33.3	66.7		0	0	0		0	100	0		100	0	0				
Total %	0	20	40		0	0	0		0	20	0		20	0	0		83.3	16.7	

Accurate Counts

978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 1

Groups Printed- Cars - Trucks - Buses

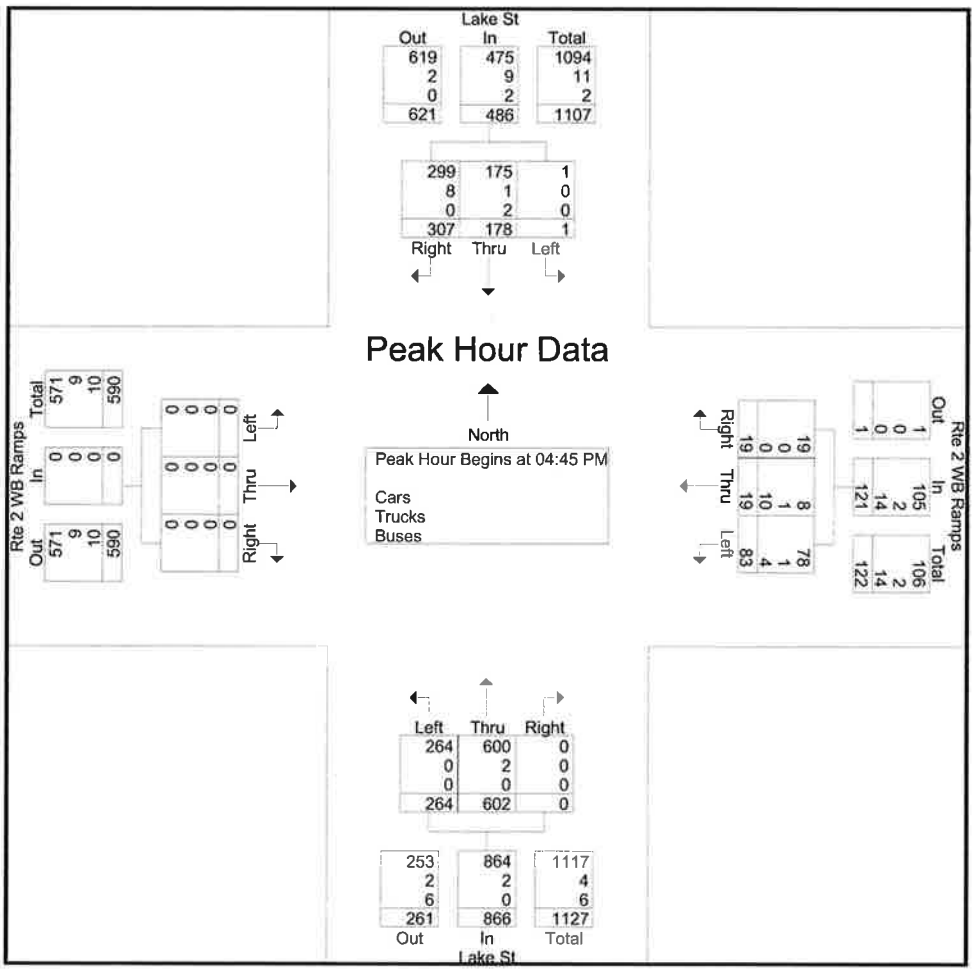
	Lake St From North			Rte 2 WB Ramps From East			Lake St From South			Rte 2 WB Ramps From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:30 PM	0	37	44	14	2	8	46	160	0	0	0	0	311
04:45 PM	0	41	62	21	3	7	56	163	0	0	0	0	353
Total	0	78	106	35	5	15	102	323	0	0	0	0	664
05:00 PM	0	41	83	27	3	2	62	185	0	0	0	0	403
05:15 PM	0	37	88	15	7	5	74	148	0	0	0	0	374
05:30 PM	1	59	74	20	6	5	72	106	0	0	0	0	343
05:45 PM	0	36	80	16	2	9	56	116	0	0	0	0	315
Total	1	173	325	78	18	21	264	555	0	0	0	0	1435
06:00 PM	0	53	75	18	2	6	74	136	0	0	0	0	364
06:15 PM	0	51	73	16	3	6	63	130	0	0	0	0	342
Grand Total	1	355	579	147	28	48	503	1144	0	0	0	0	2805
Apprch %	0.1	38	61.9	65.9	12.6	21.5	30.5	69.5	0	0	0	0	
Total %	0	12.7	20.6	5.2	1	1.7	17.9	40.8	0	0	0	0	
Cars	1	349	565	139	12	48	503	1140	0	0	0	0	2757
% Cars	100	98.3	97.6	94.6	42.9	100	100	99.7	0	0	0	0	98.3
Trucks	0	3	14	1	1	0	0	2	0	0	0	0	21
% Trucks	0	0.8	2.4	0.7	3.6	0	0	0.2	0	0	0	0	0.7
Buses	0	3	0	7	15	0	0	2	0	0	0	0	27
% Buses	0	0.8	0	4.8	53.6	0	0	0.2	0	0	0	0	1

Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 2

	Lake St From North				Rte 2 WB Ramps From East				Lake St From South				Rte 2 WB Ramps From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	41	62	103	21	3	7	31	56	163	0	219	0	0	0	0	353
05:00 PM	0	41	83	124	27	3	2	32	62	185	0	247	0	0	0	0	403
05:15 PM	0	37	88	125	15	7	5	27	74	148	0	222	0	0	0	0	374
05:30 PM	1	59	74	134	20	6	5	31	72	106	0	178	0	0	0	0	343
Total Volume	1	178	307	486	83	19	19	121	264	602	0	866	0	0	0	0	1473
% App. Total	0.2	36.6	63.2		68.6	15.7	15.7		30.5	69.5	0		0	0	0		
PHF	.250	.754	.872	.907	.769	.679	.679	.945	.892	.814	.000	.877	.000	.000	.000	.000	.914
Cars	1	175	299	475	78	8	19	105	264	600	0	864	0	0	0	0	1444
% Cars	100	98.3	97.4	97.7	94.0	42.1	100	86.8	100	99.7	0	99.8	0	0	0	0	98.0
Trucks	0	1	8	9	1	1	0	2	0	2	0	2	0	0	0	0	13
% Trucks	0	0.6	2.6	1.9	1.2	5.3	0	1.7	0	0.3	0	0.2	0	0	0	0	0.9
Buses	0	2	0	2	4	10	0	14	0	0	0	0	0	0	0	0	16
% Buses	0	1.1	0	0.4	4.8	52.6	0	11.6	0	0	0	0	0	0	0	0	1.1



Accurate Counts
978-664-2565

N/S Street : Lake Street
E/W Street : Route 2 WB Ramps
City/State : Cambridge, MA
Weather : Cloudy

File Name : 7277A001
Site Code : 7277A001
Start Date : 9/27/2016
Page No : 1

Groups Printed- Bikes Peds

	Lake St From North				Rte 2 WB Ramps From East				Lake St From South				Rte 2 WB Ramps From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:30 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	5	5	2	7
04:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	10	0	10
Total	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	14	15	2	17
05:00 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	4	4	2	6
05:15 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	7	9	0	9
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0	16
05:45 PM	0	0	0	1	0	0	0	2	0	2	0	0	0	0	0	6	9	2	11
Total	0	0	1	3	0	0	0	2	0	3	0	0	0	0	0	33	38	4	42
06:00 PM	0	1	0	1	0	0	0	1	0	2	0	0	0	0	0	5	7	3	10
06:15 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	23	23	2	25
Grand Total	0	2	3	4	0	0	0	4	0	6	0	0	0	0	0	75	83	11	94
Apprch %	0	40	60		0	0	0		0	100	0		0	0	0				
Total %	0	18.2	27.3		0	0	0		0	54.5	0		0	0	0		88.3	11.7	

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 1

Groups Printed- Cars - Trucks

	Alewife Brook Pkwy From North			Station Access Rd From East			Alewife Brook Pkwy From South			Route 2 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:30 AM	0	89	243	0	48	9	370	65	0	92	0	269	1185
07:45 AM	0	160	269	0	35	13	344	53	0	133	0	231	1238
Total	0	249	512	0	83	22	714	118	0	225	0	500	2423
08:00 AM	0	78	225	0	38	12	321	55	0	127	0	258	1114
08:15 AM	0	165	281	0	43	11	313	44	0	102	0	279	1238
08:30 AM	0	101	223	0	31	10	301	40	0	139	0	267	1112
08:45 AM	0	103	237	0	37	16	247	37	0	116	0	279	1072
Total	0	447	966	0	149	49	1182	176	0	484	0	1083	4536
09:00 AM	0	89	214	0	34	15	306	82	0	110	0	201	1051
09:15 AM	0	111	215	0	40	35	267	64	0	127	0	284	1143
Grand Total	0	896	1907	0	306	121	2469	440	0	946	0	2068	9153
Apprch %	0	32	68	0	71.7	28.3	84.9	15.1	0	31.4	0	68.6	
Total %	0	9.8	20.8	0	3.3	1.3	27	4.8	0	10.3	0	22.6	
Cars	0	879	1888	0	290	114	2420	431	0	936	0	2034	8992
% Cars	0	98.1	99	0	94.8	94.2	98	98	0	98.9	0	98.4	98.2
Trucks	0	17	19	0	16	7	49	9	0	10	0	34	161
% Trucks	0	1.9	1	0	5.2	5.8	2	2	0	1.1	0	1.6	1.8

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 2

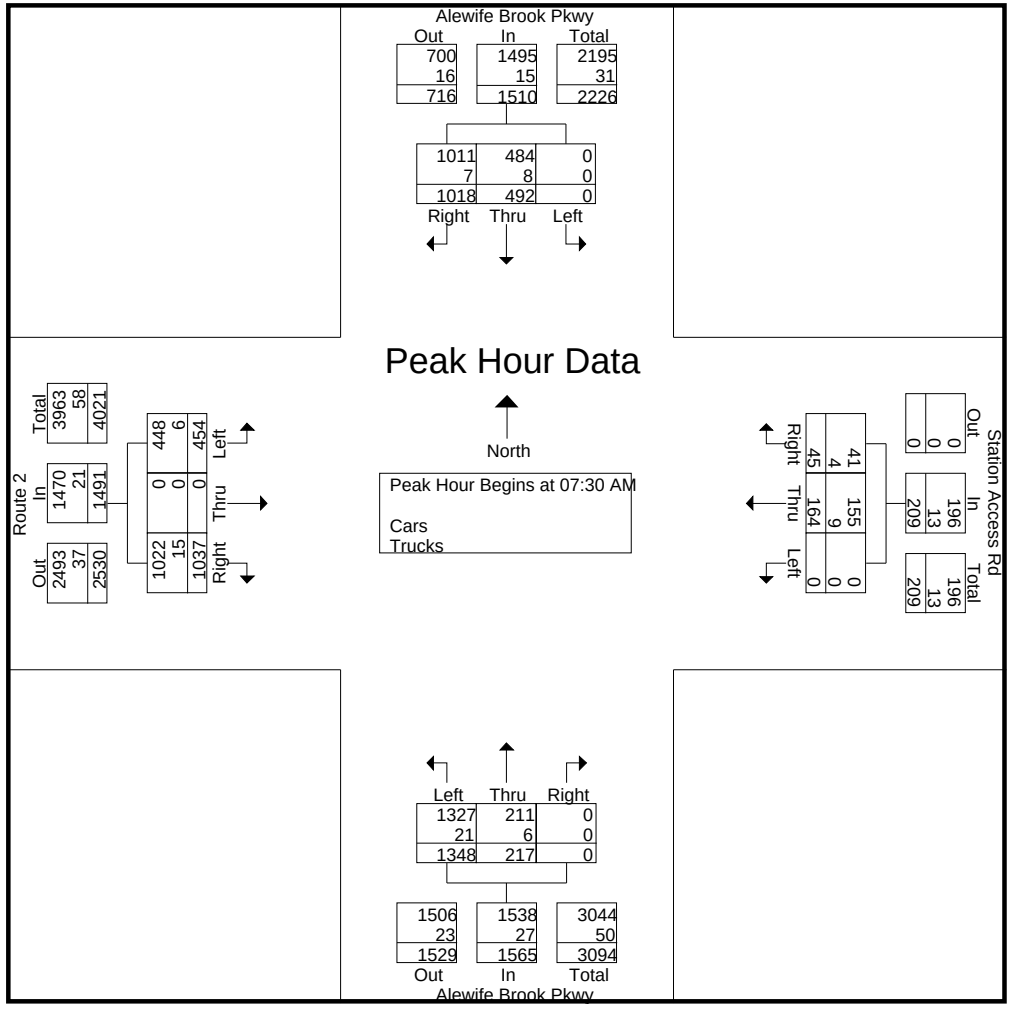
	Alewife Brook Pkwy From North				Station Access Rd From East				Alewife Brook Pkwy From South				Route 2 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 09:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	89	243	332	0	**48**	9	**57**	**370**	**65**	0	**435**	92	0	269	361	1185
07:45 AM	0	160	269	429	0	35	**13**	48	344	53	0	397	**133**	0	231	364	**1238**
08:00 AM	0	78	225	303	0	38	12	50	321	55	0	376	127	0	258	**385**	1114
08:15 AM	0	**165**	**281**	**446**	0	43	11	54	313	44	0	357	102	0	**279**	381	1238
Total Volume	0	492	1018	1510	0	164	45	209	1348	217	0	1565	454	0	1037	1491	4775
% App. Total	0	32.6	67.4		0	78.5	21.5		86.1	13.9	0		30.4	0	69.6		
PHF	.000	.745	.906	.846	.000	.854	.865	.917	.911	.835	.000	.899	.853	.000	.929	.968	.964
Cars	0	484	1011	1495	0	155	41	196	1327	211	0	1538	448	0	1022	1470	4699
% Cars	0	98.4	99.3	99.0	0	94.5	91.1	93.8	98.4	97.2	0	98.3	98.7	0	98.6	98.6	98.4
Trucks	0	8	7	15	0	9	4	13	21	6	0	27	6	0	15	21	76
% Trucks	0	1.6	0.7	1.0	0	5.5	8.9	6.2	1.6	2.8	0	1.7	1.3	0	1.4	1.4	1.6

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 3



Peak Hour Analysis From 07:30 AM to 09:15 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				08:30 AM				07:30 AM				08:00 AM			
+0 mins.	0	89	243	332	0	31	10	41	**370**	**65**	0	**435**	127	0	258	385
+15 mins.	0	160	269	429	0	37	16	53	344	53	0	397	102	0	**279**	381
+30 mins.	0	78	225	303	0	34	15	49	321	55	0	376	**139**	0	267	**406**
+45 mins.	0	**165**	**281**	**446**	0	**40**	**35**	**75**	313	44	0	357	116	0	279	395
Total Volume	0	492	1018	1510	0	142	76	218	1348	217	0	1565	484	0	1083	1567

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019

Groups Printed- Trucks

	Alewife Brook Pkwy From North			Station Access Rd From East			Alewife Brook Pkwy From South			Route 2 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:30 AM	0	1	1	0	4	1	2	3	0	1	0	3	16
07:45 AM	0	3	1	0	1	1	8	1	0	1	0	4	20
Total	0	4	2	0	5	2	10	4	0	2	0	7	36
08:00 AM	0	3	3	0	1	0	6	1	0	1	0	6	21
08:15 AM	0	1	2	0	3	2	5	1	0	3	0	2	19
08:30 AM	0	2	6	0	2	2	5	0	0	1	0	3	21
08:45 AM	0	1	0	0	1	1	5	0	0	1	0	3	12
Total	0	7	11	0	7	5	21	2	0	6	0	14	73
09:00 AM	0	2	3	0	3	0	9	2	0	1	0	3	23
09:15 AM	0	4	3	0	1	0	9	1	0	1	0	10	29
Grand Total	0	17	19	0	16	7	49	9	0	10	0	34	161
Apprch %	0	47.2	52.8	0	69.6	30.4	84.5	15.5	0	22.7	0	77.3	
Total %	0	10.6	11.8	0	9.9	4.3	30.4	5.6	0	6.2	0	21.1	

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 13

Groups Printed- Bikes Peds

	Alewife Brook Pkwy From North				Station Access Rd From East				Alewife Brook Pkwy From South				Route 2 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2
Grand Total	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 1

Groups Printed- Cars - Trucks

	Alewife Brook Pkwy From North			Station Access Rd From East			Alewife Brook Pkwy From South			Route 2 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:30 PM	0	54	267	0	76	68	375	63	0	120	0	223	1246
04:45 PM	0	58	258	0	136	73	375	71	0	151	0	271	1393
Total	0	112	525	0	212	141	750	134	0	271	0	494	2639
05:00 PM	0	65	270	0	132	82	372	56	0	132	0	204	1313
05:15 PM	0	48	282	0	159	75	371	61	0	139	0	212	1347
05:30 PM	0	71	260	0	147	87	386	43	0	144	0	257	1395
05:45 PM	0	64	242	0	122	57	371	53	0	144	0	226	1279
Total	0	248	1054	0	560	301	1500	213	0	559	0	899	5334
06:00 PM	0	62	253	0	140	68	367	45	0	151	0	269	1355
06:15 PM	0	67	245	0	153	45	382	45	0	155	0	179	1271
Grand Total	0	489	2077	0	1065	555	2999	437	0	1136	0	1841	10599
Apprch %	0	19.1	80.9	0	65.7	34.3	87.3	12.7	0	38.2	0	61.8	
Total %	0	4.6	19.6	0	10	5.2	28.3	4.1	0	10.7	0	17.4	
Cars	0	478	2071	0	1062	552	2965	427	0	1134	0	1836	10525
% Cars	0	97.8	99.7	0	99.7	99.5	98.9	97.7	0	99.8	0	99.7	99.3
Trucks	0	11	6	0	3	3	34	10	0	2	0	5	74
% Trucks	0	2.2	0.3	0	0.3	0.5	1.1	2.3	0	0.2	0	0.3	0.7

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 2

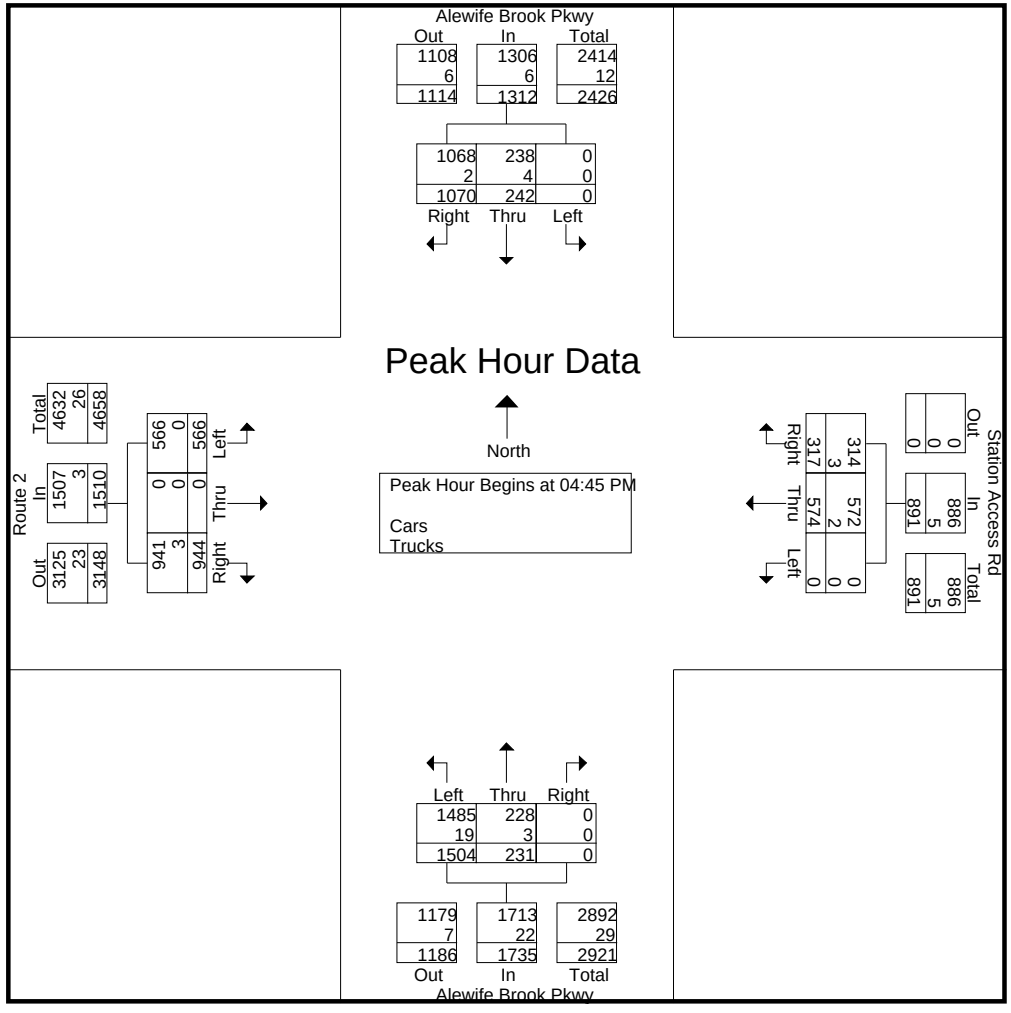
	Alewife Brook Pkwy From North				Station Access Rd From East				Alewife Brook Pkwy From South				Route 2 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	58	258	316	0	136	73	209	375	**71**	0	**446**	**151**	0	**271**	**422**	1393
05:00 PM	0	65	270	**335**	0	132	82	214	372	56	0	428	132	0	204	336	1313
05:15 PM	0	48	**282**	330	0	**159**	75	**234**	371	61	0	432	139	0	212	351	1347
05:30 PM	0	**71**	260	331	0	147	**87**	234	**386**	43	0	429	144	0	257	401	**1395**
Total Volume	0	242	1070	1312	0	574	317	891	1504	231	0	1735	566	0	944	1510	5448
% App. Total	0	18.4	81.6		0	64.4	35.6		86.7	13.3	0		37.5	0	62.5		
PHF	.000	.852	.949	.979	.000	.903	.911	.952	.974	.813	.000	.973	.937	.000	.871	.895	.976
Cars	0	238	1068	1306	0	572	314	886	1485	228	0	1713	566	0	941	1507	5412
% Cars	0	98.3	99.8	99.5	0	99.7	99.1	99.4	98.7	98.7	0	98.7	100	0	99.7	99.8	99.3
Trucks	0	4	2	6	0	2	3	5	19	3	0	22	0	0	3	3	36
% Trucks	0	1.7	0.2	0.5	0	0.3	0.9	0.6	1.3	1.3	0	1.3	0	0	0.3	0.2	0.7

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019
Page No : 3



Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:30 PM				05:15 PM			
+0 mins.	0	58	258	316	0	136	73	209	**375**	63	0	438	139	0	212	351
+15 mins.	0	65	270	**335**	0	132	82	214	375	**71**	0	**446**	144	0	257	401
+30 mins.	0	48	**282**	330	0	**159**	75	**234**	372	56	0	428	144	0	226	370
+45 mins.	0	**71**	260	331	0	147	**87**	234	371	61	0	432	**151**	0	**269**	**420**
Total Volume	0	242	1070	1312	0	574	317	891	1493	251	0	1744	578	0	964	1542

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019

Groups Printed- Trucks

	Alewife Brook Pkwy From North			Station Access Rd From East			Alewife Brook Pkwy From South			Route 2 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:30 PM	0	2	2	0	0	0	4	1	0	0	0	1	10
04:45 PM	0	0	1	0	1	1	7	1	0	0	0	0	11
Total	0	2	3	0	1	1	11	2	0	0	0	1	21
05:00 PM	0	2	0	0	0	0	4	1	0	0	0	1	8
05:15 PM	0	2	0	0	0	1	4	1	0	0	0	2	10
05:30 PM	0	0	1	0	1	1	4	0	0	0	0	0	7
05:45 PM	0	1	1	0	1	0	4	3	0	1	0	0	11
Total	0	5	2	0	2	2	16	5	0	1	0	3	36
06:00 PM	0	3	0	0	0	0	4	1	0	1	0	0	9
06:15 PM	0	1	1	0	0	0	3	2	0	0	0	1	8
Grand Total	0	11	6	0	3	3	34	10	0	2	0	5	74
Apprch %	0	64.7	35.3	0	50	50	77.3	22.7	0	28.6	0	71.4	
Total %	0	14.9	8.1	0	4.1	4.1	45.9	13.5	0	2.7	0	6.8	

Accurate Counts

978-664-2565

N/S Street : Alewife Brook Parkway
E/W Street: Route 2 / Access Rd
City/State : Cambridge, MA
Weather : Clear

File Name : 80840014
Site Code : 80840014
Start Date : 5/8/2019

Groups Printed- Bikes Peds

	Alewife Brook Pkwy From North				Station Access Rd From East				Alewife Brook Pkwy From South				Route 2 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	3	0	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	3	0	3
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Grand Total	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	3	1	4
Apprch %	0	0	0		0	0	0		0	100	0		0	0	0				
Total %	0	0	0		0	0	0		0	100	0		0	0	0		75	25	

Accurate Counts

978-664-2565

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 1

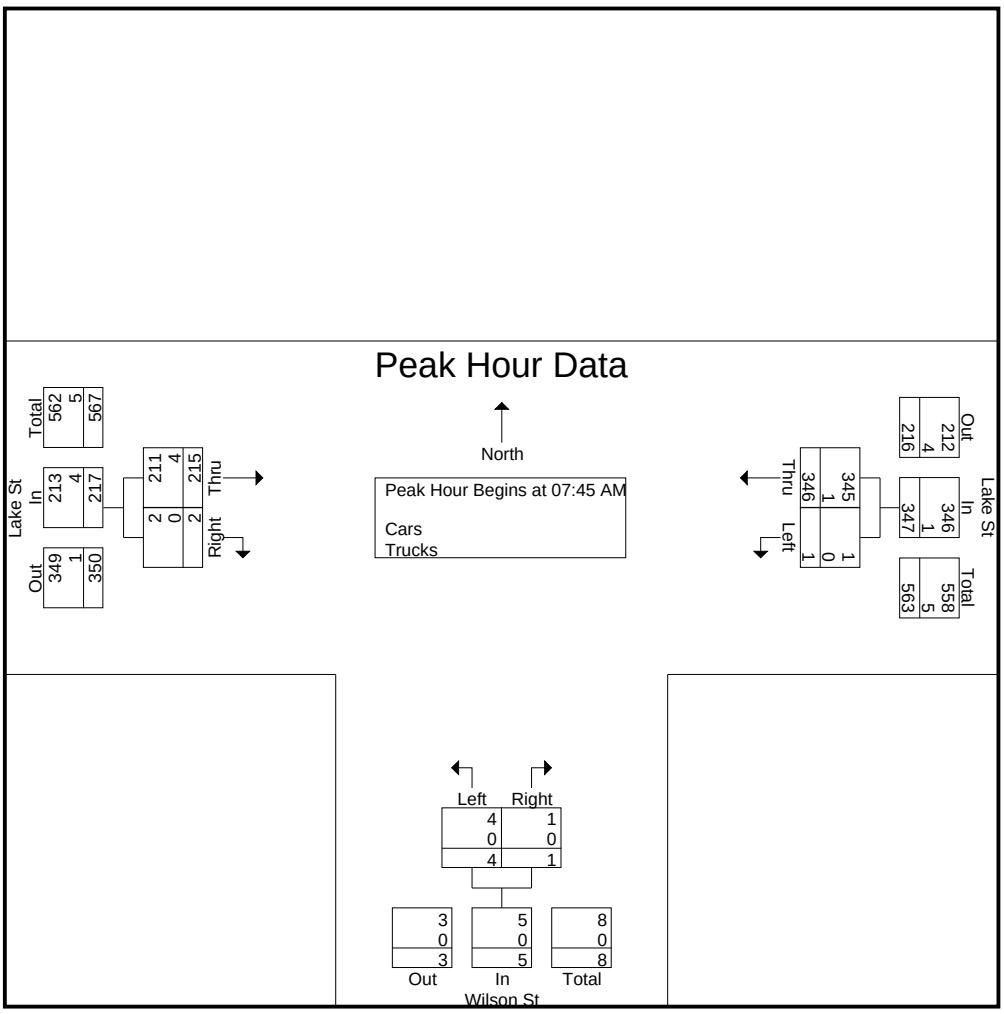
Groups Printed- Cars - Trucks

	Lake St From East		Wilson St From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	59	2	0	37	1	99
07:15 AM	0	69	1	0	43	0	113
07:30 AM	0	86	0	2	38	0	126
07:45 AM	0	100	0	0	50	0	150
Total	0	314	3	2	168	1	488
08:00 AM	1	77	1	0	44	1	124
08:15 AM	0	87	2	1	72	1	163
08:30 AM	0	82	1	0	49	0	132
08:45 AM	0	70	5	0	62	0	137
Total	1	316	9	1	227	2	556
Grand Total	1	630	12	3	395	3	1044
Apprch %	0.2	99.8	80	20	99.2	0.8	
Total %	0.1	60.3	1.1	0.3	37.8	0.3	
Cars	1	628	12	3	388	3	1035
% Cars	100	99.7	100	100	98.2	100	99.1
Trucks	0	2	0	0	7	0	9
% Trucks	0	0.3	0	0	1.8	0	0.9

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	**100**	**100**	0	0	0	50	0	50	150
08:00 AM	**1**	77	78	1	0	1	44	**1**	45	124
08:15 AM	0	87	87	**2**	**1**	**3**	**72**	1	**73**	**163**
08:30 AM	0	82	82	1	0	1	49	0	49	132
Total Volume	1	346	347	4	1	5	215	2	217	569
% App. Total	0.3	99.7		80	20		99.1	0.9		
PHF	.250	.865	.868	.500	.250	.417	.747	.500	.743	.873
Cars	1	345	346	4	1	5	211	2	213	564
% Cars	100	99.7	99.7	100	100	100	98.1	100	98.2	99.1
Trucks	0	1	1	0	0	0	4	0	4	5
% Trucks	0	0.3	0.3	0	0	0	1.9	0	1.8	0.9

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 2



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

	07:30 AM			08:00 AM			08:00 AM		
+0 mins.	0	86	86	1	0	1	44	**1**	45
+15 mins.	0	**100**	**100**	2	**1**	3	**72**	1	**73**
+30 mins.	**1**	77	78	1	0	1	49	0	49
+45 mins.	0	87	87	**5**	0	**5**	62	0	62
Total Volume	1	350	351	9	1	10	227	2	229
% App. Total	0.3	99.7		90	10		99.1	0.9	
PHF	.250	.875	.878	.450	.250	.500	.788	.500	.784
Cars	1	349	350	9	1	10	223	2	225
% Cars	100	99.7	99.7	100	100	100	98.2	100	98.3
Trucks	0	1	1	0	0	0	4	0	4
% Trucks	0	0.3	0.3	0	0	0	1.8	0	1.7

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Lake St From East		Wilson St From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	2	0	3
07:30 AM	0	0	0	0	0	0	0
07:45 AM	0	1	0	0	1	0	2
Total	0	2	0	0	3	0	5
08:00 AM	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	3	0	3
08:30 AM	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	1	0	1
Total	0	0	0	0	4	0	4
Grand Total	0	2	0	0	7	0	9
Apprch %	0	100	0	0	100	0	
Total %	0	22.2	0	0	77.8	0	

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	**1**	**1**	0	0	0	**2**	0	**2**	**3**
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	1	1	0	0	0	1	0	1	2
Total Volume	0	2	2	0	0	0	3	0	3	5
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.375	.000	.375	.417

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
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Groups Printed- Bikes Peds

	Lake St From East			Wilson St From South			Lake St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	1	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	0	2	1	0	0	2	1	3
07:30 AM	0	2	1	0	0	2	1	0	0	3	3	6
07:45 AM	0	1	0	1	0	4	0	0	0	4	2	6
Total	0	3	2	1	0	8	2	0	0	10	6	16
08:00 AM	0	3	1	0	0	0	1	0	0	1	4	5
08:15 AM	0	0	2	0	0	1	0	1	1	4	1	5
08:30 AM	0	0	0	0	0	1	1	0	0	1	1	2
08:45 AM	0	1	1	0	0	0	0	0	0	1	1	2
Total	0	4	4	0	0	2	2	1	1	7	7	14
Grand Total	0	7	6	1	0	10	4	1	1	17	13	30
Apprch %	0	100		100	0		80	20				
Total %	0	53.8		7.7	0		30.8	7.7		56.7	43.3	

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	0	0	0	0	0	**1**	0	**1**	1
07:30 AM	0	2	2	0	0	0	1	0	1	3
07:45 AM	0	1	1	**1**	0	**1**	0	0	0	2
08:00 AM	0	**3**	**3**	0	0	0	1	0	1	**4**
Total Volume	0	6	6	1	0	1	3	0	3	10
% App. Total	0	100		100	0		100	0		
PHF	.000	.500	.500	.250	.000	.250	.750	.000	.750	.625

Accurate Counts

978-664-2565

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 1

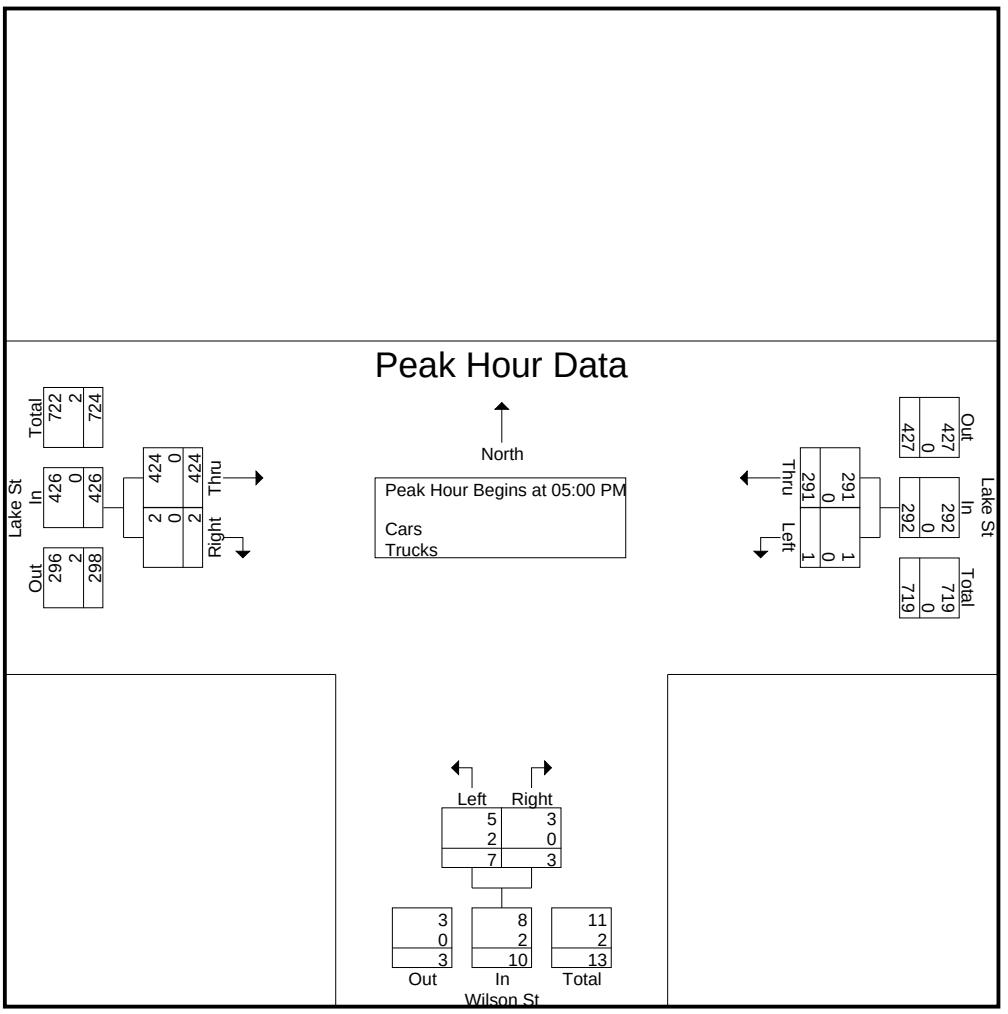
Groups Printed- Cars - Trucks

	Lake St From East		Wilson St From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	62	0	1	147	1	211
04:15 PM	0	59	0	0	101	0	160
04:30 PM	0	71	1	1	101	0	174
04:45 PM	0	59	2	0	98	0	159
Total	0	251	3	2	447	1	704
05:00 PM	1	76	0	0	129	0	206
05:15 PM	0	71	2	0	106	1	180
05:30 PM	0	66	0	2	103	1	172
05:45 PM	0	78	5	1	86	0	170
Total	1	291	7	3	424	2	728
Grand Total	1	542	10	5	871	3	1432
Apprch %	0.2	99.8	66.7	33.3	99.7	0.3	
Total %	0.1	37.8	0.7	0.3	60.8	0.2	
Cars	1	540	8	5	871	3	1428
% Cars	100	99.6	80	100	100	100	99.7
Trucks	0	2	2	0	0	0	4
% Trucks	0	0.4	20	0	0	0	0.3

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	**1**	76	77	0	0	0	**129**	0	**129**	**206**
05:15 PM	0	71	71	2	0	2	106	**1**	107	180
05:30 PM	0	66	66	0	**2**	2	103	1	104	172
05:45 PM	0	**78**	**78**	**5**	1	**6**	86	0	86	170
Total Volume	1	291	292	7	3	10	424	2	426	728
% App. Total	0.3	99.7		70	30		99.5	0.5		
PHF	.250	.933	.936	.350	.375	.417	.822	.500	.826	.883
Cars	1	291	292	5	3	8	424	2	426	726
% Cars	100	100	100	71.4	100	80.0	100	100	100	99.7
Trucks	0	0	0	2	0	2	0	0	0	2
% Trucks	0	0	0	28.6	0	20.0	0	0	0	0.3

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 2



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

	05:00 PM			05:00 PM			04:00 PM		
+0 mins.	**1**	76	77	0	0	0	**147**	**1**	**148**
+15 mins.	0	71	71	2	0	2	101	0	101
+30 mins.	0	66	66	0	**2**	2	101	0	101
+45 mins.	0	**78**	**78**	**5**	1	**6**	98	0	98
Total Volume	1	291	292	7	3	10	447	1	448
% App. Total	0.3	99.7		70	30		99.8	0.2	
PHF	.250	.933	.936	.350	.375	.417	.760	.250	.757
Cars	1	291	292	5	3	8	447	1	448
% Cars	100	100	100	71.4	100	80	100	100	100
Trucks	0	0	0	2	0	2	0	0	0
% Trucks	0	0	0	28.6	0	20	0	0	0

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Lake St From East		Wilson St From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	2	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	0	2	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	2	0	0	0	2
Total	0	0	2	0	0	0	2
Grand Total	0	2	2	0	0	0	4
Apprch %	0	100	100	0	0	0	
Total %	0	50	50	0	0	0	

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	**2**	**2**	0	0	0	0	0	0	**2**
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	2	2	0	0	0	0	0	0	2
% App. Total	0	100		0	0		0	0		
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000	.250

N/S Street : Wilson Street
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510001
Site Code : 84510001
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Lake St From East			Wilson St From South			Lake St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	4	3	0	0	1	0	1	0	4	5	9
04:45 PM	0	0	1	0	0	2	0	2	0	3	2	5
Total	0	4	4	0	0	3	0	3	0	7	7	14
05:00 PM	0	0	0	0	0	1	1	0	0	1	1	2
05:15 PM	0	0	0	0	0	1	0	0	0	1	0	1
05:30 PM	0	1	0	0	0	0	6	1	0	0	8	8
05:45 PM	0	2	0	0	0	4	0	0	0	4	2	6
Total	0	3	0	0	0	6	7	1	0	6	11	17
Grand Total	0	7	4	0	0	9	7	4	0	13	18	31
Apprch %	0	100		0	0		63.6	36.4				
Total %	0	38.9		0	0		38.9	22.2		41.9	58.1	

	Lake St From East			Wilson St From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	0	**2**	2	2
05:00 PM	0	0	0	0	0	0	1	0	1	1
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	**1**	**1**	0	0	0	**6**	1	**7**	**8**
Total Volume	0	1	1	0	0	0	7	3	10	11
% App. Total	0	100		0	0		70	30		
PHF	.000	.250	.250	.000	.000	.000	.292	.375	.357	.344

Accurate Counts

978-664-2565

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 1

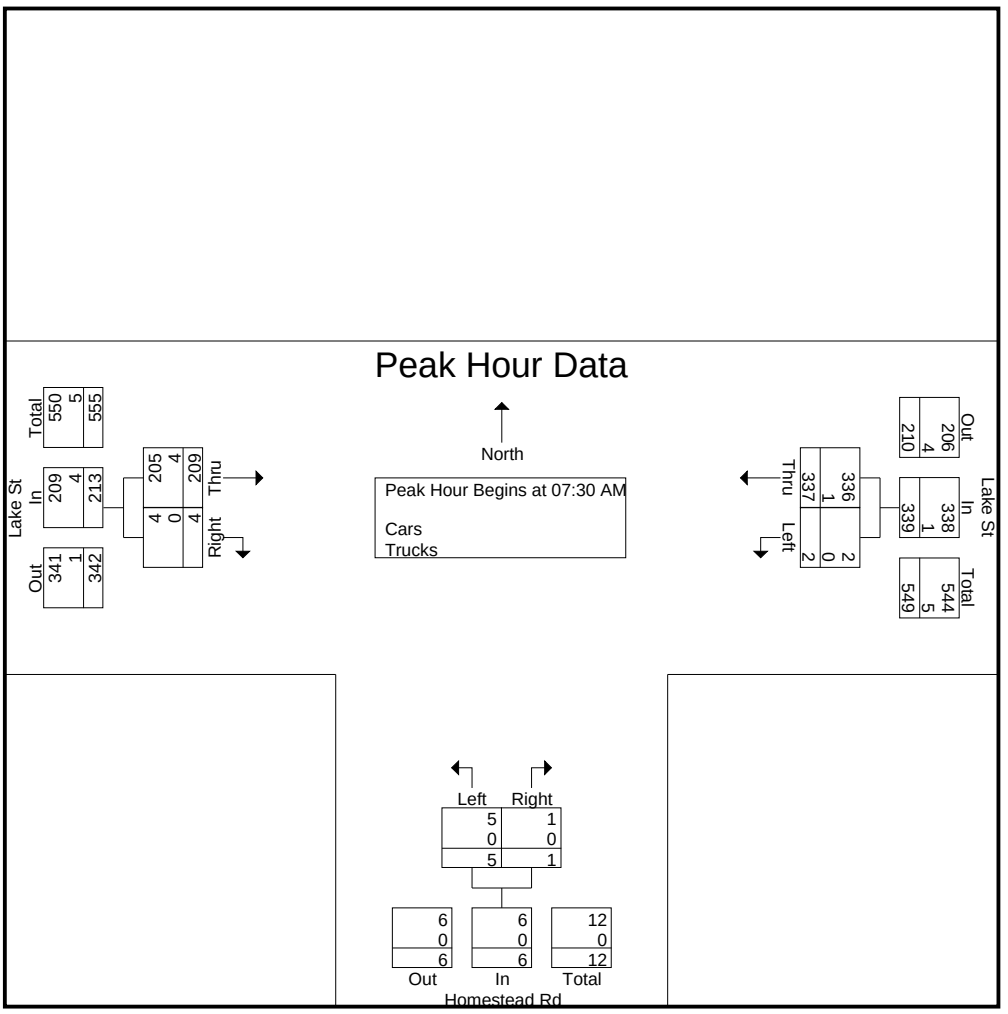
Groups Printed- Cars - Trucks

	Lake St From East		Homestead Rd From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	59	1	0	39	0	99
07:15 AM	0	63	1	0	39	1	104
07:30 AM	0	91	1	1	41	1	135
07:45 AM	1	89	1	0	48	2	141
Total	1	302	4	1	167	4	479
08:00 AM	0	78	1	0	46	1	126
08:15 AM	1	79	2	0	74	0	156
08:30 AM	0	73	0	0	54	1	128
08:45 AM	0	71	0	0	59	2	132
Total	1	301	3	0	233	4	542
Grand Total	2	603	7	1	400	8	1021
Apprch %	0.3	99.7	87.5	12.5	98	2	
Total %	0.2	59.1	0.7	0.1	39.2	0.8	
Cars	2	601	7	1	394	7	1012
% Cars	100	99.7	100	100	98.5	87.5	99.1
Trucks	0	2	0	0	6	1	9
% Trucks	0	0.3	0	0	1.5	12.5	0.9

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	**91**	**91**	1	**1**	**2**	41	1	42	135
07:45 AM	**1**	89	90	1	0	1	48	**2**	50	141
08:00 AM	0	78	78	1	0	1	46	1	47	126
08:15 AM	1	79	80	**2**	0	2	**74**	0	**74**	**156**
Total Volume	2	337	339	5	1	6	209	4	213	558
% App. Total	0.6	99.4		83.3	16.7		98.1	1.9		
PHF	.500	.926	.931	.625	.250	.750	.706	.500	.720	.894
Cars	2	336	338	5	1	6	205	4	209	553
% Cars	100	99.7	99.7	100	100	100	98.1	100	98.1	99.1
Trucks	0	1	1	0	0	0	4	0	4	5
% Trucks	0	0.3	0.3	0	0	0	1.9	0	1.9	0.9

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			08:00 AM		
+0 mins.	0	**91**	**91**	1	**1**	**2**	46	1	47
+15 mins.	**1**	89	90	1	0	1	**74**	0	**74**
+30 mins.	0	78	78	1	0	1	54	1	55
+45 mins.	1	79	80	**2**	0	2	59	**2**	61
Total Volume	2	337	339	5	1	6	233	4	237
% App. Total	0.6	99.4		83.3	16.7		98.3	1.7	
PHF	.500	.926	.931	.625	.250	.750	.787	.500	.801
Cars	2	336	338	5	1	6	230	3	233
% Cars	100	99.7	99.7	100	100	100	98.7	75	98.3
Trucks	0	1	1	0	0	0	3	1	4
% Trucks	0	0.3	0.3	0	0	0	1.3	25	1.7

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Lake St From East		Homestead Rd From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	2	0	3
07:30 AM	0	0	0	0	0	0	0
07:45 AM	0	1	0	0	1	0	2
Total	0	2	0	0	3	0	5
08:00 AM	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	3	0	3
08:30 AM	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	1	1
Total	0	0	0	0	3	1	4
Grand Total	0	2	0	0	6	1	9
Apprch %	0	100	0	0	85.7	14.3	
Total %	0	22.2	0	0	66.7	11.1	

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	**1**	**1**	0	0	0	**2**	0	**2**	**3**
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	1	1	0	0	0	1	0	1	2
Total Volume	0	2	2	0	0	0	3	0	3	5
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.375	.000	.375	.417

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Lake St From East			Homestead Rd From South			Lake St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	1	0	0	2	0	0	0	3	0	3
07:15 AM	0	0	0	0	0	3	0	0	1	4	0	4
07:30 AM	0	3	0	0	0	3	2	0	0	3	5	8
07:45 AM	0	1	1	0	0	4	0	0	0	5	1	6
Total	0	4	2	0	0	12	2	0	1	15	6	21
08:00 AM	0	2	1	0	0	1	1	0	0	2	3	5
08:15 AM	0	0	0	0	0	3	0	0	0	3	0	3
08:30 AM	0	0	0	0	0	0	1	0	0	0	1	1
08:45 AM	0	2	0	0	0	1	0	0	0	1	2	3
Total	0	4	1	0	0	5	2	0	0	6	6	12
Grand Total	0	8	3	0	0	17	4	0	1	21	12	33
Apprch %	0	100		0	0		100	0				
Total %	0	66.7		0	0		33.3	0		63.6	36.4	

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	**3**	**3**	0	0	0	**2**	0	**2**	**5**
07:45 AM	0	1	1	0	0	0	0	0	0	1
08:00 AM	0	2	2	0	0	0	1	0	1	3
Total Volume	0	6	6	0	0	0	3	0	3	9
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.375	.000	.375	.450

Accurate Counts

978-664-2565

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 1

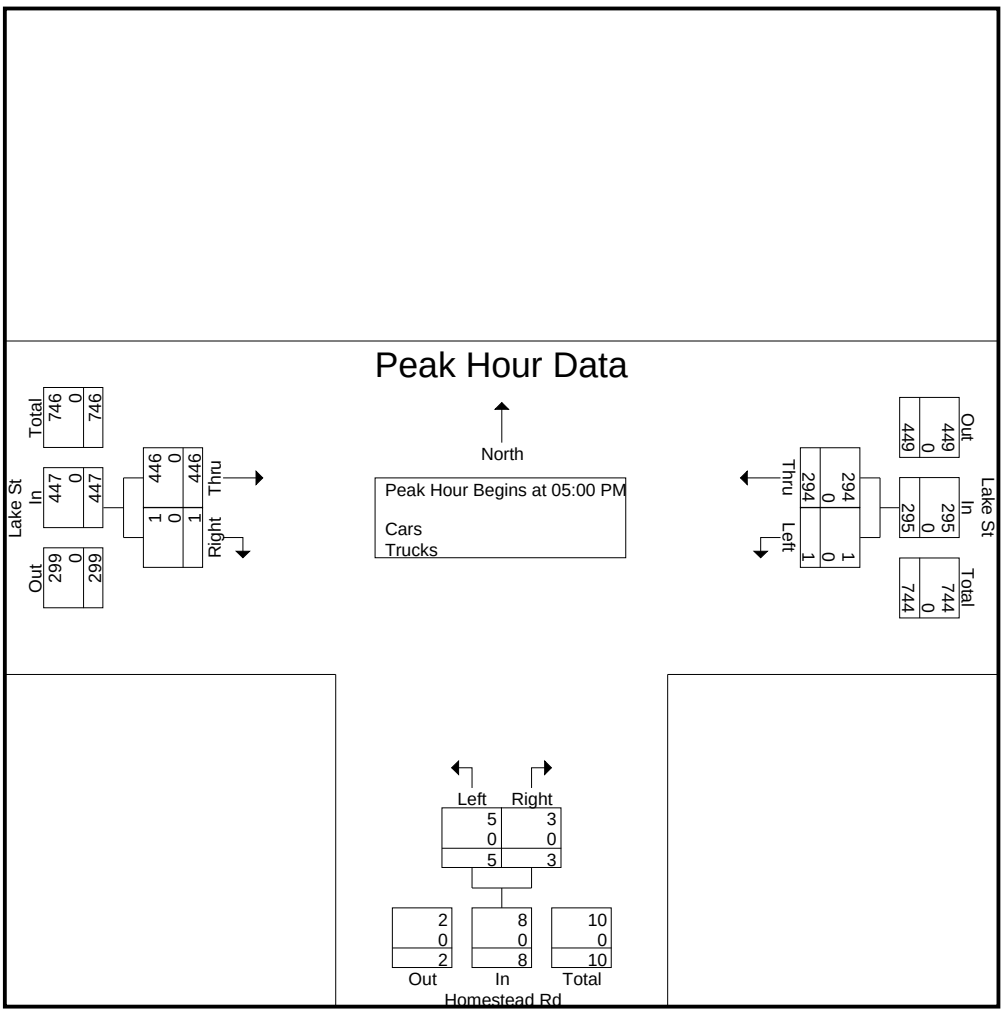
Groups Printed- Cars - Trucks

	Lake St From East		Homestead Rd From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	63	1	0	142	2	208
04:15 PM	1	60	1	0	95	1	158
04:30 PM	0	72	0	0	102	1	175
04:45 PM	0	58	1	0	100	1	160
Total	1	253	3	0	439	5	701
05:00 PM	0	74	1	0	128	0	203
05:15 PM	1	69	2	2	113	0	187
05:30 PM	0	68	2	1	108	1	180
05:45 PM	0	83	0	0	97	0	180
Total	1	294	5	3	446	1	750
Grand Total	2	547	8	3	885	6	1451
Apprch %	0.4	99.6	72.7	27.3	99.3	0.7	
Total %	0.1	37.7	0.6	0.2	61	0.4	
Cars	2	545	8	3	885	6	1449
% Cars	100	99.6	100	100	100	100	99.9
Trucks	0	2	0	0	0	0	2
% Trucks	0	0.4	0	0	0	0	0.1

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	74	74	1	0	1	**128**	0	**128**	**203**
05:15 PM	**1**	69	70	**2**	**2**	**4**	113	0	113	187
05:30 PM	0	68	68	2	1	3	108	**1**	109	180
05:45 PM	0	**83**	**83**	0	0	0	97	0	97	180
Total Volume	1	294	295	5	3	8	446	1	447	750
% App. Total	0.3	99.7		62.5	37.5		99.8	0.2		
PHF	.250	.886	.889	.625	.375	.500	.871	.250	.873	.924
Cars	1	294	295	5	3	8	446	1	447	750
% Cars	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 2



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

	05:00 PM			04:45 PM			04:45 PM		
+0 mins.	0	74	74	1	0	1	100	**1**	101
+15 mins.	**1**	69	70	1	0	1	**128**	0	**128**
+30 mins.	0	68	68	**2**	**2**	**4**	113	0	113
+45 mins.	0	**83**	**83**	2	1	3	108	1	109
Total Volume	1	294	295	6	3	9	449	2	451
% App. Total	0.3	99.7		66.7	33.3		99.6	0.4	
PHF	.250	.886	.889	.750	.375	.563	.877	.500	.881
Cars	1	294	295	6	3	9	449	2	451
% Cars	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Lake St From East		Homestead Rd From South		Lake St From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	2	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	0	2	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Grand Total	0	2	0	0	0	0	2
Apprch %	0	100	0	0	0	0	
Total %	0	100	0	0	0	0	

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	**2**	**2**	0	0	0	0	0	0	**2**
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	2	2	0	0	0	0	0	0	2
% App. Total	0	100		0	0		0	0		
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000	.250

N/S Street : Homestead Road
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510002
Site Code : 84510002
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Lake St From East			Homestead Rd From South			Lake St From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	3	0	0	0	3	0	3
04:15 PM	0	1	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	4	0	0	0	2	0	0	0	2	4	6
04:45 PM	0	0	0	0	0	1	0	0	0	1	0	1
Total	0	5	0	0	0	6	0	0	0	6	5	11
05:00 PM	0	1	0	0	0	2	4	0	0	2	5	7
05:15 PM	0	0	0	0	0	1	0	0	0	1	0	1
05:30 PM	0	1	0	0	0	0	1	0	0	0	2	2
05:45 PM	0	2	0	0	0	3	2	0	0	3	4	7
Total	0	4	0	0	0	6	7	0	0	6	11	17
Grand Total	0	9	0	0	0	12	7	0	0	12	16	28
Apprch %	0	100		0	0		100	0				
Total %	0	56.2		0	0		43.8	0		42.9	57.1	

	Lake St From East			Homestead Rd From South			Lake St From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	1	1	0	0	0	**4**	0	**4**	**5**
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	1	0	0	0	1	0	1	2
05:45 PM	0	**2**	**2**	0	0	0	2	0	2	4
Total Volume	0	4	4	0	0	0	7	0	7	11
% App. Total	0	100		0	0		100	0		
PHF	.000	.500	.500	.000	.000	.000	.438	.000	.438	.550

Accurate Counts

978-664-2565

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 1

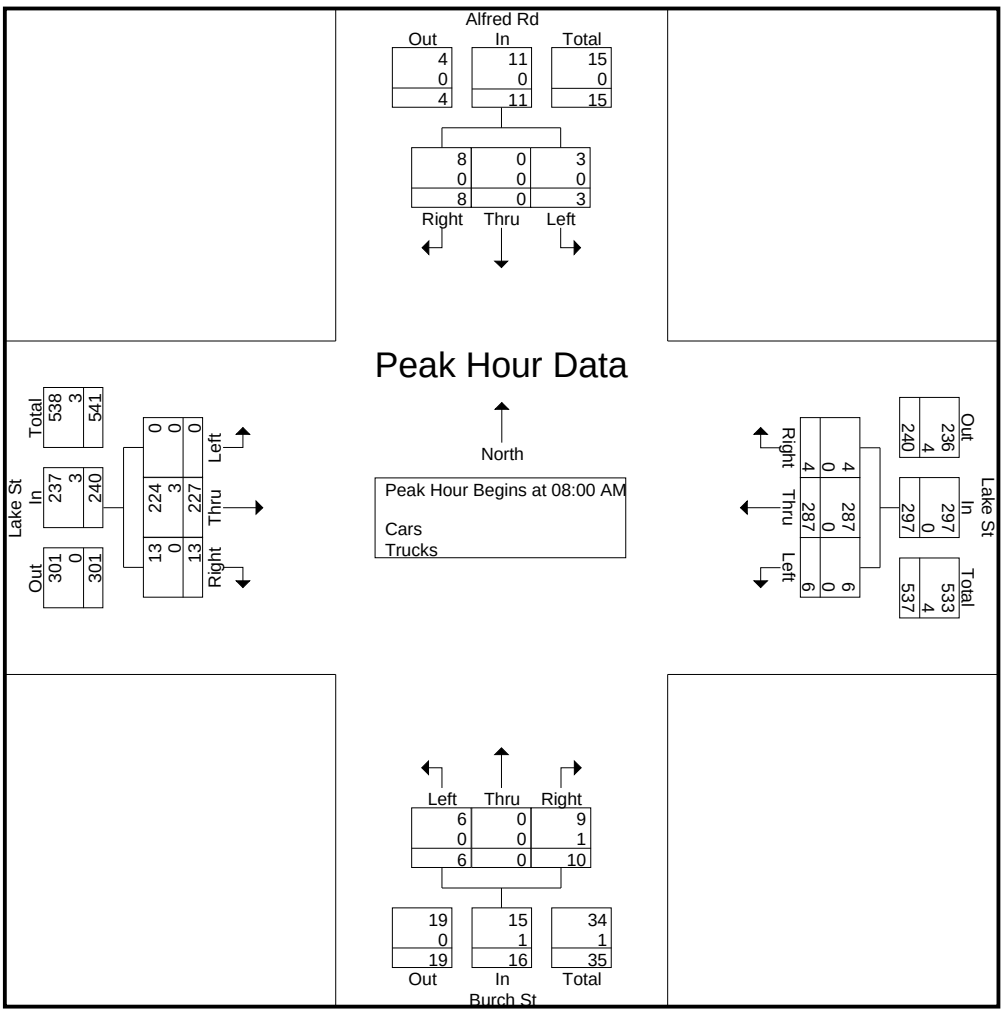
Groups Printed- Cars - Trucks

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	1	0	1	0	0	53	2	0	4	0	0	0	0	39	1	0	0	101	101
07:15 AM	1	0	2	0	1	57	0	0	3	0	0	0	0	40	1	0	0	105	105
07:30 AM	2	0	2	0	0	82	0	0	3	0	2	0	0	40	0	0	0	131	131
07:45 AM	0	0	2	0	1	83	2	0	0	0	2	0	0	50	1	0	0	141	141
Total	4	0	7	0	2	275	4	0	10	0	4	0	0	169	3	0	0	478	478
08:00 AM	0	0	2	0	0	73	0	0	3	0	2	0	0	46	1	0	0	127	127
08:15 AM	0	0	3	0	1	74	2	0	1	0	3	0	0	70	6	0	0	160	160
08:30 AM	0	0	3	0	0	69	2	0	1	0	1	0	0	57	1	0	0	134	134
08:45 AM	3	0	0	0	5	71	0	0	1	0	4	0	0	54	5	0	0	143	143
Total	3	0	8	0	6	287	4	0	6	0	10	0	0	227	13	0	0	564	564
Grand Total	7	0	15	0	8	562	8	0	16	0	14	0	0	396	16	0	0	1042	1042
Apprch %	31.8	0	68.2		1.4	97.2	1.4		53.3	0	46.7		0	96.1	3.9				
Total %	0.7	0	1.4		0.8	53.9	0.8		1.5	0	1.3		0	38	1.5		0	100	
Cars	7	0	15		8	561	8		16	0	13		0	390	16		0	0	1034
% Cars	100	0	100	0	100	99.8	100	0	100	0	92.9	0	0	98.5	100	0	0	0	99.2
Trucks	0	0	0		0	1	0		0	0	1		0	6	0		0	0	8
% Trucks	0	0	0	0	0	0.2	0	0	0	0	7.1	0	0	1.5	0	0	0	0	0.8

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	2	2	0	73	0	73	**3**	0	2	**5**	0	46	1	47	127
08:15 AM	0	0	**3**	**3**	1	**74**	**2**	**77**	1	0	3	4	0	**70**	**6**	**76**	**160**
08:30 AM	0	0	3	3	0	69	2	71	1	0	1	2	0	57	1	58	134
08:45 AM	**3**	0	0	3	**5**	71	0	76	1	0	**4**	5	0	54	5	59	143
Total Volume	3	0	8	11	6	287	4	297	6	0	10	16	0	227	13	240	564
% App. Total	27.3	0	72.7		2	96.6	1.3		37.5	0	62.5		0	94.6	5.4		
PHF	.250	.000	.667	.917	.300	.970	.500	.964	.500	.000	.625	.800	.000	.811	.542	.789	.881
Cars	3	0	8	11	6	287	4	297	6	0	9	15	0	224	13	237	560
% Cars	100	0	100	100	100	100	100	100	100	0	90.0	93.8	0	98.7	100	98.8	99.3
Trucks	0	0	0	0	0	0	0	0	0	0	1	1	0	3	0	3	4
% Trucks	0	0	0	0	0	0	0	0	0	0	10.0	6.3	0	1.3	0	1.3	0.7

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 2



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

	07:00 AM				07:30 AM				07:30 AM				08:00 AM			
+0 mins.	1	0	1	2	0	82	0	82	**3**	0	2	**5**	0	46	1	47
+15 mins.	1	0	**2**	3	**1**	**83**	**2**	**86**	0	0	2	2	0	**70**	**6**	**76**
+30 mins.	**2**	0	2	**4**	0	73	0	73	3	0	2	5	0	57	1	58
+45 mins.	0	0	2	2	1	74	2	77	1	0	**3**	4	0	54	5	59
Total Volume	4	0	7	11	2	312	4	318	7	0	9	16	0	227	13	240
% App. Total	36.4	0	63.6		0.6	98.1	1.3		43.8	0	56.2		0	94.6	5.4	
PHF	.500	.000	.875	.688	.500	.940	.500	.924	.583	.000	.750	.800	.000	.811	.542	.789
Cars	4	0	7	11	2	312	4	318	7	0	9	16	0	224	13	237
% Cars	100	0	100	100	100	100	100	100	100	0	100	100	0	98.7	100	98.8
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	1.2

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	4	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	3
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	4	4
Grand Total	0	0	0	0	0	1	0	0	0	0	1	0	0	6	0	0	0	8	8
Apprch %	0	0	0		0	100	0		0	0	100		0	100	0				
Total %	0	0	0		0	12.5	0		0	0	12.5		0	75	0		0	100	

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
07:15 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1	0	1	**2**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	3	0	3	4
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.750	.000	.750	.500

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	5	0	0	0	1	0	0	0	2	0	0	0	0	8	0	8
07:15 AM	0	0	0	7	0	1	0	1	0	0	0	0	0	0	0	0	8	1	9
07:30 AM	0	0	0	6	0	2	0	1	0	0	0	2	0	4	0	0	9	6	15
07:45 AM	0	1	0	7	0	1	0	1	0	0	0	4	0	0	0	0	12	2	14
Total	0	1	0	25	0	4	0	4	0	0	0	8	0	4	0	0	37	9	46
08:00 AM	0	0	0	14	0	2	0	1	0	0	0	0	0	1	0	2	17	3	20
08:15 AM	0	0	0	7	0	1	0	0	0	0	0	2	0	0	0	1	10	1	11
08:30 AM	0	1	0	4	0	0	0	0	0	0	0	1	0	1	0	0	5	2	7
08:45 AM	1	0	0	2	0	3	0	0	0	0	0	2	0	1	0	0	4	5	9
Total	1	1	0	27	0	6	0	1	0	0	0	5	0	3	0	3	36	11	47
Grand Total	1	2	0	52	0	10	0	5	0	0	0	13	0	7	0	3	73	20	93
Apprch %	33.3	66.7	0		0	100	0		0	0	0		0	100	0				
Total %	5	10	0		0	50	0		0	0	0		0	35	0		78.5	21.5	

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	**4**	0	**4**	**6**
07:45 AM	0	**1**	0	**1**	0	1	0	1	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Volume	0	1	0	1	0	6	0	6	0	0	0	0	0	5	0	5	12
% App. Total	0	100	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.250	.000	.250	.000	.750	.000	.750	.000	.000	.000	.000	.000	.313	.000	.313	.500

Accurate Counts

978-664-2565

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 1

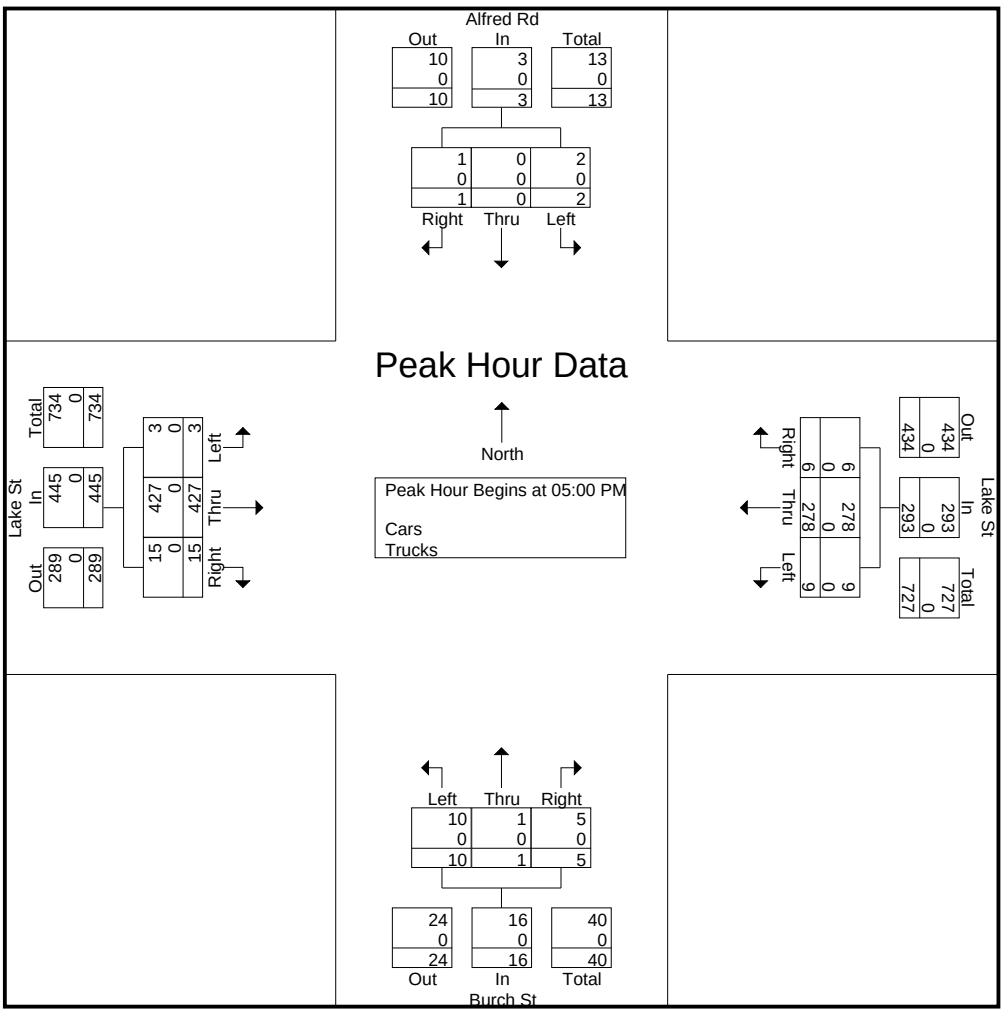
Groups Printed- Cars - Trucks

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	2	0	0	0	2	64	2	0	1	0	2	0	1	132	4	0	0	210	210
04:15 PM	0	0	0	0	2	56	3	0	2	1	2	0	0	91	6	0	0	163	163
04:30 PM	0	0	1	0	4	67	0	0	2	0	0	0	0	104	2	0	0	180	180
04:45 PM	3	0	1	0	2	59	3	0	3	0	0	0	1	93	5	0	0	170	170
Total	5	0	2	0	10	246	8	0	8	1	4	0	2	420	17	0	0	723	723
05:00 PM	0	0	0	0	0	68	2	0	4	0	3	0	0	129	1	0	0	207	207
05:15 PM	0	0	1	0	2	65	3	0	1	0	1	0	3	109	3	0	0	188	188
05:30 PM	2	0	0	0	3	64	1	0	2	1	0	0	0	105	4	0	0	182	182
05:45 PM	0	0	0	0	4	81	0	0	3	0	1	0	0	84	7	0	0	180	180
Total	2	0	1	0	9	278	6	0	10	1	5	0	3	427	15	0	0	757	757
Grand Total	7	0	3	0	19	524	14	0	18	2	9	0	5	847	32	0	0	1480	1480
Apprch %	70	0	30		3.4	94.1	2.5		62.1	6.9	31		0.6	95.8	3.6				
Total %	0.5	0	0.2		1.3	35.4	0.9		1.2	0.1	0.6		0.3	57.2	2.2		0	100	
Cars	7	0	3		19	522	14		18	2	9		5	847	32		0	0	1478
% Cars	100	0	100	0	100	99.6	100	0	100	100	100	0	100	100	100	0	0	0	99.9
Trucks	0	0	0		0	2	0		0	0	0		0	0	0		0	0	2
% Trucks	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0.1

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	68	2	70	**4**	0	**3**	**7**	0	**129**	1	**130**	**207**
05:15 PM	0	0	**1**	1	2	65	**3**	70	1	0	1	2	**3**	109	3	115	188
05:30 PM	**2**	0	0	**2**	3	64	1	68	2	**1**	0	3	0	105	4	109	182
05:45 PM	0	0	0	0	**4**	**81**	0	**85**	3	0	1	4	0	84	**7**	91	180
Total Volume	2	0	1	3	9	278	6	293	10	1	5	16	3	427	15	445	757
% App. Total	66.7	0	33.3		3.1	94.9	2		62.5	6.2	31.2		0.7	96	3.4		
PHF	.250	.000	.250	.375	.563	.858	.500	.862	.625	.250	.417	.571	.250	.828	.536	.856	.914
Cars	2	0	1	3	9	278	6	293	10	1	5	16	3	427	15	445	757
% Cars	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:15 PM				04:45 PM			
+0 mins.	2	0	0	2	0	68	2	70	2	**1**	2	5	1	93	**5**	99
+15 mins.	0	0	0	0	2	65	**3**	70	2	0	0	2	0	**129**	1	**130**
+30 mins.	0	0	**1**	1	3	64	1	68	3	0	0	3	**3**	109	3	115
+45 mins.	**3**	0	1	**4**	**4**	**81**	0	**85**	**4**	0	**3**	**7**	0	105	4	109
Total Volume	5	0	2	7	9	278	6	293	11	1	5	17	4	436	13	453
% App. Total	71.4	0	28.6		3.1	94.9	2		64.7	5.9	29.4		0.9	96.2	2.9	
PHF	.417	.000	.500	.438	.563	.858	.500	.862	.688	.250	.417	.607	.333	.845	.650	.871
Cars	5	0	2	7	9	278	6	293	11	1	5	17	4	436	13	453
% Cars	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		0	100	

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

N/S Street : Alfred Rd / Burch St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510003
Site Code : 84510003
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	3	1	4
04:15 PM	0	0	0	3	0	1	0	1	0	0	0	1	0	0	0	0	5	1	6
04:30 PM	2	0	0	3	0	0	0	1	0	0	0	2	0	0	0	0	6	2	8
04:45 PM	0	0	0	8	0	1	0	0	0	0	0	1	0	0	0	0	9	1	10
Total	2	0	0	16	0	3	0	2	0	0	0	5	0	0	0	0	23	5	28
05:00 PM	0	0	0	1	0	1	0	0	0	0	0	0	0	3	0	0	1	4	5
05:15 PM	0	0	0	1	0	0	3	1	0	0	0	1	0	1	0	0	3	4	7
05:30 PM	0	0	0	2	0	2	0	0	0	0	0	1	0	1	0	0	3	3	6
05:45 PM	0	0	0	2	0	2	0	0	0	0	0	3	0	2	0	0	5	4	9
Total	0	0	0	6	0	5	3	1	0	0	0	5	0	7	0	0	12	15	27
Grand Total	2	0	0	22	0	8	3	3	0	0	0	10	0	7	0	0	35	20	55
Apprch %	100	0	0		0	72.7	27.3		0	0	0		0	100	0				
Total %	10	0	0		0	40	15		0	0	0		0	35	0		63.6	36.4	

	Alfred Rd From North				Lake St From East				Burch St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	**3**	0	**3**	**4**
05:15 PM	0	0	0	0	0	0	**3**	**3**	0	0	0	0	0	1	0	1	4
05:30 PM	0	0	0	0	0	**2**	0	2	0	0	0	0	0	1	0	1	3
05:45 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	2	4
Total Volume	0	0	0	0	0	5	3	8	0	0	0	0	0	7	0	7	15
% App. Total	0	0	0		0	62.5	37.5		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.625	.250	.667	.000	.000	.000	.000	.000	.583	.000	.583	.938

Accurate Counts

978-664-2565

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020

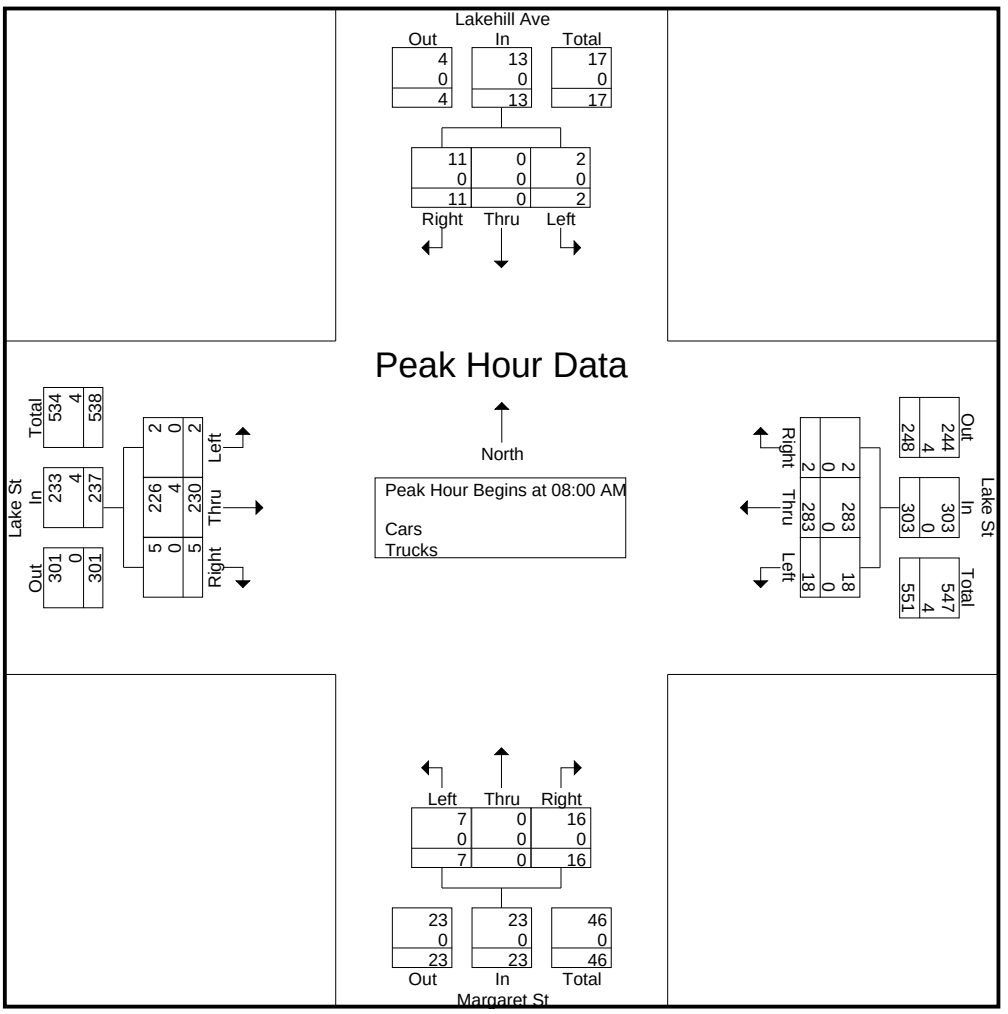
Groups Printed- Cars - Trucks

	Lakehill Ave From North			Lake St From East			Margaret St From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	1	2	56	0	1	0	5	1	38	0	104
07:15 AM	0	0	4	4	52	0	1	0	2	0	41	0	104
07:30 AM	2	0	5	2	76	1	0	0	3	1	46	0	136
07:45 AM	0	0	1	2	86	0	0	0	3	1	50	1	144
Total	2	0	11	10	270	1	2	0	13	3	175	1	488
08:00 AM	0	0	2	6	70	0	2	0	4	0	49	0	133
08:15 AM	0	0	2	3	75	0	2	0	2	0	69	2	155
08:30 AM	0	0	4	6	65	0	2	0	7	1	55	2	142
08:45 AM	2	0	3	3	73	2	1	0	3	1	57	1	146
Total	2	0	11	18	283	2	7	0	16	2	230	5	576
Grand Total	4	0	22	28	553	3	9	0	29	5	405	6	1064
Apprch %	15.4	0	84.6	4.8	94.7	0.5	23.7	0	76.3	1.2	97.4	1.4	
Total %	0.4	0	2.1	2.6	52	0.3	0.8	0	2.7	0.5	38.1	0.6	
Cars	4	0	22	28	552	3	9	0	29	5	398	6	1056
% Cars	100	0	100	100	99.8	100	100	0	100	100	98.3	100	99.2
Trucks	0	0	0	0	1	0	0	0	0	0	7	0	8
% Trucks	0	0	0	0	0.2	0	0	0	0	0	1.7	0	0.8

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	2	2	**6**	70	0	76	**2**	0	4	6	0	49	0	49	133
08:15 AM	0	0	2	2	3	**75**	0	**78**	2	0	2	4	0	**69**	**2**	**71**	**155**
08:30 AM	0	0	**4**	4	6	65	0	71	2	0	**7**	**9**	**1**	55	2	58	142
08:45 AM	**2**	0	3	**5**	3	73	**2**	78	1	0	3	4	1	57	1	59	146
Total Volume	2	0	11	13	18	283	2	303	7	0	16	23	2	230	5	237	576
% App. Total	15.4	0	84.6		5.9	93.4	0.7		30.4	0	69.6		0.8	97	2.1		
PHF	.250	.000	.688	.650	.750	.943	.250	.971	.875	.000	.571	.639	.500	.833	.625	.835	.929
Cars	2	0	11	13	18	283	2	303	7	0	16	23	2	226	5	233	572
% Cars	100	0	100	100	100	100	100	100	100	0	100	100	100	98.3	100	98.3	99.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	1.7	0.7

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
Page No : 2



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

	07:15 AM				07:30 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	4	4	2	76	**1**	79	**2**	0	4	6	0	49	0	49
+15 mins.	**2**	0	**5**	**7**	2	**86**	0	**88**	2	0	2	4	0	**69**	**2**	**71**
+30 mins.	0	0	1	1	**6**	70	0	76	2	0	**7**	**9**	**1**	55	2	58
+45 mins.	0	0	2	2	3	75	0	78	1	0	3	4	1	57	1	59
Total Volume	2	0	12	14	13	307	1	321	7	0	16	23	2	230	5	237
% App. Total	14.3	0	85.7		4	95.6	0.3		30.4	0	69.6		0.8	97	2.1	
PHF	.250	.000	.600	.500	.542	.892	.250	.912	.875	.000	.571	.639	.500	.833	.625	.835
Cars	2	0	12	14	13	307	1	321	7	0	16	23	2	226	5	233
% Cars	100	0	100	100	100	100	100	100	100	0	100	100	100	98.3	100	98.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	1.7

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
Page No : 7

Groups Printed- Trucks

	Lakehill Ave From North			Lake St From East			Margaret St From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	1	0	0	0	0	0	3	0	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	3
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	4	0	4
Grand Total	0	0	0	0	1	0	0	0	0	0	7	0	8
Apprch %	0	0	0	0	100	0	0	0	0	0	100	0	
Total %	0	0	0	0	12.5	0	0	0	0	0	87.5	0	

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
07:15 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1	0	1	**2**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	3	0	3	4
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.750	.000	.750	.500

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
Page No : 10

Groups Printed- Bikes Peds

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	5	0	0	0	0	0	0	1	4	0	1	0	0	9	2	11
07:15 AM	0	0	0	5	0	1	0	0	0	0	0	1	0	0	0	0	6	1	7
07:30 AM	0	0	0	9	0	2	0	0	0	0	0	1	1	1	0	2	12	4	16
07:45 AM	0	0	0	7	0	1	0	1	0	0	1	5	0	2	0	3	16	4	20
Total	0	0	0	26	0	4	0	1	0	0	2	11	1	4	0	5	43	11	54
08:00 AM	0	0	0	13	0	2	0	1	0	0	1	0	0	1	0	1	15	4	19
08:15 AM	0	1	0	9	0	1	0	0	0	0	1	1	0	0	0	0	10	3	13
08:30 AM	0	0	0	4	0	0	0	0	0	0	1	1	0	2	0	1	6	3	9
08:45 AM	0	0	0	1	0	2	0	1	0	0	0	1	0	2	0	0	3	4	7
Total	0	1	0	27	0	5	0	2	0	0	3	3	0	5	0	2	34	14	48
Grand Total	0	1	0	53	0	9	0	3	0	0	5	14	1	9	0	7	77	25	102
Apprch %	0	100	0		0	100	0		0	0	100		10	90	0				
Total %	0	4	0		0	36	0		0	0	20		4	36	0		75.5	24.5	

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	**1**	1	0	**2**	**4**
07:45 AM	0	0	0	0	0	1	0	1	0	0	**1**	**1**	0	**2**	0	2	4
08:00 AM	0	0	0	0	0	2	0	2	0	0	1	1	0	1	0	1	4
08:15 AM	0	**1**	0	**1**	0	1	0	1	0	0	1	1	0	0	0	0	3
Total Volume	0	1	0	1	0	6	0	6	0	0	3	3	1	4	0	5	15
% App. Total	0	100	0		0	100	0		0	0	100		20	80	0		
PHF	.000	.250	.000	.250	.000	.750	.000	.750	.000	.000	.750	.750	.250	.500	.000	.625	.938

Accurate Counts

978-664-2565

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020

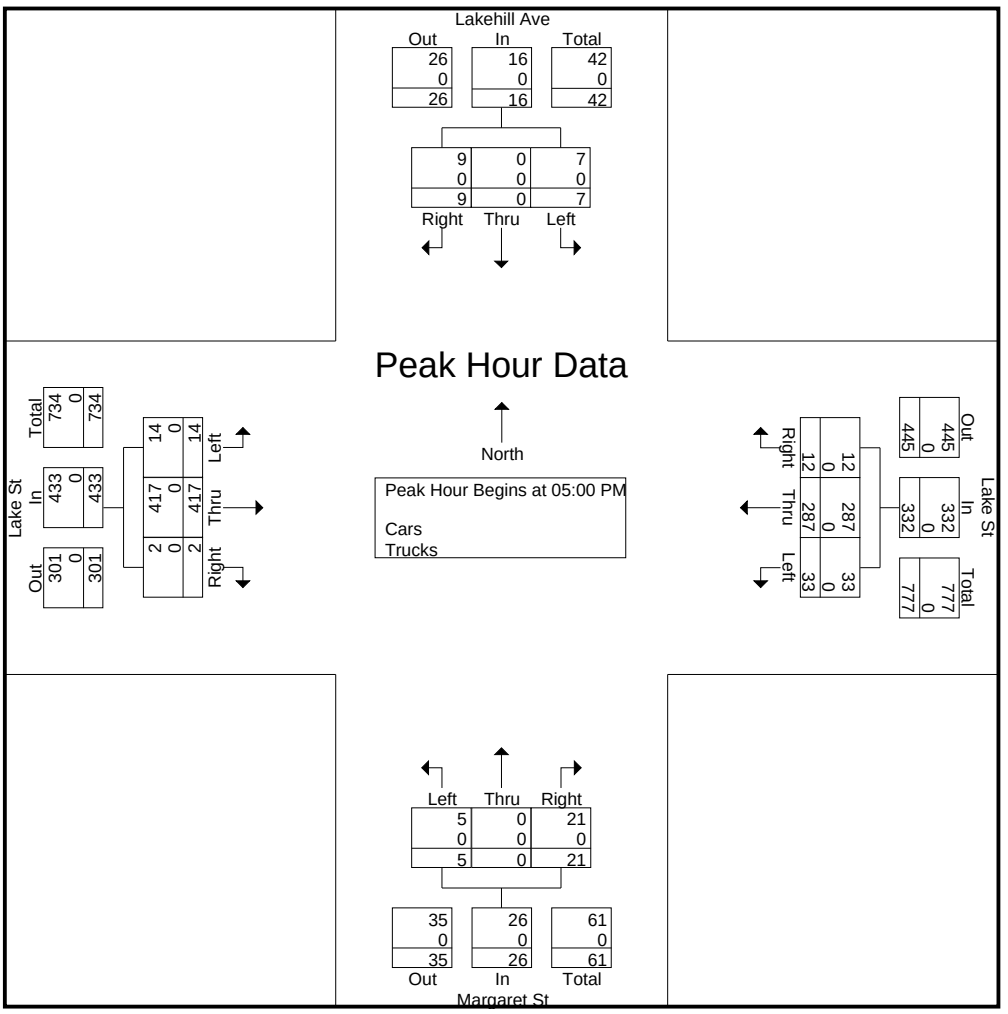
Groups Printed- Cars - Trucks

	Lakehill Ave From North			Lake St From East			Margaret St From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	2	0	1	2	64	2	1	0	3	1	134	0	210
04:15 PM	0	0	2	9	58	2	1	0	4	2	88	3	169
04:30 PM	1	0	5	11	67	4	1	0	4	0	102	2	197
04:45 PM	4	0	6	8	57	5	1	0	4	2	93	2	182
Total	7	0	14	30	246	13	4	0	15	5	417	7	758
05:00 PM	2	0	1	3	72	1	0	0	5	5	126	0	215
05:15 PM	2	0	2	3	73	1	1	0	4	4	106	1	197
05:30 PM	2	0	2	13	64	8	2	0	6	3	103	0	203
05:45 PM	1	0	4	14	78	2	2	0	6	2	82	1	192
Total	7	0	9	33	287	12	5	0	21	14	417	2	807
Grand Total	14	0	23	63	533	25	9	0	36	19	834	9	1565
Apprch %	37.8	0	62.2	10.1	85.8	4	20	0	80	2.2	96.8	1	
Total %	0.9	0	1.5	4	34.1	1.6	0.6	0	2.3	1.2	53.3	0.6	
Cars	14	0	23	63	531	25	9	0	36	19	834	9	1563
% Cars	100	0	100	100	99.6	100	100	0	100	100	100	100	99.9
Trucks	0	0	0	0	2	0	0	0	0	0	0	0	2
% Trucks	0	0	0	0	0.4	0	0	0	0	0	0	0	0.1

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**2**	0	1	3	3	72	1	76	0	0	5	5	**5**	**126**	0	**131**	**215**
05:15 PM	2	0	2	4	3	73	1	77	1	0	4	5	4	106	**1**	111	197
05:30 PM	2	0	2	4	13	64	**8**	85	**2**	0	**6**	**8**	3	103	0	106	203
05:45 PM	1	0	**4**	**5**	**14**	**78**	2	**94**	2	0	6	8	2	82	1	85	192
Total Volume	7	0	9	16	33	287	12	332	5	0	21	26	14	417	2	433	807
% App. Total	43.8	0	56.2		9.9	86.4	3.6		19.2	0	80.8		3.2	96.3	0.5		
PHF	.875	.000	.563	.800	.589	.920	.375	.883	.625	.000	.875	.813	.700	.827	.500	.826	.938
Cars	7	0	9	16	33	287	12	332	5	0	21	26	14	417	2	433	807
% Cars	100	0	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				05:00 PM				05:00 PM				04:45 PM			
+0 mins.	1	0	5	6	3	72	1	76	0	0	5	5	2	93	**2**	97
+15 mins.	**4**	0	**6**	**10**	3	73	1	77	1	0	4	5	**5**	**126**	0	**131**
+30 mins.	2	0	1	3	13	64	**8**	85	**2**	0	**6**	**8**	4	106	1	111
+45 mins.	2	0	2	4	**14**	**78**	2	**94**	2	0	6	8	3	103	0	106
Total Volume	9	0	14	23	33	287	12	332	5	0	21	26	14	428	3	445
% App. Total	39.1	0	60.9		9.9	86.4	3.6		19.2	0	80.8		3.1	96.2	0.7	
PHF	.563	.000	.583	.575	.589	.920	.375	.883	.625	.000	.875	.813	.700	.849	.375	.849
Cars	9	0	14	23	33	287	12	332	5	0	21	26	14	428	3	445
% Cars	100	0	100	100	100	100	100	100	100	0	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
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Groups Printed- Trucks

	Lakehill Ave From North			Lake St From East			Margaret St From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	2	0	0	0	0	0	0	0	2
Apprch %	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	0	0	0	100	0	0	0	0	0	0	0	

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	**1**
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

N/S Street : Lakehill Ave / Margaret St
E/W Street : Lake Street
City/State : Arlington, MA
Weather : Cloudy

File Name : 84510004
Site Code : 84510004
Start Date : 9/10/2020
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Groups Printed- Bikes Peds

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	3	0	0	0	0	1	0	0	1	0	0	0	0	4	1	5
04:15 PM	0	0	0	5	0	1	0	0	0	0	0	1	0	0	0	0	6	1	7
04:30 PM	0	0	0	5	0	0	0	1	0	0	0	2	0	1	0	0	8	1	9
04:45 PM	0	0	0	6	0	0	0	0	0	0	3	0	0	0	0	0	6	3	9
Total	0	0	0	19	0	1	0	1	1	0	3	4	0	1	0	0	24	6	30
05:00 PM	0	0	0	0	2	1	0	0	0	0	0	1	0	4	0	0	1	7	8
05:15 PM	0	0	2	2	0	0	0	1	0	0	0	0	0	0	0	0	3	2	5
05:30 PM	0	0	0	5	0	2	0	0	0	0	1	0	0	1	0	0	5	4	9
05:45 PM	0	0	0	5	1	2	0	2	0	0	0	2	0	2	0	0	9	5	14
Total	0	0	2	12	3	5	0	3	0	0	1	3	0	7	0	0	18	18	36
Grand Total	0	0	2	31	3	6	0	4	1	0	4	7	0	8	0	0	42	24	66
Apprch %	0	0	100		33.3	66.7	0		20	0	80		0	100	0				
Total %	0	0	8.3		12.5	25	0		4.2	0	16.7		0	33.3	0		63.6	36.4	

	Lakehill Ave From North				Lake St From East				Margaret St From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	**2**	1	0	**3**	0	0	0	0	0	**4**	0	**4**	**7**
05:15 PM	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	**2**	0	2	0	0	**1**	**1**	0	1	0	1	4
05:45 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	2	0	2	5
Total Volume	0	0	2	2	3	5	0	8	0	0	1	1	0	7	0	7	18
% App. Total	0	0	100		37.5	62.5	0		0	0	100		0	100	0		
PHF	.000	.000	.250	.250	.375	.625	.000	.667	.000	.000	.250	.250	.000	.438	.000	.438	.643

MINUTEMAN COMMUTER BIKEWAY DATA

Location	Month	Year	AM/PM	Total on Bikes	Total on Foot	Total Trail Users	
Minuteman at Dog Park	Sept		AM				
		2019		615	884	1535	566.6734
			PM				
		2019		555	745	1359	417.3708
Minuteman at Dog Park	Feb		AM				
		2019		271	697	986	
			PM				
		2019		218	563	801	
Minuteman at Lake St	Feb		AM				
		2019		235	140	364	0.37
			PM				
		2019		147	93	246	0.31

July 1 2019 to October 31 2019
Minuteman Bikeway at Swan Place
Pedestrian + Bicycle Volume

Peak Hour	8-9 AM	294
Peak Period	7-9 AM	548
Peak Hour/Peak Period		0.54
Peak Hour	5-6 PM	270
Peak Period	5-7 PM	534
Peak Hour/Peak Period		0.51

Year	Peak Hour	Lake Street Ped/Bike Volume
2020	AM	304
	PM	211

SEASONAL ADJUSTMENT DATA

Station **4065**

	Monthly Volume Recorded Volume	Active Days Counted	Average Daily Volume	Relation to Average Month	March to September Relation
January	3382369	24	140932	0.844	
February	3358292	22	152650	0.914	
March	5093243	29	175629	1.052	0.973
April	4822590	28	172235	1.032	
May	5753246	30	191775	1.149	
June	5040562	28	180020	1.078	
July	4859583	30	161986	0.970	
August	5151326	30	171711	1.028	
September	4956663	29	170919	1.024	
October	5150660	30	171689	1.028	
November	4509218	28	161044	0.964	
December	4192605	29	144573	0.866	
	56270357	337	166974	1.000	

Average Month Daily Volume 166974

Station 4065

Month	Year	Average Daily Volume
May	2019	186499
September	2019	184606

May 2019 to September 2019	0.990

Station 4065

Month	Year	Average Daily Volume
September	2014	168063
September	2016	170919
September	2019	184606

September 2014 to September 2016	1.017
September 2016 to September 2019	1.080

COVID-19 ADJUSTMENT DATA

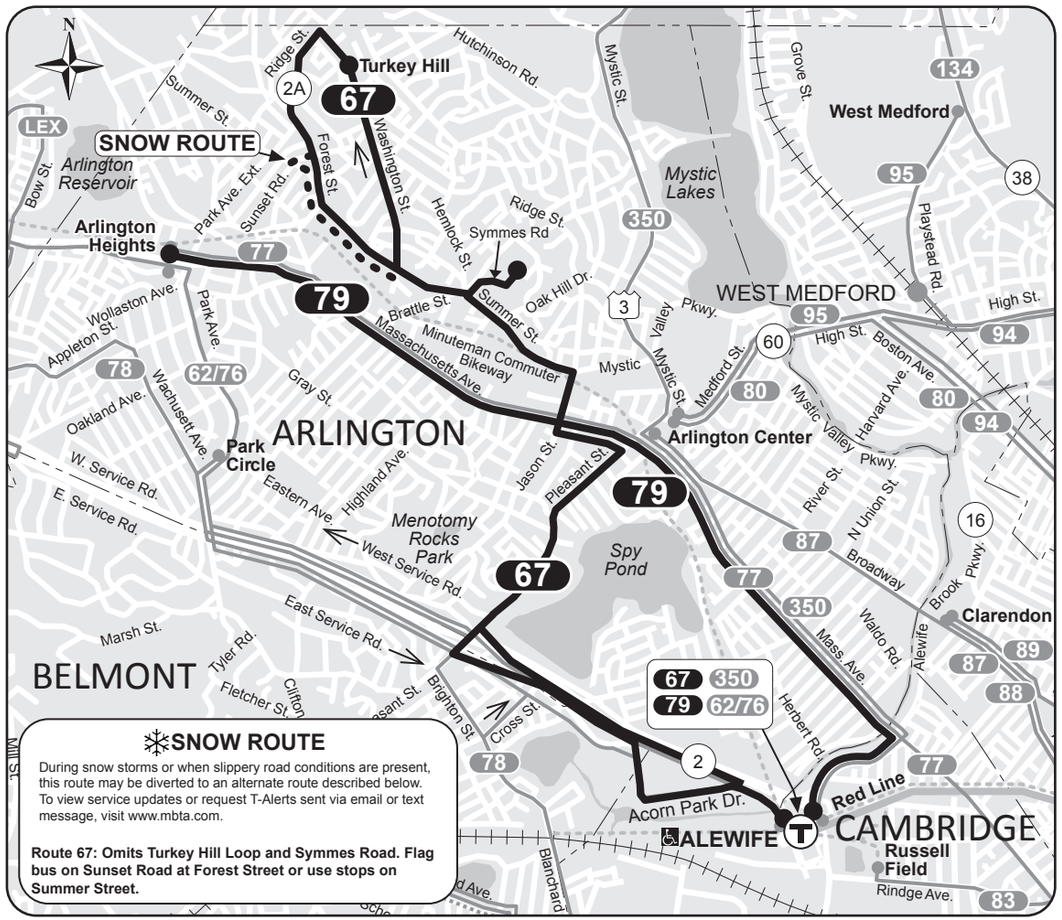
Station 4065

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	ADT
Aug-19	1615	955	683	752	1405	4627	8620	10798	11160	11372	11521	11661	11786	11803	11986	11885	12013	12024	11143	8610	6609	5129	3946	2806	184909
Aug-20	966	612	465	532	1058	3350	6542	7951	8177	8435	9121	9764	10188	10457	11218	10996	10246	9802	7890	6063	4697	3376	2474	1686	146067
19/20	1.67	1.56	1.47	1.41	1.33	1.38	1.32	1.36	1.36	1.35	1.26	1.19	1.16	1.13	1.07	1.08	1.17	1.23	1.41	1.42	1.41	1.52	1.59	1.66	

Adjust Avg of 7-10	Adjust Avg of 16-19	Adjust By ADT	Adjust by Avg Hourly
1.357	1.2705	1.266	1.35

PUBLIC TRANSPORTATION SCHEDULES

Route 67 Turkey Hill - Alewife Station
Route 79 Arlington Heights - Alewife Station



Schedule Change

67•79

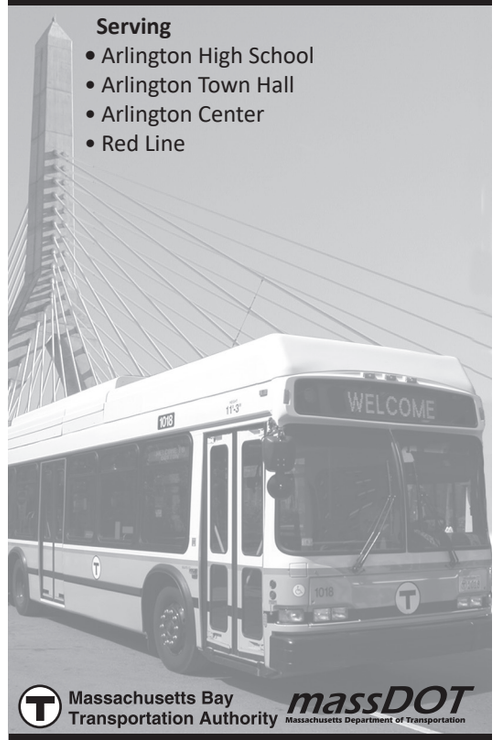
Effective August 30, 2020

67 Turkey Hill-Alewife Station

79 Arlington Heights-Alewife Station

Serving

- Arlington High School
- Arlington Town Hall
- Arlington Center
- Red Line



Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

67 Weekday

Inbound			Outbound		
Leave Turkey Hill	Arrive Arlington Center	Arrive Alewife Station	Leave Alewife Station	Arrive Arlington Center	Arrive Turkey Hill
6:18A	6:23A	6:32A	5:53A	6:00A	6:15A
6:52	6:57	7:07	6:26	6:33	6:48
7:22	7:29	7:43	6:59	7:06	7:21
7:49	7:56	8:10	7:24	7:31	7:47
8:17	8:24	8:39	7:53	8:00	8:16
8:45	8:50	9:03	8:23	8:30	8:44
9:12	9:17	9:27	8:49	8:56	9:10
10:02	10:07	10:17	9:39	9:46	10:00
10:52	10:57	11:07	10:29	10:36	10:50
11:42	11:47	11:56	11:19	11:26	11:40
12:32P	**12:37P**	**12:46P**	**12:09P**	**12:16P**	**12:30P**
1:22	**1:27**	**1:36**	**12:59**	**1:06**	**1:20**
2:12	**2:17**	**2:26**	**1:48**	**1:55**	**2:10**
3:02	**3:07**	**3:16**	**2:38**	**2:47**	**3:02**
3:52	**3:57**	**4:06**	**3:27**	**3:36**	**3:51**
4:42	**4:47**	**4:56**	**4:17**	**4:26**	**4:41**
5:10	**5:16**	**5:26**	**4:44**	**4:55**	**5:10**
5:37	**5:43**	**5:53**	**5:11**	**5:22**	**5:37**
6:05	**6:11**	**6:21**	**5:38**	**5:49**	**6:04**
6:32	**6:36**	**6:45**	**6:05**	**6:16**	**6:31**
6:57	**7:01**	**7:10**	**6:33**	**6:41**	**6:56**
7:37	**7:41**	**7:49**	**7:15**	**7:23**	**7:37**
8:20	**8:24**	**8:32**	**7:58**	**8:05**	**8:18**

Service Note: Route 67
Serves Symmes Road OUTBOUND ONLY.

Route 67
Turkey Hill-Alewife Station

79 Weekday

Inbound			Outbound		
Leave Arlington Heights	Arrive Arlington Center	Arrive Alewife Station	Leave Alewife Station	Arrive Arlington Center	Arrive Arlington Heights
6:35A	6:41A	6:55A	7:02A	7:09A	7:19A
7:00	7:06	7:20	7:30	7:38	7:52
7:30	7:39	7:59	8:10	8:16	8:26
8:00	8:06	8:24	8:35	8:41	8:51
8:30	8:36	8:54	9:30	9:36	9:46
9:00	9:05	9:20			
9:50	9:55	10:06	**2:00P**	**2:06P**	**2:16P**
			2:45	**2:52**	**3:05**
2:20P	**2:26P**	**2:39P**	**3:10**	**3:17**	**3:28**
s 3:05	**3:11**	**3:25**	**3:30**	**3:37**	**3:48**
s 3:15	**3:21**	**3:34**	**3:50**	**3:57**	**4:09**
3:20	**3:26**	**3:39**	**4:10**	**4:22**	**4:34**
s 3:25	**3:30**	**3:41**	**4:30**	**4:42**	**4:54**
3:40	**3:46**	**3:59**	**4:50**	**5:02**	**5:14**
4:00	**4:06**	**4:19**	**5:10**	**5:24**	**5:36**
4:20	**4:26**	**4:39**	**5:30**	**5:44**	**5:56**
4:40	**4:46**	**4:59**	**5:50**	**6:03**	**6:14**
5:00	**5:06**	**5:20**	**6:15**	**6:27**	**6:38**
5:20	**5:26**	**5:40**	**6:35**	**6:47**	**6:58**
5:45	**5:51**	**6:05**	**7:05**	**7:13**	**7:24**
6:05	**6:11**	**6:25**			
6:45	**6:51**	**7:02**			

s - Leaves from Massachusetts Avenue at Appleton Street and does NOT run during school vacation

Route 79
Arlington Heights-Alewife Station

No service on weekends.

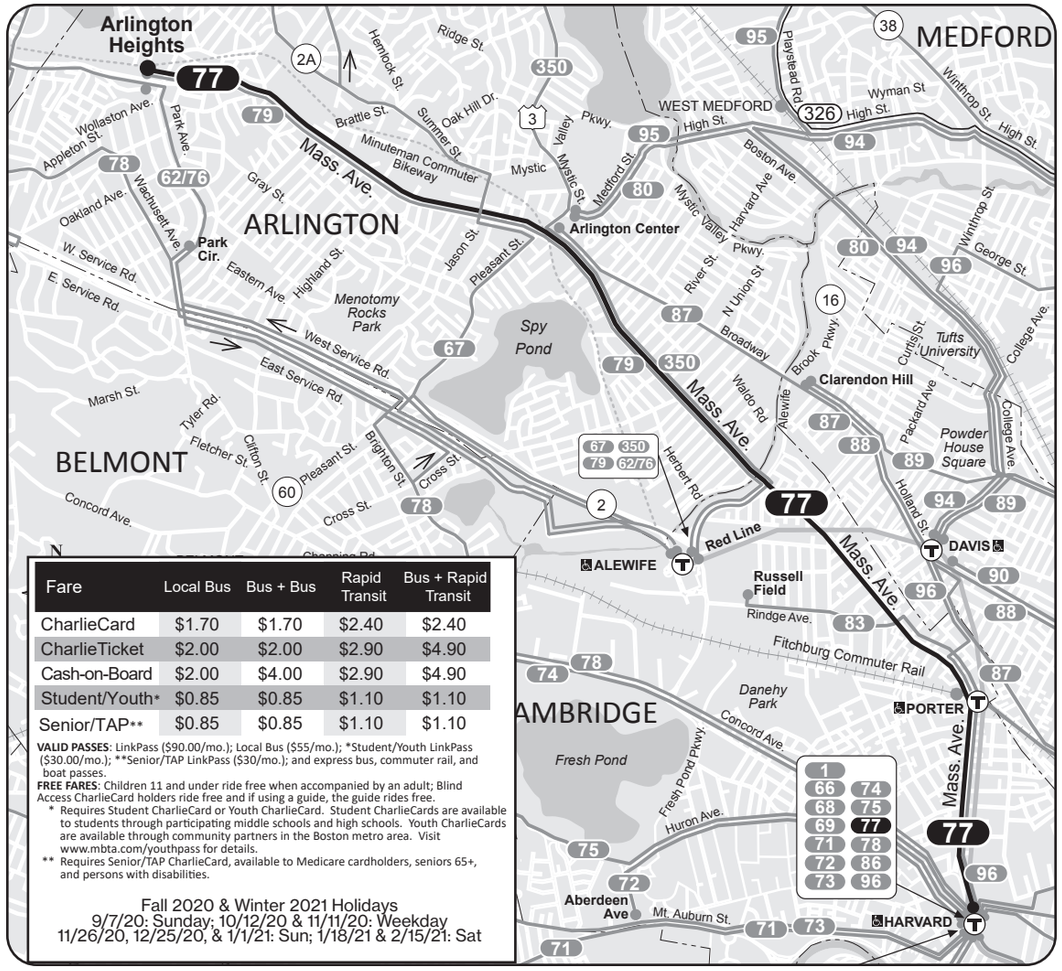
All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.40	$2.40
CharlieTicket	$2.00	$2.00	$2.90	$4.90
Cash-on-Board	$2.00	$4.00	$2.90	$4.90
Student/Youth*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

VALID PASSES: LinkPass ($90.00/mo.); Local Bus ($55/mo.); *Student/Youth LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Fall 2020 & Winter 2021 Holidays
9/7/20: Sunday; 10/12/20 & 11/11/20: Weekday
11/26/20, 12/25/20, & 1/1/21: Sun; 1/18/21 & 2/15/21: Sat

Route 77 Arlington Heights - Harvard Station



Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.40	$2.40
CharlieTicket	$2.00	$2.00	$2.90	$4.90
Cash-on-Board	$2.00	$4.00	$2.90	$4.90
Student/Youth*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

VALID PASSES: LinkPass ($90.00/mo.); Local Bus ($55/mo.); *Student/Youth LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Fall 2020 & Winter 2021 Holidays
9/7/20: Sunday; 10/12/20 & 11/11/20: Weekday
11/26/20, 12/25/20, & 1/1/21: Sun; 1/18/21 & 2/15/21: Sat

77

Effective August 30, 2020

Arlington Heights-Harvard Station

Serving

- Porter Station
- Arlington High School
- Arlington Center
- Harvard University
- Eliot Street
- Red Line
- Fitchburg Commuter Rail



Massachusetts Bay Transportation Authority
massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

77 Weekday

Inbound

Leave Arlington Heights	Arrive Arlington Center	Lv/Arrive North Camb.	Arrive Harvard Square
4:48A	4:54A	5:01A	5:12A
5:00	5:06	5:13	5:24
5:12	5:18	5:25	5:36
5:23	5:29	5:36	5:47
5:34	5:40	5:47	5:58
Every	*10 Mins.*	*or Less*	
10:15	10:23	10:34	10:51
10:25	10:33	10:44	11:01
10:34	10:42	10:53	11:10
10:43	10:51	11:02	11:19
10:52	11:00	11:11	11:28
11:01	11:09	11:20	11:37
11:11	11:19	11:30	11:47
11:20	11:28	11:39	11:56
11:29	11:37	11:48	**12:06P**
11:38	11:46	11:57	**12:15**
11:47	11:56	**12:07P**	**12:25**
11:56	**12:05P**	**12:16**	**12:34**
12:05P	**12:14**	**12:25**	**12:43**
12:14	**12:23**	**12:34**	**12:52**
Every	***11 Mins.***	***or Less***	
4:01	**4:10**	**4:22**	**4:38**
4:11	**4:20**	**4:32**	**4:49**
4:21	**4:30**	**4:42**	**5:01**
4:31	**4:40**	**4:53**	**5:12**
4:41	**4:50**	**5:04**	**5:23**
4:51	**5:00**	**5:14**	**5:33**
5:01	**5:10**	**5:24**	**5:43**
5:11	**5:20**	**5:34**	**5:53**
5:21	**5:30**	**5:44**	**6:03**
5:31	**5:40**	**5:54**	**6:13**
5:41	**5:50**	**6:04**	**6:23**
5:50	**5:59**	**6:13**	**6:32**
6:00	**6:09**	**6:23**	**6:42**
6:10	**6:19**	**6:33**	**6:52**
Every	***10 Minutes***	***Until***	
8:50	**8:56**	**9:05**	**9:20**
9:00	**9:06**	**9:15**	**9:30**
9:10	**9:16**	**9:25**	**9:40**
9:21	**9:27**	**9:36**	**9:51**
9:32	**9:38**	**9:47**	**10:02**
9:43	**9:49**	**9:58**	**10:13**
9:54	**10:00**	**10:09**	**10:24**
10:05	**10:11**	**10:20**	**10:34**
10:16	**10:22**	**10:30**	**10:43**
10:27	**10:33**	**10:40**	**10:53**
10:38	**10:43**	**10:50**	**11:03**
10:50	**10:55**	**11:02**	**11:15**
11:02	**11:07**	**11:14**	**11:27**
11:14	**11:19**	**11:26**	**11:39**
11:26	**11:31**	**11:38**	**11:51**
11:38	**11:43**	**11:50**	12:03A
11:50	**11:55**	12:02A	12:15
12:02A	12:07A	12:14	12:27
12:17	12:22	12:29	12:42
12:32	12:37	12:44	12:57

Outbound

Leave Harvard Station	Arrive North Camb.	Arrive Arlington Center	Arrive Arlington Heights
5:11A	5:19A	5:24A	5:29A
5:21	5:29	5:34	5:39
5:32	5:40	5:45	5:50
5:43	5:51	5:56	6:01
5:54	6:02	6:08	6:13
6:05	6:15	6:21	6:26
6:18	6:28	6:34	6:39
6:31	6:41	6:47	6:52
6:42	6:52	6:58	7:08
6:51	7:02	7:12	7:23
7:00	7:12	7:22	7:33
7:09	7:21	7:31	7:42
Every	*10 Mins.*	*or Less*	
11:19	11:30	11:38	11:47
11:28	11:39	11:47	11:56
11:37	11:48	11:56	**12:06P**
11:46	11:57	**12:05P**	**12:15**
11:55	**12:08P**	**12:17**	**12:27**
12:05P	**12:17**	**12:26**	**12:36**
Every	***10 Mins.***	***or Less***	
4:14	**4:30**	**4:46**	**4:58**
4:24	**4:43**	**4:59**	**5:11**
4:34	**4:53**	**5:09**	**5:21**
4:44	**5:03**	**5:19**	**5:31**
4:54	**5:13**	**5:29**	**5:41**
5:04	**5:23**	**5:39**	**5:51**
5:14	**5:33**	**5:49**	**6:01**
5:24	**5:43**	**5:59**	**6:11**
5:34	**5:53**	**6:09**	**6:21**
5:44	**6:03**	**6:19**	**6:30**
5:54	**6:13**	**6:29**	**6:36**
6:04	**6:23**	**6:37**	**6:44**
6:14	**6:31**	**6:42**	**6:49**
6:23	**6:36**	**6:47**	**6:54**
6:32	**6:44**	**6:55**	**7:02**
6:41	**6:53**	**7:04**	**7:11**
6:50	**7:02**	**7:13**	**7:20**
6:59	**7:11**	**7:22**	**7:29**
7:08	**7:20**	**7:31**	**7:38**
7:17	**7:29**	**7:40**	**7:47**
7:26	**7:38**	**7:49**	**7:56**
7:35	**7:47**	**7:58**	**8:05**
Every	***11 Mins.***	***or Less***	
10:38	**10:49**	**10:56**	**11:03**
10:50	**11:01**	**11:08**	**11:15**
11:02	**11:13**	**11:18**	**11:23**
11:13	**11:23**	**11:28**	**11:33**
11:24	**11:34**	**11:39**	**11:44**
11:35	**11:45**	**11:50**	**11:55**
11:46	**11:56**	12:01A	12:06A
11:57	12:07A	12:12	12:17
12:08A	12:18	12:23	12:28
12:19	12:29	12:34	12:39
12:30	12:40	12:45	12:50
12:45	12:55	1:00	1:05
w 1:05	1:15	1:20	1:25

77 Saturday

Inbound

Leave Arlington Heights	Arrive Arlington Center	Lv/Arrive North Camb.	Arrive Harvard Square
4:48A	4:52A	4:59A	5:09A
5:03	5:07	5:14	5:24
5:18	5:22	5:29	5:39
5:33	5:37	5:44	5:54
5:48	5:52	5:59	6:10
6:03	6:09	6:16	6:27
6:18	6:24	6:31	6:42
Every	*14 Mins.*	*Until*	
7:15	7:22	7:31	7:45
7:31	7:38	7:47	8:01
7:47	7:54	8:03	8:17
8:02	8:09	8:18	8:32
8:17	8:24	8:33	8:47
8:32	8:39	8:48	9:02
8:45	8:52	9:01	9:15
8:57	9:04	9:13	9:27
9:09	9:16	9:25	9:39
9:21	9:28	9:37	9:51
9:33	9:40	9:49	10:03
9:45	9:52	10:01	10:15
9:56	10:03	10:12	10:26
10:07	10:14	10:23	10:38
10:18	10:25	10:35	10:52
10:29	10:37	10:48	11:05
10:40	10:48	10:59	11:16
10:51	10:59	11:10	11:27
11:02	11:10	11:21	11:38
Every	*11 Mins.*	*Until*	
11:56	**12:04P**	**12:15P**	**12:32P**
12:06P	**12:14**	**12:25**	**12:42**
Every	***12 Mins.***	***or Less***	
6:34	**6:41**	**6:51**	**7:09**
6:47	**6:54**	**7:04**	**7:21**
7:00	**7:06**	**7:16**	**7:33**
7:15	**7:21**	**7:31**	**7:48**
7:30	**7:36**	**7:46**	**8:03**
7:45	**7:51**	**8:01**	**8:17**
8:00	**8:05**	**8:14**	**8:30**
8:15	**8:20**	**8:29**	**8:45**
8:30	**8:35**	**8:44**	**9:00**
8:45	**8:50**	**8:59**	**9:15**
9:00	**9:05**	**9:14**	**9:30**
9:15	**9:20**	**9:29**	**9:45**
9:31	**9:36**	**9:45**	**10:01**
9:48	**9:53**	**10:02**	**10:18**
10:05	**10:10**	**10:19**	**10:35**
10:22	**10:27**	**10:35**	**10:51**
10:39	**10:44**	**10:52**	**11:08**
Every	***17 Mins.***	***or Less***	
12:00M	12:04A	12:11A	12:25A
12:15	12:19	12:26	12:40
12:30	12:34	12:41	12:55

Outbound

Leave Harvard Station	Arrive North Camb.	Arrive Arlington Center	Arrive Arlington Heights
5:18A	5:27A	5:32A	5:38A
5:33	5:42	5:47	5:53
5:48	5:57	6:02	6:08
6:03	6:12	6:17	6:23
Every	*15 Minutes*	*Until*	
7:33	7:43	7:50	7:58
7:48	7:58	8:05	8:13
8:01	8:11	8:18	8:26
8:14	8:24	8:31	8:39
8:28	8:38	8:45	8:53
Every	*14 Mins.*	*Until*	
9:37	9:48	9:56	10:04
9:50	10:01	10:09	10:17
10:03	10:14	10:22	10:30
10:15	10:26	10:34	10:42
10:26	10:38	10:46	10:54
10:37	10:49	10:57	11:05
10:49	11:01	11:09	11:17
11:00	11:12	11:20	11:28
11:12	11:24	11:33	11:42
11:24	11:36	11:45	11:54
11:35	11:47	11:56	**12:05P**
11:47	11:59	**12:08P**	**12:17**
11:58	**12:10P**	**12:19**	**12:28**
12:09P	**12:21**	**12:30**	**12:39**
Every	***12 Mins.***	***or Less***	
6:55	**7:07**	**7:15**	**7:23**
7:07	**7:19**	**7:27**	**7:35**
7:19	**7:31**	**7:39**	**7:47**
7:31	**7:43**	**7:51**	**7:59**
7:44	**7:56**	**8:04**	**8:12**
7:57	**8:09**	**8:17**	**8:25**
8:10	**8:22**	**8:30**	**8:37**
8:25	**8:36**	**8:43**	**8:50**
8:40	**8:51**	**8:58**	**9:05**
8:55	**9:06**	**9:13**	**9:20**
9:10	**9:21**	**9:28**	**9:35**
9:25	**9:36**	**9:43**	**9:50**
9:40	**9:51**	**9:58**	**10:05**
9:55	**10:06**	**10:13**	**10:20**
10:10	**10:21**	**10:28**	**10:35**
10:26	**10:37**	**10:44**	**10:51**
10:42	**10:53**	**11:00**	**11:07**
10:58	**11:09**	**11:16**	**11:23**
11:14	**11:25**	**11:32**	**11:38**
11:30	**11:40**	**11:47**	**11:53**
11:46	**11:56**	12:03A	12:09A
12:02A	12:12A	12:19	12:25
12:18	12:28	12:35	12:41
12:35	12:45	12:52	12:58
12:50	1:00	1:05	1:11
w 1:05	1:15	1:20	1:26

w - Waits for last train to arrive at Harvard Station.

All buses are accessible to persons with disabilities

77 Sunday

Inbound

Leave Arlington Heights	Arrive Arlington Center	Arrive Harvard Square
6:00A	6:04A	6:22A
6:20	6:24	6:42
6:40	6:44	7:03
7:00	7:04	7:23
7:20	7:24	7:43
7:40	7:44	8:03
7:55	7:59	8:20
8:10	8:14	8:38
8:25	8:29	8:54
8:40	8:45	9:10
8:57	9:02	9:27
9:14	9:19	9:44
9:30	9:35	10:00
Every	*17 Mins.*	*or Less*
11:49	11:55	**12:25P**
12:05P	**12:11P**	**12:41**
Every	***17 Mins.***	***or Less***
6:20	**6:25**	**6:49**
6:34	**6:38**	**7:02**
6:47	**6:51**	**7:15**
7:01	**7:05**	**7:29**
7:16	**7:20**	**7:44**
7:32	**7:36**	**8:00**
7:48	**7:52**	**8:16**
8:05	**8:09**	**8:32**
8:22	**8:26**	**8:50**
8:39	**8:43**	**9:06**
8:55	**8:59**	**9:22**
9:12	**9:16**	**9:39**
9:28	**9:32**	**9:55**
9:44	**9:48**	**10:11**
10:00	**10:04**	**10:27**
10:15	**10:19**	**10:41**
10:32	**10:35**	**10:55**
10:48	**10:51**	**11:11**
11:04	**11:07**	**11:27**
11:17	**11:20**	**11:40**
11:35	**11:38**	**11:58**
11:55	**11:58**	12:18A
12:15A	12:18A	12:38
12:35	12:38	12:58

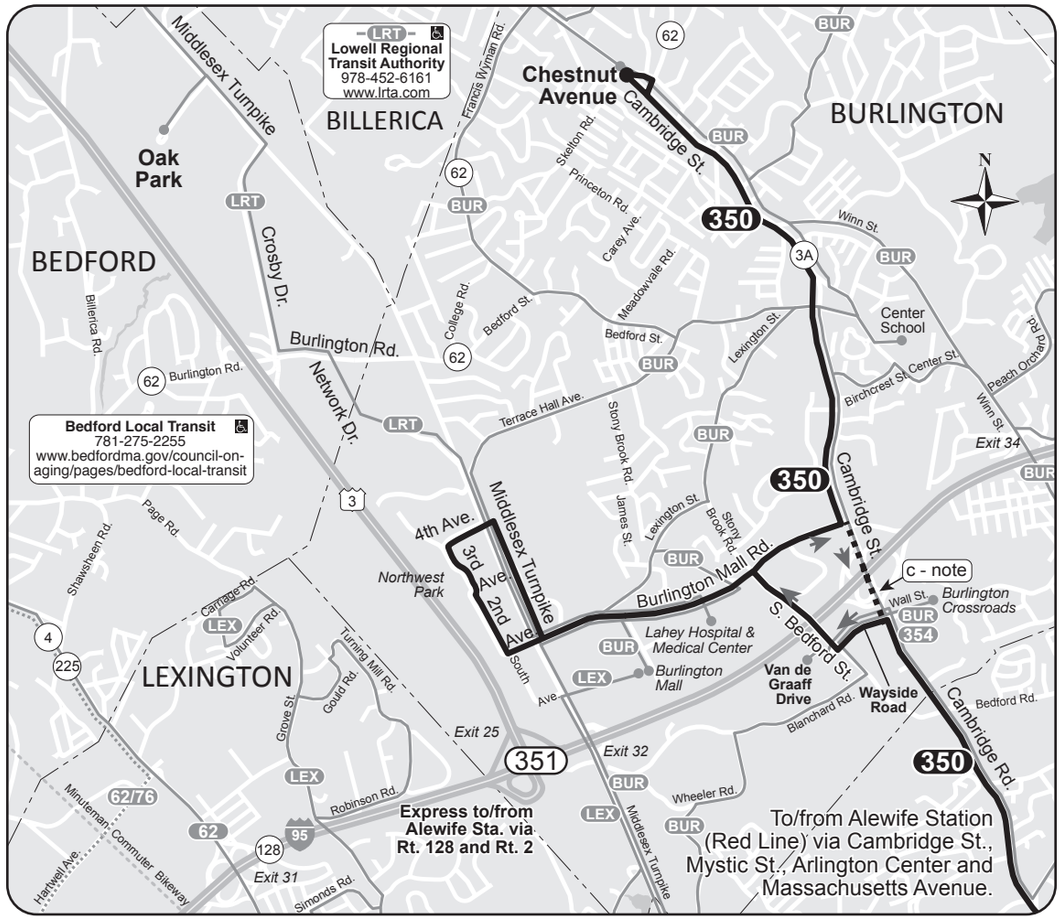
Outbound

Leave Harvard Station	Arrive Arlington Center	Arrive Arlington Heights
6:25A	6:39A	6:45A
6:44	6:58	7:04
7:04	7:18	7:24
7:24	7:38	7:44
7:44	7:58	8:05
8:04	8:23	8:30
8:24	8:43	8:50
8:44	9:03	9:11
9:04	9:24	9:32
9:24	9:44	9:52
9:44	10:04	10:12
10:04	10:24	10:32
Every	*15 Mins.*	*or Less*
11:46	**12:08P**	**12:17P**
12:01P	**12:23P**	**12:32P**
Every	***15 Mins.***	***or Less***
7:08	**7:28**	**7:36**
7:21	**7:41**	**7:49**
7:36	**7:56**	**8:04**
7:51	**8:11**	**8:19**
8:07	**8:27**	**8:35**
8:23	**8:43**	**8:51**
8:38	**8:58**	**9:06**
8:54	**9:14**	**9:22**
9:10	**9:30**	**9:37**
9:25	**9:42**	**9:49**
9:40	**9:57**	**10:04**
9:54	**10:11**	**10:18**
10:09	**10:26**	**10:33**
10:22	**10:39**	**10:46**
10:36	**10:53**	**11:00**
10:49	**11:06**	**11:13**
11:02	**11:19**	**11:26**
11:15	**11:32**	**11:37**
11:30	**11:45**	**11:50**
11:45	12:00M	12:05A
12:00M	12:15A	12:20
12:10A	12:25	12:30
12:25	12:40	12:45
12:45	1:00	1:05
w 1:05	1:20	1:25

Harvard Busway construction note:
Route 77 won't serve Harvard Busway during this time. Inbound service will not serve Harvard Station Busway during this time. Passengers wishing to access Harvard Station are advised to disembark at the temporary bus stop located on Brattle St @ Palmer St. Outbound service is unaffected, and will continue to board passengers in the Harvard Station Busway.

Fares and holidays on map side.

Route 350 North Burlington - Alewife Station
Route 351 Bedford Woods Dr - Alewife Station



Service/Schedule Change

350•351

Effective August 30, 2020

350 North Burlington-Alewife Station

351 Bedford Woods Dr - Alewife Station

Serving

- Burlington Mall
- Oak Park
- Northwest Park
- Red Line
- Lahey Hospital & Medical Center
- Four Corners
- Arlington Center



Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

350 & 351 Weekday

Inbound					Outbound				
Leave Chestnut & Cambridge	Arrive Burlington Mall Road	Arrive Woburn/ Burl. Line	Arrive Arlington Center	Arrive Alewife Station	Leave Alewife Station	Arrive Arlington Center	Arrive Woburn/ Burl. Line	Arrive Burlington Mall Road	Arrive Chestnut & Cambridge
6:00A	.....	6:05A	6:19A	6:31A	b 5:53	6:00	.....	.....	.....
.....	.....	.....	6:23	6:32	b 6:16	6:22	6:39	6:50	7:08
6:20	.....	6:25	6:42	7:02	b 6:36	6:42	6:59	7:09	7:25
6:38	.....	6:45	7:04	7:24	b 6:56	7:02	7:17	7:27	7:43
6:53	.....	7:00	7:19	7:41	7:16	7:22	7:37	7:47	8:03
7:15	.....	7:22	7:41	8:03	7:36	7:43	8:02	8:11	8:31
7:35	.....	7:44	8:03	8:25	7:56	8:03	8:22	8:31	8:51
7:55	.....	8:04	8:23	8:45	8:16	8:23	8:42	8:51	9:11
8:20	8:35A	8:42	9:03	9:13	8:56	9:03	9:22	9:31	9:49
8:40	8:55	9:02	9:19	9:29	9:36	9:42	9:59	10:08	10:26
9:00	9:14	9:21	9:38	9:48	10:16	10:22	10:39	10:48	11:06
9:20	9:34	9:41	9:58	10:09	10:56	11:02	11:19	11:28	11:46
10:00	10:14	10:21	10:38	10:49	11:36	11:42	11:59	**12:08P**	**12:26P**
10:40	10:54	11:01	11:18	11:29					
11:20	11:34	11:41	11:58	**12:09P**	**12:16P**	**12:22P**	**12:39P**	**12:48**	**1:06**
					12:56	**1:02**	**1:19**	**1:28**	**1:46**
12:00N	**12:14P**	**12:21P**	**12:38P**	**12:49**	**1:36**	**1:42**	**1:59**	**2:07**	**2:24**
12:40	**12:54**	**1:02**	**1:19**	**1:30**	**2:16**	**2:26**	**2:45**	**2:53**	**3:12**
1:20	**1:34**	**1:42**	**1:59**	**2:10**	**2:41**	**2:51**	**3:09**	**3:18**	**3:37**
2:00	**2:14**	**2:22**	**2:39**	**2:50**	**3:05**	**3:13**	**3:31**	**3:40**	**3:59**
2:40	**2:54**	**3:03**	**3:21**	**3:32**	**3:30**	**3:38**	**3:56**	**4:05**	**4:27**
3:25	**3:40**	**3:50**	**4:08**	**4:19**	**3:55**	**4:03**	**4:22**	**4:31**	**4:53**
3:45	**4:00**	**4:10**	**4:28**	**4:39**	**4:25**	**4:35**	**4:54**	**5:03**	**5:25**
4:10	**4:25**	**4:35**	**4:53**	**5:07**	**4:55**	**5:08**	**5:28**	.....	**5:43**
4:30	**4:45**	**4:55**	**5:16**	**5:32**	**5:20**	**5:33**	**5:53**	.....	**6:08**
4:45	**5:00**	**5:10**	**5:32**	**5:48**	**5:40**	**5:53**	**6:13**	.....	**6:28**
5:10	**5:25**	**5:35**	**5:57**	**6:10**	**6:00**	**6:13**	**6:33**	.....	**6:48**
5:35	**5:50**	**6:00**	**6:21**	**6:34**	**6:20**	**6:33**	**6:53**	.....	**7:08**
5:55	**6:10**	**6:18**	**6:37**	**6:50**	**6:42**	**6:51**	**7:06**	**7:15**	**7:37**
6:15	**6:30**	**6:37**	**6:52**	**7:05**	**7:05**	**7:14**	**7:29**	**7:38**	**8:00**
6:35	**6:49**	**6:56**	**7:11**	**7:24**	**7:35**	**7:44**	**7:59**	**8:07**	**8:23**
6:55	**7:09**	**7:16**	**7:31**	**7:41**	**8:31**	**8:39**	**8:54**	**9:02**	**9:17**
7:45	**7:59**	**8:05**	**8:18**	**8:28**	**9:25**	**9:33**	**9:48**	**9:56**	**10:11**
8:35	**8:49**	**8:55**	**9:08**	**9:18**	**10:20**	**10:32**	**10:50**	.....	**11:05**
9:30	**9:44**	**9:50**	**10:03**	**10:13**					
10:25	**10:39**	**10:45**	**10:58**	**11:08**					

ROUTE 350 FARES

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.40	$2.40
CharlieTicket	$2.00	$2.00	$2.90	$4.90
Cash-on-Board	$2.00	$4.00	$2.90	$4.90
Student/Youth*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

VALID PASSES: LinkPass ($90.00/mo.); Local Bus ($55/mo.); *Student/Youth LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Route 351 indicated by shaded areas

ROUTE 351 FARES

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.25	$4.25	$4.25
CharlieTicket	$2.00	$5.25	$7.25	$8.15
Cash-on-Board	$2.00	$5.25	$7.25	$8.15
Student/Youth*	$0.85	$2.10	$2.10	$2.10
Senior/TAP**	$0.85	$2.10	$2.10	$2.10

VALID PASSES on 441/442: LinkPass ($90.00/mo.); Local Bus ($55/mo.); *Student/Youth LinkPass ($30.00/mo.); **Senior/TAP LinkPass ($30/mo.); and express bus, commuter rail, and boat passes.
VALID PASSES on 448/449: Inner Express Bus ($136.00/mo.); Outer Express Bus ($168/mo.), commuter rail zone 1 or higher, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+

350 Saturday

Inbound			Outbound		
Leave Chestnut & Cambridge	Arrive Burlington Mall Road	Arrive Alewife Station	Leave Alewife Station	Arrive Burlington Mall Road	Arrive Chestnut & Cambridge
7:10A	.....	7:38A	6:25A	6:51A	7:05A
7:50	.....	8:18	7:05	7:31	7:45
8:30	8:45A	9:14	7:45	8:11	8:25
9:30	9:45	10:17	8:30	8:59	9:18
10:30	10:46	11:19	9:30	10:01	10:22
11:30	11:46	**12:21P**	10:30	11:01	11:22
			11:30	**12:01P**	**12:21P**
12:30P	**12:46P**	**1:25**			
1:30	**1:46**	**2:25**	**12:30P**	**1:02**	**1:22**
2:30	**2:46**	**3:21**	**1:30**	**2:02**	**2:22**
3:30	**3:46**	**4:21**	**2:30**	**3:02**	**3:22**
4:30	**4:46**	**5:20**	**3:30**	**4:01**	**4:19**
5:30	**5:46**	**6:17**	**4:30**	**4:58**	**5:16**
6:25	**6:41**	**7:10**	**5:30**	**5:55**	**6:13**
7:20	**7:35**	**8:04**	**6:25**	**6:50**	**7:08**
8:10	**8:25**	**8:54**	**7:15**	**7:40**	**7:58**
9:00	**9:15**	**9:44**	**8:10**	**8:33**	**8:52**
9:50	**10:05**	**10:34**	**9:00**	**9:23**	**9:42**
			9:50	.....	**10:20**
			10:40	.....	**11:10**

350 Sunday

Inbound			Outbound		
Leave Chestnut & Cambridge	Arrive Burlington Mall Road	Arrive Alewife Station	Leave Alewife Station	Arrive Burlington Mall Road	Arrive Chestnut & Cambridge
7:55A	.....	8:24A	7:05A	7:31A	7:49A
9:20	.....	9:52	8:30	8:57	9:16
10:50	.....	11:22	9:55	10:24	10:43
			11:25	11:54	**12:13P**
12:20P	**12:34P**	**1:06P**			
1:15	**1:29**	**2:00**	**12:20P**	**12:49P**	**1:08**
2:10	**2:24**	**2:56**	**1:15**	**1:45**	**2:04**
3:05	**3:19**	**3:53**	**2:10**	**2:38**	**2:57**
4:00	**4:14**	**4:50**	**3:05**	**3:33**	**3:52**
4:55	**5:09**	**5:42**	**4:00**	**4:28**	**4:47**
5:50	**6:04**	**6:37**	**4:55**	**5:23**	**5:42**
6:50	**7:04**	**7:35**	**5:50**	**6:18**	**6:37**
			6:50	.....	**7:26**

Fall 2020 & Winter 2021 Holidays
9/7/20: Sunday; 10/12/20 & 11/11/20: Weekday
11/26/20, 12/25/20, & 1/1/21: Sun; 1/18/21 & 2/15/21: Sat

NOTE:
Route 351 Alewife service operates via Berth 8

Route 351 may be limited or suspended. Visit mbta.com for latest updates.

All buses are accessible to persons with disabilities

b - Omits Northwest Park

Route 350
North Burlington-Alewife Station

Route 351
Bedford Woods Dr - Alewife Station

Fares

PRICE PER TRIP	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.40	$2.40
CharlieTicket	$2.00	$2.00	$2.90	$4.90***
Cash-on-Board	$2.00	$4.00	$2.90	$4.90***
Student/Youth*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10
UNLIMITED TRIP PASSES				
1-Day	$12.75	$12.75	$12.75	$12.75
7-Day	$22.50	$22.50	$22.50	$22.50
Monthly	$55.00	$55.00	$90.00	$90.00
Senior/TAP Monthly	$30.00/month for unlimited travel on Local Bus and Rapid Transit			

VALID PASSES: LinkPass ($84.50/mo.); Student /Youth LinkPass* ($30/mo.) ; Senior/TAP LinkPass* ($30/mo.); and express bus, commuter rail, and boat passes.

FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free: if using a guide, the guide rides free

* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.

** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

*** For Silver Line SL4 or SL5 pay $2.75. Also see "transfers."

TRANSFERS

If paying with a CharlieTicket or CharlieCard, discounted transfers that are available are automatic — just use the same ticket or card throughout your trip. If paying with cash onboard a vehicle, free transfers are only allowed between rapid transit lines and inside paid platform areas at gated stations.

SCHEDULES

Schedules are available at the following stations: Park Street, Airport, Malden, Harvard, Haymarket (Green Line Level), Back Bay and Downtown Crossing (Orange Line Level) or see station personnel. Schedules also available at the Transportation Building (10 Park Plaza), 45 High St, and online at mbta.com.

For real-time subway and bus tracking, download the Transit app on any smartphone.



Rapid Transit

Effective August 30, 2020











Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

Rapid Transit Line	Weekday				Saturday			Sunday		
	First Trip	Peak	Off Peak	Last Trip	First Trip	Arriving Every	Last Trip	First Trip	Arriving Every	Last Trip
Red Line										
Alewife	5:24 AM	9	12-16	12:20 AM	5:24 AM	12-16	12:20 AM	6:08AM	12-16	12:20 AM
Braintree	5:08 AM	mins	mins	12:17 AM	5:09 AM	mins	12:17 AM	6:00AM	mins	12:17 AM
Alewife	5:16 AM	9	12-16	w 12:27 AM	5:16 AM	12-16	w 12:27 AM	6:00AM	12-16	w 12:27 AM
Ashmont	5:16 AM	mins	mins	w 12:30 AM	5:16 AM	mins	w 12:30 AM	6:00AM	mins	w 12:30 AM
"M" Ashmont	5:17 AM	5	8-12 Day	w 1:05 AM	5:15 AM	8-12 Day	w 1:05 AM	6:03AM	8-12 Day	w 1:05 AM
Mattapan	5:05 AM	mins	26 Late	12:53 AM	5:05 AM	26 Early/Late	12:53 AM	5:51AM	26 Early/Late	12:53 AM
Blue Line										
Wonderland	5:13 AM	5	9-13	12:28 AM	5:25 AM	9-13	12:28 AM	5:58AM	9-13	12:28 AM
Orient Heights	5:14 AM	mins	mins	12:33 AM	5:13 AM	mins	12:33 AM	6:03AM	mins	12:33 AM
Bowdoin	5:30 AM			w 1:00 AM	5:29 AM		w 1:00 AM	6:21AM		w 1:00 AM
Orange Line										
Oak Grove	5:16 AM	6	9-11	w 12:30 AM	5:16 AM	9-11	w 12:30 AM	6:00AM	9-11	w 12:30 AM
Forest Hills	5:16 AM	mins	mins	w 12:28 AM	5:16 AM	mins	w 12:28 AM	6:00AM	mins	w 12:28 AM
Green Line*										
B Boston College	5:01 AM	5-6	7-9	12:10 AM	4:45 AM [2]	7-8	12:09 AM	5:20AM [2]	9	12:10 AM
Park Street	5:45 AM	mins	mins	w 12:52 AM	5:40 AM	mins	w 12:52 AM	6:12AM	mins	w 12:52 AM
C Cleveland Circle	4:57 AM [1]	6-8	9-11	12:07 AM	4:50 AM [2]	9-10	12:10 AM	5:30AM [2]	10	12:10 AM
North Station	5:48 AM	mins	mins	w 12:46 AM	5:30 AM	mins	w 12:46 AM	6:06AM	mins	w 12:46 AM
D Riverside	4:56 AM	6	8-11	12:05 AM	4:55 AM	8-9	12:02 AM	5:25AM	11-12	12:05 AM
Government Ctr.	5:45 AM	mins	mins	w 12:49 AM	5:38 AM	mins	w 12:49 AM	6:10AM	mins	w 12:49 AM
E Lechmere *	5:00 AM [4]	6-7	8-10	12:30 AM	5:01 AM	10	12:30 AM	5:35AM	12	12:30 AM
Heath Street	5:45 AM	mins	mins	12:47 AM [3]	5:39 AM	mins	12:47 AM [3]	6:15AM	mins	12:47 AM [3]
Silver Line										
SL1 Logan Airport	5:38 AM	7-12	10-12	f 1:03 AM	5:48 AM	10-12	1:15 AM	5:50AM	10-12	f 1:12 AM
South Station	5:40 AM	mins	mins	w 1:02 AM	5:45 AM	mins	w 12:59 AM	6:12AM	mins	w 1:00 AM
SL2 Design Center	6:07 AM	6	14-16	12:37 AM	6:03 AM	14-16	12:35 AM	6:51AM	14-16	12:51 AM
South Station	5:44 AM	mins	mins	12:50 AM	5:47 AM	mins	12:45 AM	6:35AM	mins	12:36 AM
	4:55 AM	6-11	8-13	f 1:05 AM	5:30 AM	8-13	1:22 AM	6:26AM	8-13	f 1:25 AM
SL3 Chelsea Station	4:20 AM	mins	mins	w 12:35 AM	4:56 AM	mins	w 12:55 AM	5:53AM	mins	w 12:55 AM
South Station										
SL4 Nubian Station	5:20 AM	6-11	6-11	12:20 AM	5:23 AM	13-20	12:20 AM	6:02AM	13-20	12:20 AM
South Station	5:38 AM	mins	mins	12:37 AM	5:40 AM	mins	12:40 AM	6:20AM	mins	12:40 AM
SL5 Nubian Station	5:15 AM	11-14	13-20	12:51 AM	5:19 AM	6-11	12:43 AM	6:00AM	6-11	12:25 AM
Downtown Xing	5:32 AM	mins	mins	w 1:07 AM	5:34 AM	mins	w 1:00 AM	6:16AM	mins	w 12:47 AM

Peak Service:
Weekdays 7 AM - 9 AM, 4 PM - 6:30 PM

Green Line Notes:

New and ongoing infrastucture projects may result in diversions on some branches at various times.

See GL service changes at mbta.com/GLwork

View service alerts at mbta.com/alerts

* E trains start/end at North Station for Green Line Extension work – shuttles provided between North Station and Lechmere.

More: mbta.com/GLEwork

1 - The first two C train AM northbound trips run through to Lechmere Station on weekdays.

2 - The first B and second C train AM northbound trips run through to Lechmere Station on weekends.

3 - On weekdays the 12:27 AM trip (weekends the 12:32 AM trip) from Heath St is the last connecting train to other lines downtown. The 12:37AM and 12:47AM trips (weekends the 12:47AM trip) from Heath St. runs in service to Lechmere with no guaranteed connections.

4 - Early morning service from Lechmere to Riverside departs Lechmere at 5:00 AM.

f - After exiting Ted Williams Tunnel bus will only service World Trade Center and South Station stops.

w - Last trips wait at some stations, primarily in the Downtown area, for connecting service. Departure times are approximate.

Fall 2020 & Winter 2021 Holidays
9/7/20: Sunday; 10/12/20 & 11/11/20: Weekday
11/26/20, 12/25/20, & 1/1/21: Sun; 1/18/21 & 2/15/21: Sat

MOTOR VEHICLE CRASH DATA

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Route 2 ST #

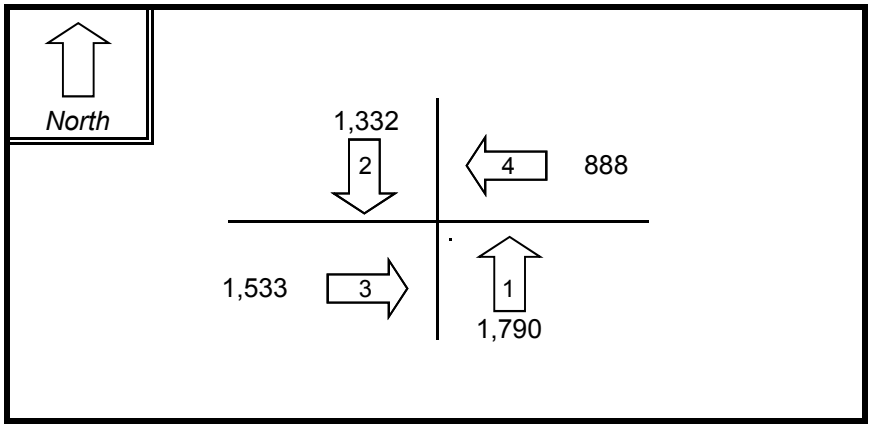
MINOR STREET(S) : Route 16 ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM
(Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	1,790	1,332	1,533	888		**5,543**

" K " FACTOR : **0.082** APPROACH ADT : **67,598** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 88 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : **17.60**

CRASH RATE CALCULATION : **0.71** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

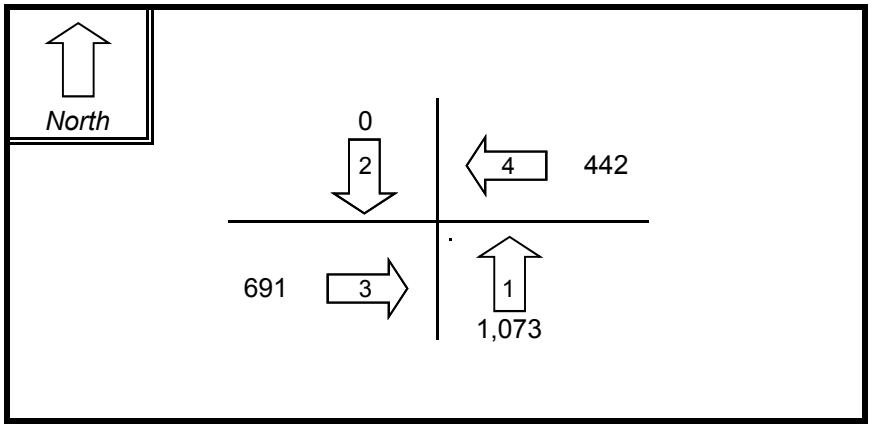
MINOR STREET(S) : Route 2 EB On/Off Ramps ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	1,073		691	442		**2,206**

" K " FACTOR : **0.082** APPROACH ADT : **26,902** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 5 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : **1.00**

CRASH RATE CALCULATION : **0.10** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

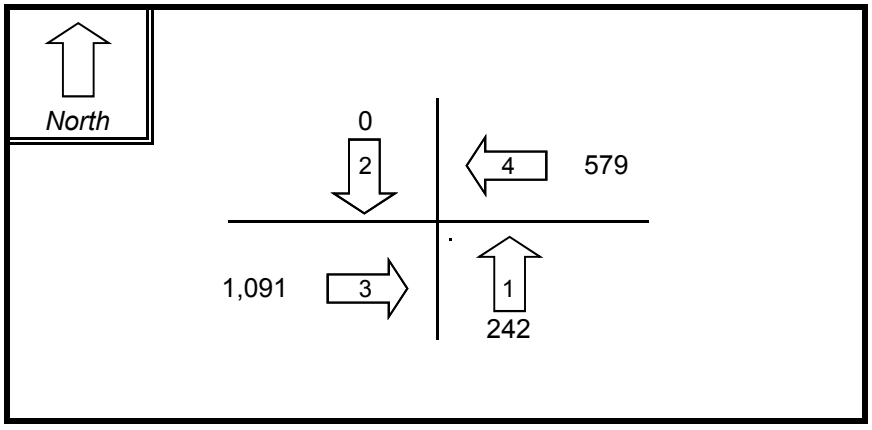
MINOR STREET(S) : Route 2 EB On/Off Ramps ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	242		1,091	579		**1,912**

" K " FACTOR : **0.082** APPROACH ADT : **23,317** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 5 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : **1.00**

CRASH RATE CALCULATION : **0.12** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

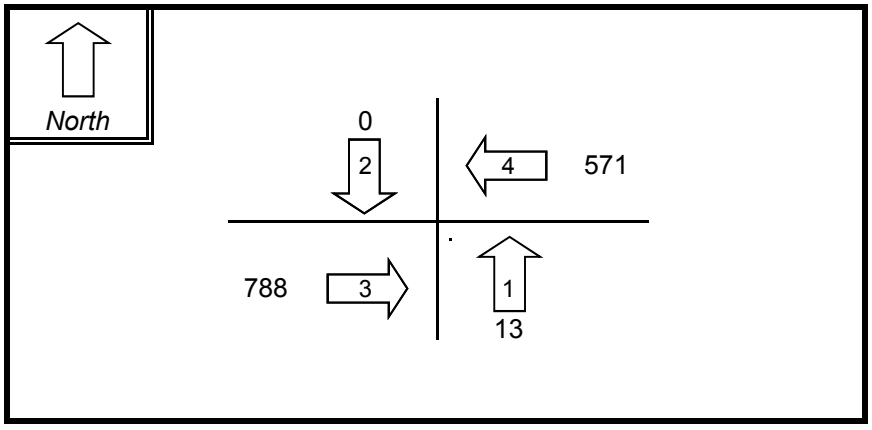
MINOR STREET(S) : Wlison Avenue ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	13		788	571		1,372

" K " FACTOR : 0.082 APPROACH ADT : 16,732 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 2 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 0.40

CRASH RATE CALCULATION : 0.07 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

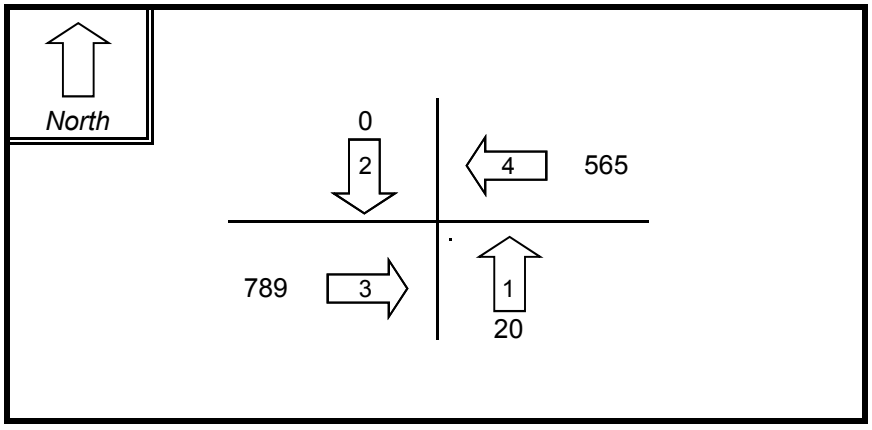
MINOR STREET(S) : Littlejohn Street ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM
(Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	20		789	565		1,374

" K " FACTOR : 0.082 APPROACH ADT : 16,756 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 4 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 0.80

CRASH RATE CALCULATION : 0.13 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

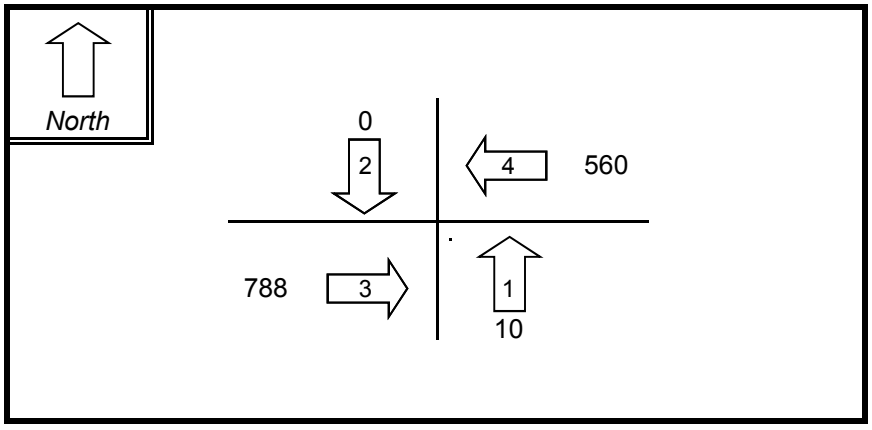
MINOR STREET(S) : Homestead Road ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM
(Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	10		788	560		1,358

" K " FACTOR : 0.082 APPROACH ADT : 16,561 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 1 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 0.20

CRASH RATE CALCULATION : 0.03 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

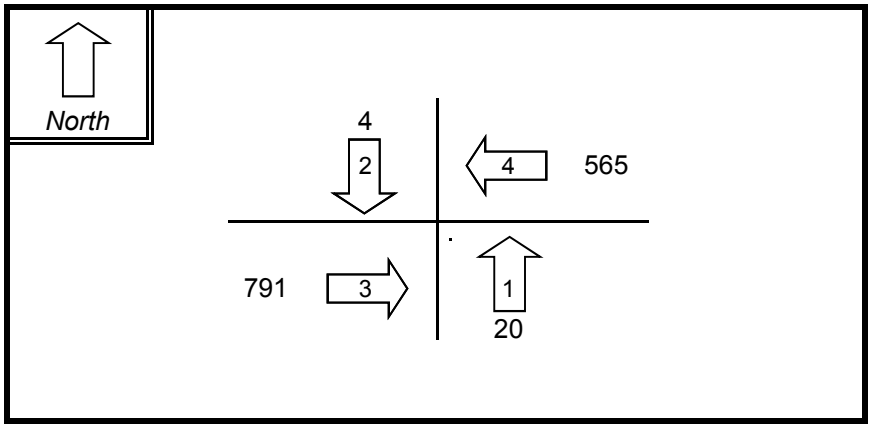
MINOR STREET(S) : Burch Street ST #

Alfred Road ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	20	4	791	565		1,380

" K " FACTOR : 0.082 APPROACH ADT : 16,829 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 3 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 0.60

CRASH RATE CALCULATION : 0.10 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

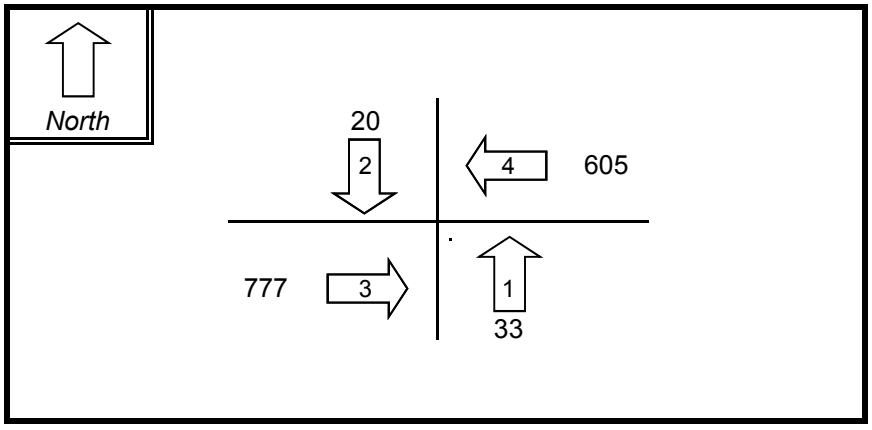
MINOR STREET(S) : Margaret Street ST #

Lakehill Avenue ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	33	20	777	605		1,435

" K " FACTOR : 0.082 APPROACH ADT : 17,500 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 7 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 1.40

CRASH RATE CALCULATION : 0.22 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

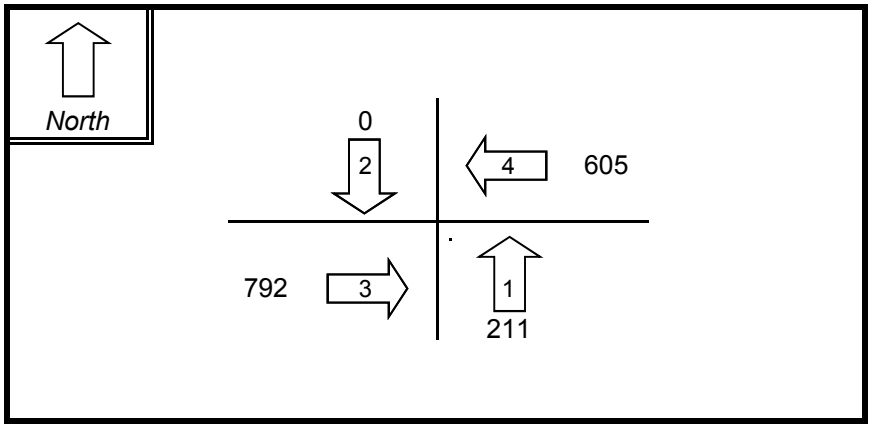
MINOR STREET(S) : Minuteman Commuter Bikeway ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	211		792	605		1,608

" K " FACTOR : 0.082 APPROACH ADT : 19,610 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 18 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 3.60

CRASH RATE CALCULATION : 0.50 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Lake Street ST #

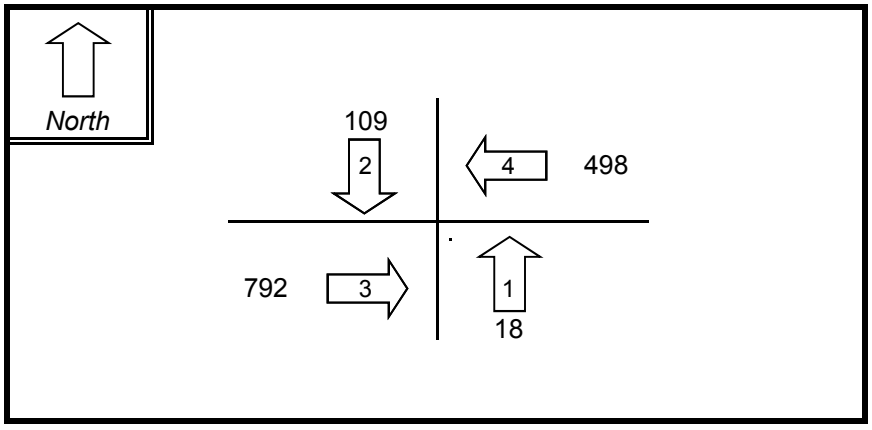
MINOR STREET(S) : Brooks Avenue ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	18	109	792	498		1,417

" K " FACTOR : 0.082 APPROACH ADT : 17,280 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 11 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : 2.20

CRASH RATE CALCULATION : 0.35 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Arlington COUNT DATE : 2020

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Massachusetts Avenue ST #

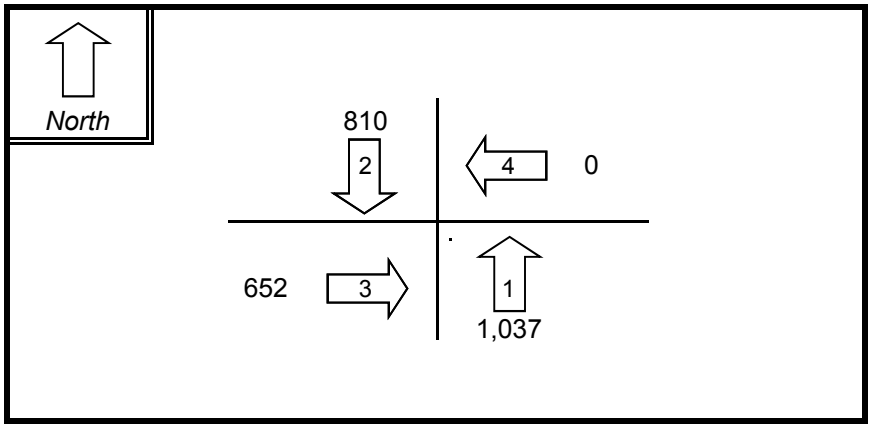
MINOR STREET(S) : Lake Street ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM (Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	1,037	810	652			**2,499**

" K " FACTOR : **0.082** APPROACH ADT : **30,476** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 22 # OF YEARS : 5 AVERAGE # OF ACCIDENTS (**A**) : **4.40**

CRASH RATE CALCULATION : **0.40** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

MassDOT Crash Report for Lake Street at Brooks Avenue in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
03/04/2013	Property damage only (none injured)	4:47 PM	2		Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear		BROOKS AVE / LAKE ST	
08/08/2013	Not Reported	6:18 PM	2	D1: (No improper driving),(No improper driving) / D2: (Followed too closely),(Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear/Clear		BROOKS AVE / LAKE ST	
09/23/2013	Property damage only (none injured)	9:18 AM	3	D1: (Followed too closely),(Other improper action) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: S / V2: S / V3: S	Clear		LAKE ST. / BROOKS AVE.	
02/05/2014	Property damage only (none injured)	2:26 PM	2	D1: (Followed too closely),(Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Rear-end	Snow	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: N / V2: N	Snow/Sleet, hail (freezing rain or drizzle)	64	LAKE ST.	BROOKS AVENUE
02/18/2014	Not Reported	2:02 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Snow	V1: Slowing or stopped in traffic / V2: Turning right	V1: W / V2: N	Snow		BROOKS AVE / LAKE STREET	
03/19/2014	Property damage only (none injured)	7:49 AM	2	D1: (Followed too closely),(Inattention) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: S / V2: S	Clear	67	LAKE ST	BROOKS AVENUE
10/06/2014	Property damage only (none injured)	7:58 PM	2	D1: (No improper driving) / D2: (Followed too closely),(Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear		LAKE ST. / BROOKS AVE.	
03/23/2015	Property damage only (none injured)	11:16 AM	1	D1: (Over-correcting/over-steering)	Daylight	Single vehicle crash	Dry	V1: Turning right	V1: S	Clear		BROOKS AVENUE / LAKE STREET	
09/05/2016	Property damage only (none injured)	5:23 PM	2	D1: (Inattention),(Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Backing	V1: E / V2: E	Clear		BROOKS AVE / LAKE STREET	
11/06/2017	Property damage only (none injured)	5:13 PM	2		Dark - lighted roadway	Head-on	Wet	V1: Turning left / V2: Travelling straight ahead	V1: N / V2: S	Rain/Cloudy		BROOKS AVE / LAKE ST	
11/08/2017	Not Reported	2:21 PM	1	D1: (Unknown)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead	V1: S	Clear/Clear		BROOKS AVENUE / LAKE STREET	

MassDOT Crash Report for Lake Street at Burch Street-Alfred Road in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
07/25/2013	Property damage only (none injured)	7:24 AM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Cloudy	102	LAKE ST
09/03/2013	Not Reported	7:11 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Dusk	Angle	Dry	V1: Turning left / V2: Slowing or stopped in traffic	V1: E / V2: W	Clear		BURCH ST / LAKE ST
03/27/2017	Property damage only (none injured)	9:20 AM	2	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Wet	V1: Overtaking/passing / V2: Travelling straight ahead	V1: N / V2: N	Rain/Cloudy		BURCH STREET / LAKE STREET

MassDOT Crash Report for Lake Street at Homestead Road in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
11/06/2017	Property damage only (none injured)	2:41 PM	2		Daylight	Sideswipe, same direction	Wet	V1: Overtaking/passing / V2: Slowing or stopped in traffic	V1: N / V2: N	Cloudy		HOMESTEAD ROAD / LAKE STREET

MassDOT Crash Report for Lake Street at Littlejohn Street in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
09/09/2014	Property damage only (none injured)	7:39 AM	2	D1: (Unknown) / D2: (Inattention)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Turning left	V1: S / V2: S	Clear/Clear		LITTLE JOHN STREET / LAKE STREET
06/13/2015	Non-fatal injury	9:03 PM	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Head-on	Dry	V1: Parked / V2: Travelling straight ahead	V1: Not Reported / V2: N	Clear	148	LAKE STREET
09/19/2015	Non-fatal injury	4:55 PM	1	D1: (No improper driving)	Daylight	Angle	Dry	V1: Turning left	V1: S	Clear		LAKE ST / LITTLEJOHN ST
04/13/2016	Property damage only (none injured)	8:21 AM	2	D1: (Inattention),(Failed to yield right of way)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Clear		LAKE STREET / LITTLEJOHN STREET

MassDOT Crash Report for Lake Street at Margaret Street at Lakehill Avenue in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
04/25/2013	Property damage only (none injured)	8:22 AM	2	D1: (Inattention),(Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Wet	V1: Turning right / V2: Slowing or stopped in traffic	V1: N / V2: N	Cloudy		LAKE ST / MARGARET ST
05/04/2013	Property damage only (none injured)	8:55 AM	2	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Parked	V1: W / V2: Reported but invalid	Clear		LAKE ST / MARGARET ST
05/09/2014	Not Reported	9:47 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings),(Failed to yield right of way)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Entering traffic lane	V1: N / V2: W	Clear	81	LAKE ST
02/10/2016	Property damage only (none injured)	8:37 AM	2		Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: N	Cloudy/Snow		LAKE ST / LAKEHILL AVE. / MARGARET ST.
09/01/2016	Not Reported	4:08 PM	2		Daylight	Head-on	Dry	V1: Turning left / V2: Travelling straight ahead	V1: S / V2: N	Cloudy		LAKE ST / MARGARET ST
08/08/2017	Not Reported	6:18 PM	2		Daylight	Sideswipe, same direction	Dry	V1: Turning left / V2: Travelling straight ahead	V1: W / V2: W	Clear		LAKE ST / MARGARET ST
09/16/2017	Non-fatal injury	11:24 AM	3		Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: S / V2: S / V3: S	Cloudy		LAKEHILL AVE / LAKE ST

MassDOT Crash Report for Lake Street at Minuteman Commuter Bikeway in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
08/23/2013	Property damage only (none injured)	11:04 AM	1	D1: (Failed to yield right of way)	Daylight	Pedestrian	Dry	V1: Travelling straight ahead	V1: N	Cloudy		LAKE STREET	MARGARET STREET
07/23/2014	Property damage only (none injured)	8:28 AM	1	D1: (No improper driving),(No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead	V1: N	Clear/Clear	72	LAKE ST	BIKE PATH
09/30/2014	Property damage only (none injured)	3:44 PM	1	D1: (No improper driving)	Not reported	Pedestrian	Not reported	V1: Slowing or stopped in traffic	V1: S	Not Reported		LAKE STREET	
02/13/2015	Not Reported	4:26 PM	1	D1: (No improper driving),(No improper driving)	Daylight	Pedestrian	Snow	V1: Slowing or stopped in traffic	V1: S	Clear/Clear		/ LAKE STREET	
10/04/2015	Property damage only (none injured)	2:11 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Clear		LAKE STREET	
05/11/2016	Non-fatal injury	6:26 AM	1	D1: (No improper driving)	Daylight	Sideswipe, opposite direction	Dry	V1: Travelling straight ahead	V1: N	Clear		LAKE STREET / MINUTEMAN COMMUTER BIKEWAY	
05/25/2016	Property damage only (none injured)	3:05 PM	2	D1: (Inattention),(Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: S / V2: S	Clear	75	LAKE ST	
06/06/2016	Property damage only (none injured)	9:52 AM	3		Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead / V3: Travelling straight ahead	V1: S / V2: S / V3: S	Clear	74	LAKE ST	
09/13/2016	Property damage only (none injured)	10:07 AM	2		Daylight	Angle	Dry	V1: Backing / V2: Parked	V1: W / V2: S	Clear	68	LAKE ST	
01/25/2017	Not Reported	11:52 AM	1		Daylight	Bicyclist	Dry	V1: Travelling straight ahead	V1: S	Clear		/ / LAKE STREET	LAKEHILL AVENUE
10/10/2017	Property damage only (none injured)	6:48 PM	3		Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: S / V2: S / V3: S	Clear		LAKE STREET	
12/27/2016	Non-fatal injury	11:54 AM	1	D1: (No improper driving)	Daylight	Pedestrian	Wet	V1: Travelling straight ahead	V1: N	Clear		LAKE STREET	MARGARET STREET
08/24/2017	Property damage only (none injured)	7:27 AM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Bicyclist	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: Not Reported	Clear		LAKE STREET	
06/23/2014	Property damage only (none injured)	6:07 PM	1	D1: (No improper driving)	Daylight	Bicyclist	Dry	V1: Travelling straight ahead	V1: S	Clear		LAKE STREET / BIKE PATH	
11/08/2014	Non-fatal injury	10:49 AM	3	D1: (Inattention),(Unknown) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: S / V2: S / V3: S	Clear	73	LAKE ST.	MINUTEMAN TRAIL
10/29/2016	Property damage only (none injured)	2:40 PM	3	D1: (Inattention),(Distracted) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: S / V2: S / V3: S	Clear	71	LAKE ST	MINUTEMAN TRAIL BIKE PATH
10/22/2014	Non-fatal injury	12:51 PM	2	D1: (Distracted) / D2: (No improper driving),(No improper driving)	Daylight	Rear-end	Wet	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: S / V2: S	Rain/Cloudy	71	LAKE STREET	
09/15/2015	Not Reported	3:55 PM	2	D1: (Operating defective equipment) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Clear	71	LAKE ST	

MassDOT Crash Report for Lake Street at Route 2 EB On-Off Ramps in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
01/28/2014	Property damage only (none injured)	1:00 AM	1	D1: (Failure to keep in proper lane or running off road)	Dark - lighted roadway	Single vehicle crash	Dry	V1: Travelling straight ahead	V1: W	Clear		LAKE STREET / RAMP-RT 2 EB/ACORN PARK RD TO LAKE ST	
02/06/2014	Property damage only (none injured)	10:46 AM	1	D1: (Other improper action)	Daylight	Single vehicle crash	Snow	V1: Turning right	V1: E	Snow		RAMP-RT 2 EB/ACORN PARK RD TO LAKE ST	
08/01/2014	Property damage only (none injured)	9:10 AM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Turning left / V2: Turning right	V1: E / V2: N	Clear		RAMP-LAKE STREET TO RT 2 EB	LAKE STREET
11/23/2017	Property damage only (none injured)	10:18 AM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: N	Clear/Clear		LAKE STREET / RAMP-LAKE ST TO RT 2 EB /	
12/23/2017	Property damage only (none injured)	4:51 AM	1	D1: (Driving too fast for conditions)	Dark - lighted roadway	Single vehicle crash	Ice	V1: Travelling straight ahead	V1: N	Not Reported		LAKE STREET	RAMP-LAKE ST TO RT 2 EB

MassDOT Crash Report for Lake Street at Route 2 WB On-Off Ramps in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
03/11/2013	Not Reported	8:05 AM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Not reported	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: Not Reported / V2: Not Reported	Clear		LAKE STREET / RAMP-LAKE ST TO RT 2 WB / LAKE ST	
11/03/2013	Property damage only (none injured)	1:47 AM	1	D1: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner),(Disregarded traffic signs, signals, road markings)	Dark - lighted roadway	Single vehicle crash	Wet	V1: Travelling straight ahead	V1: W	Clear/Clear	200	LAKE ST	
10/15/2015	Not Reported	7:08 PM	2	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Entering traffic lane / V2: Entering traffic lane	V1: N / V2: N	Clear		CONCORD TURNPIKE / LAKE STREET	
07/12/2016	Non-fatal injury	5:51 PM	2		Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear		LAKE STREET Rte 2 E	RAMP 2 WB TO LAKE STREET
06/02/2017	Non-fatal injury	12:52 PM	1		Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead	V1: N	Clear		LAKE STREET / RAMP-RT 2 WB TO LAKE ST / RAMP-LAKE ST TO RT 2 WB	

MassDOT Crash Report for Lake Street at Wilson Avenue in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
08/12/2014	Property damage only (none injured)	11:50 AM	2	D1: (Unknown)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Parked	V1: S / V2: S	Cloudy	181	LAKE ST
05/01/2015	Property damage only (none injured)	6:14 PM	2	D1: (No improper driving) / D2: (Made an improper turn)	Daylight	Angle	Dry	V1: Turning left / V2: Overtaking/passing	V1: E / V2: N	Clear		LAKE ST / WILSON AVE

MassDOT Crash Report for Massachusetts Avenue at Lake Street in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
03/02/2013	Property damage only (none injured)	5:16 PM	1	D1: (No improper driving)	Daylight	Angle	Dry	V1: Turning right	V1: S	Cloudy		LAKE ST / MASSACHUSETTS AVENUE	
05/22/2013	Property damage only (none injured)	1:01 PM	1	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead	V1: E	Clear	204	MASS AVE	LAKE STREET
04/24/2013	Property damage only (none injured)	6:54 AM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Wet	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Cloudy		LAKE ST / MASSACHUSETTS AVENUE	
01/15/2014	Property damage only (none injured)	5:55 PM	2	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		LAKE ST / MASSACHUSETTS AVENUE	
07/02/2014	Not Reported	6:47 PM	3	D1: (No improper driving) / D2: (No improper driving) / D3: (Other improper action)	Dusk	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: W / V2: W / V3: W	Cloudy	204	MASSACHUSETTS AVENUE	LAKE STREET
11/20/2014	Property damage only (none injured)	6:07 PM	1	D1: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead	V1: S	Clear		LAKE ST / MASSACHUSETTS AVENUE	
01/11/2015	Property damage only (none injured)	2:29 PM	2	D1: (Made an improper turn) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Making U-turn / V2: Travelling straight ahead	V1: S / V2: Not Reported	Cloudy/Cloudy	191	MASSACHUSETTS AVENUE	
04/15/2015	Property damage only (none injured)	3:44 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: N	Cloudy		LAKE ST / MASSACHUSETTS AVENUE	
04/29/2015	Not Reported	8:29 AM	2	D1: (No improper driving),(No improper driving) / D2: (No improper driving),(No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Turning right / V2: Travelling straight ahead	V1: E / V2: E	Clear/Clear	204	MASSACHUSETTS AVENUE	
05/01/2015	Property damage only (none injured)	5:54 AM	2	D1: (No improper driving) / D2: (Followed too closely),(Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		MASSACHUSETTS AVENUE / LAKE ST	
05/24/2015	Property damage only (none injured)	10:02 PM	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		LAKE ST / MASSACHUSETTS AVENUE	
06/05/2015	Not Reported	2:28 PM	2	D1: (No improper driving),(No improper driving) / D2: (Illness)	Daylight	Rear-end	Dry	V1: Parked / V2: Travelling straight ahead	V1: W / V2: W	Clear/Clear		LAKE ST / MASSACHUSETTS AVENUE	
08/07/2015	Non-fatal injury	4:56 PM	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road),(Illness)	Daylight	Sideswipe, opposite direction	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: E	Clear		LAKE ST / MASSACHUSETTS AVENUE	
11/19/2015	Not Reported	3:35 PM	2	D1: (No improper driving),(No improper driving) / D2: (No improper driving),(No improper driving)	Daylight	Angle	Dry	V1: Slowing or stopped in traffic / V2: Backing	V1: W / V2: W	Cloudy/Cloudy		LAKE ST / MASSACHUSETTS AVENUE Rte 185 W	
12/10/2015	Not Reported	6:27 AM	2	D1: (Unknown) / D2: (Unknown)	Dark - lighted roadway	Sideswipe, same direction	Dry	V1: Turning right / V2: Turning right	V1: E / V2: E	Clear		LAKE STREET / MASSACHUSETTS AVENUE	
01/17/2016	Property damage only (none injured)	2:51 PM	2	D1: (Inattention),(Other improper action) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: N / V2: N	Cloudy	2	LAKE ST.	MASSACHUSETTS AVENUE Rte 3A 2
09/13/2016	Property damage only (none injured)	12:09 PM	1		Daylight	Single vehicle crash	Dry	V1: Travelling straight ahead	V1: S	Clear		LAKE ST / MASSACHUSETTS AVENUE	
06/03/2017	Property damage only (none injured)	1:12 PM	1	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead	V1: W	Cloudy		MASSACHUSETTS AVENUE Rte 2A W	LAKE STREET
07/08/2017	Property damage only (none injured)	12:11 PM	2		Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Backing	V1: E / V2: E	Clear/Clear	204	MASSACHUSETTS AVENUE	
10/26/2017	Property damage only (none injured)	9:42 AM	2		Daylight	Sideswipe, same direction	Wet	V1: Travelling straight ahead / V2: Parked	V1: E / V2: E	Cloudy/Rain	204	MASSACHUSETTS AVENUE	
11/27/2017	Property damage only (none injured)	12:07 PM	2	D1: (No improper driving) / D2: (Made an improper turn),(Failure to keep in proper lane or running off road)	Daylight	Sideswipe, same direction	Dry	V1: Turning right / V2: Leaving traffic lane	V1: S / V2: E	Clear		LAKE STREET / MASSACHUSETTS AVENUE	
06/03/2017	Property damage only (none injured)	1:12 PM	2	D1: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: E	Cloudy		MASSACHUSETTS AVENUE Rte 3 W / LAKE STREET	

MassDOT Crash Report for Route 2 at Route 16 in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
01/23/2013	Property damage only (none injured)	1:20 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Cloudy		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY Rte 3A S
08/03/2013	Property damage only (none injured)	5:30 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	CONCORD TURNPIKE Rte 2 E
09/21/2013	Non-fatal injury	11:57 AM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	CONCORD TURNPIKE Rte 2 E
03/24/2014	Property damage only (none injured)	1:37 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: W / V2: W	Cloudy		ALEWIFE BROOK PARKWAY Rte 2 E	CONCORD TURNPIKE Rte 2 W
08/09/2014	Property damage only (none injured)	7:31 AM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Clear		ALEWIFE STATION ACCESS ROAD / ALEWIFE BROOK PARKWAY Rte US3 N	
10/06/2014	Non-fatal injury	2:51 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: S	Clear		CONCORD TURNPIKE Rte SR2 W / CONCORD TURNPIKE Rte SR2 W / ALEWIFE BROOK PARKWAY	
10/15/2014	Property damage only (none injured)	11:20 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Dark - lighted roadway	Rear-end	Wet	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Rain		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE Rte 2 W
10/23/2014	Non-fatal injury	6:55 PM	3	D1: (Followed too closely) / D2: (No improper driving) / D3: (No improper driving)	Dark - roadway not lighted	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Clear		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY Rte 3A S
03/19/2015	Non-fatal injury	8:44 AM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: S / V2: N	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	CONCORD TURNPIKE
04/08/2015	Property damage only (none injured)	7:34 PM	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY Rte 3
07/22/2015	Property damage only (none injured)	1:00 AM	2	D1: (No improper driving) / D2: (Followed too closely)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		Rte 2 E	ALEWIFE BROOK PARKWAY
09/09/2015	Property damage only (none injured)	3:35 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Turning left	V1: S / V2: S	Clear		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE	
09/26/2015	Property damage only (none injured)	10:55 AM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	
10/08/2015	Non-fatal injury	10:23 AM	2		Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	ALEWIFE LOOP DRIVEWAY
10/29/2015	Property damage only (none injured)	3:40 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Clear		CONCORD TURNPIKE Rte SR2 E / ALEWIFE BROOK PARKWAY Rte SR3A / ALEWIFE STATION ACCESS ROAD	
01/11/2016	Non-fatal injury	12:06 PM	3	D1: (Other improper action) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Clear		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY Rte 3
01/11/2016	Property damage only (none injured)	8:12 AM	3	D1: (Inattention) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Clear		ALEWIFE BROOK PARKWAY Rte US3 S / CONCORD TURNPIKE Rte SR2 E	
01/13/2016	Property damage only (none injured)	9:42 PM	2	D2: (Physical impairment)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: Not Reported / V2: N	Clear		ALEWIFE BROOK PARKWAY	
01/26/2016	Property damage only (none injured)	7:52 AM	2	D1: (No improper driving) / D2: (Other improper action)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Changing lanes	V1: E / V2: E	Clear		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE
04/01/2016	Property damage only (none injured)	6:43 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Dusk	Angle	Dry	V1: Turning right / V2: Travelling straight ahead	V1: N / V2: W	Clear		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE /	
05/03/2016	Property damage only (none injured)	1:38 AM	1	D1: (Made an improper turn)	Dark - lighted roadway	Single vehicle crash	Dry	V1: Not reported	V1: N	Clear		Rte 2 W	ALEWIFE BROOK PARKWAY
06/15/2016	Property damage only (none injured)	7:18 PM	2	D1: (No improper driving) / D2:	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: S	Clear		ALEWIFE STATION ACCESS ROAD / ALEWIFE BROOK PARKWAY Rte US3 N	
07/29/2016	Non-fatal injury	1:42 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: S / V2: S	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	WHITTEMORE AVENUE
09/01/2016	Non-fatal injury	7:44 AM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Clear		ALEWIFE BROOK PARKWAY / ALEWIFE LOOP DRIVEWAY	
10/11/2016	Property damage only (none injured)	11:06 AM	2		Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: N	Clear		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE	

MassDOT Crash Report for Route 2 at Route 16 in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
10/17/2016	Property damage only (none injured)	8:01 AM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Cloudy		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY
11/02/2016	Property damage only (none injured)	1:35 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: N / V2: N	Clear		ALEWIFE BROOK PARKWAY	ALEWIFE STATION ACCESS ROAD
11/29/2016	Property damage only (none injured)	4:25 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Dark - lighted roadway	Angle	Wet	V1: Entering traffic lane / V2: Travelling straight ahead	V1: W / V2: N	Cloudy/Rain		ALEWIFE BROOK PARKWAY Rte UNKNOW	WHITTEMORE AVENUE
12/09/2016	Non-fatal injury	8:07 AM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear		ALEWIFE BROOK PARKWAY Rte 2 E	CONCORD TURNPIKE
12/17/2016	Property damage only (none injured)	1:10 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Cloudy		ALEWIFE BROOK PARKWAY / ALEWIFE LOOP DRIVEWAY /	
01/15/2017	Property damage only (none injured)	8:42 AM	2	D1: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE	
03/11/2017	Property damage only (none injured)	1:36 AM	1	D1: (Over-correcting/over-steering)	Dark - lighted roadway	Single vehicle crash	Snow	V1: Slowing or stopped in traffic	V1: E	Snow		CONCORD TURNPIKE / ALEWIFE BROOK PARKWAY	
08/11/2017	Non-fatal injury	3:52 PM	3	D1: (Followed too closely) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Clear		ALEWIFE BROOK PARKWAY Rte 3 S	CONCORD TURNPIKE Rte 2 W
09/06/2017	Property damage only (none injured)	6:10 PM	3	D1: (No improper driving) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: E / V2: E / V3: E	Clear		CONCORD TURNPIKE Rte 2 E	CONCORD TURNPIKE
10/30/2017	Property damage only (none injured)	4:13 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY Rte 3A S
09/27/2017	Property damage only (none injured)	10:28 AM	3	D1: (Followed too closely) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: N / V2: N / V3: N	Clear		ALEWIFE BROOK PARKWAY Rte SR3A S / ALEWIFE BROOK PARKWAY Rte SR16 E / WHITTEMORE AVENUE	
03/11/2016	Property damage only (none injured)	2:16 AM	2	D1: (Physical impairment) / D2: (No improper driving)	Dark - lighted roadway	Sideswipe, same direction	Wet	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Not Reported		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE	
12/18/2015	Property damage only (none injured)	8:46 PM	2	D1: (No improper driving) / D2: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: S	Clear		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE
10/29/2015	Property damage only (none injured)	8:30 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW W	CONCORD TURNPIKE
11/02/2015	Non-fatal injury	3:33 PM	1	D1: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic	V1: E	Clear		CONCORD TURNPIKE Rte SR2 E / ALEWIFE BROOK PARKWAY Rte SR3A	
09/01/2015	Property damage only (none injured)	10:50 PM	2	D1: (Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Travelling straight ahead / V2: Not reported	V1: E / V2: Not Reported	Clear		Rte 16	CONCORD TURNPIKE
07/14/2015	Property damage only (none injured)	5:24 PM	2	D1: (No improper driving) / D2: (Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	RAMP-RT 2 EB TO ALEWIFE STA/ACORN PARK D
07/18/2015	Non-fatal injury	12:24 PM	3	D1: (No improper driving) / D2: (No improper driving) / D3: (Other improper action)	Daylight	Rear-end	Wet	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: E / V2: E / V3: E	Cloudy		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY
07/05/2015	Non-fatal injury	4:56 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte SR2 E / ALEWIFE BROOK PARKWAY Rte SR3 / ALEWIFE STATION ACCESS ROAD	
06/15/2015	Property damage only (none injured)	11:18 AM	3	D1: (Operating defective equipment) / D2: (No improper driving) / D3: (Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: E / V2: E / V3: E	Clear		ALEWIFE BROOK PARKWAY Rte SR3A S / CONCORD TURNPIKE Rte SR2 E	
06/09/2015	Property damage only (none injured)	6:15 PM	2	D1: (No improper driving) / D2: (Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE / CONCORD TURNPIKE Rte SR2 E / ALEWIFE BROOK PARKWAY	
05/20/2015	Property damage only (none injured)	10:50 AM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		CONCORD TURNPIKE Rte SR2 W / ALEWIFE BROOK PARKWAY	
04/15/2015	Non-fatal injury	3:27 PM	5	D1: (No improper driving) / D2: (No improper driving) / D3: (No improper driving) / D4: (No improper driving) / D5: (Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic / V4: Slowing or stopped in traffic / V5: Changing lanes	V1: E / V2: E / V3: E / V4: E / V5: E	Clear		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY
04/07/2015	Property damage only (none injured)	1:50 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Not Reported		ALEWIFE BROOK PARKWAY Rte US3 N / ALEWIFE STATION ACCESS ROAD	
03/17/2015	Property damage only (none injured)	4:45 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Clear		ALEWIFE STATION ACCESS ROAD / ALEWIFE BROOK PARKWAY Rte US3 N	

MassDOT Crash Report for Route 2 at Route 16 in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
02/05/2015	Property damage only (none injured)	9:20 AM	1	D1: (Failure to keep in proper lane or running off road)	Daylight	Single vehicle crash	Wet	V1: Travelling straight ahead	V1: N	Snow		ALEWIFE BROOK PARKWAY Rte UNKNOW	ALEWIFE LOOP DRIVEWAY
01/28/2015	Property damage only (none injured)	4:20 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Rear-end	Snow	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: N / V2: N	Cloudy		ALEWIFE BROOK PARKWAY Rte 16 E	
01/09/2015	Property damage only (none injured)	12:17 PM	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	ALEWIFE LOOP DRIVEWAY
10/08/2014	Property damage only (none injured)	6:22 PM	2		Dusk	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: W	Clear		ALEWIFE BROOK PARKWAY Rte SR16 E / ALEWIFE BROOK PARKWAY Rte SR2 E / CONCORD TURNPIKE Rte SR2 W	
09/10/2014	Property damage only (none injured)	10:24 AM	2	D1: (No improper driving) / D2: (Made an improper turn)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: S	Clear		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY
09/08/2014	Property damage only (none injured)	3:58 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: W / V2: W	Clear		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY
07/22/2014	Property damage only (none injured)	11:02 AM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: W / V2: W	Not Reported		ALEWIFE BROOK PARKWAY Rte UNKNOW	CONCORD TURNPIKE
07/10/2014	Non-fatal injury	11:24 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Clear		ALEWIFE STATION ACCESS ROAD / ALEWIFE BROOK PARKWAY Rte US3 N	
06/18/2014	Property damage only (none injured)	12:45 AM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Clear		ALEWIFE BROOK PARKWAY Rte US3 S / CONCORD TURNPIKE Rte SR2 W / ALEWIFE STATION ACCESS ROAD	
06/14/2014	Property damage only (none injured)	3:06 AM	1	D1: (Fatigued/asleep)	Dark - lighted roadway	Single vehicle crash	Wet	V1: Travelling straight ahead	V1: E	Rain		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY Rte 3A S
05/05/2014	Property damage only (none injured)	8:55 AM	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Overtaking/passing	V1: E / V2: E	Cloudy		CONCORD TURNPIKE Rte 2 E	CONCORD TURNPIKE
05/22/2014	Non-fatal injury	10:51 AM	3	D1: (Failed to yield right of way) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Angle	Dry	V1: Turning left / V2: Travelling straight ahead / V3: Travelling straight ahead	V1: W / V2: N / V3: S	Cloudy		ALEWIFE BROOK PARKWAY Rte UNKNOW N	WHITTEMORE AVENUE
05/07/2014	Property damage only (none injured)	11:43 AM	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	
05/03/2014	Property damage only (none injured)	10:41 PM	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	Dark - lighted roadway	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE	CONCORD TURNPIKE Rte 2 E
04/23/2014	Property damage only (none injured)	9:35 AM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Wet	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: W / V2: W	Rain		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE Rte 2 W
03/29/2014	Not Reported	2:46 AM	1		Dark - lighted roadway	Single vehicle crash	Dry	V1: Travelling straight ahead	V1: W	Clear		CONCORD TURNPIKE Rte 2 W	ALEWIFE BROOK PARKWAY
01/20/2014	Property damage only (none injured)	6:40 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Dark - roadway not lighted	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	CONCORD TURNPIKE
01/21/2014	Property damage only (none injured)	3:15 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		CONCORD TURNPIKE Rte SR2 W / ALEWIFE BROOK PARKWAY	
01/16/2014	Property damage only (none injured)	11:33 AM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Cloudy		ALEWIFE BROOK PARKWAY Rte 3 N	ALEWIFE STATION ACCESS ROAD
01/09/2014	Property damage only (none injured)	9:09 PM	3	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving) / D3: (No improper driving)	Dark - lighted roadway	Sideswipe, same direction	Dry	V1: Changing lanes / V2: Travelling straight ahead / V3: Travelling straight ahead	V1: N / V2: N / V3: N	Clear		ALEWIFE BROOK PARKWAY / CONCORD TURNPIKE /	
11/09/2013	Property damage only (none injured)	9:27 AM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: S / V2: S	Clear		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE
09/30/2013	Property damage only (none injured)	7:23 PM	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY Rte 3 S
08/26/2013	Property damage only (none injured)	12:05 AM	2	D1: (Inattention) / D2: (Inattention)	Dark - lighted roadway	Sideswipe, opposite direction	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	CONCORD TURNPIKE
08/07/2013	Property damage only (none injured)	11:20 AM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: W / V2: W	Cloudy		ALEWIFE BROOK PARKWAY Rte UNKNOW	CONCORD TURNPIKE
05/16/2013	Property damage only (none injured)	6:15 AM	2	D1: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Not reported	V1: E / V2: Not Reported	Clear		ALEWIFE BROOK PARKWAY Rte 3 S / CONCORD TURNPIKE / ALEWIFE STATION ACCESS ROAD	

MassDOT Crash Report for Route 2 at Route 16 in Arlington MA 2013-2017

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway	Near Intersection Roadway
06/14/2013	Property damage only (none injured)	7:05 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		CONCORD TURNPIKE Rte 2 E	CONCORD TURNPIKE Rte 2 E
05/14/2013	Non-fatal injury	12:15 AM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: N	Not Reported		ALEWIFE STATION ACCESS ROAD / CONCORD TURNPIKE / ALEWIFE BROOK PARKWAY Rte 3 S	
05/13/2013	Non-fatal injury	11:00 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: N	Not Reported		ALEWIFE BROOK PARKWAY Rte 3 S / CONCORD TURNPIKE Rte 2 E	
05/25/2013	Non-fatal injury	11:53 AM	2	D1: (No improper driving) / D2: (Driving too fast for conditions)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: W / V2: W	Clear		ALEWIFE BROOK PARKWAY	
05/13/2013	Property damage only (none injured)	3:01 PM	2	D1: (No improper driving) / D2: (Other improper action)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		CONCORD TURNPIKE Rte 2 W	RAMP-ALEWIFE BROOK PARKWAY SB TO RT 2 WB
05/12/2013	Property damage only (none injured)	8:54 PM	2	D1: (No improper driving) / D2: (No improper driving)	Dark - lighted roadway	Sideswipe, same direction	Dry	V1: Other / V2: Other	V1: N / V2: N	Clear		ALEWIFE BROOK PARKWAY	CONCORD TURNPIKE
03/24/2013	Property damage only (none injured)	3:40 AM	1	D1: (Physical impairment)	Dark - roadway not lighted	Single vehicle crash	Dry	V1: Turning left	V1: W	Clear		ALEWIFE STATION ACCESS ROAD	ALEWIFE BROOK PARKWAY Rte 3 N
03/20/2013	Property damage only (none injured)	5:29 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Not Reported		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY
03/20/2013	Property damage only (none injured)	10:06 AM	3	D1: (No improper driving) / D2: (No improper driving) / D3: (Followed too closely)	Daylight	Rear-end	Wet	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: W / V2: W / V3: W	Clear		CONCORD TURNPIKE Rte 2 W / ALEWIFE BROOK PARKWAY Rte 3 S	
03/14/2013	Property damage only (none injured)	4:52 PM	3	D1: (No improper driving) / D2: (No improper driving) / D3: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: S / V2: S / V3: S	Clear		ALEWIFE BROOK PARKWAY Rte UNKNOW	WHITTEMORE AVENUE
01/30/2013	Non-fatal injury	11:50 PM	3	D1: (Physical impairment) / D2: (No improper driving) / D3: (No improper driving)	Dark - lighted roadway	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: W / V2: W / V3: W	Clear		ALEWIFE BROOK PARKWAY	
01/19/2013	Property damage only (none injured)	4:45 PM	2	D1: (Other improper action)	Dusk	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Cloudy		CONCORD TURNPIKE Rte 2 E	ALEWIFE BROOK PARKWAY
01/29/2013	Property damage only (none injured)	11:10 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Dark - lighted roadway	Angle	Wet	V1: Entering traffic lane / V2: Travelling straight ahead	V1: W / V2: N	Rain/Fog, smog, smoke		ALEWIFE BROOK PARKWAY Rte 16 W	CONCORD TURNPIKE

GROWTH RATE DATA

Massachusetts Highway Department
4925 Annual Growth Rate 2013-2019

Location ID:	**4925**	**Seasonal Factor Group:**	**U3**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**3 - Other Principal Arterial**	**Axle Factor Group:**	**U3**
Location:	**Waverly Oaks Road**	**Growth Factor Group:**	**U3**
	West of Beaver Road		

Year	**AADT**
2019	7529
2013	8331
A = 2019/2013	0.9037
B = A^(1/6)	0.9800
Average Annual Growth Rate	**-2.00**
Use	

TRIP GENERATION CALCULATIONS

Institute of Transportation Engineers (ITE)
Trip Generation, 10 th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 176

AVERAGE WEEKDAY DAILY

T = 5.45 * (X) - 1.75
T = 5.45 * 176 - (1.75)
T = 957.45
T = 958 vehicle trips
with 50% (479 vpd) entering and 50% (479 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.98 * Ln(X) - 0.98
Ln T = 0.98 * Ln 176 - (0.98)
Ln T = 4.09
T = 59.57
T = 60 vehicle trips
with 26% (16 vph) entering and 74% (44 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.96 * Ln(X) - 0.63
Ln T = 0.96 * Ln 176 - (0.63)
Ln T = 4.33
T = 76.22
T = 76 vehicle trips
with 61% (46 vph) entering and 39% (30 vph) exiting.

JOURNEY TO WORK DATA

Journey to Work: Exiting/Exiting Traffic							
Town/City/County	**Percent**	**Route 2 EB Enter WB Exit**	**Alwife Brook Parkway NB**	**Alwife Brook Parkway SB**	**Mass Ave NB**	**Mass Ave SB**	**Lake Street WB**
Andover town	1.46	0.97				0.49	
Salem city	1.33	0.67				0.67	
Acton town	1.05	1.05					
Arlington town	6.20				5.89	0.31	
Bedford town	1.81	1.81					
Belmont town	2.01						2.01
Billerica town	1.13	1.13					
Burlington town	3.30	3.30					
Cambridge city	6.26			2.09		4.17	
Chelmsford town	1.25	1.25					
Concord town	1.05	1.05					
Everett city	1.25				0.42	0.84	
Framingham town	1.63	1.08					0.54
Lexington town	3.52	3.52					
Malden city	1.18				0.39	0.78	
Medford city	2.56				1.70	0.85	
Newton city	2.65	0.88					1.77
Somerville city	2.48			0.83		1.65	
Stoneham town	1.02				0.51	0.51	
Waltham city	3.41						3.41
Watertown Town city	2.26						2.26
Weston town	1.44	1.44					
Winchester town	1.49	0.99			0.50		
Woburn city	2.43	1.22			1.22		
Brookline town	1.67			0.56		0.56	0.56
Wellesley town	1.95	1.30					0.65
Norwell town	1.16	0.39		0.39		0.39	
Boston city	8.23			2.74	2.74	2.74	
Worcester city	1.13	1.13					
Barnstable County	0.19	0.09				0.09	
Bristol County	0.20	0.10				0.10	
Essex County	6.18	3.09				3.09	
Middlesex County	12.83	12.83					
Norfolk County	5.58	2.79				2.79	
Plymouth County	1.19	0.60				0.60	
Suffolk County	1.60			0.80		0.80	
Worcester County	3.92	3.92					
TOTAL	**100.00**	**46.61**	**0.00**	**7.40**	**13.37**	**21.43**	**11.20**
USE	**100**	**45**	**0**	**10**	**15**	**20**	**10**

CAPACITY ANALYSIS

2020 Baseline Weekday Morning Peak Hour
2020 Baseline Weekday Evening Peak Hour
2027 No-Build Weekday Morning Peak Hour
2027 No-Build Weekday Evening Peak Hour
2027 Build Weekday Morning Peak Hour
2027 Build Weekday Evening Peak Hour

2020 Baseline Weekday Morning Peak Hour

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	574	3	1	1121	5	1
Future Vol, veh/h	574	3	1	1121	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	765	4	1	1289	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	769	0	2058	767
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	1291	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	854	-	61	405
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	260	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	854	-	61	405
Mov Cap-2 Maneuver	-	-	-	-	61	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	259	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	62
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	71	-	-	854	-
HCM Lane V/C Ratio	0.113	-	-	0.001	-
HCM Control Delay (s)	62	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	561	14	5	1098	24	6
Future Vol, veh/h	561	14	5	1098	24	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	748	19	5	1181	32	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	767	0	1949	758
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	1191	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	856	-	72	410
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	291	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	856	-	71	410
Mov Cap-2 Maneuver	-	-	-	-	71	-
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	286	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	80.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	85	-	-	856	-
HCM Lane V/C Ratio	0.471	-	-	0.006	-
HCM Control Delay (s)	80.4	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	2	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	562	5	3	1096	7	1
Future Vol, veh/h	562	5	3	1096	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	749	7	3	1178	9	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	756	0	1937	753
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	1184	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	864	-	73	413
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	293	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	864	-	72	413
Mov Cap-2 Maneuver	-	-	-	-	72	-
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	290	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	56.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	80	-	-	864	-
HCM Lane V/C Ratio	0.133	-	-	0.004	-
HCM Control Delay (s)	56.8	-	-	9.2	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	545	18	8	1080	5	8	0	14	4	0	11
Future Vol, veh/h	0	545	18	8	1080	5	8	0	14	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	690	23	8	1125	5	10	0	18	4	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1130	0	0	713	0	0	1852	1848	702	1855	1857	1128
Stage 1	-	-	-	-	-	-	702	702	-	1144	1144	-
Stage 2	-	-	-	-	-	-	1150	1146	-	711	713	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	626	-	-	896	-	-	58	75	425	57	74	251
Stage 1	-	-	-	-	-	-	432	443	-	245	277	-
Stage 2	-	-	-	-	-	-	243	276	-	427	438	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	626	-	-	896	-	-	54	73	425	54	72	251
Mov Cap-2 Maneuver	-	-	-	-	-	-	54	73	-	54	72	-
Stage 1	-	-	-	-	-	-	432	443	-	245	270	-
Stage 2	-	-	-	-	-	-	226	269	-	409	438	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	43.3	37.5
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	626	-	-	896	-	-	127
HCM Lane V/C Ratio	0.227	-	-	-	0.009	-	-	0.128
HCM Control Delay (s)	43.3	0	-	-	9.1	0	-	37.5
HCM Lane LOS	E	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	3	553	7	24	1069	3	9	0	22	3	0	15
Future Vol, veh/h	3	553	7	24	1069	3	9	0	22	3	0	15
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	658	8	25	1102	3	12	0	29	4	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1105	0	0	970	0	0	2138	2129	966	1839	2132	1104
Stage 1	-	-	-	-	-	-	974	974	-	1154	1154	-
Stage 2	-	-	-	-	-	-	1164	1155	-	685	978	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	639	-	-	719	-	-	36	50	311	59	50	259
Stage 1	-	-	-	-	-	-	305	333	-	242	274	-
Stage 2	-	-	-	-	-	-	239	274	-	441	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	639	-	-	537	-	-	22	33	232	46	33	259
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	33	-	46	33	-
Stage 1	-	-	-	-	-	-	225	246	-	240	241	-
Stage 2	-	-	-	-	-	-	194	241	-	381	245	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	139.9	34.4
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	62	639	-	-	537	-	-	146
HCM Lane V/C Ratio	0.667	0.006	-	-	0.046	-	-	0.164
HCM Control Delay (s)	139.9	10.7	0	-	12	0	-	34.4
HCM Lane LOS	F	B	A	-	B	A	-	D
HCM 95th %tile Q(veh)	2.9	0	-	-	0.1	-	-	0.6

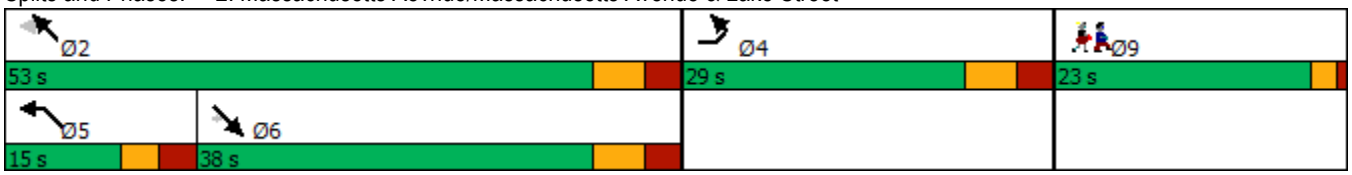


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	247	279	822	580	381	438	
Future Volume (vph)	247	279	822	580	381	438	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.928			0.850			
Flt Protected	0.977				0.950		
Satd. Flow (prot)	1933	0	3421	1492	1728	1863	
Flt Permitted	0.977				0.147		
Satd. Flow (perm)	1933	0	3421	1492	267	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	49			209			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	271	307	893	630	414	476	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	578	0	893	630	414	476	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.12		0.75	0.96	1.43	0.49	
Control Delay	108.2		31.9	48.1	232.9	17.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	108.2		31.9	48.1	232.9	17.9	
LOS	F		C	D	F	B	
Approach Delay	108.2		38.6			117.9	
Approach LOS	F		D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.43			
Intersection Signal Delay: 75.7		Intersection LOS: E	
Intersection Capacity Utilization 91.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	578	893	630	414	476
v/c Ratio	1.12	0.75	0.96	1.43	0.49
Control Delay	108.2	31.9	48.1	232.9	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	108.2	31.9	48.1	232.9	17.9
Queue Length 50th (ft)	~306	198	213	~211	133
Queue Length 95th (ft)	#659	#371	#561	#512	317
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	516	1196	657	289	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.12	0.75	0.96	1.43	0.49

Intersection Summary

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

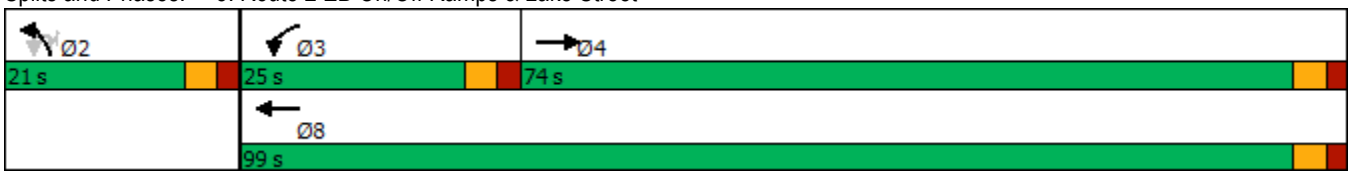
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	284	435	166	390	253	208	493
Future Volume (vph)	284	435	166	390	253	208	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2132	1812	1685	3455	0	2036	1706
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2132	1812	1685	3455	0	2036	1706
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		322					407
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	312	478	198	464	278	229	542
Shared Lane Traffic (%)							
Lane Group Flow (vph)	312	478	198	464	0	507	542
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	14.3	57.9	12.2	31.6		16.2	16.2
Actuated g/C Ratio	0.25	1.00	0.21	0.55		0.28	0.28
v/c Ratio	0.59	0.26	0.56	0.25		0.89	0.70
Control Delay	24.7	0.4	27.5	7.0		44.0	12.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.7	0.4	27.5	7.0		44.0	12.1
LOS	C	A	C	A		D	B
Approach Delay	10.0			13.1		27.5	
Approach LOS	A			B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 57.9			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	312	478	198	464	507	542
v/c Ratio	0.59	0.26	0.56	0.25	0.89	0.70
Control Delay	24.7	0.4	27.5	7.0	44.0	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	0.4	27.5	7.0	44.0	12.1
Queue Length 50th (ft)	95	0	62	39	167	36
Queue Length 95th (ft)	176	0	116	53	#400	#191
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2132	1812	588	3455	568	769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.26	0.34	0.13	0.89	0.70

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	210	567	0	0	435	691	0	0	0	121	6	10
Future Volume (vph)	210	567	0	0	435	691	0	0	0	121	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1583	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1583	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						520						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	239	644	0	0	473	751	0	0	0	149	7	12
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	239	644	0	0	473	751	0	0	0	77	79	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	10.8	31.4			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.73	0.65			0.96	0.96				0.18	0.19	0.02
Control Delay	37.8	13.8			56.5	34.1				18.4	18.4	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	37.8	13.8			56.5	34.1				18.4	18.4	0.1
LOS	D	B			E	C				B	B	A
Approach Delay		20.3			42.7						17.1	
Approach LOS		C			D						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 59.4			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 32.1		Intersection LOS: C	
Intersection Capacity Utilization 71.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street

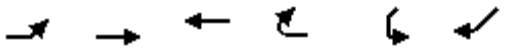




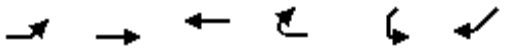
Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	239	644	473	751	77	79	12
v/c Ratio	0.73	0.65	0.96	0.96	0.18	0.19	0.02
Control Delay	37.8	13.8	56.5	34.1	18.4	18.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	13.8	56.5	34.1	18.4	18.4	0.1
Queue Length 50th (ft)	81	150	168	80	22	23	0
Queue Length 95th (ft)	#164	238	#335	#314	47	48	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	349	1014	495	782	426	427	592
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.64	0.96	0.96	0.18	0.19	0.02

Intersection Summary

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



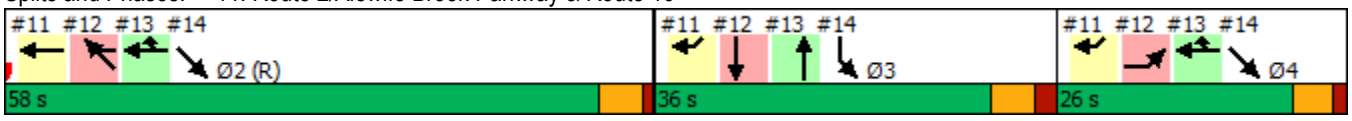
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	1523	0	0	1019		
Future Volume (vph)	0	0	1523	0	0	1019		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						9		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1692	0	0	1199		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1692	0	0	1199		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

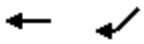


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			0.81			0.98		
Control Delay			5.7			52.6		
Queue Delay			2.3			0.0		
Total Delay			8.0			52.6		
LOS			A			D		
Approach Delay			8.0		52.6			
Approach LOS			A		D			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 26.5		Intersection LOS: C	
Intersection Capacity Utilization 81.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16

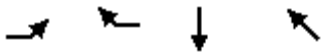




Lane Group	WBT	SWR
Lane Group Flow (vph)	1692	1199
v/c Ratio	0.81	0.98
Control Delay	5.7	52.6
Queue Delay	2.3	0.0
Total Delay	8.0	52.6
Queue Length 50th (ft)	41	502
Queue Length 95th (ft)	m40	#613
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1226
Starvation Cap Reductn	262	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.93	0.98

Intersection Summary

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



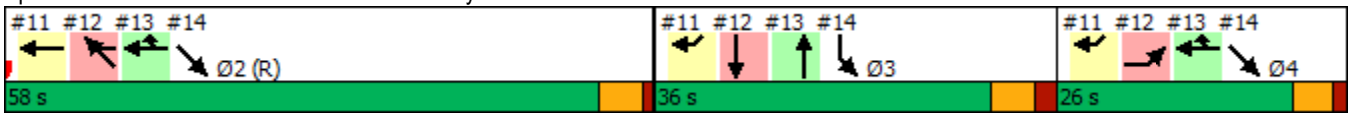
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	486	163	489	1360
Future Volume (vph)	486	163	489	1360
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	501	173	575	1511
Shared Lane Traffic (%)				
Lane Group Flow (vph)	501	173	575	1511
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

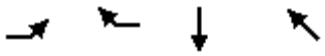
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.89	0.25	0.70	1.04
Control Delay	67.3	14.2	46.2	68.0
Queue Delay	0.0	2.4	0.0	0.8
Total Delay	67.3	16.6	46.2	68.8
LOS	E	B	D	E
Approach Delay			46.2	68.8
Approach LOS			D	E

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 60.6		Intersection LOS: E	
Intersection Capacity Utilization 100.1%		ICU Level of Service G	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



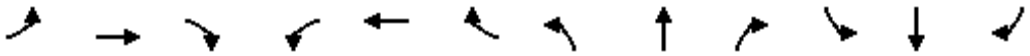


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	501	173	575	1511
v/c Ratio	0.89	0.25	0.70	1.04
Control Delay	67.3	14.2	46.2	68.0
Queue Delay	0.0	2.4	0.0	0.8
Total Delay	67.3	16.6	46.2	68.8
Queue Length 50th (ft)	197	82	213	~665
Queue Length 95th (ft)	#291	134	259	#804
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	405	0	0
Spillback Cap Reductn	0	1	0	3
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	0.59	0.70	1.04

Intersection Summary

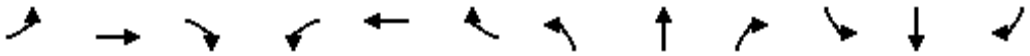
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	163	52	0	216	0	0	0	0
Future Volume (vph)	0	0	0	0	163	52	0	216	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	177	57	0	240	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	177	57	0	240	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

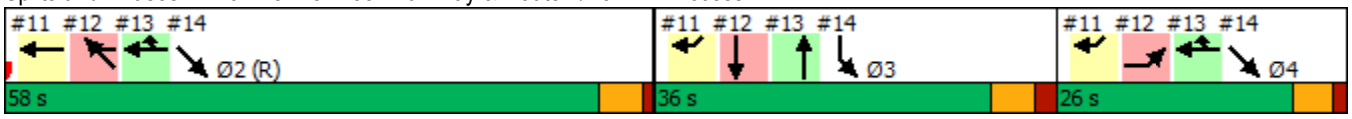
Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.06		0.30				
Control Delay					8.3	7.6		37.8				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.4	7.6		37.8				
LOS					A	A		D				
Approach Delay					8.2			37.8				
Approach LOS					A			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 27.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



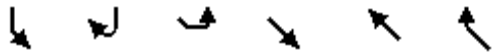
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

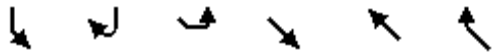


Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	177	57	240
v/c Ratio	0.17	0.06	0.30
Control Delay	8.3	7.6	37.8
Queue Delay	0.1	0.0	0.0
Total Delay	8.4	7.6	37.8
Queue Length 50th (ft)	48	15	80
Queue Length 95th (ft)	78	30	117
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	203	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.06	0.30

Intersection Summary



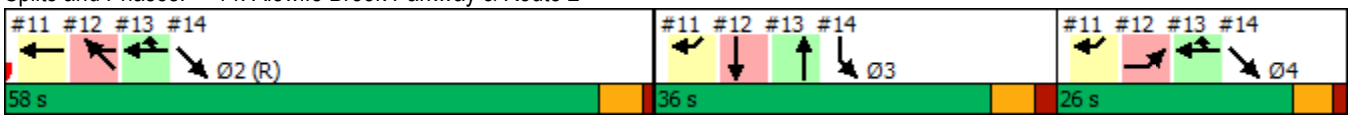
Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	489	0	0	1064	0	0		
Future Volume (vph)	489	0	0	1064	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	575	0	0	1097	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	575	0	0	1097	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.59			0.50				
Control Delay	2.3			11.4				
Queue Delay	0.9			0.0				
Total Delay	3.2			11.4				
LOS	A			B				
Approach Delay	3.2			11.4				
Approach LOS	A			B				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 57.3%		ICU Level of Service B	
Analysis Period (min) 15			

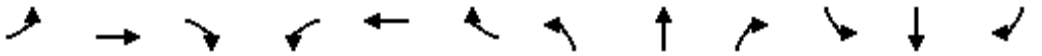
Splits and Phases: 14: Alewife Brook Parkway & Route 2





Lane Group	SBL	SET
Lane Group Flow (vph)	575	1097
v/c Ratio	0.59	0.50
Control Delay	2.3	11.4
Queue Delay	0.9	0.0
Total Delay	3.2	11.4
Queue Length 50th (ft)	5	209
Queue Length 95th (ft)	0	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	168	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	0.50

Intersection Summary



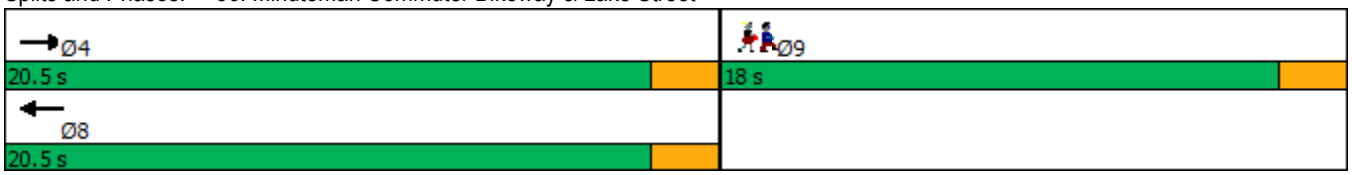
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	578	0	0	1096	0	0	0	0	0	0	0
Future Volume (vph)	0	578	0	0	1096	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	688	0	0	1130	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	0	1130	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		4			8							
Permitted Phases												
Detector Phase		4			8							

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		20.5			20.5							
Total Split (%)		53.2%			53.2%							
Maximum Green (s)		18.5			18.5							
Yellow Time (s)		2.0			2.0							
All-Red Time (s)		0.0			0.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		2.0			2.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		Max			Max							
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		33.5			33.5							
Actuated g/C Ratio		0.63			0.63							
v/c Ratio		0.54			0.84							
Control Delay		7.6			15.8							
Queue Delay		0.0			48.7							
Total Delay		7.6			64.5							
LOS		A			E							
Approach Delay		7.6			64.5							
Approach LOS		A			E							

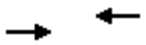
Intersection Summary			
Area Type:	Other		
Cycle Length: 38.5			
Actuated Cycle Length: 53.5			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 43.0		Intersection LOS: D	
Intersection Capacity Utilization 61.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 36: Minuteman Commuter Bikeway & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	47%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	304
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

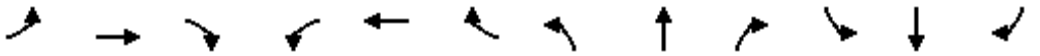
Intersection Summary



Lane Group	EBT	WBT
Lane Group Flow (vph)	688	1130
v/c Ratio	0.54	0.84
Control Delay	7.6	15.8
Queue Delay	0.0	48.7
Total Delay	7.6	64.5
Queue Length 50th (ft)	101	232
Queue Length 95th (ft)	149	#517
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1283	1348
Starvation Cap Reductn	0	424
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.54	1.22

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	520	28	4	957	0	22	4	3	3	7	117
Future Volume (vph)	30	520	28	4	957	0	22	4	3	3	7	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993						0.986			0.876	
Flt Protected		0.997						0.963			0.999	
Satd. Flow (prot)	0	1984	0	0	1944	0	0	1804	0	0	1663	0
Flt Permitted		0.932			0.998			0.711			0.993	
Satd. Flow (perm)	0	1854	0	0	1940	0	0	1332	0	0	1653	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4						4			150	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	571	31	5	1100	0	29	5	4	4	9	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	635	0	0	1105	0	0	38	0	0	163	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		9.0	21.0		14.0	14.0	
Total Split (s)	28.0	28.0		28.0	28.0		10.0	24.0		14.0	14.0	
Total Split (%)	38.6%	38.6%		38.6%	38.6%		13.8%	33.1%		19.3%	19.3%	
Maximum Green (s)	24.0	24.0		24.0	24.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		25.0			25.0			6.9			6.9	
Actuated g/C Ratio		0.58			0.58			0.16			0.16	
v/c Ratio		0.59			0.98			0.18			0.42	
Control Delay		12.8			37.7			18.9			9.1	
Queue Delay		5.7			0.0			0.0			0.0	
Total Delay		18.5			37.7			18.9			9.1	
LOS		B			D			B			A	
Approach Delay		18.5			37.7			18.9			9.1	
Approach LOS		B			D			B			A	

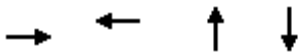
Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 43			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 28.7		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.5
Total Split (s)	20.5
Total Split (%)	28%
Maximum Green (s)	16.0
Yellow Time (s)	4.0
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	16
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	635	1105	38	163
v/c Ratio	0.59	0.98	0.18	0.42
Control Delay	12.8	37.7	18.9	9.1
Queue Delay	5.7	0.0	0.0	0.0
Total Delay	18.5	37.7	18.9	9.1
Queue Length 50th (ft)	55	147	6	2
Queue Length 95th (ft)	#408	#772	28	35
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1079	1127	647	513
Starvation Cap Reductn	378	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.91	0.98	0.06	0.32

Intersection Summary

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

2020 Baseline Weekday Evening Peak Hour

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	785	3	1	570	9	4
Future Vol, veh/h	785	3	1	570	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	946	4	1	606	12	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	950	0	1556	948
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	608	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	731	-	107	319
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	731	-	107	319
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	494	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	35.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	135	-	-	731	-
HCM Lane V/C Ratio	0.128	-	-	0.001	-
HCM Control Delay (s)	35.6	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	783	6	9	556	15	5
Future Vol, veh/h	783	6	9	556	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	900	7	10	625	20	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	907	0	1549	904
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	645	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	759	-	127	338
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	526	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	759	-	124	338
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	515	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	34.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	147	-	-	759	-
HCM Lane V/C Ratio	0.181	-	-	0.013	-
HCM Control Delay (s)	34.8	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	787	1	1	559	6	4
Future Vol, veh/h	787	1	1	559	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	905	1	1	628	8	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	906	0	1536	906
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	630	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	759	-	129	337
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	535	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	759	-	129	337
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	534	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	27.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	171	-	-	759	-
HCM Lane V/C Ratio	0.078	-	-	0.001	-
HCM Control Delay (s)	27.8	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	768	19	11	546	8	13	1	6	3	0	1
Future Vol, veh/h	4	768	19	11	546	8	13	1	6	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	893	22	13	635	9	17	1	8	4	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	644	0	0	915	0	0	1580	1584	904	1585	1591	640
Stage 1	-	-	-	-	-	-	914	914	-	666	666	-
Stage 2	-	-	-	-	-	-	666	670	-	919	925	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	951	-	-	754	-	-	89	110	338	89	108	479
Stage 1	-	-	-	-	-	-	330	355	-	452	460	-
Stage 2	-	-	-	-	-	-	452	459	-	328	351	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	951	-	-	754	-	-	86	106	338	84	104	479
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	106	-	84	104	-
Stage 1	-	-	-	-	-	-	326	351	-	447	448	-
Stage 2	-	-	-	-	-	-	439	447	-	316	347	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	46.9	40.8
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	112	951	-	-	754	-	-	106
HCM Lane V/C Ratio	0.238	0.005	-	-	0.017	-	-	0.05
HCM Control Delay (s)	46.9	8.8	0	-	9.9	0	-	40.8
HCM Lane LOS	E	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	756	3	42	548	15	6	0	27	9	0	11
Future Vol, veh/h	18	756	3	42	548	15	6	0	27	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	911	4	48	623	17	7	0	33	11	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	640	0	0	1219	0	0	1996	1997	1217	1702	1991	632
Stage 1	-	-	-	-	-	-	1261	1261	-	728	728	-
Stage 2	-	-	-	-	-	-	735	736	-	974	1263	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	954	-	-	579	-	-	45	61	223	73	61	484
Stage 1	-	-	-	-	-	-	211	244	-	418	432	-
Stage 2	-	-	-	-	-	-	414	428	-	305	243	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	954	-	-	432	-	-	27	36	167	49	36	484
Mov Cap-2 Maneuver	-	-	-	-	-	-	27	36	-	49	36	-
Stage 1	-	-	-	-	-	-	150	174	-	398	357	-
Stage 2	-	-	-	-	-	-	333	354	-	233	173	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	79.9	54.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	86	954	-	-	432	-	-	97
HCM Lane V/C Ratio	0.474	0.023	-	-	0.11	-	-	0.258
HCM Control Delay (s)	79.9	8.9	0	-	14.4	0	-	54.5
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	2	0.1	-	-	0.4	-	-	0.9

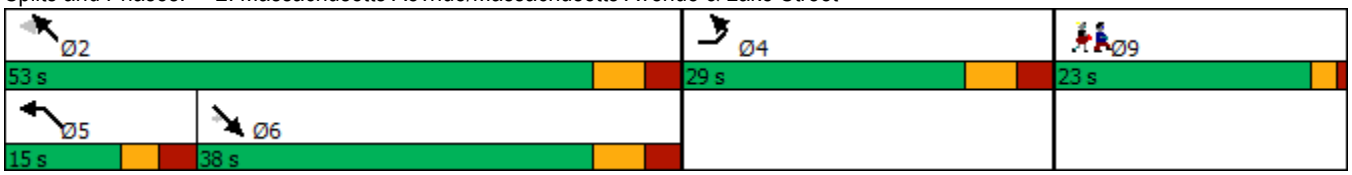


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	397	255	635	175	323	714	
Future Volume (vph)	397	255	635	175	323	714	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.947			0.850			
Flt Protected	0.970				0.950		
Satd. Flow (prot)	1978	0	3421	1507	1745	1863	
Flt Permitted	0.970				0.242		
Satd. Flow (perm)	1978	0	3421	1507	444	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	28			81			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	451	290	690	190	351	776	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	741	0	690	190	351	776	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.45		0.58	0.33	0.96	0.80	
Control Delay	240.7		27.5	15.6	57.9	28.1	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	240.7		27.5	15.6	57.9	28.1	
LOS	F		C	B	E	C	
Approach Delay	240.7		24.9			37.4	
Approach LOS	F		C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.45			
Intersection Signal Delay: 88.2		Intersection LOS: F	
Intersection Capacity Utilization 89.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	741	690	190	351	776
v/c Ratio	1.45	0.58	0.33	0.96	0.80
Control Delay	240.7	27.5	15.6	57.9	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	240.7	27.5	15.6	57.9	28.1
Queue Length 50th (ft)	~498	142	37	89	278
Queue Length 95th (ft)	#887	265	113	#359	#702
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	511	1196	579	367	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.45	0.58	0.33	0.96	0.80

Intersection Summary

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

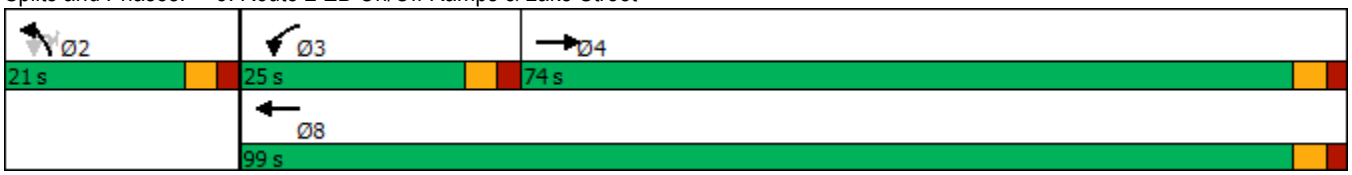
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	520	171	159	283	14	488	571
Future Volume (vph)	520	171	159	283	14	488	571
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		69					433
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	553	182	183	325	15	508	595
Shared Lane Traffic (%)							
Lane Group Flow (vph)	553	182	183	325	0	523	595
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	24.1	68.8	13.0	42.2		16.4	16.4
Actuated g/C Ratio	0.35	1.00	0.19	0.61		0.24	0.24
v/c Ratio	0.73	0.11	0.59	0.15		1.08	0.81
Control Delay	26.1	0.1	35.0	5.4		93.4	18.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.1	0.1	35.0	5.4		93.4	18.6
LOS	C	A	C	A		F	B
Approach Delay	19.7			16.1		53.6	
Approach LOS	B			B		D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 68.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 35.0		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	553	182	183	325	523	595
v/c Ratio	0.73	0.11	0.59	0.15	1.08	0.81
Control Delay	26.1	0.1	35.0	5.4	93.4	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	0.1	35.0	5.4	93.4	18.6
Queue Length 50th (ft)	196	0	71	26	~253	57
Queue Length 95th (ft)	335	0	142	37	#556	#279
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2045	1664	491	3490	486	739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.11	0.37	0.09	1.08	0.81

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	327	764	0	0	245	334	0	0	0	197	21	24
Future Volume (vph)	327	764	0	0	245	334	0	0	0	197	21	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						367						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	372	868	0	0	269	367	0	0	0	207	22	25
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	372	868	0	0	269	367	0	0	0	114	115	25
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	11.5	30.0			14.0	14.0				16.0	16.0	16.0
Actuated g/C Ratio	0.20	0.52			0.24	0.24				0.28	0.28	0.28
v/c Ratio	1.04	0.89			0.62	0.58				0.25	0.24	0.04
Control Delay	87.4	26.7			26.5	6.7				19.1	19.0	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	87.4	26.7			26.5	6.7				19.1	19.0	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		44.9			15.0						17.2	
Approach LOS		D			B						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 58.1			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 32.7		Intersection LOS: C	
Intersection Capacity Utilization 58.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



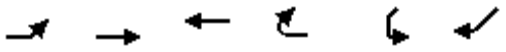


Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	372	868	269	367	114	115	25
v/c Ratio	1.04	0.89	0.62	0.58	0.25	0.24	0.04
Control Delay	87.4	26.7	26.5	6.7	19.1	19.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	26.7	26.5	6.7	19.1	19.0	0.1
Queue Length 50th (ft)	~155	246	84	0	33	34	0
Queue Length 95th (ft)	#289	#461	149	55	72	72	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	358	1039	497	669	453	470	603
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.84	0.54	0.55	0.25	0.24	0.04

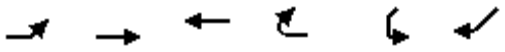
Intersection Summary

~ 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.



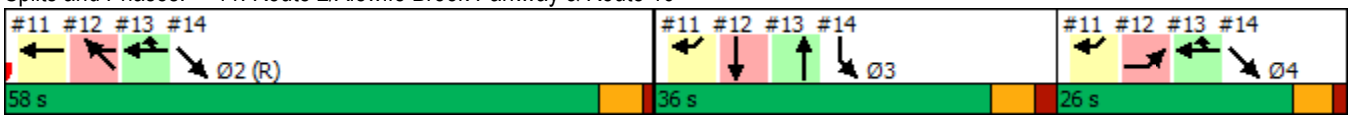
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	2131	0	0	1091		
Future Volume (vph)	0	0	2131	0	0	1091		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						2		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2197	0	0	1113		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2197	0	0	1113		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

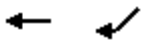


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			1.04			0.91		
Control Delay			29.4			41.9		
Queue Delay			1.5			0.0		
Total Delay			30.9			41.9		
LOS			C			D		
Approach Delay			30.9		41.9			
Approach LOS			C		D			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 34.6		Intersection LOS: C	
Intersection Capacity Utilization 97.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16





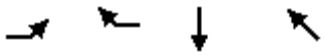
Lane Group	WBT	SWR
Lane Group Flow (vph)	2197	1113
v/c Ratio	1.04	0.91
Control Delay	29.4	41.9
Queue Delay	1.5	0.0
Total Delay	30.9	41.9
Queue Length 50th (ft)	~656	442
Queue Length 95th (ft)	m52	#606
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1222
Starvation Cap Reductn	8	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.05	0.91

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.

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



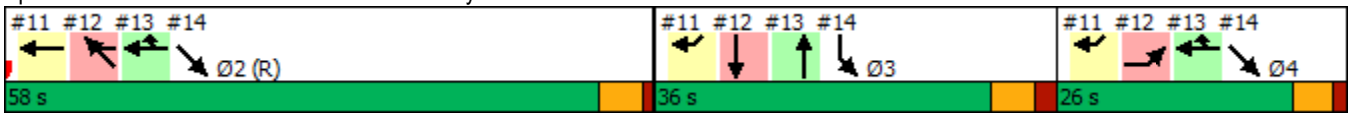
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	581	571	241	1560
Future Volume (vph)	581	571	241	1560
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	646	601	246	1608
Shared Lane Traffic (%)				
Lane Group Flow (vph)	646	601	246	1608
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

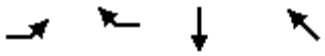
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.14	0.82	0.30	1.10
Control Delay	125.6	27.9	37.7	86.8
Queue Delay	0.0	1.3	0.0	2.1
Total Delay	125.6	29.2	37.7	89.0
LOS	F	C	D	F
Approach Delay			37.7	89.0
Approach LOS			D	F

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 80.9		Intersection LOS: F	
Intersection Capacity Utilization 130.6%		ICU Level of Service H	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



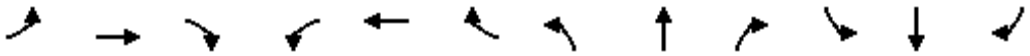


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	646	601	246	1608
v/c Ratio	1.14	0.82	0.30	1.10
Control Delay	125.6	27.9	37.7	86.8
Queue Delay	0.0	1.3	0.0	2.1
Total Delay	125.6	29.2	37.7	89.0
Queue Length 50th (ft)	~300	399	81	~741
Queue Length 95th (ft)	#418	#578	119	#880
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	36	0	73
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.14	0.86	0.30	1.15

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.



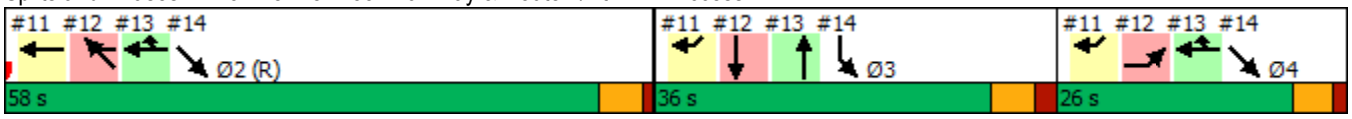
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	571	317	0	230	0	0	0	0
Future Volume (vph)	0	0	0	0	571	317	0	230	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	601	334	0	237	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	601	334	0	237	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.54	0.35		0.29				
Control Delay					13.1	10.4		37.7				
Queue Delay					1.7	0.0		0.0				
Total Delay					14.8	10.4		37.7				
LOS					B	B		D				
Approach Delay					13.2			37.7				
Approach LOS					B			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 50.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



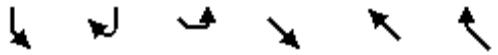
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

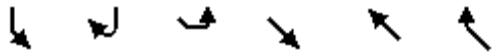


Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	601	334	237
v/c Ratio	0.54	0.35	0.29
Control Delay	13.1	10.4	37.7
Queue Delay	1.7	0.0	0.0
Total Delay	14.8	10.4	37.7
Queue Length 50th (ft)	227	106	78
Queue Length 95th (ft)	320	159	115
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	336	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.77	0.35	0.29

Intersection Summary



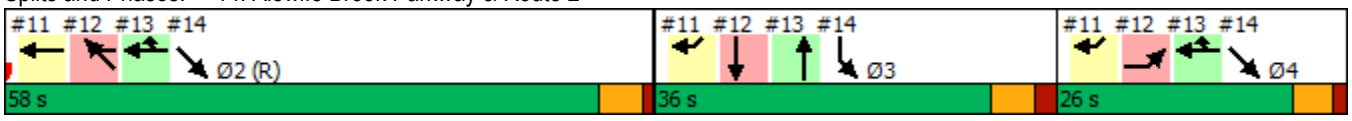
Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	241	0	0	952	0	0		
Future Volume (vph)	241	0	0	952	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	254							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	246	0	0	1058	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	246	0	0	1058	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.25			0.48				
Control Delay	0.7			11.2				
Queue Delay	0.5			0.0				
Total Delay	1.3			11.2				
LOS	A			B				
Approach Delay	1.3			11.2				
Approach LOS	A			B				

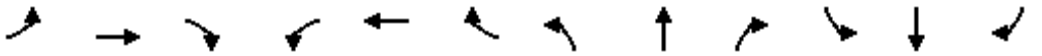
Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 46.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Lane Group	SBL	SET
Lane Group Flow (vph)	246	1058
v/c Ratio	0.25	0.48
Control Delay	0.7	11.2
Queue Delay	0.5	0.0
Total Delay	1.3	11.2
Queue Length 50th (ft)	0	198
Queue Length 95th (ft)	0	245
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	988	2188
Starvation Cap Reductn	419	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.43	0.48

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	648	65	5	492	1	9	5	4	0	5	104
Future Volume (vph)	79	648	65	5	492	1	9	5	4	0	5	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989						0.972			0.871	
Flt Protected		0.995			0.999			0.976				
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1802	0	0	1655	0
Flt Permitted		0.903			0.992			0.807				
Satd. Flow (perm)	0	1810	0	0	1948	0	0	1490	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						5			135	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	90	736	74	6	559	1	12	7	5	0	6	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	566	0	0	24	0	0	141	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		9.0	21.0		14.0	14.0	
Total Split (s)	28.0	28.0		28.0	28.0		10.0	24.0		14.0	14.0	
Total Split (%)	38.6%	38.6%		38.6%	38.6%		13.8%	33.1%		19.3%	19.3%	
Maximum Green (s)	24.0	24.0		24.0	24.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		25.0			25.0			6.6			6.6	
Actuated g/C Ratio		0.58			0.58			0.15			0.15	
v/c Ratio		0.85			0.50			0.10			0.38	
Control Delay		21.8			10.4			17.5			8.7	
Queue Delay		48.8			0.0			0.0			0.0	
Total Delay		70.6			10.4			17.5			8.7	
LOS		E			B			B			A	
Approach Delay		70.6			10.4			17.5			8.7	
Approach LOS		E			B			B			A	

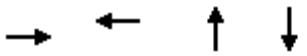
Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 42.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 43.6		Intersection LOS: D	
Intersection Capacity Utilization 86.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.5
Total Split (s)	20.5
Total Split (%)	28%
Maximum Green (s)	16.0
Yellow Time (s)	4.0
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	9
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	900	566	24	141
v/c Ratio	0.85	0.50	0.10	0.38
Control Delay	21.8	10.4	17.5	8.7
Queue Delay	48.8	0.0	0.0	0.0
Total Delay	70.6	10.4	17.5	8.7
Queue Length 50th (ft)	97	43	4	1
Queue Length 95th (ft)	#636	#286	20	30
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1060	1138	728	505
Starvation Cap Reductn	272	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.14	0.50	0.03	0.28

Intersection Summary

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

2027 No-Build Weekday Morning Peak Hour

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	614	3	1	1189	5	1
Future Vol, veh/h	614	3	1	1189	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	819	4	1	1367	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	823	0	2190	821
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	1369	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	816	-	51	378
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	239	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	816	-	51	378
Mov Cap-2 Maneuver	-	-	-	-	51	-
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	238	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	74
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	60	-	-	816	-
HCM Lane V/C Ratio	0.133	-	-	0.001	-
HCM Control Delay (s)	74	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	601	14	5	1166	24	6
Future Vol, veh/h	601	14	5	1166	24	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	801	19	5	1254	32	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	820	0	2075	811
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	1264	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	818	-	60	383
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	268	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	818	-	59	383
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	263	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	107.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	71	-	-	818	-
HCM Lane V/C Ratio	0.563	-	-	0.007	-
HCM Control Delay (s)	107.5	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	605	5	3	1164	7	1
Future Vol, veh/h	605	5	3	1164	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	807	7	3	1252	9	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	814	0	2069	811
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	1258	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	822	-	60	383
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	270	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	822	-	59	383
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	267	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	69.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	66	-	-	822	-
HCM Lane V/C Ratio	0.162	-	-	0.004	-
HCM Control Delay (s)	69.8	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	585	18	8	1148	5	8	0	14	4	0	11
Future Vol, veh/h	0	585	18	8	1148	5	8	0	14	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	741	23	8	1196	5	10	0	18	4	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1201	0	0	764	0	0	1974	1970	753	1977	1979	1199
Stage 1	-	-	-	-	-	-	753	753	-	1215	1215	-
Stage 2	-	-	-	-	-	-	1221	1217	-	762	764	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	588	-	-	858	-	-	47	63	397	47	62	228
Stage 1	-	-	-	-	-	-	405	420	-	224	256	-
Stage 2	-	-	-	-	-	-	222	256	-	400	416	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	588	-	-	858	-	-	44	61	397	44	60	228
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	61	-	44	60	-
Stage 1	-	-	-	-	-	-	405	420	-	224	249	-
Stage 2	-	-	-	-	-	-	204	249	-	382	416	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	53.5	44.2
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	101	588	-	-	858	-	-	108
HCM Lane V/C Ratio	0.272	-	-	-	0.01	-	-	0.151
HCM Control Delay (s)	53.5	0	-	-	9.2	0	-	44.2
HCM Lane LOS	F	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	593	7	24	1136	3	9	0	22	3	0	16
Future Vol, veh/h	3	593	7	24	1136	3	9	0	22	3	0	16
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	706	8	25	1171	3	12	0	29	4	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1174	0	0	1018	0	0	2255	2246	1014	1956	2249	1173
Stage 1	-	-	-	-	-	-	1022	1022	-	1223	1223	-
Stage 2	-	-	-	-	-	-	1233	1224	-	733	1026	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	602	-	-	689	-	-	30	42	292	49	42	236
Stage 1	-	-	-	-	-	-	287	316	-	221	254	-
Stage 2	-	-	-	-	-	-	219	254	-	415	315	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	602	-	-	514	-	-	18	27	218	38	27	236
Mov Cap-2 Maneuver	-	-	-	-	-	-	18	27	-	38	27	-
Stage 1	-	-	-	-	-	-	212	234	-	219	218	-
Stage 2	-	-	-	-	-	-	171	218	-	355	233	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	192.1	39.6
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	52	602	-	-	514	-	-	129
HCM Lane V/C Ratio	0.795	0.006	-	-	0.048	-	-	0.196
HCM Control Delay (s)	192.1	11	0	-	12.4	0	-	39.6
HCM Lane LOS	F	B	A	-	B	A	-	E
HCM 95th %tile Q(veh)	3.3	0	-	-	0.2	-	-	0.7

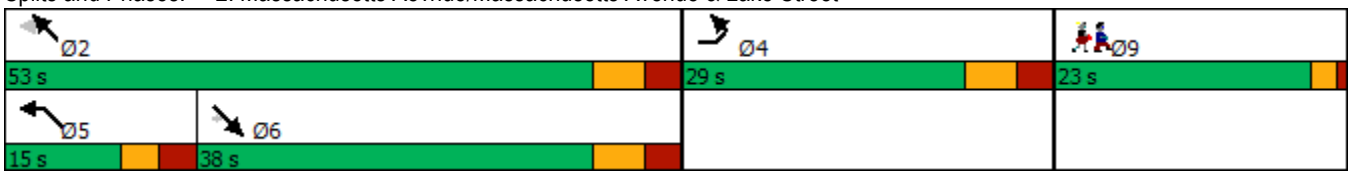


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	258	291	851	608	402	454	
Future Volume (vph)	258	291	851	608	402	454	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.928			0.850			
Flt Protected	0.977				0.950		
Satd. Flow (prot)	1933	0	3421	1492	1728	1863	
Flt Permitted	0.977				0.133		
Satd. Flow (perm)	1933	0	3421	1492	242	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	49			211			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	284	320	925	661	437	493	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	604	0	925	661	437	493	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.17		0.77	1.00	1.57	0.51	
Control Delay	126.4		33.0	58.6	292.8	18.3	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	126.4		33.0	58.6	292.8	18.3	
LOS	F		C	E	F	B	
Approach Delay	126.4		43.6			147.3	
Approach LOS	F		D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.57			
Intersection Signal Delay: 90.6		Intersection LOS: F	
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	604	925	661	437	493
v/c Ratio	1.17	0.77	1.00	1.57	0.51
Control Delay	126.4	33.0	58.6	292.8	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	126.4	33.0	58.6	292.8	18.3
Queue Length 50th (ft)	~335	208	237	~250	140
Queue Length 95th (ft)	#698	#409	#604	#559	332
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	516	1196	659	279	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.17	0.77	1.00	1.57	0.51

Intersection Summary

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

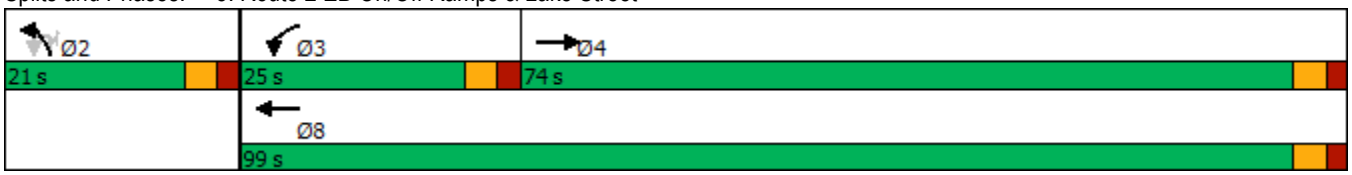
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	311	493	210	419	271	221	520
Future Volume (vph)	311	493	210	419	271	221	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2132	1812	1685	3455	0	2037	1706
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2132	1812	1685	3455	0	2037	1706
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		333					402
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	342	542	250	499	298	243	571
Shared Lane Traffic (%)							
Lane Group Flow (vph)	342	542	250	499	0	541	571
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	15.7	63.2	16.2	37.0		16.2	16.2
Actuated g/C Ratio	0.25	1.00	0.26	0.59		0.26	0.26
v/c Ratio	0.64	0.30	0.58	0.25		1.04	0.78
Control Delay	27.7	0.4	27.3	6.5		78.8	16.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.7	0.4	27.3	6.5		78.8	16.8
LOS	C	A	C	A		E	B
Approach Delay	11.0			13.4		47.0	
Approach LOS	B			B		D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 63.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	342	542	250	499	541	571
v/c Ratio	0.64	0.30	0.58	0.25	1.04	0.78
Control Delay	27.7	0.4	27.3	6.5	78.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	0.4	27.3	6.5	78.8	16.8
Queue Length 50th (ft)	118	0	83	42	~234	54
Queue Length 95th (ft)	204	0	151	57	#482	#243
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2110	1812	538	3455	520	735
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.46	0.14	1.04	0.78

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	224	607	0	0	478	716	0	0	0	151	6	10
Future Volume (vph)	224	607	0	0	478	716	0	0	0	151	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						490						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	255	690	0	0	520	778	0	0	0	186	7	12
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	255	690	0	0	520	778	0	0	0	97	96	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	11.0	31.5			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.77	0.69			1.05	1.03				0.23	0.22	0.02
Control Delay	40.9	15.0			81.3	51.2				19.0	18.9	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	40.9	15.0			81.3	51.2				19.0	18.9	0.1
LOS	D	B			F	D				B	B	A
Approach Delay		22.0			63.2						17.8	
Approach LOS		C			E						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 59.5			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 43.5		Intersection LOS: D	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



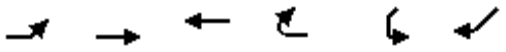


Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	255	690	520	778	97	96	12
v/c Ratio	0.77	0.69	1.05	1.03	0.23	0.22	0.02
Control Delay	40.9	15.0	81.3	51.2	19.0	18.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	15.0	81.3	51.2	19.0	18.9	0.1
Queue Length 50th (ft)	88	167	~214	~135	28	28	0
Queue Length 95th (ft)	#179	265	#378	#357	56	55	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	348	1012	494	759	425	429	591
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.68	1.05	1.03	0.23	0.22	0.02

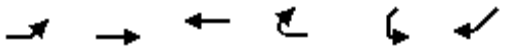
Intersection Summary

~ 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.



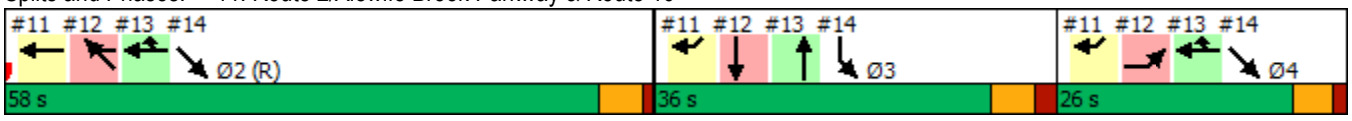
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	1596	0	0	1062		
Future Volume (vph)	0	0	1596	0	0	1062		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						7		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1773	0	0	1249		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1773	0	0	1249		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

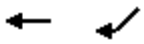


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			0.85			1.02		
Control Delay			5.6			62.8		
Queue Delay			4.5			0.0		
Total Delay			10.1			62.8		
LOS			B			E		
Approach Delay			10.1		62.8			
Approach LOS			B		E			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			

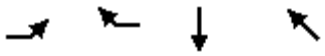
Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	1773	1249
v/c Ratio	0.85	1.02
Control Delay	5.6	62.8
Queue Delay	4.5	0.0
Total Delay	10.1	62.8
Queue Length 50th (ft)	43	~581
Queue Length 95th (ft)	m40	#659
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1225
Starvation Cap Reductn	252	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	1.02

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



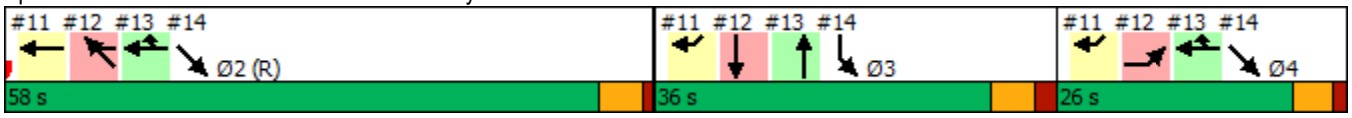
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	505	169	506	1427
Future Volume (vph)	505	169	506	1427
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	521	180	595	1586
Shared Lane Traffic (%)				
Lane Group Flow (vph)	521	180	595	1586
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

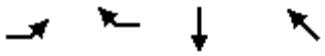
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.5
Queue Delay	0.0	2.4	0.0	3.6
Total Delay	72.2	16.7	47.1	89.1
LOS	E	B	D	F
Approach Delay			47.1	89.1
Approach LOS			D	F

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 72.8		Intersection LOS: E	
Intersection Capacity Utilization 103.7%		ICU Level of Service G	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



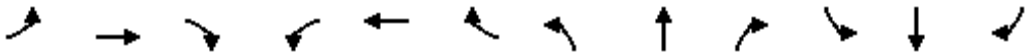


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	521	180	595	1586
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.5
Queue Delay	0.0	2.4	0.0	3.6
Total Delay	72.2	16.7	47.1	89.1
Queue Length 50th (ft)	206	86	223	~728
Queue Length 95th (ft)	#308	138	269	#868
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	397	0	0
Spillback Cap Reductn	0	6	0	13
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.60	0.72	1.10

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.



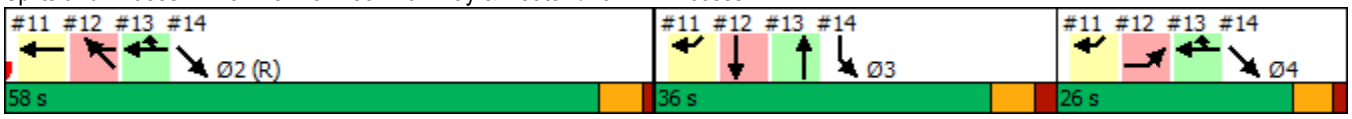
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Future Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.07		0.32				
Control Delay					8.4	7.6		38.0				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.5	7.6		38.0				
LOS					A	A		D				
Approach Delay					8.3			38.0				
Approach LOS					A			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 23.3		Intersection LOS: C	
Intersection Capacity Utilization 27.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



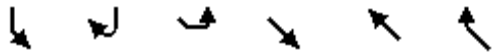
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

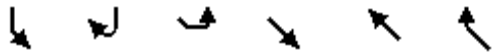


Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	184	59	249
v/c Ratio	0.17	0.07	0.32
Control Delay	8.4	7.6	38.0
Queue Delay	0.1	0.0	0.0
Total Delay	8.5	7.6	38.0
Queue Length 50th (ft)	50	15	83
Queue Length 95th (ft)	81	31	121
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	223	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.07	0.32

Intersection Summary



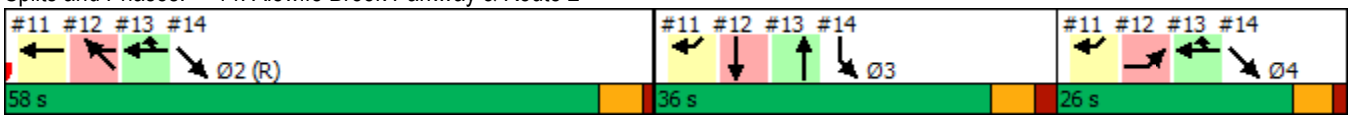
Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	506	0	0	1102	0	0		
Future Volume (vph)	506	0	0	1102	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	216							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	595	0	0	1136	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	595	0	0	1136	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.62			0.52				
Control Delay	2.8			11.7				
Queue Delay	1.0			0.0				
Total Delay	3.7			11.7				
LOS	A			B				
Approach Delay	3.7			11.7				
Approach LOS	A			B				

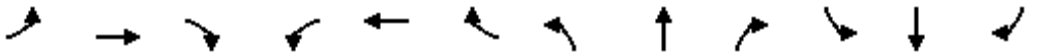
Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 59.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Lane Group	SBL	SET
Lane Group Flow (vph)	595	1136
v/c Ratio	0.62	0.52
Control Delay	2.8	11.7
Queue Delay	1.0	0.0
Total Delay	3.7	11.7
Queue Length 50th (ft)	5	220
Queue Length 95th (ft)	0	272
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	960	2188
Starvation Cap Reductn	156	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.74	0.52

Intersection Summary



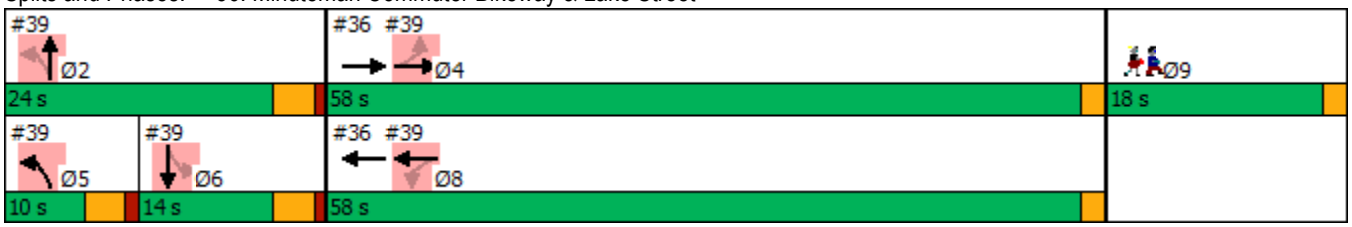
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑							
Traffic Volume (vph)	0	618	0	0	1163	0	0	0	0	0	0	0
Future Volume (vph)	0	618	0	0	1163	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	736	0	0	1199	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	736	0	0	1199	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		4			8							
Permitted Phases												
Detector Phase		4			8							

Lane Group	Ø2	Ø5	Ø6	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(ft)				
Detector 2 Size(ft)				
Detector 2 Type				
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	2	5	6	9
Permitted Phases				
Detector Phase				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		58.0			58.0							
Total Split (%)		58.0%			58.0%							
Maximum Green (s)		56.0			56.0							
Yellow Time (s)		2.0			2.0							
All-Red Time (s)		0.0			0.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		2.0			2.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		Max			Max							
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.1			56.1							
Actuated g/C Ratio		0.61			0.61							
v/c Ratio		0.59			0.92							
Control Delay		14.7			13.7							
Queue Delay		0.0			30.3							
Total Delay		14.7			44.0							
LOS		B			D							
Approach Delay		14.7			44.0							
Approach LOS		B			D							

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 32.9		Intersection LOS: C	
Intersection Capacity Utilization 64.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 36: Minuteman Commuter Bikeway & Lake Street



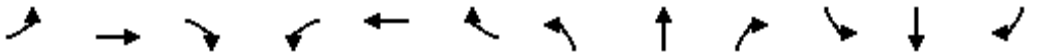
Lane Group	Ø2	Ø5	Ø6	Ø9
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	9.0	14.0	18.0
Total Split (s)	24.0	10.0	14.0	18.0
Total Split (%)	24%	10%	14%	18%
Maximum Green (s)	20.0	6.0	10.0	16.0
Yellow Time (s)	3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Min	None	Min	None
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				304
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Lane Group	EBT	WBT
Lane Group Flow (vph)	736	1199
v/c Ratio	0.59	0.92
Control Delay	14.7	13.7
Queue Delay	0.0	30.3
Total Delay	14.7	44.0
Queue Length 50th (ft)	245	121
Queue Length 95th (ft)	378	m#405
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1240	1304
Starvation Cap Reductn	0	175
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.59	1.06

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	541	46	6	1004	0	38	4	5	3	7	121
Future Volume (vph)	31	541	46	6	1004	0	38	4	5	3	7	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990						0.985			0.875	
Flt Protected		0.998						0.961			0.999	
Satd. Flow (prot)	0	1978	0	0	1944	0	0	1799	0	0	1661	0
Flt Permitted		0.916			0.997			0.422			0.994	
Satd. Flow (perm)	0	1815	0	0	1938	0	0	790	0	0	1653	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						6			155	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	34	595	51	7	1154	0	51	5	7	4	9	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	680	0	0	1161	0	0	63	0	0	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		9.0	21.0		14.0	14.0	
Total Split (s)	58.0	58.0		58.0	58.0		10.0	24.0		14.0	14.0	
Total Split (%)	58.0%	58.0%		58.0%	58.0%		10.0%	24.0%		14.0%	14.0%	
Maximum Green (s)	56.0	56.0		56.0	56.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		2.0			2.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.1			56.1			12.5			12.5	
Actuated g/C Ratio		0.61			0.61			0.13			0.13	
v/c Ratio		0.62			0.99			0.57			0.47	
Control Delay		4.3			44.4			53.7			11.9	
Queue Delay		0.0			18.6			4.0			1.8	
Total Delay		4.3			62.9			57.7			13.7	
LOS		A			E			E			B	
Approach Delay		4.3			62.9			57.7			13.7	
Approach LOS		A			E			E			B	

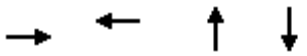
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 39.6		Intersection LOS: D	
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	304
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	680	1161	63	168
v/c Ratio	0.62	0.99	0.57	0.47
Control Delay	4.3	44.4	53.7	11.9
Queue Delay	0.0	18.6	4.0	1.8
Total Delay	4.3	62.9	57.7	13.7
Queue Length 50th (ft)	9	618	32	7
Queue Length 95th (ft)	3	#1013	59	41
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1102	1173	175	375
Starvation Cap Reductn	2	0	0	0
Spillback Cap Reductn	0	69	61	98
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	1.05	0.55	0.61

Intersection Summary

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

2027 No-Build Weekday Evening Peak Hour

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	829	3	1	599	9	4
Future Vol, veh/h	829	3	1	599	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	999	4	1	637	12	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1003	0	1640	1001
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	639	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	698	-	95	297
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	478	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	698	-	95	297
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	477	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	40
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	120	-	-	698	-
HCM Lane V/C Ratio	0.144	-	-	0.002	-
HCM Control Delay (s)	40	-	-	10.2	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	827	6	9	585	15	5
Future Vol, veh/h	827	6	9	585	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	951	7	10	657	20	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	958	0	1632	955
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	677	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	726	-	113	316
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	509	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	726	-	111	316
Mov Cap-2 Maneuver	-	-	-	-	111	-
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	39
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	132	-	-	726	-
HCM Lane V/C Ratio	0.202	-	-	0.014	-
HCM Control Delay (s)	39	-	-	10	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	831	1	1	588	6	4
Future Vol, veh/h	831	1	1	588	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	955	1	1	661	8	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	956	0	1619	956
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	663	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	727	-	115	316
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	727	-	115	316
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	515	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	30.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	154	-	-	727	-
HCM Lane V/C Ratio	0.087	-	-	0.002	-
HCM Control Delay (s)	30.6	-	-	10	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	812	19	11	575	8	13	1	6	3	0	1
Future Vol, veh/h	4	812	19	11	575	8	13	1	6	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	944	22	13	669	9	17	1	8	4	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	678	0	0	966	0	0	1665	1669	955	1670	1676	674
Stage 1	-	-	-	-	-	-	965	965	-	700	700	-
Stage 2	-	-	-	-	-	-	700	704	-	970	976	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	923	-	-	721	-	-	78	97	316	77	96	458
Stage 1	-	-	-	-	-	-	309	336	-	433	444	-
Stage 2	-	-	-	-	-	-	433	443	-	307	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	923	-	-	721	-	-	75	93	316	72	92	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	75	93	-	72	92	-
Stage 1	-	-	-	-	-	-	305	332	-	428	431	-
Stage 2	-	-	-	-	-	-	419	430	-	294	328	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	54.9	47
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	98	923	-	-	721	-	-	91
HCM Lane V/C Ratio	0.272	0.005	-	-	0.018	-	-	0.059
HCM Control Delay (s)	54.9	8.9	0	-	10.1	0	-	47
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	799	3	42	577	16	6	0	27	9	0	11
Future Vol, veh/h	19	799	3	42	577	16	6	0	27	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	963	4	48	656	18	7	0	33	11	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	674	0	0	1271	0	0	2083	2085	1269	1789	2078	665
Stage 1	-	-	-	-	-	-	1315	1315	-	761	761	-
Stage 2	-	-	-	-	-	-	768	770	-	1028	1317	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	927	-	-	553	-	-	39	54	208	64	54	464
Stage 1	-	-	-	-	-	-	196	230	-	401	417	-
Stage 2	-	-	-	-	-	-	397	413	-	285	229	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	927	-	-	413	-	-	23	31	155	41	31	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	23	31	-	41	31	-
Stage 1	-	-	-	-	-	-	138	163	-	379	339	-
Stage 2	-	-	-	-	-	-	314	336	-	212	162	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	97.4	67.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	76	927	-	-	413	-	-	82
HCM Lane V/C Ratio	0.536	0.025	-	-	0.116	-	-	0.305
HCM Control Delay (s)	97.4	9	0	-	14.9	0	-	67.1
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	2.3	0.1	-	-	0.4	-	-	1.1

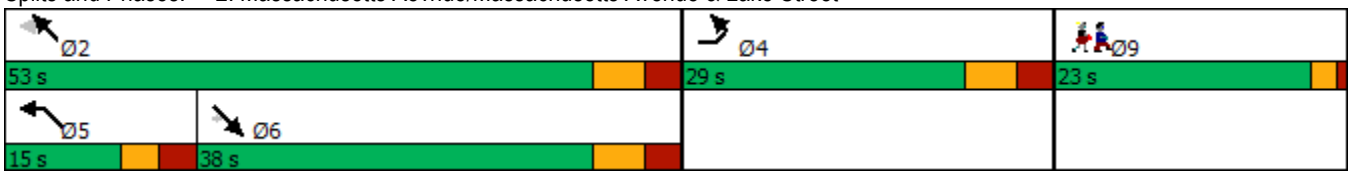


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	419	271	658	183	336	739	
Future Volume (vph)	419	271	658	183	336	739	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.947			0.850			
Flt Protected	0.971				0.950		
Satd. Flow (prot)	1980	0	3421	1507	1745	1863	
Flt Permitted	0.971				0.229		
Satd. Flow (perm)	1980	0	3421	1507	421	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	28			82			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	476	308	715	199	365	803	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	784	0	715	199	365	803	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.53		0.60	0.34	1.02	0.83	
Control Delay	276.0		27.9	16.0	74.7	29.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	276.0		27.9	16.0	74.7	29.9	
LOS	F		C	B	E	C	
Approach Delay	276.0		25.3			43.9	
Approach LOS	F		C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.53			
Intersection Signal Delay: 101.5		Intersection LOS: F	
Intersection Capacity Utilization 93.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	784	715	199	365	803
v/c Ratio	1.53	0.60	0.34	1.02	0.83
Control Delay	276.0	27.9	16.0	74.7	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	276.0	27.9	16.0	74.7	29.9
Queue Length 50th (ft)	~546	148	40	93	294
Queue Length 95th (ft)	#949	277	119	#393	#740
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	512	1196	580	357	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.53	0.60	0.34	1.02	0.83

Intersection Summary

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

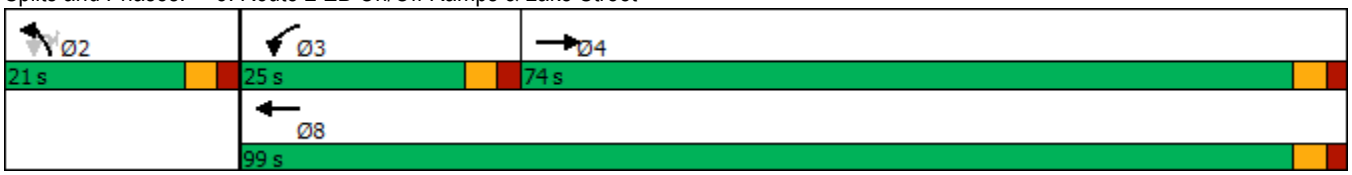
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	543	181	171	299	14	531	632
Future Volume (vph)	543	181	171	299	14	531	632
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		70					441
Link Speed (mph)	30			30		30	
Link Distance (ft)	373			505		387	
Travel Time (s)	8.5			11.5		8.8	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	578	193	197	344	15	553	658
Shared Lane Traffic (%)							
Lane Group Flow (vph)	578	193	197	344	0	568	658
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	25.7	71.4	14.0	44.8		16.4	16.4
Actuated g/C Ratio	0.36	1.00	0.20	0.63		0.23	0.23
v/c Ratio	0.75	0.12	0.61	0.16		1.21	0.90
Control Delay	26.9	0.1	36.0	5.3		143.6	27.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.9	0.1	36.0	5.3		143.6	27.8
LOS	C	A	D	A		F	C
Approach Delay	20.2			16.5		81.4	
Approach LOS	C			B		F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 71.4			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.21			
Intersection Signal Delay: 49.0		Intersection LOS: D	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	578	193	197	344	568	658
v/c Ratio	0.75	0.12	0.61	0.16	1.21	0.90
Control Delay	26.9	0.1	36.0	5.3	143.6	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	0.1	36.0	5.3	143.6	27.8
Queue Length 50th (ft)	214	0	79	27	~314	90
Queue Length 95th (ft)	360	0	156	40	#633	#362
Internal Link Dist (ft)	293			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2002	1664	473	3490	468	734
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.42	0.10	1.21	0.90

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	368	807	0	0	262	346	0	0	0	208	22	25
Future Volume (vph)	368	807	0	0	262	346	0	0	0	208	22	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						380						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	418	917	0	0	288	380	0	0	0	219	23	26
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	418	917	0	0	288	380	0	0	0	120	122	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	11.5	30.6			14.6	14.6				16.0	16.0	16.0
Actuated g/C Ratio	0.20	0.52			0.25	0.25				0.27	0.27	0.27
v/c Ratio	1.18	0.93			0.64	0.59				0.27	0.26	0.04
Control Delay	134.3	32.2			27.1	6.6				19.4	19.3	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	134.3	32.2			27.1	6.6				19.4	19.3	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		64.1			15.4						17.5	
Approach LOS		E			B						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 58.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 44.3		Intersection LOS: D	
Intersection Capacity Utilization 61.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



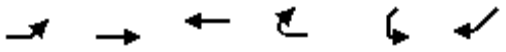


Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	418	917	288	380	120	122	26
v/c Ratio	1.18	0.93	0.64	0.59	0.27	0.26	0.04
Control Delay	134.3	32.2	27.1	6.6	19.4	19.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.3	32.2	27.1	6.6	19.4	19.3	0.1
Queue Length 50th (ft)	~191	274	90	0	35	36	0
Queue Length 95th (ft)	#331	#502	160	56	75	76	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	354	1028	492	675	448	465	598
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	0.89	0.59	0.56	0.27	0.26	0.04

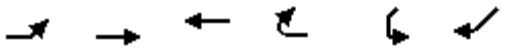
Intersection Summary

~ 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.



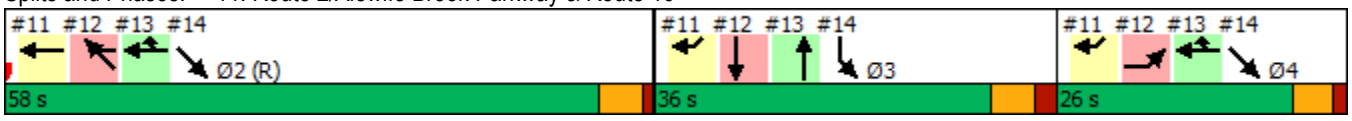
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	2209	0	0	1131		
Future Volume (vph)	0	0	2209	0	0	1131		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						1		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2277	0	0	1154		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2277	0	0	1154		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

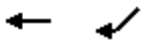


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			1.08			0.95		
Control Delay			46.7			46.7		
Queue Delay			1.5			0.0		
Total Delay			48.2			46.7		
LOS			D			D		
Approach Delay			48.2		46.7			
Approach LOS			D		D			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 47.7		Intersection LOS: D	
Intersection Capacity Utilization 100.6%		ICU Level of Service G	
Analysis Period (min) 15			

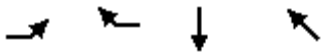
Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	2277	1154
v/c Ratio	1.08	0.95
Control Delay	46.7	46.7
Queue Delay	1.5	0.0
Total Delay	48.2	46.7
Queue Length 50th (ft)	~702	472
Queue Length 95th (ft)	m#57	#644
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1221
Starvation Cap Reductn	7	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.08	0.95

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



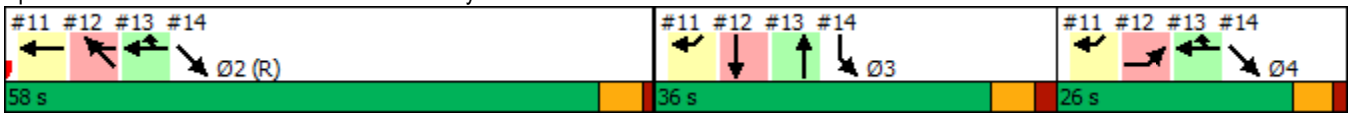
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	610	591	250	1618
Future Volume (vph)	610	591	250	1618
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	678	622	255	1668
Shared Lane Traffic (%)				
Lane Group Flow (vph)	678	622	255	1668
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

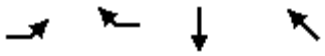
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	102.5
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	102.8
LOS	F	C	D	F
Approach Delay			37.8	102.8
Approach LOS			D	F

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 93.2		Intersection LOS: F	
Intersection Capacity Utilization 134.7%		ICU Level of Service H	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



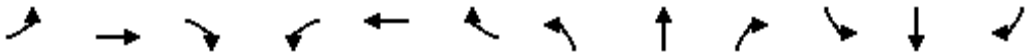


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	678	622	255	1668
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	102.5
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	102.8
Queue Length 50th (ft)	~326	422	84	~792
Queue Length 95th (ft)	#446	#639	123	#931
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	53	0	107
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.31	1.23

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.



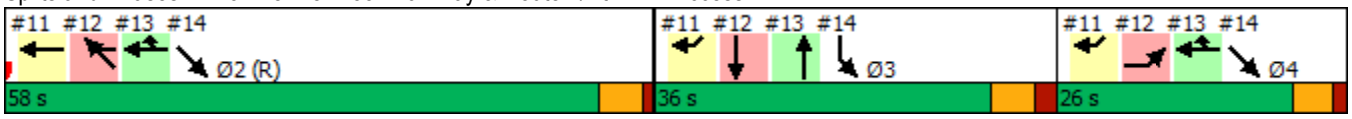
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Future Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.56	0.36		0.30				
Control Delay					13.5	10.5		37.8				
Queue Delay					2.1	0.0		0.0				
Total Delay					15.6	10.5		37.8				
LOS					B	B		D				
Approach Delay					13.8			37.8				
Approach LOS					B			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 18.6		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



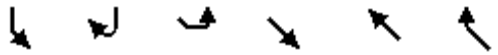
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	622	345	245
v/c Ratio	0.56	0.36	0.30
Control Delay	13.5	10.5	37.8
Queue Delay	2.1	0.0	0.0
Total Delay	15.6	10.5	37.8
Queue Length 50th (ft)	239	110	81
Queue Length 95th (ft)	337	165	119
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	337	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.80	0.36	0.30

Intersection Summary

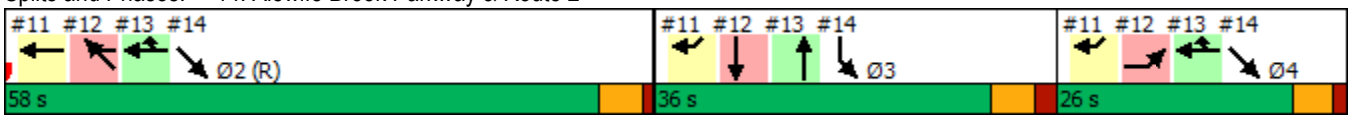


Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	250	0	0	987	0	0		
Future Volume (vph)	250	0	0	987	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	255	0	0	1097	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	255	0	0	1097	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				

Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.26			0.50				
Control Delay	0.8			11.4				
Queue Delay	0.5			0.0				
Total Delay	1.3			11.4				
LOS	A			B				
Approach Delay	1.3			11.4				
Approach LOS	A			B				

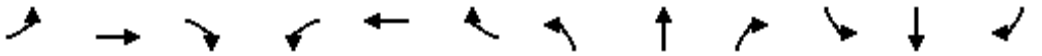
Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 47.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Lane Group	SBL	SET
Lane Group Flow (vph)	255	1097
v/c Ratio	0.26	0.50
Control Delay	0.8	11.4
Queue Delay	0.5	0.0
Total Delay	1.3	11.4
Queue Length 50th (ft)	0	209
Queue Length 95th (ft)	1	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	391	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.50

Intersection Summary



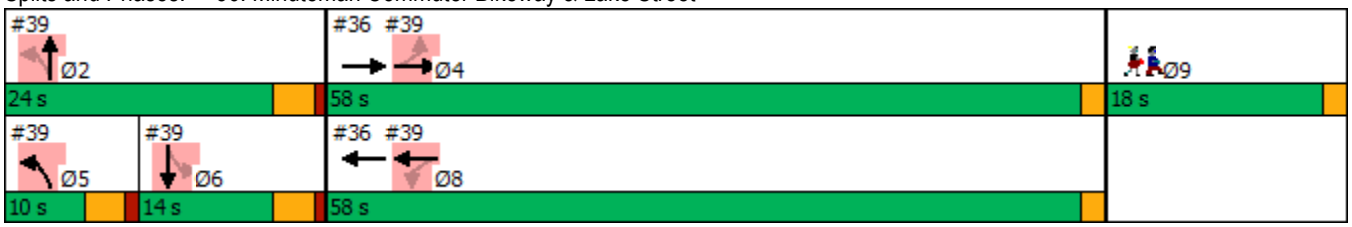
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	823	0	0	633	0	0	0	0	0	0	0
Future Volume (vph)	0	823	0	0	633	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	980	0	0	653	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	980	0	0	653	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		4			8							
Permitted Phases												
Detector Phase		4			8							

Lane Group	Ø2	Ø5	Ø6	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(ft)				
Detector 2 Size(ft)				
Detector 2 Type				
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	2	5	6	9
Permitted Phases				
Detector Phase				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		58.0			58.0							
Total Split (%)		58.0%			58.0%							
Maximum Green (s)		56.0			56.0							
Yellow Time (s)		2.0			2.0							
All-Red Time (s)		0.0			0.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		2.0			2.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		Max			Max							
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.0			56.0							
Actuated g/C Ratio		0.64			0.64							
v/c Ratio		0.75			0.47							
Control Delay		15.6			4.0							
Queue Delay		0.0			0.3							
Total Delay		15.6			4.3							
LOS		B			A							
Approach Delay		15.6			4.3							
Approach LOS		B			A							

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 46.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 36: Minuteman Commuter Bikeway & Lake Street

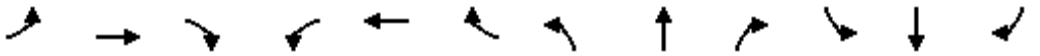


Lane Group	Ø2	Ø5	Ø6	Ø9
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	9.0	14.0	18.0
Total Split (s)	24.0	10.0	14.0	18.0
Total Split (%)	24%	10%	14%	18%
Maximum Green (s)	20.0	6.0	10.0	16.0
Yellow Time (s)	3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Min	None	Min	None
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				211
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Lane Group	EBT	WBT
Lane Group Flow (vph)	980	653
v/c Ratio	0.75	0.47
Control Delay	15.6	4.0
Queue Delay	0.0	0.3
Total Delay	15.6	4.3
Queue Length 50th (ft)	326	53
Queue Length 95th (ft)	460	98
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1314	1381
Starvation Cap Reductn	0	236
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.75	0.57

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	683	70	6	512	1	15	5	7	0	5	108
Future Volume (vph)	82	683	70	6	512	1	15	5	7	0	5	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989						0.966			0.871	
Flt Protected		0.995			0.999			0.973				
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1786	0	0	1655	0
Flt Permitted		0.897			0.992			0.466				
Satd. Flow (perm)	0	1798	0	0	1948	0	0	855	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8						9			140	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	93	776	80	7	582	1	20	7	9	0	6	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	949	0	0	590	0	0	36	0	0	146	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		9.0	21.0		14.0	14.0	
Total Split (s)	58.0	58.0		58.0	58.0		10.0	24.0		14.0	14.0	
Total Split (%)	58.0%	58.0%		58.0%	58.0%		10.0%	24.0%		14.0%	14.0%	
Maximum Green (s)	56.0	56.0		56.0	56.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		2.0			2.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.0			56.0			7.3			7.3	
Actuated g/C Ratio		0.64			0.64			0.08			0.08	
v/c Ratio		0.82			0.47			0.46			0.55	
Control Delay		8.3			9.8			49.2			16.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.3			9.8			49.3			16.2	
LOS		A			A			D			B	
Approach Delay		8.3			9.8			49.3			16.2	
Approach LOS		A			A			D			B	

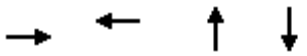
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 10.3		Intersection LOS: B	
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	211
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	949	590	36	146
v/c Ratio	0.82	0.47	0.46	0.55
Control Delay	8.3	9.8	49.2	16.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	9.8	49.3	16.2
Queue Length 50th (ft)	33	147	14	3
Queue Length 95th (ft)	38	234	36	37
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1156	1250	202	313
Starvation Cap Reductn	2	0	0	0
Spillback Cap Reductn	0	13	6	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.82	0.48	0.18	0.47

Intersection Summary

2027 Build Weekday Morning Peak Hour

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	619	3	1	1202	5	1
Future Vol, veh/h	619	3	1	1202	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	825	4	1	1382	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	829	0	2211	827
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	1384	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	811	-	49	375
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	235	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	811	-	49	375
Mov Cap-2 Maneuver	-	-	-	-	49	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	234	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	78.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	57	-	-	811	-
HCM Lane V/C Ratio	0.14	-	-	0.001	-
HCM Control Delay (s)	78.2	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	601	19	5	1166	37	6
Future Vol, veh/h	601	19	5	1166	37	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	801	25	5	1254	49	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	826	0	2078	814
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	1264	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	813	-	60	381
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	268	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	813	-	59	381
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	263	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	173.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	67	-	-	813	-
HCM Lane V/C Ratio	0.856	-	-	0.007	-
HCM Control Delay (s)	173.7	-	-	9.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	4.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	7	2	30	19	5
Future Vol, veh/h	13	7	2	30	19	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	14	8	2	33	21	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	24	26	0	-	0
Stage 1	24	-	-	-	-	-
Stage 2	37	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	950	1058	1601	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	949	1058	1601	-	-	-
Mov Cap-2 Maneuver	949	-	-	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1601	-	984	-	-
HCM Lane V/C Ratio	0.001	-	0.022	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	602	5	3	1164	7	1
Future Vol, veh/h	602	5	3	1164	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	803	7	3	1252	9	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	810	0	2065	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	1258	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	825	-	61	385
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	270	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	825	-	60	385
Mov Cap-2 Maneuver	-	-	-	-	60	-
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	267	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	68.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	67	-	-	825	-
HCM Lane V/C Ratio	0.159	-	-	0.004	-
HCM Control Delay (s)	68.6	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	585	18	10	1148	5	8	0	21	4	0	11
Future Vol, veh/h	0	585	18	10	1148	5	8	0	21	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	741	23	10	1196	5	10	0	26	4	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1201	0	0	764	0	0	1978	1974	753	1985	1983	1199
Stage 1	-	-	-	-	-	-	753	753	-	1219	1219	-
Stage 2	-	-	-	-	-	-	1225	1221	-	766	764	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	588	-	-	858	-	-	47	63	397	46	62	228
Stage 1	-	-	-	-	-	-	405	420	-	223	255	-
Stage 2	-	-	-	-	-	-	221	255	-	398	416	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	588	-	-	858	-	-	43	61	397	42	60	228
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	61	-	42	60	-
Stage 1	-	-	-	-	-	-	405	420	-	223	246	-
Stage 2	-	-	-	-	-	-	202	246	-	372	416	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	47	45.5
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	588	-	-	858	-	-	105
HCM Lane V/C Ratio	0.3	-	-	-	0.012	-	-	0.155
HCM Control Delay (s)	47	0	-	-	9.2	0	-	45.5
HCM Lane LOS	E	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	600	7	24	1138	3	9	0	22	3	0	16
Future Vol, veh/h	3	600	7	24	1138	3	9	0	22	3	0	16
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	714	8	25	1173	3	12	0	29	4	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1176	0	0	1026	0	0	2265	2256	1022	1966	2259	1175
Stage 1	-	-	-	-	-	-	1030	1030	-	1225	1225	-
Stage 2	-	-	-	-	-	-	1235	1226	-	741	1034	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	601	-	-	685	-	-	29	42	289	48	42	236
Stage 1	-	-	-	-	-	-	284	313	-	221	254	-
Stage 2	-	-	-	-	-	-	218	253	-	411	312	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	601	-	-	511	-	-	17	27	216	37	27	236
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	27	-	37	27	-
Stage 1	-	-	-	-	-	-	210	231	-	219	218	-
Stage 2	-	-	-	-	-	-	170	217	-	351	231	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	213.9	39.9
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	49	601	-	-	511	-	-	128
HCM Lane V/C Ratio	0.844	0.006	-	-	0.048	-	-	0.198
HCM Control Delay (s)	213.9	11	0	-	12.4	0	-	39.9
HCM Lane LOS	F	B	A	-	B	A	-	E
HCM 95th %tile Q(veh)	3.5	0	-	-	0.2	-	-	0.7

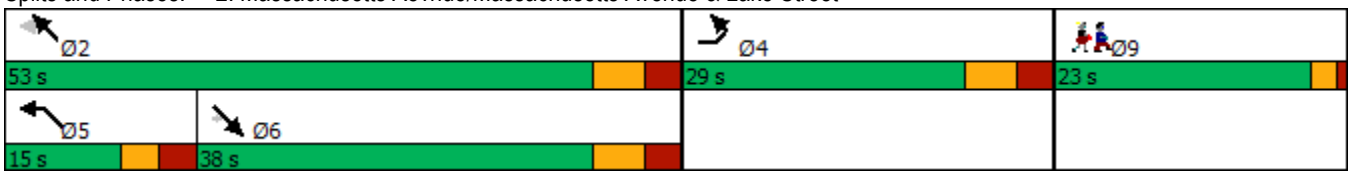


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	261	295	851	609	403	454	
Future Volume (vph)	261	295	851	609	403	454	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.928			0.850			
Flt Protected	0.977				0.950		
Satd. Flow (prot)	1933	0	3421	1492	1728	1863	
Flt Permitted	0.977				0.133		
Satd. Flow (perm)	1933	0	3421	1492	242	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	49			212			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	287	324	925	662	438	493	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	611	0	925	662	438	493	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.18		0.77	1.00	1.57	0.51	
Control Delay	131.5		33.0	58.9	294.4	18.3	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	131.5		33.0	58.9	294.4	18.3	
LOS	F		C	E	F	B	
Approach Delay	131.5		43.8			148.2	
Approach LOS	F		D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.57			
Intersection Signal Delay: 92.0		Intersection LOS: F	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	611	925	662	438	493
v/c Ratio	1.18	0.77	1.00	1.57	0.51
Control Delay	131.5	33.0	58.9	294.4	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	131.5	33.0	58.9	294.4	18.3
Queue Length 50th (ft)	~343	208	237	~251	140
Queue Length 95th (ft)	#709	#409	#606	#562	332
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	516	1196	659	279	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.18	0.77	1.00	1.57	0.51

Intersection Summary

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

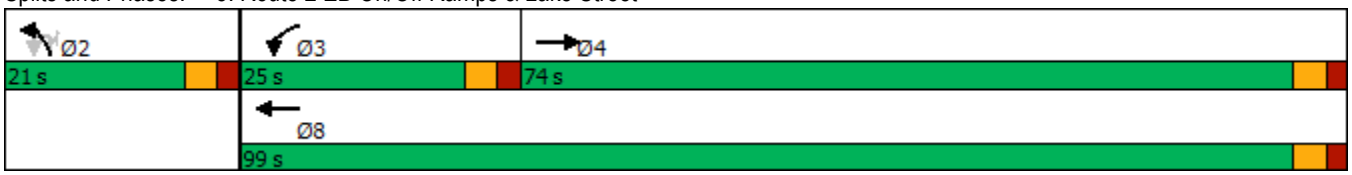
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	312	493	212	421	271	221	523
Future Volume (vph)	312	493	212	421	271	221	523
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2132	1812	1685	3455	0	2037	1706
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2132	1812	1685	3455	0	2037	1706
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		332					405
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	343	542	252	501	298	243	575
Shared Lane Traffic (%)							
Lane Group Flow (vph)	343	542	252	501	0	541	575
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	15.8	63.5	16.4	37.3		16.1	16.1
Actuated g/C Ratio	0.25	1.00	0.26	0.59		0.25	0.25
v/c Ratio	0.65	0.30	0.58	0.25		1.04	0.78
Control Delay	27.8	0.4	27.3	6.4		80.3	17.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.8	0.4	27.3	6.4		80.3	17.0
LOS	C	A	C	A		F	B
Approach Delay	11.0			13.4		47.7	
Approach LOS	B			B		D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 63.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 26.5		Intersection LOS: C	
Intersection Capacity Utilization 67.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	343	542	252	501	541	575
v/c Ratio	0.65	0.30	0.58	0.25	1.04	0.78
Control Delay	27.8	0.4	27.3	6.4	80.3	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	0.4	27.3	6.4	80.3	17.0
Queue Length 50th (ft)	119	0	84	43	~236	55
Queue Length 95th (ft)	205	0	152	57	#482	#246
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2110	1812	535	3455	518	735
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.47	0.15	1.04	0.78

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	224	611	0	0	482	725	0	0	0	151	6	11
Future Volume (vph)	224	611	0	0	482	725	0	0	0	151	6	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						492						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	255	694	0	0	524	788	0	0	0	186	7	14
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	255	694	0	0	524	788	0	0	0	97	96	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	11.0	31.5			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.77	0.70			1.06	1.04				0.23	0.22	0.02
Control Delay	40.9	15.1			83.8	54.7				19.0	18.9	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	40.9	15.1			83.8	54.7				19.0	18.9	0.1
LOS	D	B			F	D				B	B	A
Approach Delay		22.0			66.3						17.7	
Approach LOS		C			E						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 59.5			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 45.2		Intersection LOS: D	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



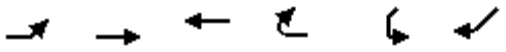


Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	255	694	524	788	97	96	14
v/c Ratio	0.77	0.70	1.06	1.04	0.23	0.22	0.02
Control Delay	40.9	15.1	83.8	54.7	19.0	18.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	15.1	83.8	54.7	19.0	18.9	0.1
Queue Length 50th (ft)	88	168	~217	~169	28	28	0
Queue Length 95th (ft)	#179	268	#381	#364	56	55	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	348	1012	494	760	425	429	591
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.69	1.06	1.04	0.23	0.22	0.02

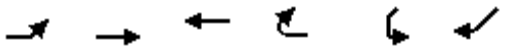
Intersection Summary

~ 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.



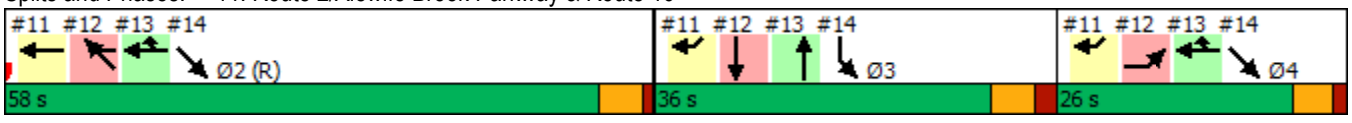
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	1597	0	0	1062		
Future Volume (vph)	0	0	1597	0	0	1062		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						7		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1774	0	0	1249		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1774	0	0	1249		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

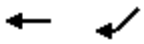


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			0.85			1.02		
Control Delay			5.6			62.8		
Queue Delay			4.6			0.0		
Total Delay			10.1			62.8		
LOS			B			E		
Approach Delay			10.1		62.8			
Approach LOS			B		E			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			

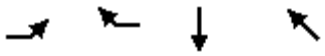
Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	1774	1249
v/c Ratio	0.85	1.02
Control Delay	5.6	62.8
Queue Delay	4.6	0.0
Total Delay	10.1	62.8
Queue Length 50th (ft)	43	~581
Queue Length 95th (ft)	m40	#659
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1225
Starvation Cap Reductn	252	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	1.02

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



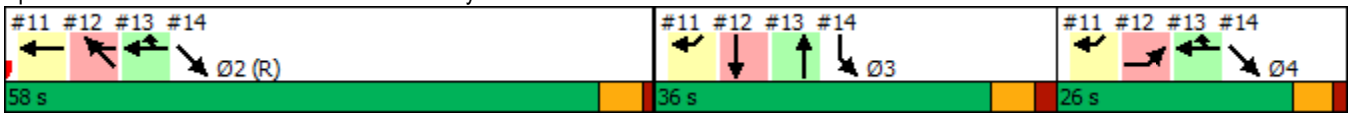
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	505	169	506	1428
Future Volume (vph)	505	169	506	1428
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	521	180	595	1587
Shared Lane Traffic (%)				
Lane Group Flow (vph)	521	180	595	1587
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

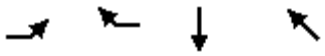
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.8
Queue Delay	0.0	2.4	0.0	3.3
Total Delay	72.2	16.7	47.1	89.1
LOS	E	B	D	F
Approach Delay			47.1	89.1
Approach LOS			D	F

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 72.8		Intersection LOS: E	
Intersection Capacity Utilization 103.7%		ICU Level of Service G	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



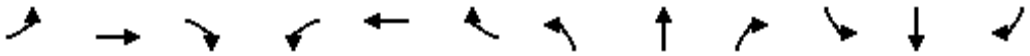


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	521	180	595	1587
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.8
Queue Delay	0.0	2.4	0.0	3.3
Total Delay	72.2	16.7	47.1	89.1
Queue Length 50th (ft)	206	86	223	~730
Queue Length 95th (ft)	#308	138	269	#868
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	397	0	0
Spillback Cap Reductn	0	6	0	13
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.60	0.72	1.10

Intersection Summary

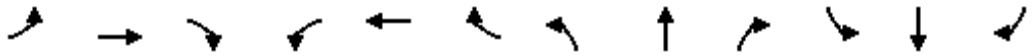
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Future Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

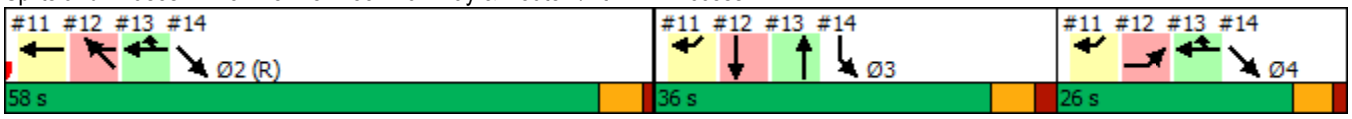
Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.07		0.32				
Control Delay					8.4	7.6		38.0				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.5	7.6		38.0				
LOS					A	A		D				
Approach Delay					8.3			38.0				
Approach LOS					A			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 23.3		Intersection LOS: C	
Intersection Capacity Utilization 27.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



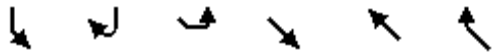
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	184	59	249
v/c Ratio	0.17	0.07	0.32
Control Delay	8.4	7.6	38.0
Queue Delay	0.1	0.0	0.0
Total Delay	8.5	7.6	38.0
Queue Length 50th (ft)	50	15	83
Queue Length 95th (ft)	81	31	121
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	223	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.07	0.32

Intersection Summary

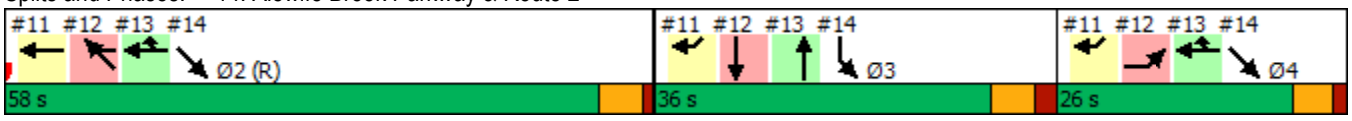


Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	506	0	0	1104	0	0		
Future Volume (vph)	506	0	0	1104	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	215							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	595	0	0	1138	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	595	0	0	1138	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				

Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.62			0.52				
Control Delay	2.8			11.7				
Queue Delay	1.0			0.0				
Total Delay	3.7			11.7				
LOS	A			B				
Approach Delay	3.7			11.7				
Approach LOS	A			B				

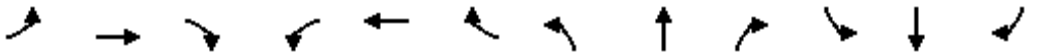
Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 59.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Lane Group	SBL	SET
Lane Group Flow (vph)	595	1138
v/c Ratio	0.62	0.52
Control Delay	2.8	11.7
Queue Delay	1.0	0.0
Total Delay	3.7	11.7
Queue Length 50th (ft)	5	221
Queue Length 95th (ft)	0	272
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	959	2188
Starvation Cap Reductn	155	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.74	0.52

Intersection Summary



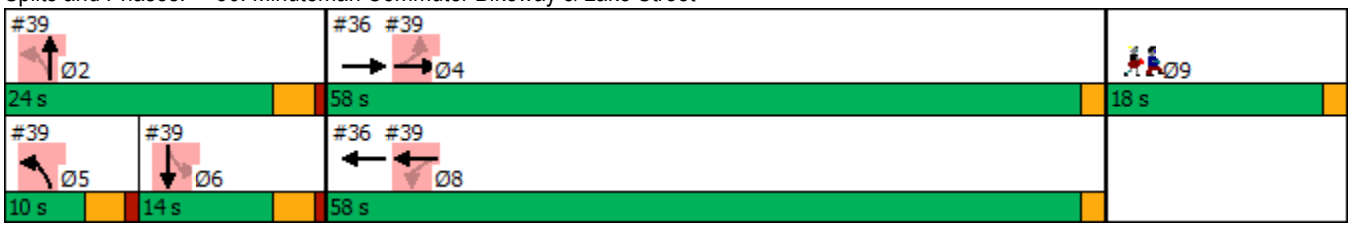
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	625	0	0	1165	0	0	0	0	0	0	0
Future Volume (vph)	0	625	0	0	1165	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	744	0	0	1201	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	744	0	0	1201	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		4			8							
Permitted Phases												
Detector Phase		4			8							

Lane Group	Ø2	Ø5	Ø6	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(ft)				
Detector 2 Size(ft)				
Detector 2 Type				
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	2	5	6	9
Permitted Phases				
Detector Phase				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		58.0			58.0							
Total Split (%)		58.0%			58.0%							
Maximum Green (s)		56.0			56.0							
Yellow Time (s)		2.0			2.0							
All-Red Time (s)		0.0			0.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		2.0			2.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		Max			Max							
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.1			56.1							
Actuated g/C Ratio		0.61			0.61							
v/c Ratio		0.60			0.92							
Control Delay		14.8			13.8							
Queue Delay		0.0			30.5							
Total Delay		14.8			44.4							
LOS		B			D							
Approach Delay		14.8			44.4							
Approach LOS		B			D							

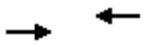
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 33.1		Intersection LOS: C	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 36: Minuteman Commuter Bikeway & Lake Street



Lane Group	Ø2	Ø5	Ø6	Ø9
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	9.0	14.0	18.0
Total Split (s)	24.0	10.0	14.0	18.0
Total Split (%)	24%	10%	14%	18%
Maximum Green (s)	20.0	6.0	10.0	16.0
Yellow Time (s)	3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Min	None	Min	None
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				311
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

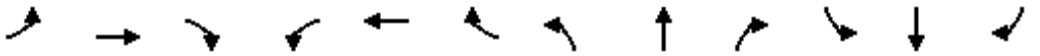
Intersection Summary



Lane Group	EBT	WBT
Lane Group Flow (vph)	744	1201
v/c Ratio	0.60	0.92
Control Delay	14.8	13.8
Queue Delay	0.0	30.5
Total Delay	14.8	44.4
Queue Length 50th (ft)	249	122
Queue Length 95th (ft)	384	m#427
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1240	1304
Starvation Cap Reductn	0	174
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.60	1.06

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	548	46	6	1006	0	38	4	5	3	7	121
Future Volume (vph)	31	548	46	6	1006	0	38	4	5	3	7	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990						0.985			0.875	
Flt Protected		0.998						0.961			0.999	
Satd. Flow (prot)	0	1978	0	0	1944	0	0	1799	0	0	1661	0
Flt Permitted		0.917			0.997			0.422			0.994	
Satd. Flow (perm)	0	1817	0	0	1938	0	0	790	0	0	1653	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						6			155	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	34	602	51	7	1156	0	51	5	7	4	9	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	687	0	0	1163	0	0	63	0	0	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		9.0	21.0		14.0	14.0	
Total Split (s)	58.0	58.0		58.0	58.0		10.0	24.0		14.0	14.0	
Total Split (%)	58.0%	58.0%		58.0%	58.0%		10.0%	24.0%		14.0%	14.0%	
Maximum Green (s)	56.0	56.0		56.0	56.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		2.0			2.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.1			56.1			12.5			12.5	
Actuated g/C Ratio		0.61			0.61			0.13			0.13	
v/c Ratio		0.62			0.99			0.57			0.47	
Control Delay		4.4			44.8			53.7			11.9	
Queue Delay		0.0			18.9			4.0			1.8	
Total Delay		4.4			63.7			57.7			13.7	
LOS		A			E			E			B	
Approach Delay		4.4			63.7			57.7			13.7	
Approach LOS		A			E			E			B	

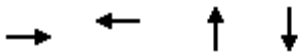
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 39.9		Intersection LOS: D	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	311
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	687	1163	63	168
v/c Ratio	0.62	0.99	0.57	0.47
Control Delay	4.4	44.8	53.7	11.9
Queue Delay	0.0	18.9	4.0	1.8
Total Delay	4.4	63.7	57.7	13.7
Queue Length 50th (ft)	8	621	32	7
Queue Length 95th (ft)	3	#1017	59	41
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1103	1173	175	375
Starvation Cap Reductn	3	0	0	0
Spillback Cap Reductn	0	69	61	98
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	1.05	0.55	0.61

Intersection Summary

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

2027 Build Weekday Evening Peak Hour

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	842	3	1	607	9	4
Future Vol, veh/h	842	3	1	607	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	1014	4	1	646	12	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1018	0	1664	1016
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	648	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	689	-	92	291
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	689	-	92	291
Mov Cap-2 Maneuver	-	-	-	-	92	-
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	472	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	41
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	117	-	-	689	-
HCM Lane V/C Ratio	0.148	-	-	0.002	-
HCM Control Delay (s)	41	-	-	10.2	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	827	19	9	585	23	5
Future Vol, veh/h	827	19	9	585	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	951	22	10	657	31	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	973	0	1639	962
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	677	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	717	-	112	313
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	509	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	717	-	110	313
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	46.1
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	124	-	-	717	-
HCM Lane V/C Ratio	0.301	-	-	0.014	-
HCM Control Delay (s)	46.1	-	-	10.1	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1.2	-	-	0	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	5	7	20	15	13
Future Vol, veh/h	8	5	7	20	15	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	5	8	22	16	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	23	30	0	-	0
Stage 1	23	-	-	-	-	-
Stage 2	38	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	950	1060	1596	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	990	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	945	1060	1596	-	-	-
Mov Cap-2 Maneuver	945	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	990	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	986	-	-
HCM Lane V/C Ratio	0.005	-	0.014	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	831	1	1	588	6	4
Future Vol, veh/h	831	1	1	588	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	955	1	1	661	8	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	956	0	1619	956
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	663	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	727	-	115	316
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	727	-	115	316
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	515	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	30.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	154	-	-	727	-
HCM Lane V/C Ratio	0.087	-	-	0.002	-
HCM Control Delay (s)	30.6	-	-	10	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	812	19	18	575	8	13	1	11	3	0	1
Future Vol, veh/h	4	812	19	18	575	8	13	1	11	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	944	22	21	669	9	17	1	15	4	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	678	0	0	966	0	0	1681	1685	955	1689	1692	674
Stage 1	-	-	-	-	-	-	965	965	-	716	716	-
Stage 2	-	-	-	-	-	-	716	720	-	973	976	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	923	-	-	721	-	-	76	95	316	75	94	458
Stage 1	-	-	-	-	-	-	309	336	-	424	437	-
Stage 2	-	-	-	-	-	-	424	435	-	306	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	923	-	-	721	-	-	72	89	316	68	89	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	89	-	68	89	-
Stage 1	-	-	-	-	-	-	305	332	-	419	416	-
Stage 2	-	-	-	-	-	-	403	415	-	287	328	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	51.4	49.6
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	110	923	-	-	721	-	-	86
HCM Lane V/C Ratio	0.303	0.005	-	-	0.029	-	-	0.062
HCM Control Delay (s)	51.4	8.9	0	-	10.1	0	-	49.6
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1.2	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	804	3	42	584	16	6	0	27	9	0	11
Future Vol, veh/h	19	804	3	42	584	16	6	0	27	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	969	4	48	664	18	7	0	33	11	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	682	0	0	1277	0	0	2097	2099	1275	1803	2092	673
Stage 1	-	-	-	-	-	-	1321	1321	-	769	769	-
Stage 2	-	-	-	-	-	-	776	778	-	1034	1323	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	920	-	-	550	-	-	39	53	206	62	53	459
Stage 1	-	-	-	-	-	-	195	228	-	397	413	-
Stage 2	-	-	-	-	-	-	393	410	-	283	228	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	920	-	-	411	-	-	23	30	154	40	30	459
Mov Cap-2 Maneuver	-	-	-	-	-	-	23	30	-	40	30	-
Stage 1	-	-	-	-	-	-	138	161	-	376	335	-
Stage 2	-	-	-	-	-	-	309	333	-	210	161	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	97.4	69.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	76	920	-	-	411	-	-	80
HCM Lane V/C Ratio	0.536	0.025	-	-	0.116	-	-	0.313
HCM Control Delay (s)	97.4	9	0	-	14.9	0	-	69.3
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	2.3	0.1	-	-	0.4	-	-	1.2

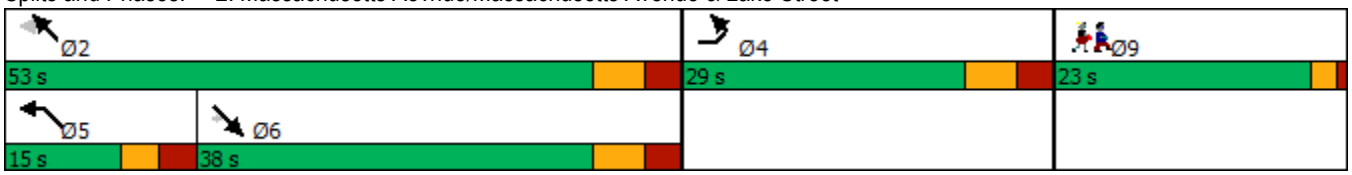


Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations							
Traffic Volume (vph)	421	274	658	186	340	739	
Future Volume (vph)	421	274	658	186	340	739	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	0		55	150		
Storage Lanes	1	0		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Frt	0.947			0.850			
Flt Protected	0.971				0.950		
Satd. Flow (prot)	1980	0	3421	1507	1745	1863	
Flt Permitted	0.971				0.229		
Satd. Flow (perm)	1980	0	3421	1507	421	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)	28			84			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	478	311	715	202	370	803	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	789	0	715	202	370	803	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1		2	1	1	2	
Detector Template	Left		Thru	Right	Left	Thru	
Leading Detector (ft)	20		100	20	20	100	
Trailing Detector (ft)	0		0	0	0	0	
Detector 1 Position(ft)	0		0	0	0	0	
Detector 1 Size(ft)	20		6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94			94	
Detector 2 Size(ft)			6			6	
Detector 2 Type			Cl+Ex			Cl+Ex	
Detector 2 Channel							
Detector 2 Extend (s)			0.0			0.0	
Turn Type	Prot		NA	Perm	pm+pt	NA	

Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases				6	2		
Detector Phase	4		6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0		23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0		38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%		36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0		31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0		4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0		3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0		7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	22.2		31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.25		0.35	0.35	0.53	0.52	
v/c Ratio	1.54		0.60	0.35	1.04	0.83	
Control Delay	280.2		27.9	15.9	78.5	29.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	280.2		27.9	15.9	78.5	29.9	
LOS	F		C	B	E	C	
Approach Delay	280.2		25.3			45.2	
Approach LOS	F		C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 105			
Actuated Cycle Length: 89.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.54			
Intersection Signal Delay: 103.3		Intersection LOS: F	
Intersection Capacity Utilization 93.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Massachusetts Aevnue/Massachusetts Avenue & Lake Street





Lane Group	EBL	SET	SER	NWL	NWT
Lane Group Flow (vph)	789	715	202	370	803
v/c Ratio	1.54	0.60	0.35	1.04	0.83
Control Delay	280.2	27.9	15.9	78.5	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	280.2	27.9	15.9	78.5	29.9
Queue Length 50th (ft)	~551	148	40	95	294
Queue Length 95th (ft)	#955	277	121	#402	#740
Internal Link Dist (ft)	1046	560			565
Turn Bay Length (ft)			55	150	
Base Capacity (vph)	512	1196	581	357	966
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.54	0.60	0.35	1.04	0.83

Intersection Summary

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

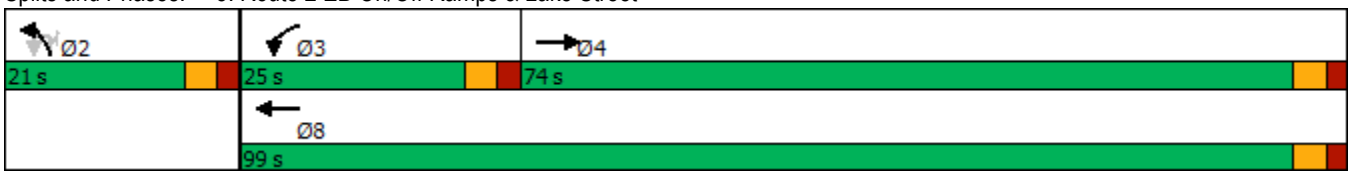
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	545	181	172	300	14	531	641
Future Volume (vph)	545	181	172	300	14	531	641
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.850					0.850
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		70					448
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	580	193	198	345	15	553	668
Shared Lane Traffic (%)							
Lane Group Flow (vph)	580	193	198	345	0	568	668
Enter Blocked Intersection	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm

Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	25.8	71.6	14.1	45.0		16.4	16.4
Actuated g/C Ratio	0.36	1.00	0.20	0.63		0.23	0.23
v/c Ratio	0.75	0.12	0.61	0.16		1.22	0.90
Control Delay	27.0	0.1	36.1	5.3		144.9	28.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.0	0.1	36.1	5.3		144.9	28.6
LOS	C	A	D	A		F	C
Approach Delay	20.3			16.5		82.1	
Approach LOS	C			B		F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 71.6			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.22			
Intersection Signal Delay: 49.4		Intersection LOS: D	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Route 2 EB On/Off Ramps & Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	580	193	198	345	568	668
v/c Ratio	0.75	0.12	0.61	0.16	1.22	0.90
Control Delay	27.0	0.1	36.1	5.3	144.9	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	0.1	36.1	5.3	144.9	28.6
Queue Length 50th (ft)	215	0	80	27	~315	92
Queue Length 95th (ft)	361	0	157	40	#634	#367
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2000	1664	471	3490	467	739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.42	0.10	1.22	0.90

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.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	368	818	0	0	264	352	0	0	0	208	22	27
Future Volume (vph)	368	818	0	0	264	352	0	0	0	208	22	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						387						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	418	930	0	0	290	387	0	0	0	219	23	28
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	418	930	0	0	290	387	0	0	0	120	122	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0				0	0	0
Act Effct Green (s)	11.5	30.9			14.9	14.9				16.0	16.0	16.0
Actuated g/C Ratio	0.20	0.52			0.25	0.25				0.27	0.27	0.27
v/c Ratio	1.19	0.94			0.64	0.59				0.27	0.26	0.05
Control Delay	136.9	33.5			26.8	6.6				19.4	19.3	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	136.9	33.5			26.8	6.6				19.4	19.3	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		65.6			15.2						17.4	
Approach LOS		E			B						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 58.9			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 45.0		Intersection LOS: D	
Intersection Capacity Utilization 62.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



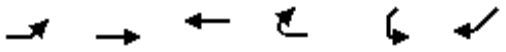


Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	418	930	290	387	120	122	28
v/c Ratio	1.19	0.94	0.64	0.59	0.27	0.26	0.05
Control Delay	136.9	33.5	26.8	6.6	19.4	19.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	136.9	33.5	26.8	6.6	19.4	19.3	0.1
Queue Length 50th (ft)	~191	281	91	0	35	36	0
Queue Length 95th (ft)	#331	#513	161	57	75	76	0
Internal Link Dist (ft)		425	300			449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	352	1022	489	679	446	463	596
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.59	0.57	0.27	0.26	0.05

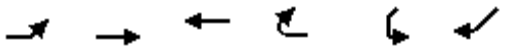
Intersection Summary

~ 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.



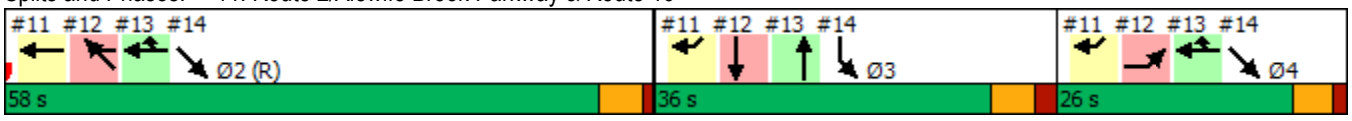
Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	0	0	2211	0	0	1131		
Future Volume (vph)	0	0	2211	0	0	1131		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						1		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2279	0	0	1154		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2279	0	0	1154		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru			Right		
Leading Detector (ft)			100			20		
Trailing Detector (ft)			0			0		
Detector 1 Position(ft)			0			0		
Detector 1 Size(ft)			6			20		
Detector 1 Type			Cl+Ex			Cl+Ex		
Detector 1 Channel								
Detector 1 Extend (s)			0.0			0.0		
Detector 1 Queue (s)			0.0			0.0		
Detector 1 Delay (s)			0.0			0.0		
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA			custom		
Protected Phases			2			3 4	3	4
Permitted Phases								
Detector Phase			2			3 4		

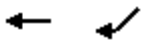


Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Switch Phase								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effct Green (s)			53.0			56.0		
Actuated g/C Ratio			0.44			0.47		
v/c Ratio			1.08			0.95		
Control Delay			47.1			46.7		
Queue Delay			1.5			0.0		
Total Delay			48.7			46.7		
LOS			D			D		
Approach Delay			48.7		46.7			
Approach LOS			D		D			

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 48.0		Intersection LOS: D	
Intersection Capacity Utilization 100.6%		ICU Level of Service G	
Analysis Period (min) 15			

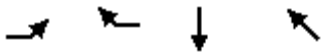
Splits and Phases: 11: Route 2/Alewife Brook Parkway & Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	2279	1154
v/c Ratio	1.08	0.95
Control Delay	47.1	46.7
Queue Delay	1.5	0.0
Total Delay	48.7	46.7
Queue Length 50th (ft)	~704	472
Queue Length 95th (ft)	m#56	#644
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1221
Starvation Cap Reductn	7	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.08	0.95

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



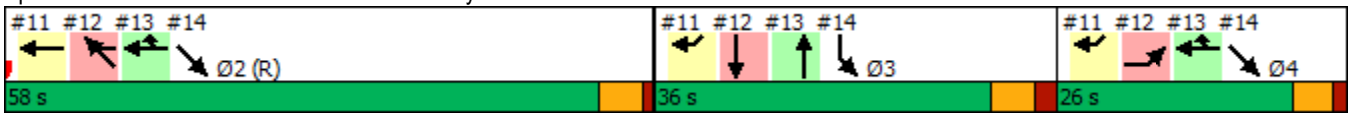
Lane Group	EBL	WBR	SBT	NWT
Lane Configurations				
Traffic Volume (vph)	610	591	250	1620
Future Volume (vph)	610	591	250	1620
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt		0.865		
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)			30	30
Link Distance (ft)			202	278
Travel Time (s)			4.6	6.3
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	678	622	255	1670
Shared Lane Traffic (%)				
Lane Group Flow (vph)	678	622	255	1670
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)			0	0
Link Offset(ft)			0	0
Crosswalk Width(ft)			16	16
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94	94
Detector 2 Size(ft)			6	6
Detector 2 Type			Cl+Ex	Cl+Ex
Detector 2 Channel				
Detector 2 Extend (s)			0.0	0.0
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

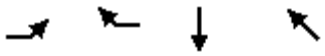
Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag		Lead	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effct Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	103.1
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	103.3
LOS	F	C	D	F
Approach Delay			37.8	103.3
Approach LOS			D	F

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 93.5		Intersection LOS: F	
Intersection Capacity Utilization 134.8%		ICU Level of Service H	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 12: Alewife Brook Parkway & Route 2



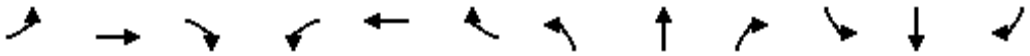


Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	678	622	255	1670
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	103.1
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	103.3
Queue Length 50th (ft)	~326	422	84	~794
Queue Length 95th (ft)	#446	#639	123	#933
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	53	0	107
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.31	1.23

Intersection Summary

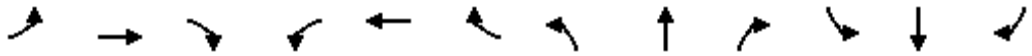
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Future Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red			No			No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template					Thru	Right		Thru				
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

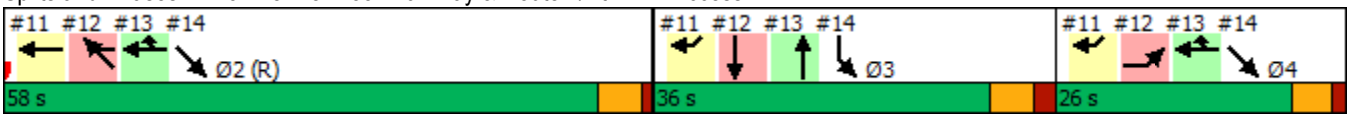
Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					2 4	2 4		3				
Permitted Phases												
Detector Phase					2 4	2 4		3				
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.56	0.36		0.30				
Control Delay					13.5	10.5		37.8				
Queue Delay					2.1	0.0		0.0				
Total Delay					15.6	10.5		37.8				
LOS					B	B		D				
Approach Delay					13.8			37.8				
Approach LOS					B			D				

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 18.6		Intersection LOS: B	
Intersection Capacity Utilization 52.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Alewife Brook Parkway & Route 2/Rt 2 WB Access



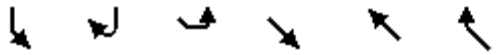
Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	622	345	245
v/c Ratio	0.56	0.36	0.30
Control Delay	13.5	10.5	37.8
Queue Delay	2.1	0.0	0.0
Total Delay	15.6	10.5	37.8
Queue Length 50th (ft)	239	110	81
Queue Length 95th (ft)	337	165	119
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	337	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.80	0.36	0.30

Intersection Summary

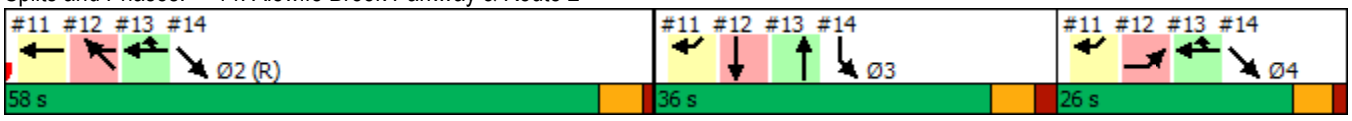


Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	250	0	0	988	0	0		
Future Volume (vph)	250	0	0	988	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	255	0	0	1098	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	255	0	0	1098	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				

Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead							Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effct Green (s)	30.0			79.0				
Actuated g/C Ratio	0.25			0.66				
v/c Ratio	0.26			0.50				
Control Delay	0.8			11.4				
Queue Delay	0.5			0.0				
Total Delay	1.3			11.4				
LOS	A			B				
Approach Delay	1.3			11.4				
Approach LOS	A			B				

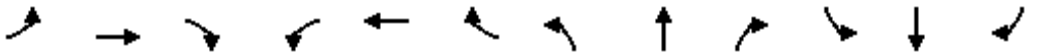
Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 47.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Lane Group	SBL	SET
Lane Group Flow (vph)	255	1098
v/c Ratio	0.26	0.50
Control Delay	0.8	11.4
Queue Delay	0.5	0.0
Total Delay	1.3	11.4
Queue Length 50th (ft)	0	210
Queue Length 95th (ft)	1	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	391	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.50

Intersection Summary



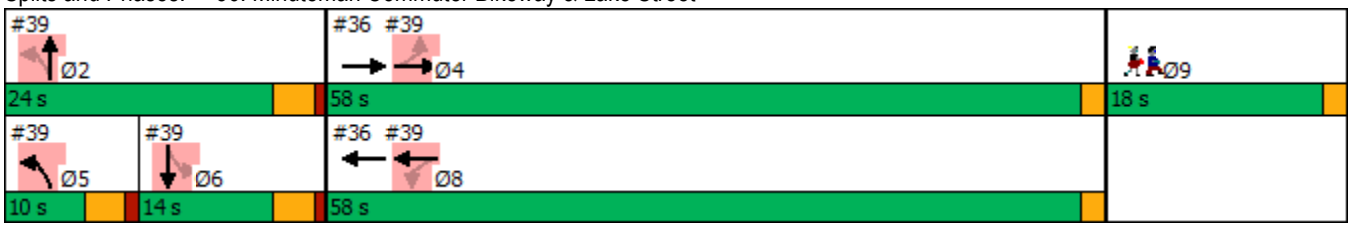
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑							
Traffic Volume (vph)	0	840	0	0	642	0	0	0	0	0	0	0
Future Volume (vph)	0	840	0	0	642	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1000	0	0	662	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1000	0	0	662	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		4			8							
Permitted Phases												
Detector Phase		4			8							

Lane Group	Ø2	Ø5	Ø6	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(ft)				
Detector 2 Size(ft)				
Detector 2 Type				
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	2	5	6	9
Permitted Phases				
Detector Phase				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		58.0			58.0							
Total Split (%)		58.0%			58.0%							
Maximum Green (s)		56.0			56.0							
Yellow Time (s)		2.0			2.0							
All-Red Time (s)		0.0			0.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		2.0			2.0							
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		Max			Max							
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.0			56.0							
Actuated g/C Ratio		0.64			0.64							
v/c Ratio		0.76			0.48							
Control Delay		16.1			4.0							
Queue Delay		0.0			0.3							
Total Delay		16.1			4.3							
LOS		B			A							
Approach Delay		16.1			4.3							
Approach LOS		B			A							

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 47.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 36: Minuteman Commuter Bikeway & Lake Street

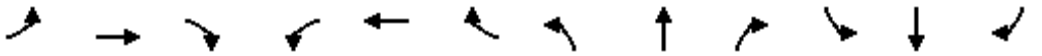


Lane Group	Ø2	Ø5	Ø6	Ø9
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	9.0	14.0	18.0
Total Split (s)	24.0	10.0	14.0	18.0
Total Split (%)	24%	10%	14%	18%
Maximum Green (s)	20.0	6.0	10.0	16.0
Yellow Time (s)	3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Min	None	Min	None
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				220
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Lane Group	EBT	WBT
Lane Group Flow (vph)	1000	662
v/c Ratio	0.76	0.48
Control Delay	16.1	4.0
Queue Delay	0.0	0.3
Total Delay	16.1	4.3
Queue Length 50th (ft)	339	53
Queue Length 95th (ft)	477	98
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1314	1381
Starvation Cap Reductn	0	221
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	0.57

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	688	70	6	519	1	15	5	7	0	5	108
Future Volume (vph)	82	688	70	6	519	1	15	5	7	0	5	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989						0.966			0.871	
Flt Protected		0.995			0.999			0.973				
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1786	0	0	1655	0
Flt Permitted		0.896			0.992			0.466				
Satd. Flow (perm)	0	1796	0	0	1948	0	0	855	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						9			140	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	93	782	80	7	590	1	20	7	9	0	6	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	955	0	0	598	0	0	36	0	0	146	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		9.0	21.0		14.0	14.0	
Total Split (s)	58.0	58.0		58.0	58.0		10.0	24.0		14.0	14.0	
Total Split (%)	58.0%	58.0%		58.0%	58.0%		10.0%	24.0%		14.0%	14.0%	
Maximum Green (s)	56.0	56.0		56.0	56.0		6.0	20.0		10.0	10.0	
Yellow Time (s)	2.0	2.0		2.0	2.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	0.0	0.0		0.0	0.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		2.0			2.0			4.0			4.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		56.0			56.0			7.3			7.3	
Actuated g/C Ratio		0.64			0.64			0.08			0.08	
v/c Ratio		0.83			0.48			0.46			0.55	
Control Delay		8.3			9.9			49.2			16.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.3			9.9			49.3			16.2	
LOS		A			A			D			B	
Approach Delay		8.3			9.9			49.3			16.2	
Approach LOS		A			A			D			B	

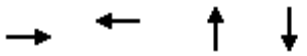
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 87.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 10.4		Intersection LOS: B	
Intersection Capacity Utilization 90.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	18%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	220
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	955	598	36	146
v/c Ratio	0.83	0.48	0.46	0.55
Control Delay	8.3	9.9	49.2	16.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	9.9	49.3	16.2
Queue Length 50th (ft)	29	150	14	3
Queue Length 95th (ft)	#57	237	36	37
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1155	1250	202	313
Starvation Cap Reductn	2	0	0	0
Spillback Cap Reductn	0	13	6	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	0.48	0.18	0.47

Intersection Summary

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

TOWN OF ARLINGTON

DEPARTMENT OF PLANNING and
COMMUNITY DEVELOPMENT

TOWN HALL, 730 MASSACHUSETTS AVENUE
ARLINGTON, MASSACHUSETTS 02476
TELEPHONE 781-316-3090

MEMORANDUM

To: Zoning Board of Appeals

From: Jennifer Raitt, Director of Planning and Community Development

cc: Erin Zwirko, AICP LEED AP, Assistant Director of Planning and Community Development
Daniel Amstutz, AICP, Senior Transportation Planner
Emily Sullivan, AICP Candidate, Environmental Planner and Conservation Agent

Date: January 8, 2021

RE: Thorndike Place Comments from Department of Planning and Community Development

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To aid the Arlington Zoning Board of Appeals (ZBA) in their review of the Arlington Land Realty, LLC Application for a Comprehensive Permit to develop Thorndike Place, the Department is providing the following comments and questions on the proposed project, organized by topical issue:

1. **Conservation and Environmental Amenities**: The Conservation Commission provided significant comments and recommendations which should be considered to protect the wetlands and address stormwater issues. The Department has the following comments in addition to comments provided by the Conservation Commission and BETA Group, the Town's third-party reviewer:
   - The Applicant should consider placing a Conservation Restriction (CR) on the undeveloped portion of the property to protect the open space in perpetuity. The CR could then be managed by the property owner, Conservation Commission, and a nonprofit entity such as the Arlington Land Trust. In the CR Management Plan, the Applicant could create a phased restoration plan for the entirety of the protected open space. The phased restoration plan should prioritize invasive species removal and management, as well as understory revegetation. The Applicant should consult with the Conservation Commission on appropriate restoration species. This phased approach would enhance the site over time, creating higher quality habitat and better functioning resource areas.

- As part of the CR, the Applicant should consider a trail system through the protected open space. Trails could be created with a combination of natural materials (e.g. mulch or stone dust) or boardwalks and should be designed to minimize resource area impacts. The Applicant should aim for an ADA compliant trail network. The trails should connect to the Minuteman Bikeway and Alewife Greenway. The Applicant should consider the Alewife Greenway and Alewife Wetlands Area as design models. The trail system should include signage for wayfinding, ecological identification, resource area identification, history of area, and climate change design considerations.
- Ornamental vegetation proposed around the buildings should be native species. The Applicant should consider reducing the amount of lawn turf onsite, and maximize natural meadow and pollinator gardens throughout the developed portion of the site.
- The Applicant should consider installing a community garden area as an onsite amenity and community-building asset for residents. The Applicant can refer to the Magnolia Park Community Garden.
- Where feasible, the Applicant should consider installing porous pavement for pathways, sidewalks, and parking areas to reduce localized stormwater flooding and to reduce stormwater pollution.

2. **Circulation, Parking, Access, and Connections**: The Transportation Advisory Committee (TAC) provided a review of traffic and circulation including reviewing the initial and updated Traffic Impact Assessment Study (TIAS). The Department has the following comments in addition to comments provided by TAC and BETA Group:
   - First and foremost, the number of parking spaces per housing unit is very high and we recommend reducing it to an allocation of fewer than 200 spaces. The Applicant should consider compact car spaces and reduce the size of surface parking areas.
   - The Applicant should clarify on Garage Level Plan the number of bike parking spaces in each area. There is one reference to the Bicycle Room and the number “108” next to it, which is lower than the 144 spaces proposed.
   - The Applicant should clarify that the ingress/egress method is the same as vehicles; some residents may use the elevator or walk bikes out using east side garage door.
   - The Department recommends that the “5’ wide gravel path” (Layout & Materials Plan) connecting east side garage door to asphalt path/sidewalk is paved with same materials as asphalt path under the assumption that some residents may use this entry to the garage as pedestrians or cyclists. Porous materials would be preferred, see note in prior section.
   - The Applicant should clarify details of bike parking design to align with Arlington Bicycle Parking Guidelines. Bike parking that requires a person to physically lift a bicycle to park it is not permitted. Review dimensional guidance from Bicycle Parking Guidelines to ensure enough space is provided for 144 bike parking spaces.
   - On the Layout & Materials Plan, an accessible ramp and stairs is shown on the south side of the building, but it is not clear where this goes to. There is no door shown on this section of the plan and no door shown at this location in the Garage Level Plan. The Applicant should clarify what this ramp connects to for understanding why a ramp and stairs are needed.

- The Applicant should show entry and exit doorways with accessible sidewalk pathways to access the street or around the building. Of particular note are doorways on the east side of the building and the doorway on the southwest side of the building near the garage entrance.
- The Department recommends an accessible sidewalk connection on the west side of the building to connect the south courtyard to the outdoor parking area.
- The sidewalk along Dorothy Road should be a minimum 5' wide and constructed of concrete, not asphalt. All other outdoor walkways should be at least 5' wide.
- The crosswalk connecting the west outdoor parking area to the building should be a continental or zebra-style crosswalk instead of only parallel lines. In addition, the curb ramps for this crosswalk are offset in the Layout and Materials Plan. They should be directly across from each other to the extent practicable.
- Crosswalks should also be included across the driveway aprons for the small parking area in the front of the building if it is assumed that frequent drop-offs and deliveries will be done in this area.

Traffic Impact Assessment (TIA) Report

- The Department agrees with BETA Group regarding the scope of the TIA and the methodology for determining current traffic volumes, adjusted due to COVID-19.
- Figure 2 of existing conditions notes the crosswalk for the Minuteman Bikeway crossing of Lake St but does not identify whether it is a signalized or unsignalized intersection. Existing conditions should be updated to note that this is now a signalized intersection.
- Figure 2 of existing conditions and other street network diagrams exclude a number of streets in the neighborhood, and erroneously show Mary Street ending at Burch Street in the east and Littlejohn at the south, and Burch Street ending at Dorothy Road. Mary Street ends at Margaret Street in the east and Wilson Ave in the south, and Burch Street ends at Edith Street. Include Osborne Road and Edith Street in analysis as they will likely be used by cyclists and pedestrians for accessing the Minuteman Bikeway and Thorndike Field.
- As part of the existing intersection signage and geometry, note that the north/eastbound approach to Burch Street from Lake Street has a red and white sign that says "Thorndike Field Parking" with an arrow directing traffic down Burch Street.
- The Department agrees with BETA Group's comment T32 regarding timed entry restrictions, with clarification that Burch Street does not have an entry restriction. Reference note above that signage directs traffic down Burch Street to get to Thorndike Field parking.
- The TIA recommendation to install a 23-dock Bluebikes station in the vicinity of the existing Bluebikes station at Magnolia Field/Minuteman Bikeway should be clarified to explain a more specific location, or if it would be adding to the existing Bluebikes station. Alternatively, the Applicant could work with the Town to identify the exact location and number of docks in consultation with Bluebikes staff.
- The intersection of Dorothy Road and Littlejohn Street is currently Stop-controlled on only one approach: Dorothy Road approaching Littlejohn. The approach from Littlejohn to Dorothy Road is uncontrolled. For the TIA recommendation to put the

project driveway under Stop sign control, it is unclear if the approach from Littlejohn Street to Dorothy Road/project should also be put under Stop sign control.

3. **Design**: The Department has the following comments:
   - The Department appreciates the inclusion of an upper story step back, particularly how far it steps back fronting Dorothy Road. However, it is not clear if that space will be used as outdoor space for the residents (plan only indicates roof below). This should be clarified as there may be sound impacts if used for common space.
   - Consideration should be given to the building color scheme. Improvements to accent colors denoting where the main entrances are located and other key locations of building interest could be emphasized with alternate colors. We believe the building design is an improvement from the prior design choices.
   - Additional renderings, including improved street review, would be helpful in conducting this review.
   - While the Applicant has made some interesting choices for sustainable design, including modular design and blue roofs, we recommend that the Applicant consider more recent goals set by the Town to achieve net zero greenhouse gas emissions by 2050, including fossil fuel free infrastructure, solar, and other considerations to reduce building emissions.
   - Outdoor space around the building is minimal and should be improved or enhanced.

4. **Affordable Housing**: The Department has the following comments:
   - While we appreciate the responses to the Town's Housing Production Plan (HPP) adopted by the Select Board and Redevelopment Board in 2016, the Applicant does not address why they are unable to match the Zoning Bylaw inclusionary requirements at a minimum, particularly lowering the prices and incomes for rental units.
   - Further, per the Town's Inclusionary Zoning requirements, the Department recommends that the Applicant clearly show that the affordable units are dispersed throughout the development and comparable to market rate units in terms of quality and character, room size, and external appearance. Parking for affordable units should also be comparable in location and appearance to parking for market rate units.
   - The Applicant should provide the Affirmative Fair Housing Marketing Plan to determine the market for these homes.

The Department is available to discuss any of the above comments and questions with the ZBA. We would appreciate the opportunity to discuss the project design further with the ZBA and with the Applicant.

Arlington Transportation Advisory Committee

Date: January 6, 2021.
To: Arlington Zoning Board of Appeal.
From: TAC Executive Committee.
Subject: Review of Thorndike Place Traffic Impact Assessment

Memorandum

At the request of Jenny Raitt, Director of the Department of Planning and Community Development, the TAC Executive Committee has reviewed the Traffic Impact Assessment (TIA) for the proposed Thorndike Place development, dated November 2020, the December 1, 2020 Beta review of that TIA, and other documents. The comments presented below have not been reviewed or approved by the full TAC membership.

1. The TAC Executive Committee concurs with the findings, comments, and recommendations of the Beta review except as noted below:

    a. The proponent should consider providing subsidized MBTA passes in the proposed TDM program.
    b. The project proposes an average of 1.3 parking spaces per unit which the Executive Committee believes is too high for a transit-oriented development (TOD). The Committee recommends the Board of Appeals reduce the required number of spaces as allowed by the Zoning Code. A maximum of one space per unit is more appropriate for a TOD. This would be consistent with the findings in the MAPC Perfect Fit Parking for metro Boston (Arlington was included in the report).
    c. Vox on 2 is approximately 0.5 mile from the Alewife Station whereas the proposed development is 0.8 miles from the station. Should the vehicle mode share be increased to reflect that the proposed project is farther from the station than Vox on 2?
    d. Add to Beta comment T20 that the dramatic level of service (LOS) improvements on Lake Street EB at Brooks Avenue do not seem correct. The TIA shows LOS improves from E to A in the AM and from D to A in the PM. Previous analyses of the then proposed Lake Street signals did not yield such dramatic improvements in LOS
    e. Table 7 of the TIA should be expanded to include traffic volumes and percentage increases on Lake St. between Littlejohn Street and Route 2, and between Margaret Street and Brooks Ave.
    f. The operations analysis should be expanded to include a discussion of queueing on Lake Street at the bikeway and at Brooks Avenue.
    g. Consideration should be given to locating the proposed Bluebikes station farther to the west near the west end of the Thorndike Field parking lot.
    h. In T15 include changes in student attendance at the Hardy School in the review of 2020 volumes.

2. In addition to the requests and comments above, the Executive Committee believes the answers to the following Beta comments are critically important:

    a. T32. Existing signed turning restrictions exist from 7-9 AM and from 4-7 PM on weekdays from Lake Street onto Wilson Avenue, Littlejohn Street, and Homestead Road *(Note: The Beta review incorrectly indicates there is also a turn restriction on Burch Street).* Assess the impact of this restriction and clarify whether discontinuance of this restriction is proposed.
    b. T41. Quantify and analyze the effect of construction on the Dorothy Road neighborhood. It is expected that the earthwork required for the site will result in a significant number of trips for large dump trucks, in addition to other construction vehicles related to the grading and construction of the Site building. Verify turning path of large construction vehicles at affected intersections within the neighborhood and to/from Lake Street
    c. T42. Provide additional commentary on the impact of the Project on the Dorothy Road neighborhood, including summarizing expected increases in daily and peak hourly traffic on Littlejohn Street, Dorothy Road, Burch Street and Margaret Street.
    The Executive Committee believes the traffic impacts on Littlejohn Street, Dorothy Street and Burch Street may result in a significant percentage increase in neighborhood traffic volumes. This is a quality-of-life issue rather than a roadway capacity issue. The Executive Committee recommends a post-development monitoring study be included in the TDM program. The study may identify traffic calming measures which are needed to mitigate impacts on the neighborhood streets.

TAC Executive Committee:
Howard Muise, Chair.
Jeff Maxtutis, Vice Chair.
Shoji Takahashi, Secretary.
Dan Amstutz, Senior Transportation Planner, DPCD.

Thorndike Place - AFD ISD

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	Thorndike_Place_comments_AFD_120720.pdf	Thorndike Place comments AFD 120720
🗋	Reference Material	Turning_Radius_Spec_Sheet.pdf	Turning Radius Spec Sheet
🗋	Reference Material	Thorndike_Place_comments_ISD_120720.pdf	Thorndike Place comments ISD 120720

Jenny

I will continue to go over these documents but I wanted to get you the Turning Radius Spec Sheet to assist in the design of the emergency access roadways.

Deputy Chief Ryan Melly
Fire Prevention Division
Arlington Fire Department
(781) 316-3803

> From: "Jenny Raitt" <JRaitt@town.arlington.ma.us>
> To: "Michael Rademacher" <MRademacher@town.arlington.ma.us>, "Wayne Chouinard" <WChouinard@town.arlington.ma.us>, "Kevin Kelley" <KKelley@town.arlington.ma.us>, "Ryan Melly" <RMelly@town.arlington.ma.us>, "Christine Bongiorno" <CBongiorno@town.arlington.ma.us>, "Natasha Waden" <NWaden@town.arlington.ma.us>, "Mike Byrne" <MByrne@town.arlington.ma.us>
> Date: Mon, 23 Nov 2020 15:42:58 -0500
> Subject: Thorndike Place Comprehensive Permit - Updated Comments
>
> Dear all,
>
> I am coordinating the next technical review for the proposed Thorndike Place Comprehensive Permit project submitted by Arlington Land Realty, LLC for Thorndike Place. The ZBA schedule of meetings and timeline can be found here: http://webmail.town.arlington.ma.us/WorldClient.dll?Session=OO348X9G3A9FH&View=OpenAttachment&Number=98106&FolderID=0&Part=2&Filename=Thorndike%20Place%20Notes%20from%2020_1120.pdf. All other documents about the project can be found here: https://www.arlingtonma.gov/town-governance/boards-and-committees/zoning-board-of-appeals/thorndike-place-comprehensive-permit.
>
> Attached please find documents received from the applicant and subsequently reviewed by BETA. I am seeking updated comments from Engineering, Health Department, Inspectional Services, and the Fire Department on these documents. Please provide me with your comments by December 7th at 4:00 p.m. Please note that the Transportation Advisory Committee and the Conservation Commission are also providing comments.
>
> Please let me know if you have any questions about the application or process.
>
> Thanks,
> Jenny
>
> Jennifer Raitt
> Director, Department of Planning and Community Development
> Town of Arlington
>
> *Arlington values equity, diversity, and inclusion. We are committed to building a community where everyone is heard, respected, and protected.*
>
> > From: Todd Undzis <TUndzis@BETA-Inc.com>
> > To: Jenny Raitt <JRaitt@town.arlington.ma.us>
> > Cc: Emily Sullivan <ESullivan@town.arlington.ma.us>, Marta Nover <MNover@BETA-Inc.com>, Douglas Heim <DHeim@town.arlington.ma.us>, Greg Lucas <GLucas@BETA-Inc.com>, Julia Stearns <JStearns@BETA-Inc.com>
> > Date: Fri, 20 Nov 2020 18:38:45 +0000
> > Subject: Thorndike Place Comp Permit peer review letter #2
>
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brackets) and you know the content is safe.

Hello Jennifer –

Attached please find BETA's Peer Review letter #2 for the Thorndike Place project dated Nov 20, 2020.

If you have any questions please feel free to contact us directly.

Thanks.

Todd Undzis, PE
Project Manager

BETA Group, Inc. -
Celebrating 35 Years

BETA Group, Inc.
401.333.2382

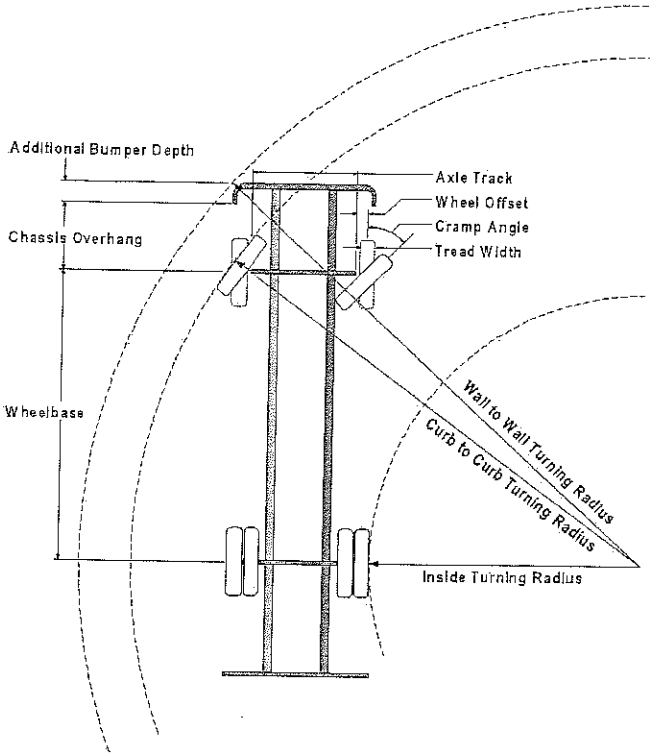
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Turning Performance Analysis

03/16/2018

Bid Number: 378
Department: ARLINGTON FIRE DEPARTMENT, MA

Chassis: Arrow XT Chassis, PAP/Midmount
Body: Aerial, Platform, 95', Mid-Mount, No Pump, S/S Body



Parameters:

Inside Cramp Angle:	40°
Axle Track:	82.92 in.
Wheel Offset:	5.25 in.
Tread Width:	17.5 in.
Chassis Overhang:	68.99 in.
Additional Bumper Depth:	7 in.
Front Overhang:	75.99 in.
Wheelbase:	261.5 in.

Calculated Turning Radii:

Inside Turn:	24 ft. 10 in.
Curb to curb:	40 ft. 7 in.
Wall to wall:	44 ft. 2 in.

Comments:

Category	Option	Description
Axle, Front, Custom	0090913	Axle, Front, Oshkosh TAK-4, Non Drive, 24,000 lb, Qtm/AXT/DCF
Wheels, Front	0091794	Wheels, Front, 22.50" x 13.00", Steel, Hub Pilot
Tires, Front	0582746	Tires, Front, Goodyear, G296 MSA, 445/65R22.50, 20 ply
Bumpers	0550026	Bumper, Non-Extended, Arrow XT
Aerial Devices	0592911	Aerial, 95' Pierce PAP, Mid Mount

Notes:

Actual Inside cramp angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for 9.00 inch curb.

LADDER 1 TOWER

Hi Jenny,
Mike and I have really have no further comments until the zoning process is complete. After Building Permit issuance I'm sure we'll have many discussions with the development team.
Mike

Arlington values equity, diversity, and inclusion. We are committed to
building a community where everyone is heard, respected, and protected.
Michael F. Byrne
Director of Inspectional Services
51 Grove Street
Arlington, MA 02476
781-316-3390

> From: "Jenny Raitt" <JRaitt@town.arlington.ma.us>
> To: "Wayne Chouinard" <WChouinard@town.arlington.ma.us>, "Michael Rademacher" <MRademacher@town.arlington.ma.us>, "Kevin Kelley" <KKelley@town.arlington.ma.us>, "Ryan Melly" <RMelly@town.arlington.ma.us>, "Christine Bongiorno" <CBongiorno@town.arlington.ma.us>, "Natasha Waden" <NWaden@town.arlington.ma.us>, "Mike Byrne" <MByrne@town.arlington.ma.us>
> Date: Mon, 07 Dec 2020 09:57:48 -0500
> Subject: Re: Thorndike Place Comprehensive Permit - Updated Comments
>
> Thank you for your comments, Wayne.
>
> Best,
> Jenny
>
> Jennifer Raitt
> Director, Department of Planning and Community Development
> Town of Arlington
>
> *Arlington values equity, diversity, and inclusion. We are committed to building a community where everyone is heard, respected, and protected.*
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> > Date: Fri, 04 Dec 2020 17:33:31 -0500
> > Subject: Re: Thorndike Place Comprehensive Permit - Updated Comments
> >
> > Hello Jenny,
> >
> > Comments pertaining to the Thorndike Place Comprehensive Permit Application are attached as requested. Please let me know if I can answer any questions or if any additional information or clarification is required.
> >
> > Regards,
> >
> > Wayne
> >
> > **Wayne A. Chouinard, PE**
> > Town Engineer
> > Arlington Public Works
> > 51 Grove Street
> > Office: (781) 316-3320
> > E-mail: wchouinard@town.arlington.ma.us
> >
> > > From: "Jenny Raitt" <JRaitt@town.arlington.ma.us>
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Subject: Thorndike Place Comprehensive Permit - Updated Comments

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Please let me know if you have any questions about the application or process.

Thanks,
Jenny

Jennifer Raitt
Director, Department of Planning and Community Development
Town of Arlington

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> If you have any questions please feel free to contact us directly.
>
> Thanks.
>
> **Todd Undzis, PE**
> Project Manager



BETA Group, Inc. -
Celebrating 35 Years

BETA Group, Inc.
401.333.2382



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Thorndike Place - Department of Planning and Community Development

ATTACHMENTS:

Type	File Name	Description
Reference Material	DPCD_comments_to_ZBA_Re_Thorndike_Place_010821.pdf	DPCD comments to ZBA Re Thorndike Place 010821

TOWN OF ARLINGTON

DEPARTMENT OF PLANNING and
COMMUNITY DEVELOPMENT

TOWN HALL, 730 MASSACHUSETTS AVENUE
ARLINGTON, MASSACHUSETTS 02476
TELEPHONE 781-316-3090

MEMORANDUM

To: Zoning Board of Appeals

From: Jennifer Raitt, Director of Planning and Community Development

cc: Erin Zwirko, AICP LEED AP, Assistant Director of Planning and Community Development
Daniel Amstutz, AICP, Senior Transportation Planner
Emily Sullivan, AICP Candidate, Environmental Planner and Conservation Agent

Date: January 8, 2021

RE: Thorndike Place Comments from Department of Planning and Community Development

---

To aid the Arlington Zoning Board of Appeals (ZBA) in their review of the Arlington Land Realty, LLC Application for a Comprehensive Permit to develop Thorndike Place, the Department is providing the following comments and questions on the proposed project, organized by topical issue:

1. **Conservation and Environmental Amenities**: The Conservation Commission provided significant comments and recommendations which should be considered to protect the wetlands and address stormwater issues. The Department has the following comments in addition to comments provided by the Conservation Commission and BETA Group, the Town's third-party reviewer:
   - The Applicant should consider placing a Conservation Restriction (CR) on the undeveloped portion of the property to protect the open space in perpetuity. The CR could then be managed by the property owner, Conservation Commission, and a nonprofit entity such as the Arlington Land Trust. In the CR Management Plan, the Applicant could create a phased restoration plan for the entirety of the protected open space. The phased restoration plan should prioritize invasive species removal and management, as well as understory revegetation. The Applicant should consult with the Conservation Commission on appropriate restoration species. This phased approach would enhance the site over time, creating higher quality habitat and better functioning resource areas.

- As part of the CR, the Applicant should consider a trail system through the protected open space. Trails could be created with a combination of natural materials (e.g. mulch or stone dust) or boardwalks and should be designed to minimize resource area impacts. The Applicant should aim for an ADA compliant trail network. The trails should connect to the Minuteman Bikeway and Alewife Greenway. The Applicant should consider the Alewife Greenway and Alewife Wetlands Area as design models. The trail system should include signage for wayfinding, ecological identification, resource area identification, history of area, and climate change design considerations.
- Ornamental vegetation proposed around the buildings should be native species. The Applicant should consider reducing the amount of lawn turf onsite, and maximize natural meadow and pollinator gardens throughout the developed portion of the site.
- The Applicant should consider installing a community garden area as an onsite amenity and community-building asset for residents. The Applicant can refer to the Magnolia Park Community Garden.
- Where feasible, the Applicant should consider installing porous pavement for pathways, sidewalks, and parking areas to reduce localized stormwater flooding and to reduce stormwater pollution.

2. **Circulation, Parking, Access, and Connections**: The Transportation Advisory Committee (TAC) provided a review of traffic and circulation including reviewing the initial and updated Traffic Impact Assessment Study (TIAS). The Department has the following comments in addition to comments provided by TAC and BETA Group:
   - First and foremost, the number of parking spaces per housing unit is very high and we recommend reducing it to an allocation of fewer than 200 spaces. The Applicant should consider compact car spaces and reduce the size of surface parking areas.
   - The Applicant should clarify on Garage Level Plan the number of bike parking spaces in each area. There is one reference to the Bicycle Room and the number “108” next to it, which is lower than the 144 spaces proposed.
   - The Applicant should clarify that the ingress/egress method is the same as vehicles; some residents may use the elevator or walk bikes out using east side garage door.
   - The Department recommends that the “5’ wide gravel path” (Layout & Materials Plan) connecting east side garage door to asphalt path/sidewalk is paved with same materials as asphalt path under the assumption that some residents may use this entry to the garage as pedestrians or cyclists. Porous materials would be preferred, see note in prior section.
   - The Applicant should clarify details of bike parking design to align with Arlington Bicycle Parking Guidelines. Bike parking that requires a person to physically lift a bicycle to park it is not permitted. Review dimensional guidance from Bicycle Parking Guidelines to ensure enough space is provided for 144 bike parking spaces.
   - On the Layout & Materials Plan, an accessible ramp and stairs is shown on the south side of the building, but it is not clear where this goes to. There is no door shown on this section of the plan and no door shown at this location in the Garage Level Plan. The Applicant should clarify what this ramp connects to for understanding why a ramp and stairs are needed.

- The Applicant should show entry and exit doorways with accessible sidewalk pathways to access the street or around the building. Of particular note are doorways on the east side of the building and the doorway on the southwest side of the building near the garage entrance.
- The Department recommends an accessible sidewalk connection on the west side of the building to connect the south courtyard to the outdoor parking area.
- The sidewalk along Dorothy Road should be a minimum 5' wide and constructed of concrete, not asphalt. All other outdoor walkways should be at least 5' wide.
- The crosswalk connecting the west outdoor parking area to the building should be a continental or zebra-style crosswalk instead of only parallel lines. In addition, the curb ramps for this crosswalk are offset in the Layout and Materials Plan. They should be directly across from each other to the extent practicable.
- Crosswalks should also be included across the driveway aprons for the small parking area in the front of the building if it is assumed that frequent drop-offs and deliveries will be done in this area.

Traffic Impact Assessment (TIA) Report

- The Department agrees with BETA Group regarding the scope of the TIA and the methodology for determining current traffic volumes, adjusted due to COVID-19.
- Figure 2 of existing conditions notes the crosswalk for the Minuteman Bikeway crossing of Lake St but does not identify whether it is a signalized or unsignalized intersection. Existing conditions should be updated to note that this is now a signalized intersection.
- Figure 2 of existing conditions and other street network diagrams exclude a number of streets in the neighborhood, and erroneously show Mary Street ending at Burch Street in the east and Littlejohn at the south, and Burch Street ending at Dorothy Road. Mary Street ends at Margaret Street in the east and Wilson Ave in the south, and Burch Street ends at Edith Street. Include Osborne Road and Edith Street in analysis as they will likely be used by cyclists and pedestrians for accessing the Minuteman Bikeway and Thorndike Field.
- As part of the existing intersection signage and geometry, note that the north/eastbound approach to Burch Street from Lake Street has a red and white sign that says "Thorndike Field Parking" with an arrow directing traffic down Burch Street.
- The Department agrees with BETA Group's comment T32 regarding timed entry restrictions, with clarification that Burch Street does not have an entry restriction. Reference note above that signage directs traffic down Burch Street to get to Thorndike Field parking.
- The TIA recommendation to install a 23-dock Bluebikes station in the vicinity of the existing Bluebikes station at Magnolia Field/Minuteman Bikeway should be clarified to explain a more specific location, or if it would be adding to the existing Bluebikes station. Alternatively, the Applicant could work with the Town to identify the exact location and number of docks in consultation with Bluebikes staff.
- The intersection of Dorothy Road and Littlejohn Street is currently Stop-controlled on only one approach: Dorothy Road approaching Littlejohn. The approach from Littlejohn to Dorothy Road is uncontrolled. For the TIA recommendation to put the

project driveway under Stop sign control, it is unclear if the approach from Littlejohn Street to Dorothy Road/project should also be put under Stop sign control.

3. **Design**: The Department has the following comments:
   - The Department appreciates the inclusion of an upper story step back, particularly how far it steps back fronting Dorothy Road. However, it is not clear if that space will be used as outdoor space for the residents (plan only indicates roof below). This should be clarified as there may be sound impacts if used for common space.
   - Consideration should be given to the building color scheme. Improvements to accent colors denoting where the main entrances are located and other key locations of building interest could be emphasized with alternate colors. We believe the building design is an improvement from the prior design choices.
   - Additional renderings, including improved street review, would be helpful in conducting this review.
   - While the Applicant has made some interesting choices for sustainable design, including modular design and blue roofs, we recommend that the Applicant consider more recent goals set by the Town to achieve net zero greenhouse gas emissions by 2050, including fossil fuel free infrastructure, solar, and other considerations to reduce building emissions.
   - Outdoor space around the building is minimal and should be improved or enhanced.

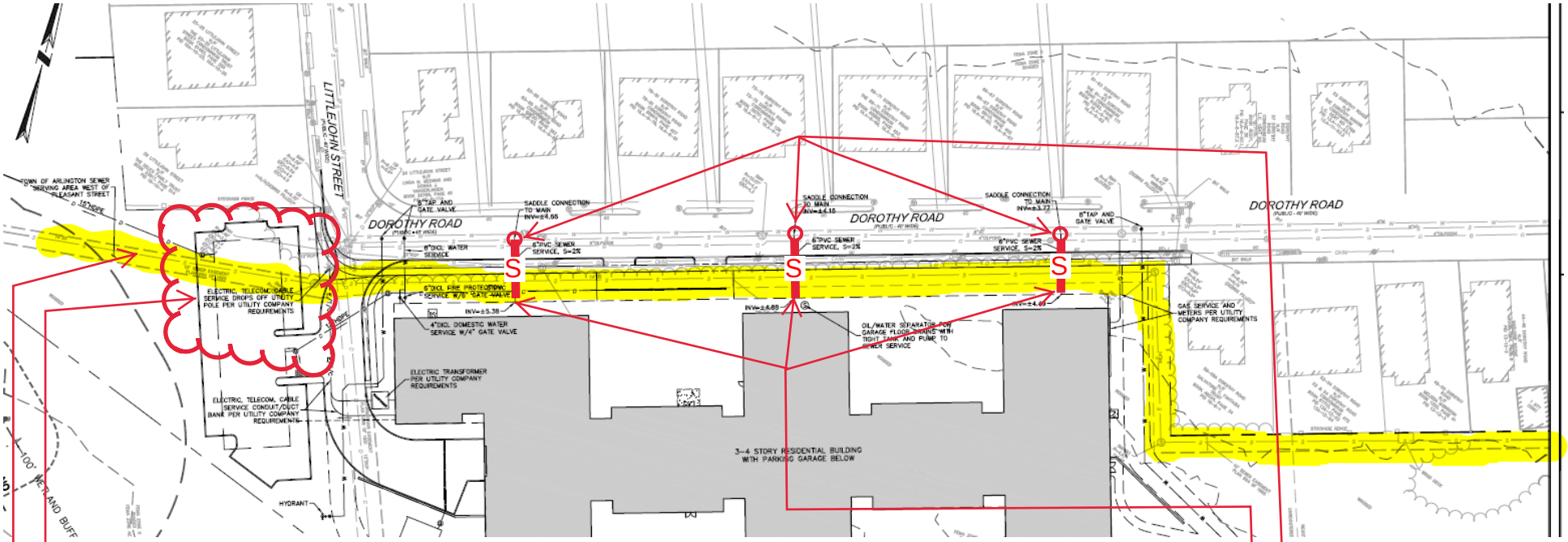
4. **Affordable Housing**: The Department has the following comments:
   - While we appreciate the responses to the Town's Housing Production Plan (HPP) adopted by the Select Board and Redevelopment Board in 2016, the Applicant does not address why they are unable to match the Zoning Bylaw inclusionary requirements at a minimum, particularly lowering the prices and incomes for rental units.
   - Further, per the Town's Inclusionary Zoning requirements, the Department recommends that the Applicant clearly show that the affordable units are dispersed throughout the development and comparable to market rate units in terms of quality and character, room size, and external appearance. Parking for affordable units should also be comparable in location and appearance to parking for market rate units.
   - The Applicant should provide the Affirmative Fair Housing Marketing Plan to determine the market for these homes.

The Department is available to discuss any of the above comments and questions with the ZBA. We would appreciate the opportunity to discuss the project design further with the ZBA and with the Applicant.

Thorndike Place - Town Engineer's Memorandum and Planning

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	Sewer_System_Schematic_-_Dorothy_Road.pdf	Sewer System Schematic - Dorothy Road
🗋	Reference Material	Thorndike_Place_-_Engineering_Preliminary_Review_Comments_2020-12-04.pdf	Thorndike Place - Engineering Preliminary Review Comments_2020-12-04
🗋	Reference Material	Water_System_Schematic_-_Dorothy_Rd..pdf	Water System Schematic - Dorothy Rd.



Sewer System Schematic

(Dorothy Road)

- Utility Plans indicate connection to the existing sewer line located in Dorothy Road. Any sewer service connection to the Sewer Collection System should use an 8" pvc service. Connections to the main >6" should be directed to a sewer manhole.

Cross Country Sewer Easement

(Dorothy Road)

- Stormwater Infiltration Areas shall not be sited above the sewer main/easement or such that the sewer main is within the infiltration zone and/or resulting effects of groundwater mounding.
- Prior to construction a pipe line evaluation shall be performed along the 14/18" sewer main. Upon completion of construction, a post- construction evaluation of the sewer main shall be performed. Any damaged and/or disturbed pipe shall be repaired/replaced.

TOWN OF ARLINGTON
Department of Public Works
51 Grove Street
Arlington, Massachusetts 02476
Telephone (781) 316-3320 Fax (781) 316-3281

Engineering Division

Date: December 4, 2020
To: Jenny Raitt; Director of Planning and Community Development
From: Wayne Chouinard, Town Engineer
RE: Plan review for Thorndike Place – Nov 2020

The Town of Arlington Engineering Division is in receipt of the information related to the Comprehensive Permit Application for Thorndike Place provided by the DPCD on Monday Nov. 23, 2020. This plan set was developed for permitting purposes only. It is expected that a final review will be required for final construction level documentation.

Comments pertaining to the review of the site plan "Thorndike Place Comprehensive Permit", dated March 13, 2020 and revised November 3, 2020 are as follows:

Utilities: Water

- Calculations should be provided to ensure the distribution system for the area has capacity for increased demand for fire flow and domestic water supply without impacting the existing system or abutter's water volume and pressure.
- Utility Plans indicate connection to the existing water main located in Dorothy Road. The existing water mains were installed in 1931, 1946 and 1948 and are beyond the recommended service life. Any connection to the Town System should replace the water main, hydrants and gate valves as indicated on the Water System Schematic Sketch – Dorothy Road (attached).
- Connections to the Town water main require a triple gated connection to provide maximum shut-off and distribution control.
- Connections to the Town water main requires a tee connection .
- Consideration should be given for the the proposed water line connecting to the fire hydrant located in the southwest corner to be extended from the Littlejohn water main to provide and opportunity for the main connection to the building to be located outside of Dorothy Road and reduce bends and fittings to the hydrant.

Utilities: Sewer

- Up-gradient sewer flow, with peaking factor shall be determined and provided to document suitable capacity for proposed additional flow into the sewer system. Evaluation shall include the downstream sewer main to determine whether it will provide sufficient capacity for the intended increase in flow and address any added I/I potential.
- It is recommended that an Inflow/Infiltration (I/I) mitigation fee be assessed to be used to reduce I/I of the Town sewer system in the amount equal to four(4) times the design flow of the project.
- Due to the anticipated flow leaving the proposed building, sewer services should utilize 8" service lines and are required to discharge into a sewer manhole when entering the Town sewer collection system. (see attached Sewer System Schematic – Dorothy Road)
- Details of the oil/gas separators and proposed pump system should be provided.
- The underground infiltration system proposed in the parking lot located at the western edge of the project is not recommended in the vicinity of the existing sewer line/easement without requiring and upgrade or renewal of the existing sewer main.
- Prior to construction a pipe line evaluation shall be performed along the 14/18" sewer main. Upon completion of construction, a post- construction evaluation of the sewer main shall be performed. Any damaged and/or disturbed pipe shall be repaired/replaced.

Stormwater/Resource Areas:

- See previous comments pertaining to status of Isolated Vegetated Wetlands sent by email on December 3, 2020.
- Based on review of the Grading & Drainage Plan it is not clear how the proposed drainage system relates to the post-development routing diagram included in the Stormwater Report, particularly connection of subcatchment 3S and 7S to the drainage collection system.
- There are no details provided to review the stormwater runoff system on the building roof which is indicated to detain roof runoff.
- Plan should indicate all drainage and stormwater collection pipes or infrastructure, including downspouts or perimeter drains.
- Suitable documentation of groundwater conditions have not been provided. Deep observation test holes should be performed to identify soil conditions and observable groundwater indicators. Additionally, and due to the disturbed nature of the site, full depth monitor wells should be installed to a depth of 10 feet to document the probable seasonal high groundwater level. The Frimpter Method shall be utilized with the observed ground water readings and in conjunction with the USGS Groundwater Well Network. At a minimum these test pits should be installed in the proposed foot print of the building and in the areas of the proposed stormwater infiltration systems.
- Stormwater infiltration is not recommended over the existing sewer line/easement without upgrading or renewing the existing 14"/18" sewer main. Groundwater mounding calculations shall be provided and the infiltration system shall be placed a minimum of 2ft above the calculated ground water mound elevation as well as in a location such that the infiltrated water does not impact the sewer main.

Utilities: Other

- What are the off-site upgrade requirements necessary for the CATV requirements for proposed development? Will current utility pole and cable configurations accommodate the required cable, electric and telephone wires without the need for additional utility poles or improvements outside of the project locus? Any installation of new utility poles or underground conduit in the public right of way will require a Grant of Location from the Board of Selectmen. This information should be provided as part of the application process to evaluate the entirety of impacts and effects.

Pavement, parking and sidewalks:

- Please clarify the access/egress and parking configuration proposed at the front drop off/pick up entrance of the building including dimensions and turning radius. The parking space orientation does not conform to the expected traffic flow direction.
- Sidewalk widths proposed within the public right of way should be 5 feet in width.
- The proposed fire lane located in the rear of the building is very close to the building. It is recommended the fire lane provide a suitable buffer distance from the building to protect fire personell and apparatus in the event of building/wall collapse.
- Concrete sidewalks and driveway aprons should be installed along the frontage of the property.
- Current curb stones along the project frontage consists of small length cobbles. During the installation of new granite curbing, these small cobbles shall be removed and stacked and/or delivered to the DPW Yard.
- The main access driveway into the property appears to be an extension of Littlejohn Street. This may result in unintended entry into the property by the traveling public.
- Due to the location and alignment of the main driveway, egress of vehicles from theproject site during darkness will result in repetitive light intrusion on #24 Littlejohn Street from the headlights. Consider an alternative access location or prevention method for the abutter.
- Was consideration given to providing pedestrian access through the property to the pedestrian bridge located over Rte. 2 or to Margaret Street at the entrance to Thorndike Field?

Landscaping:

- Project should provide screening of parking areas and buildings from the immediate abutters. Large, mixed evergreens should be provided suitable to grow into a visual screen for the 3-4 story building. Parking areas should be shielded from abutters with suitably selected mixed Evergreen species.

- It is unclear if there are any existing public shade trees along the frontage of the proposed project. A public shade tree under MGL Chapter 87 is defined as "any tree 1-inch and larger dbh growing within the public right of way. Removal of public shade trees is not allowed without a Tree Hearing arranged and coordinated by the Arlington Tree Warden.
- Limits of disturbance, tree clearing and excavation for the project should be indicated on the plan.

Lighting:

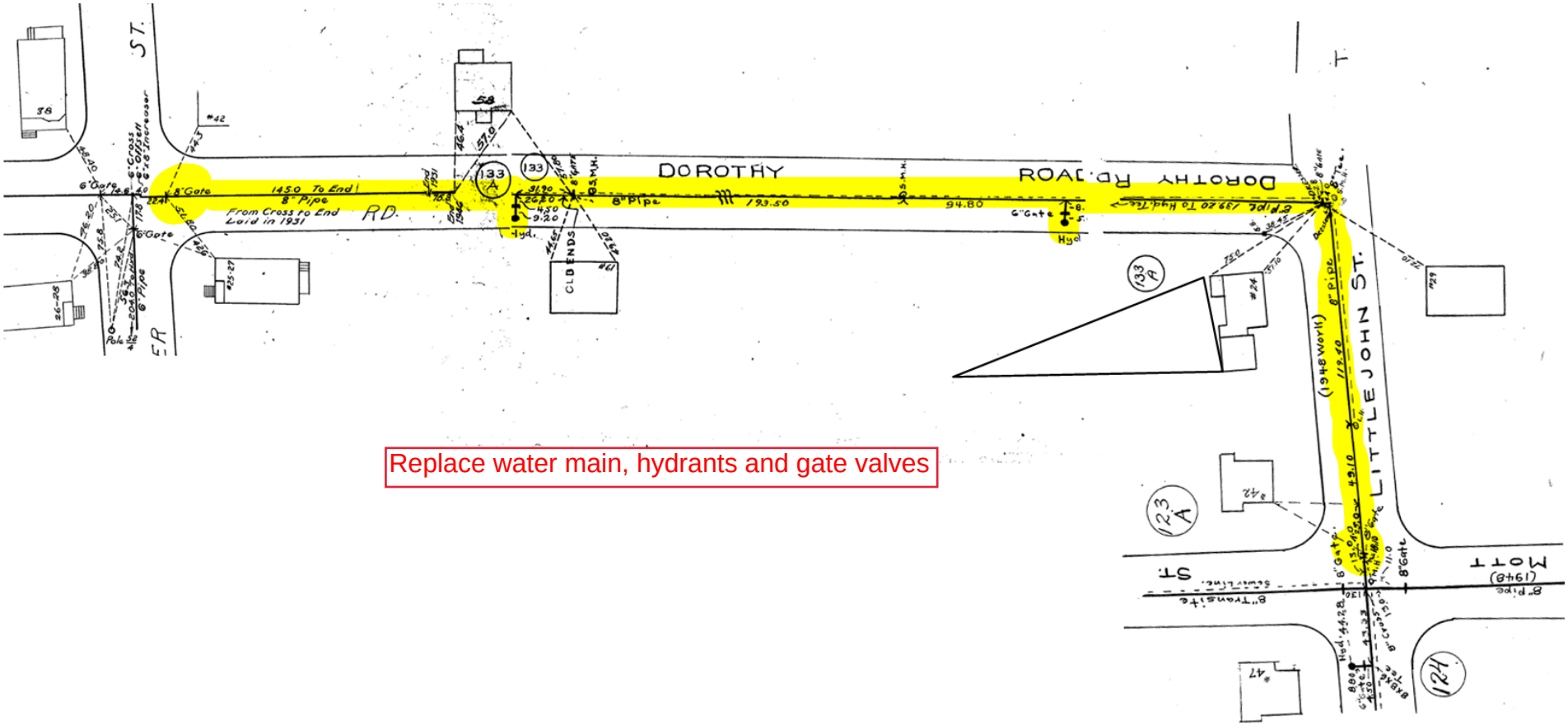
- A photometric plan should be provided to evaluate site lighting and light spillage at property lines. Night sky reduction, light pollution, cut off fixtures and glare should be addressed and carefully evaluated and documented.

Traffic:

- Comments pertaining to the Traffic Report is deferred to the Transportation Advisory Committee

Administrative:

- Consideration should be given to designing and providing wider sewer easement beyond 10ft. These easement width were typical in past generations of design but are found as the utilities are aging do not provide suitable room to perform all necessary work within the easement.
- Site plan should identify areas where delivery, drop off and other larger vehicles may require suitable turning radius requirements.
- Time of use restrictions for deliveries, trash pickup etc. to reduce impacts on adjacent neighborhood should be included.
- Signage – none included



Water System Schematic

(Dorothy Road & Littlejohn St.)

- Utility Plans indicate connection to the existing water line located in Dorothy Road. The existing water mains connected to this main were installed in 1931, 1946 and 1948 and are beyond the recommended service life. Any connection to the Town System should replace the segments of water mains up to and including the gate connections.

Thorndike Place - Public Comments

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	A_Lenk_letter_12-26-20_(1).pdf	A Lenk letter 12-26-20
🗋	Reference Material	L_Culverhouse_12-22-20.pdf	L Culverhouse 12-22-20

Dear Members of the Arlington Zoning Board of Appeals,

I hope that you and your loved ones are able to find joy during these "unprecedented" times - that's a term we'll all be glad to leave behind in better days ahead!
I'm writing to ask that you please do whatever is in your power to preserve the Mugar Wetlands. As you're already aware, this unique area provides myriad benefits to its surroundings. The Mugar Wetlands provides crucial open space, including old growth trees that absorb water flow coming down from Arlington Heights, gradually releasing it to avoid catastrophic flooding in this dense residential area. In addition, the Mugar Wetlands provides critical habitat for wildlife, perhaps some who had to flee the Silver Maple Forest when tragically, a large area was cleared to make way for "The Royale" development - certainly an ironic name given that the developer manipulated 40B/Affordable Housing guidelines to obtain his permit after a decade-long battle with citizens, including myself, who fought to save this rare urban wild, for parallel reasons that the Mugar Wetlands should also be saved.
As a former member of the Coalition to Preserve the Silver Maple Forest/Belmont Uplands, I beg you not to acquiesce to pressure/s in this matter. We ALL want/need an increase in affordable housing in the Arlington/Belmont/Cambridge area but, for myriad reasons, the Mugar Wetlands is a totally inappropriate location to address this need.

Thank you for your consideration,

Allison V. Lenk
(Belmont resident on Cambridge/Arlington line)

I can't tell you how concerned I am about the proposed housing development for the Mugar wetlands. There are so many reasons why this is a really bad idea. The building of luxury apartments even if there are a smattering of affordable units will increase the price of housing in that part of town and make living in Arlington that much more out of reach for middle and low income households. This goes against our stated goal of creating more affordable housing and will make it that much more difficult to reach the state mandated goal of 10%.

Equally as troubling is the concern for local residents of the increased risk of flooding. We know this will happen so how can we move forward with a plan that places residents' homes at risk.

And for me the most troubling is that at a time when urbanization is removing animal habitats and wild areas that we need in order to protect our planet and ecosystem we are considering killing a whole habitat. The animals that live in this area help manage the rodent population and by decimating it I can guarantee that our rodent problem will increase and then we will all be left scratching our heads and wondering what happened. When you remove natural predators that is what happens. Knowing this, how can you in good conscience allow this project to go forward. The pursuit of profit and the pursuit of affordable housing do not go hand in hand. We need to be focusing on creating additional affordable units before more market priced units. And we need to be inviting non profit developers to help us with that.

Please do the right thing. Mugar can find plenty of other places to increase their profits but not on our wetlands and not at the expense of our low income residents.

Thank you for your consideration.

Lynette Culverhouse

TMM precinct 11

Thorndike Place - Previous Correspondence Received

ATTACHMENTS:

Type	File Name	Description
Reference Material	M_McCabe_letter_12-2-20.pdf	M McCabe letter 12-2-20
Reference Material	S_Dominguez_letter.pdf	S Dominguez letter
Reference Material	B_Barton_letter_11-28-20.pdf	B Barton letter 11-28-20
Reference Material	E_Brown_letter_11-25-20.pdf	E Brown letter 11-25-20
Reference Material	L_Krupp_11-25-20.pdf	L Krupp letter 11-25-20
Reference Material	N_Dangle_letter_12-3-20.pdf	N Dangle letter 12-3-20
Reference Material	ACC_Comments_at_ZBA_Hearing_Thorndike_Place_08DEC2020_Chapnick.pdf	ACC Comments at ZBA Hearing Thorndike Place_12-8-20 Chapnick
Reference Material	MugarWaterIssues12-6-20.pdf	MugarWaterIssues12-6-20
Reference Material	MugarTrafficIssuesAmmended12-6-20.pdf	MugarTrafficIssuesAmmended12-6-20
Reference Material	Letter_to_ZBA_Thorndike_Place_November_2020.pdf	P Fiore letter 11-2020
Reference Material	Mugar_site_AU-B9_1983.pdf	Fiore Mugar site 1983(1)
Reference Material	Mugar_site_CS-1_1983.pdf	Fiore Mugar site 1983
Photograph / Image	008_Deer_58_Mott.JPG	Fiore Deer 58 Mott(1)
Photograph / Image	009_Deer_58_Mott.JPG	Fiore Deer 58 Mott
Photograph / Image	263_Mugar_turkeys.JPG	Fiore Mugar turkeys
Photograph / Image	DSCN0510.JPG	Fiore DSCN0510
Photograph / Image	759_Mugar_fox.JPG	Fiore Mugar fox
Photograph / Image	Deer_drinking_water_58_Mott_St.jpg	Fiore Deer drinking water 58 Mott St
Photograph / Image	DSCN0461.JPG	Fiore DSCN0461
Photograph / Image	DSCN0490.JPG	Fiore DSCN0490
Photograph / Image	DSCN0517.JPG	Fiore DSCN0517
Photograph / Image	DSCN0648.JPG	Fiore DSCN0648
Photograph / Image	DSCN0594.JPG	Fiore DSCN0594
Photograph / Image	DSCN0844.JPG	P Fiore DSCN0844
Photograph		

Photograph / Image	DSCN0924.JPG	P Fiore DSCN0924
Photograph / Image	DSCN0944.JPG	P Fiore DSCN0944
Reference Material	M_Shapiro_letter_10-13-20.pdf	M Shapiro letter 10-13-20

Conservation Commission,

According to floodplain management the purpose is to protect human life and health, **minimize property damage, protect unwittingly buying land subject to flood hazards, to protect water supply, sanitary sewage disposal and natural drainage.** The prevention of unwise development in areas subject to flooding will reduce financial burdens to the **community** and the State, and will prevent future displacement and suffering of its residents.
According to the Flood Disaster Protection Act of 1973 EXIT (Public Law 93-234, 87 Star. 975), in order avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:
In carrying out the activities described in Section 1 of this order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs and budget requests reflect considerations of flood hazard and floodplain management; and to prescribe procedures the policies and requirements of this Order, as follows:

(b) If, after compliance with the requirements of this Order, new construction of structures or facilities are to be located in a floodplain, accepted flood proofing and other flood protection measures shall be applied to **new construction** or rehabilitation. To achieve flood protection, agencies shall, wherever practicable, elevate structures (not to include underground parking) above the base flood level rather than filling in land.

The development of the Mugar site will extend the existing floodplain into the neighborhoods leading to a decrease in property value and possible destruction to the surrounding properties.

I have confidence in the Conservation Commission that these facts will be taken into consideration when making any decisions to development of the Mugar property.

Thank you,
Mark W. McCabe
4 Dorothy Road
Arlington, MA 02474

Hello

There is nothing more important than leaving wetlands alone under the current and near future context of climate change. Its time for towns to stop listening to developers when it comes to avoiding massive flooding of our homes. Please stop this an any development in this limited and struggling to survive parcel.

Nothing these developers can do to alter the fact that the wetlands need to be protected.

Silvia Dominguez
Town Meeting member District 4.

Dear ZBA members,

As a resident at 27 Burch Street, I am writing to ask that in your review of the new documents submitted by the Oaktree development, that you ensure that you take into account the important questions raised by the Arlington Town Trust in their review and to share my confidence and expectation that you will hold the developer to full compliance with the local Wetland Protection Bylaw and regulations pertaining to stormwater and flood zones by denying waiver of these requirements.

As an environmental professional and local resident, I would emphasize the significant degrees of warming we are locked into in the decades ahead due to historical global carbon emissions, which will put a premium on the value of our natural and constructed green infrastructure (wetlands, permeable pavements) in protecting our community from the full range of flooding risks we face.

Thank you for your diligence and support on this review.

Sincerely,
Brooke Barton
27 Burch Street, Arlington, MA 02474
VP, Innovation & Evaluation, Ceres

To: The Honorable Members of the Zoning Board of Appeals, Town of Arlington,

First let me thankyou for your dedicated service to the town of Arlington and its citizens. Your continued focused efforts on this and all the important topics before the board is very important and I applaud you.

My comment on the proposed project called "Thorndike Place" is based on and informed by over three decades of development & construction project experience in the healthcare sector where I have experienced numerous, similar challenges with projects not unlike the one before you in both Massachusetts and Connecticut

In short, my expectation is that the Zoning Board of Appeals hold the developer to full compliance with the local Wetlands Protection Bylaw and regulations pertaining to stormwater and flood zones by denying any waivers of these requirements, as the regulations are to protect critical resources and public safety, and should be fully enforced.

Sincerely and Respectfully Submitted

Ed

Edward M. Browne
49 Mary Street
Arlington, Ma
M: 617-849-2145

Hi,

Larry Krupp here, listened in on last night's discussion re posting website content. Strongly suggest you consider a sort-able table or more than one. E.g., each document or public comment is a separate row, with columns such as Title, Date, Submitter, Type, Whether Controlling, and Full Text (or link to it). This gives different people the ability to see the data their own way; e.g., someone might want to see just what's new in the last week - so they can click and sort by date. Others might want to see all items of a particular type (e.g., Public Comments) so they click that column. Etc.

I work with this kind of stuff a lot, and listening to your conversation last night this immediately came to mind.

Done the right way it can be easy to manage/update and provide the public with a lot more of what they want.

My 2 cents,

- Larry

Hello,

Adding my name to the opposition for this build out. The wetlands are needed more than ever.

Thank you.

Nancie Dangel
4-B Sargent Street
Cambridge, MA 02140

Comments Summarized from the Arlington Conservation Commission

as given by Susan Chapnick, Chair

ZBA Hearing Dec. 8, 2020

Thank you, Chairman Klein, for the opportunity to summarize the Arlington Conservation Commission's comments from our fourth set of written comments on the Thorndike Place submittals – by letter dated Nov. 20, 2020 and from the Working Session held at the Conservation Commission's public meeting of Dec 3rd, where BSC Group and BETA Group (Town's peer review consultant) discussed the supplemental materials presented by the Applicant in November (as presented tonight).

The purpose of the Working Session was informational and to define next steps.

The ACC is pleased that the supplemental materials were responsive to many of our prior comments, however an important requirement of the ACC's wetland regulation to protect the ability of the 100-year floodplain to hold flood waters has not been fully addressed, as was discussed and will be summarized tonight.

In addition to those issues specifically discussed at the Working Session, I want to stress that the ACC's prior comments concerning the value of the wetland resources, vegetation replacement, floodplain, and stormwater impacts are still valid. I will summarize issues discussed at the Working Session as well as some others and recommend next steps.

Issue #1. Wetlands Delineation
ACC understands that BETA Group has performed a review of BSC's wetland boundary delineations and has agreed with the updated delineation. However, the Conservation Commission does not yet agree with the conclusion of BSC and BETA that the 2 Isolated Vegetated Wetlands no longer exist on the site. BETA's review does not appear to be based on any examination of the soils at the site. The Commission agrees with the Town Engineer's observation that the potential for the existence of the 2 isolated wetlands has not be adequately evaluated.

Recommendation:

- ***Perform soil investigation to evaluate the potential for Isolated Vegetated Wetlands in the northeast disturbed portion of the site, consistent with 310 CMR 10:55(2)(c)3 and Arlington Wetland Regs Section 21.B.(3)(c).*** BETA concurred at our Working Session.

These regulations say that "Where an area has been disturbed (e.g., by cutting, filling, or cultivation), the boundary is the line within which there are indicators of saturated or inundated conditions sufficient to support a predominance of wetland indicator plants, or credible evidence from a competent source that the area supported, or would support under undisturbed conditions, a predominance of wetland indicator plants prior to the disturbance or characteristic of hydric soils."

Issue #2. Floodplain & Compensatory Flood Storage
ACC understands that BETA Group has found that the flood storage volume lost and compensatory flood storage proposed are consistent.

ACC finds the 2:1 compensatory flood storage proposed consistent with Town Bylaw and Regulations.

Recommendations:

- ***Require that the applicant provide plans for floodplain restoration for the proposed compensatory flood storage area, compliant with the Vegetation Removal and Replacement Section 24 of the Arlington Wetland Regulations.***

- ***Review existing FEMA Floodplain line.*** The ACC included this in our comment letter of July 9th; however, it has not been addressed by BSC or BETA but was brought up in Public Comment of the Working Session last week. The existing FEMA mapping is 10 years old and likely not based on the Cornell dataset (as required in our Wetland Regulations). When the Commission has valid documentation or compelling evidence suggesting that the FEMA floodplain and base flood elevation is not accurate, it can require an Applicant to re-delineate the floodplain line. Reference the Arlington Wetland Regulations Section 23.B(1)(c)ii:

"Notwithstanding the foregoing, where National Flood Insurance Program (NFIP) profile data [FEMA Floodplain line] is unavailable or determined by the Commission to be outdated, inaccurate or not reflecting current conditions, the boundary of bordering land subject to flooding shall be the maximum lateral extent of floodwater which has been observed or recorded or the Commission may require the applicant to determine the boundary of Bordering Land Subject to Flooding by engineering calculations which shall be…" [continues with specific requirements, including use of Cornell precipitation data]

- ***Require that climate change impacts be evaluated in consideration of the requirements of the "Limited environmental impact" review criteria specified in the ZBA Comprehensive Permit Regulations (adopted 7/08/2015) Section 6.2 & 6.3*** – specifically, how the development demonstrates that it will "improve water quality, control flooding, maintain ecological diversity, promote adaptation to climate changes." The ACC recommends using data available for Arlington in the Massachusetts Coastal Flood Risk Model (MC-FRM, communication from Woods Hole Group) and information generated by Cambridge's Climate Change Vulnerability Assessment - *considering that the base flood elevation/extent of flooding in the area is projected to rise in the coming decades.*

Issue #3. Stormwater Management

ACC understands that BETA Group reviewed the efficacy of the stormwater management design presented by BSC and has enumerated several concerns. We have further recommendations for the design of the stormwater management system.

Recommendations:

- ***Require the use, in the stormwater modeling, of minimum standards now recommended by the MassDEP Stormwater Advisory Committee and the Town of Arlington proposed Stormwater requirements including the use of "NOAA Plus" precipitation data, 90% TSS removal, and revised recharge guidance.*** While ACC is aware that formal revisions to MassDEP regulations will not occur until next spring 2021, these stormwater standards will be in effect prior to the proposed project construction and, furthermore, it is within the spirit of the State Executive Order 569, State Hazard Mitigation and Climate Adaption Plan, and Arlington's Comprehensive Permit Regulations to conservatively design a stormwater management system so that *climate change and hazard mitigation are taken into account.*

- ***Require verification of existing groundwater elevations based on test-pit data.*** BETA concurred at our Working Session.

Issue #4. Evaluation of Wildlife Habitat & Vegetation
BSC provided a comprehensive Wildlife Habitat and Vegetation Evaluation report supported with field survey notes, as requested by the ACC.

Recommendation:

- ***Require the Applicant to quantify the numbers and types of trees (including species and DBH) that will be removed during construction in the AURA and impacted in the floodplain and provide a vegetation replacement planting plan as mitigation for loss of canopy, wildlife habitat, and climate change resilience attributes.*** This type of tally is required by Section 24 of the Arlington Wetlands Regulations on Vegetation Replacement.

Issue #5. Conservation Restriction for Undeveloped Lands of the Mugar Parcel

Recommendation:

- ***Propose an appropriate conservation and stewardship mechanism for the undeveloped portions of the site as a condition of the permit.*** ACC recommends that the ZBA work with the ACC, the Arlington Land Trust, the Arlington Open Space Committee and other Town officials to develop an appropriate conservation and stewardship mechanism similar to the Symmes Conservation areas that are protected resource areas under the Town Bylaw and implementing Wetlands regulations. This mechanism should include funding considerations.

December 6, 2020

Zoning Board of Appeals
Town of Arlington
51 Grove Street
Arlington, MA 02476

RE: **Water Issues – Mugar Property - Thorndike Place Development**

Dear Zoning Board of Appeals Members:

I am writing in regard to the proposed Thorndike Place development. The changes generated by this proposed project would have a devastating impact on the neighborhood. There are three major issues:

- Removal of trees
- Sewage system limitations
- Stormwater management

As everyone should be aware, the neighborhood where this proposed project is located has major issues with water, particularly with a high groundwater level and subsequent basement flooding, and developing this project will only make them worse. When it rains a lot, the water table rises and impacts basements in the area. In many areas, the groundwater rises to the surface and ponds.

Trees help lower the water table by drinking up groundwater. Removing trees will impact the groundwater level in the area. Replacing trees with impermeable surface will further reduce the area that can act as a sponge and soak up water. Trees also take carbon dioxide, a greenhouse gas out of the air and help efforts to fight global warming. In addition, trees provide cooling and help mitigate the urban heat effect, reducing the energy use for cooling in the summer. We need to do everything we can to combat climate change which has known negative impacts to this area due to storms with increased rainfall and subsequent flooding. Lastly, trees provide much needed habitat for animals and birds and should be preserved.

The proposed project will add a significant amount of sewage to the system in the area. The system relies on gravity to work properly. Much of the piping is in contact with the groundwater, particularly when it rains a lot and the groundwater level rises. Unfortunately, this old piping has leaks and allows groundwater to infiltrate. During the big storms of October 1996 and March 2010, sewage was bubbling up out of the manhole in Margaret Street at the entrance to Thorndike Field (it is labeled as sewer not stormwater). There are serious questions about the capacity of the sewage system to safely handle the significantly increased flow the proposed project will generate.

Stormwater management is of the greatest concern. The stormwater management and compensatory system must be designed using the current industry-standard which is the100-year rainfall amount supplied by NOAA or Cornell. **Using old rainfall data published in 1961**

(Technical Paper 40) is unacceptable and morally wrong. Scientists and lay-persons alike know that climate change has increased the frequency and intensity of high-rainfall events since the pre-1960 years, and are only going to increase further as climate change continues. The system must at least be able to handle the amount of rainfall that professional and ethical stormwater management engineers use – the NOAA or Cornell data sets – and provide adequate compensatory storage. There are other negative impacts associated with the proposed project, including:

- Retention ponds will raise the groundwater level around them (mounding) and impact homes located in close proximity.
- All outlets from stormwater management structures must be located far away from nearby homes because the groundwater level will be raised locally around the outlet.
- Any below ground level areas of the proposed building will be in contact with the groundwater, particularly when it rises during and after storm events. This will interfere with groundwater flow, creating a barrier and raising the groundwater level upgradient, increasing basement flooding of nearby homes.
- **Over time, initially tight construction will develop cracks and the groundwater will enter below-ground stormwater management structures rendering them ineffective.** In addition, they will interfere with groundwater flow as discussed in the prior bullet.

Bottom line – given the existing high groundwater level in the neighborhood, particularly during and after storm events, the project will have devastating impacts on the neighborhood. Please do not allow it. Please contact me with any questions or for additional information.

Sincerely,

Jennifer Griffith
4 Edith Street
Arlington, MA 02474

December 6, 2020

Zoning Board of Appeals
Town of Arlington
51 Grove Street
Arlington, MA 02476

RE: **Amend My September 2020 Letter on Traffic Issues – Mugar Property - Thorndike Place Development**

Dear Zoning Board of Appeals Members:

I am writing to update my earlier letter, dated September 21, 2020 in regard to traffic issues related to the proposed Thorndike Place development to reflect the changes in design submitted since then. In my earlier letter I outlined two major issues:

- Pedestrians walking to Alewife and soccer fields
- Turning left onto Lake Street to access Route 2/Belmont

The updated project design as currently proposed largely alleviates the safety concerns related to how the neighborhood is used for parking during the week for commuters accessing the Alewife T station and on weekends in the Spring and Fall by families for soccer games in Thorndike and Magnolia Fields. Most of this parking and resulting pedestrian traffic is in the Burch, Edith, Margaret, and Osborne Street areas and the portion of Dorothy Road between Parker and Margaret Streets, and the current design does not bring traffic in or out through this area any longer.

However, the other concern – turning left onto Lake Street to access Route 2 and Belmont is still valid. In normal times, as everyone is aware, the traffic on Lake Street heading towards Massachusetts Avenue is backed-up for hours both in the morning and in the evening. Leaving the neighborhood to access Route 2, the Alewife area, and Boston and other areas via Belmont, is treacherous. The cars on Lake Street are basically parked. There are NO sightlines for cars that need to turn left out of the neighborhood. Cars on Lake Street block the intersections so it can take time for someone to leave space to get out. And then you cannot see if anyone is coming from the right. After their frustration with the back-ups at the Brooks Avenue traffic light and the bike path, once "released" cars are traveling Lake Street at speed. Turning left out of the neighborhood is treacherous enough and takes enough time as it is. **Adding a significant number of additional cars to this situation is extremely dangerous** and will cause a significant line of back-ups in the neighborhood**. A new traffic light will be needed on Lake Street at the intersection with Little John Street** to let all these additional cars from the proposed project out of the neighborhood safely.

Bottom line – adding more cars into the neighborhood is unacceptably dangerous. Please do not allow it. Please contact me with any questions or for additional information.

Sincerely,

Jennifer Griffith
4 Edith Street
Arlington, MA 02474

Mr. Christian Klein November 23, 2020

Chair, Zoning Board of Appeals

Arlington, MA 02474

Dear Mr. Klein,

Most of my life has been spent living in a home that abuts the Mugar property. I was attending Hardy School in 1970 when Town Meeting zoned the Mugar Property for Planned Unit Development. My family's name is mentioned as one of the abutters in Warrant Article 99 that year. I write you now about the latest proposal by the Mugar family: Thorndike Place.

I stand in solidarity with my neighbors concerns regarding the future overcrowding at Hardy School, the increased vehicle traffic, the increased likelihood of neighborhood flooding, rodents, and increased strain on municipal services.

In this letter I choose to focus on the areas designated CS – 1 and AU – B9 in the BSC Group Wildlife Habitat and Vegetation Evaluation of November 2020. These are areas of proposed parking lots.

I have observed these loci from my kitchen window and backyard for decades. I witnessed the individual in his green vest doing the evaluation out behind my house approximately 9:00 A.M. on Tuesday, October 27th. However, a report based on one day of surveying cannot do this area justice.

As recently as Monday November 9th at 7:30 A.M. there were three deer in my backyard. I attached a photo of one drinking water from the bird bath I have out back on the lawn. I attached another photo from earlier in the summer of a deer eating mulberries off the ground as do many species of birds and other wildlife from the Mugar property when the berries ripen. These deer have been coming for several years now and I watch them come out from the Mugar property and disappear back into it in the areas of CS-1 and AU-B9.

There are numerous species of what might be considered garden variety birds and animals that go in and out of the property. I have attached photos of some of them. I do not have photos of owls and hawks, but I have seen them in the trees out there. Fireflies have returned in the evenings at the edge of my backyard where it meets the Mugar property.

While I have photographed a fox and seen a coyote, they have not been problems and no doubt are feeding on rodents. If there is destruction of their habitat and they are driven out the rodent problem will no doubt go from bad to worse and possibly require the use of poison and the risk that poses to raptors and other wildlife.

It is to the Mugar's credit that through their passive management of the property they have allowed the area of CS-1 and AU-B9 to become forested. The trees there are soaking up groundwater and cleaning the air of CO2. Cleaning the air of CO2 is probably particularly helpful given the proximity of Route 2 and the volume of traffic on it. It would be a shame to clear cut this area for parking lots and destroy wildlife habitat decades in the making and increase the likelihood of additional neighborhood flooding.

This is an area that would seem to be of future use by students of biology and ecology in the Arlington Public Schools if conserved.

As for the parking lots, if the tenants of the development want the benefit of parking, they should shoulder the burden of it. The parking lots should be immediately adjacent to the development. To put their parking lots in the neighbors back yards requires the clear cutting of trees that consequently destroys privacy. The parking lots and the associated 24/7 noise, exhaust, and traffic in the lots will lead to permanent loss of neighbor's quiet enjoyment of their property. It also is likely that plows, sanders, dumpsters, and other maintenance equipment needed to maintain the parking lots and the development itself would be stored in these lots.

I have also attached photos from 1983, pre-forestation, to demonstrate the prevalence of water in the area. The first photo of the rear of two homes and the water in the foreground is the area of CS-1. In other photos those of us of vintage age will remember the large Faces nightclub sign across Route 2. This dry summer is an exception.

These two areas, CS-1 and AU-B9, provide habitat for wildlife, trees that soak up ground water and clean the air of CO2, and act as a buffer for the neighbors from the property. They should be preserved for such.

Thank You for your consideration.

Sincerely, Peter Fiore, 58 Mott Street, Arlington, MA 02474



2



3



5



6





3/2/83 A.M
various
places on
the Mugar
Site



1



4





























Dear Town of Arlington Zoning Board of Appeals and Conservation Commission,

For almost 13 years now, I have been a resident of the neighborhood directly impacted by the development of the Mugar Wetlands/property which the hopeful developers call "Thorndike Place."

I was very surprised at the October 1, 2020 meeting of the Conservation Commission to learn that the developers have intended to greatly decrease the size of the development, but I am still very concerned about the overall size and scope of the project.

First, I still object that this project as only a 40b project in name--as a social worker who helps many individuals with the complex task of securing truly affordable housing, I can assure you 20% of units made "affordable" or below market rate, for just 20 years, is NOT true affordable housing.

Second, is the developer really allowed to pull a "bait and switch" where the building is much smaller with less impact (on paper)? As I understand it, the flood plain study was conducted by the developer in winter during a drought, and the independent company who was supposed to verify this mapping was not given the information as of the October 1, 2020 meeting of the Conservation Commission to do so. Please assure me they are not allowed to forge ahead without this important step.

In addition, I can assure you, given the minimal plans presented at last month's Conservation Commission meeting, the building is still way too big for the area. The new October 2020 proposal is three stories along Dorothy Road, and four to five stories as it goes back into the woods? The houses in that area are MUCH smaller than that.

I invite you to come and take a walk with me along the proposed length of Dorothy Road, and see how large the proposed apartment building would look right along the road. It is still WAY too big for that area, and although I am not an engineer, I can tell you a full underground parking garage in that area, official flood plain or not, is just going to cause more flooding in the surrounding houses and streets.

And twenty to thirty units??? Once again, unless they are ALL affordable apartments (30% of someone's income, with income guidelines, to follow as well), it is really not true affordable housing, and not really helping the community out, in addition to just being too large for that part of the neighborhood. The new proposed single building is still too big for the marked area out of the flood plain delineated by the developers. I am also very concerned about the process of building a very large underground parking garage, and the damage that the process of building it will cause to the houses in the neighborhood.

If the developers really want to build multiple units, and make a lot of money, which is of course why they are developing land known as wetlands at all, why don't they just build the six to seven townhouses, with two units each, as was part of the original plan, leaving out the building behind it? Each of the twelve to fourteen units would sell for

about a million dollars each, and fine, the developers would make some money, but the houses would at least be within the scope of the existing neighborhood.

I also hope you ensure that the continued and ongoing review of the wetlands is thorough and accurate, and includes investigation of whether they have been been altered or covered by dumping or filling during the site's decades of neglect. Please don't take the developers at their word that they have done their "due diligence" and continue to monitor and assess what they are telling you. From the newest proposed building, it is clear to me that money is the most important issue to the owners of this land, NOT making affordable housing NOR protecting our dwindling natural environment, let alone take care of a property that has essentially been abandoned for many years with little care or concern for prior dumping or filling.

Thank you for reading my comments, and please feel free to contact me further if you would like to discuss true affordable housing issues, or tour the neighborhood with me. I am passionate about this project, because I care deeply about the area in which I live, the environment, my neighbors, and low income housing and their residents.

Regards,

Marci Shapiro Ide
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Windows User

W i n d o w s U s e r M i c r o s o f t W o r d