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PRINCIPALS
Robert J. Michaud, P.E.
Ronald D. Desrosiers, P.E., PTOE
Daniel J. Mills, P.E., PTOE

MEMORANDUM

DATE: September 5, 2019

TO: Paul Capasso
Packard Cove Associates LLP
49 Lexington Street
Newton, MA 02465

FROM: Robert J. Michaud, P.E. – Managing Principal
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Proposed Residential Development**
15 & 21 Lexington Street – Newton, MA

MDM Transportation Consultants, Inc. (MDM) has prepared this traffic impact assessment (TIA) for the proposed apartment development to be located at 15 & 21 Lexington Street in Newton, Massachusetts. The location of the site relative to adjacent roadways is shown in **Figure 1**. This memorandum describes existing (baseline) traffic conditions for adjacent roadways, trip generation characteristics of the proposed development, quantifies incremental traffic impacts of the Site development on area roadways, and evaluates safety-related conditions at key study locations that provide access to the Site. Several improvements aimed at enhancing traffic operations and/or safety is outlined under *Recommendations and Conclusions*.

Key findings of the traffic assessment are as follows:

- *Baseline Traffic Volumes.* Lexington Street carries approximately 15,010 vehicles per day (vpd) on weekdays. Peak hour traffic flow on Lexington Street is approximately 7 to 8 percent of the daily flow with directional flow generally evenly distributed between the northbound and southbound directions.

- *Safety Characteristics.* A review of MassDOT crash data indicates that no immediate safety countermeasures are warranted based on the crash history at the study intersections. Likewise, the available sight lines at the proposed Site Driveway intersection with Lexington Street will exceed the minimum and ideal sight line requirements from AASHTO.

Figure 1

Site Location

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Date: September 2019
Dwg No. 888 MR01.dwg

- *Modest Trip Generation*. The proposed development is estimated to generate approximately 11 vehicle trips (3 entering and 8 exiting) during the weekday morning peak hour and 13 vehicle trips (8 entering and 5 exiting) during the weekday evening peak hour. On a daily basis, the proposed development is estimated to generate approximately 176 vehicle trips on a weekday. Compared to the existing homes the project will generate approximately 9 additional trips during the weekday morning peak hour, 10 additional trips during the weekday evening peak hour and 144 trips over the course of a day. The resulting trip increase is nominal and will result in an additional vehicular trip every 6 to 7 minutes during the peak hours.

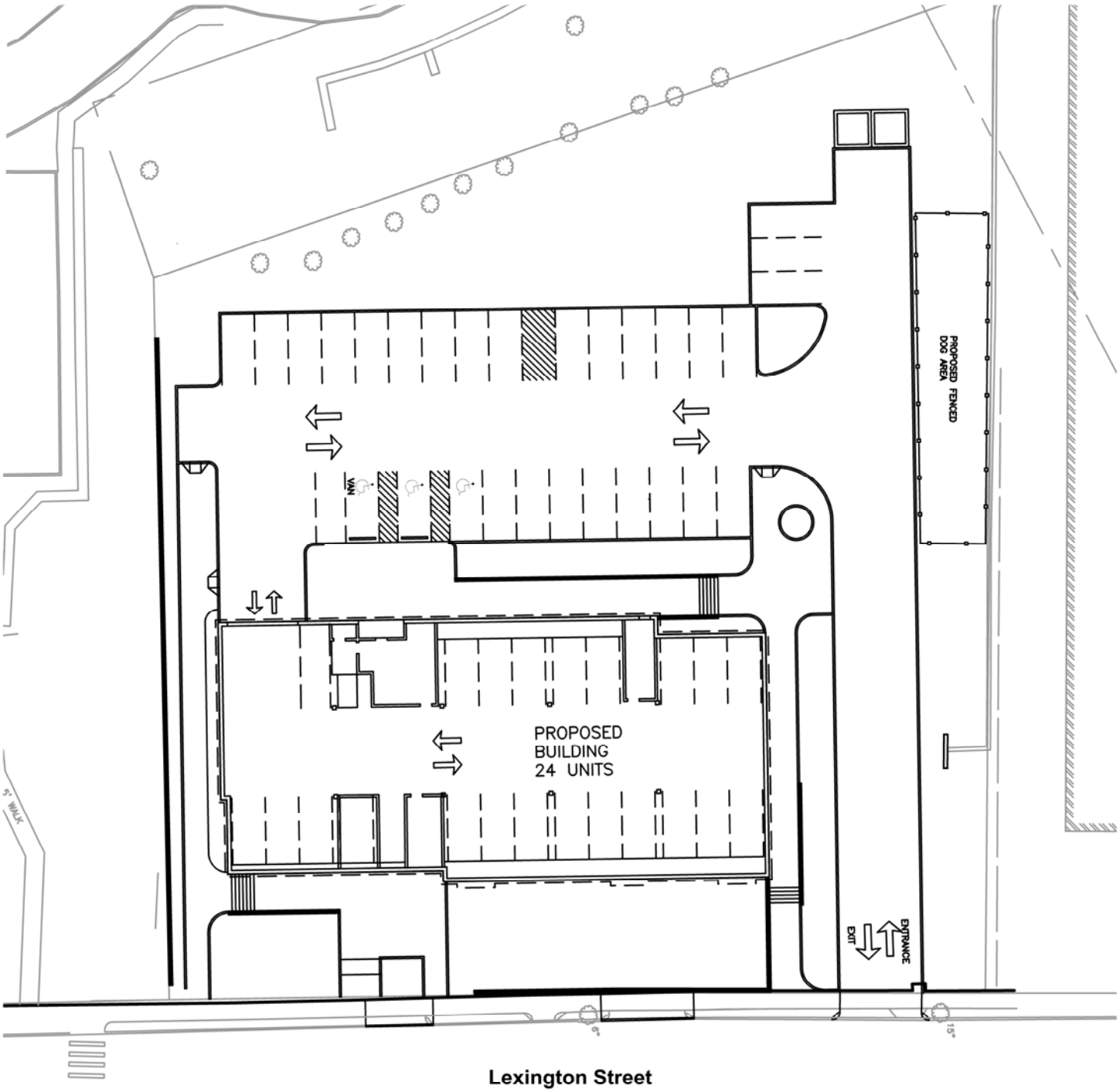
- *Adequate Roadway Capacity*. The proposed site driveway intersection will operate well below capacity at LOS C during peak hours. Incremental traffic increases at the study intersections due to the proposed development generally result in inconsequential changes in intersection operations compared to No-Build conditions. Therefore, no additional roadway improvements are warranted to accommodate the project.

In summary, trip generation for the development is projected to be modest. MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. The available sight lines at the Site Driveway with Lexington Street exceed the recommended sight line requirements from AASHTO. Implementation of recommended improvements as outlined under *Conclusions and Recommendations* will satisfy all applicable design and safety criteria.

PROJECT DESCRIPTION

The existing Site consists of approximately 1.15± acres of land located at 15 & 21 Lexington Street. 15 Lexington Street includes a duplex house, and a separate apartment building, for a total of three units on the property. 21 Lexington includes a single-family home. Access/egress is provided by two driveways along Lexington Street.

Under the proposed site programming, the existing buildings will be removed and a 2 story, 24-unit multi-family apartment development will be constructed with 51± parking spaces (22 garage spaces and 29 surface parking spaces). The garage will also provide an area for covered bicycle parking. The proposed access/egress along Lexington Street will be consolidated to a single driveway directly opposite Milton Avenue. The preliminary site plan prepared by Everett M. Brooks Co. is shown in **Figure 2**.



Lexington Street

North
Scale: Not to Scale

Site Plan Source: Everett M. Brooks Co.

Figure 2

Preliminary Site Plan

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Date: September 2019
Dwg No. 888 Figure 2.dwg

EXISTING TRAFFIC & SAFETY CHARACTERISTICS

An overview of existing roadway conditions, traffic volumes, and sight lines is provided below.

Lexington Street

Lexington Street is classified by the Massachusetts Department of Transportation (MassDOT) as an Urban Principal Arterial under local (City) jurisdiction. Lexington Street is generally a north-south roadway in the project area which connects Route 30 to the south and Route 20 to the north in Waltham. Adjacent to the Site, Lexington Street provides two-way traffic flow, has a width of approximately 28 feet with one travel lane in each direction and no shoulders. There are sidewalks on both sides of Lexington Street within the study area. The regulatory (posted) speed limit along Lexington Street is 25 mph in both travel directions within the study area. Land use along Lexington Street within the project area includes a mix of land uses including but not limited to single family homes, apartments, restaurants, retail and office buildings.

River Street

River Street is classified by the Massachusetts Department of Transportation (MassDOT) as a Rural Minor Collector under local (City) jurisdiction. River Street is generally an east-west roadway in the project area which connects Lexington Street to the west and Waltham Street to the east. River Street provides two-way traffic flow, has a width of approximately 30 feet with one travel lane in each direction and no shoulders. There are sidewalks on both sides of River Street within the study area. The regulatory (posted) speed limit along River Street is 25 mph in both travel directions within the study area. Land use along River Street within the project area includes a mix of land uses including but not limited to single family homes, apartments, restaurants, retail and office buildings.

Rumford Avenue

Rumford Avenue is classified by the Massachusetts Department of Transportation (MassDOT) as a Local Road under local (City) jurisdiction. Rumford Avenue is generally an east-west roadway in the project area which connects Forest Grove Road to the west and Lexington Street to the east. Rumford Avenue provides two-way traffic flow, has a width of approximately 30 feet with one travel lane in each direction and no shoulders. There are sidewalks on both sides of Rumford Avenue within the study area. The regulatory (posted) speed limit along Rumford Avenue is 25 mph in both travel directions within the study area. Land use along River Street within the project area includes a mix of land uses including but not limited to single family homes, apartments, restaurants, retail and office buildings.

Traffic Volumes

Traffic volume data were collected at the primary study area intersection during the weekday morning (7:00 AM - 9:00 AM) and weekday evening (4:00 PM – 6:00 PM), periods to coincide with peak traffic activity of the proposed use and the adjacent streets Review of MassDOT permanent count station data indicates that November is an average traffic month, therefore, no adjustment for seasonal fluctuations was required. The weekday morning and weekday evening peak hour traffic volumes for the study intersection are shown in **Figure 3**. Traffic count data and MassDOT permanent count station data are provided in the **Attachments**.

Daily traffic volumes along Lexington Street, south of the Waltham town line were collected in November 2018 and are summarized in **Table 1**. Detail traffic count data is included in the **Attachments**.

TABLE 1
BASELINE TRAFFIC VOLUME SUMMARY
LEXINGTON STREET AT WALTHAM TOWN LINE

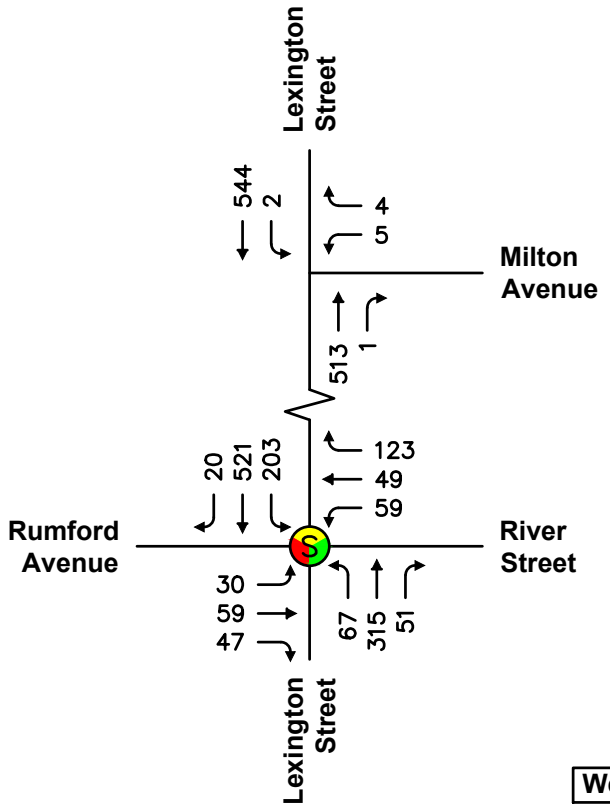
Time Period	Daily Volume (vpd)[1]	Percent Daily Traffic[2]	Peak Hour Volume (vph)[3]	Peak Flow Direction[4]	Peak Hour Directional Volume (vph)[4]
Weekday Morning Peak Hour	15,010	7%	1,065	51% SB	546
Weekday Evening Peak Hour	15,010	8%	1,205	52% NB	629

[1]Two-way daily traffic expressed in vehicles per day without seasonal adjustment.
[2]The percent of daily traffic that occurs during the peak hour.
[3]Two-way peak-hour volume expressed in vehicles per hour.
[4]NB = Northbound, SB = Southbound

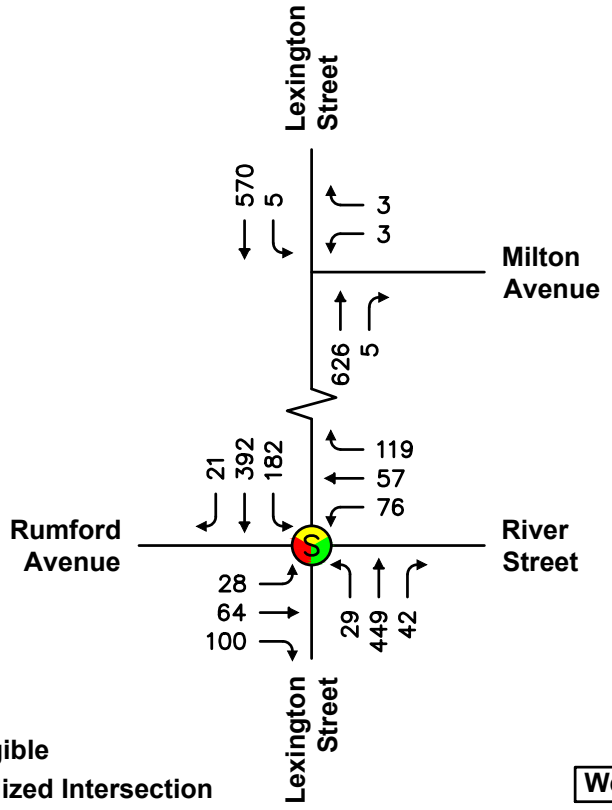
As summarized in **Table 1,** the weekday daily traffic volume on Lexington Street is approximately 15,010 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Lexington Street ranges from approximately 1,065 to 1,205 vehicles per hour (vph) representing approximately 7 to 8 percent of daily traffic flow.

Measured Travel Speeds

Vehicle speeds were obtained for Lexington Street near the Site using a radar recorder. These measured travel speeds provide a basis for determining sight line requirements at the proposed site driveway. **Table 2** presents a summary of the travel speed data collected for Lexington Street in the site vicinity. Collected speed data are provided in the **Attachments**.



Weekday Morning Peak Hour



Weekday Evening Peak Hour

North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
S = Signalized Intersection

Figure 3

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2018 Baseline Conditions
Weekday Peak Hour Traffic Volumes

Date: September 2019
Dwg No. 888 MR01.dwg

TABLE 2
SPEED STUDY RESULTS – LEXINGTON STREET

Travel Direction	Regulatory Speed Limit[1]	Travel Speed	
		Mean[2]	85th Percentile[3]
Northbound	25	25	29
Southbound	25	25	29

[1] Regulatory Speed limit in miles per hour (mph).
[2] Arithmetic mean
[3] The speed at or below which 85 percent of the vehicles are traveling

As summarized in **Table 2**, the mean (average) travel speed on Lexington Street was observed to be 25 mph in the northbound and 25 mph in the southbound direction. The 85th percentile travel speeds were observed to be 29 mph in the northbound direction and 29 mph in the southbound direction.

Sight Line Evaluation

An evaluation of sight lines was conducted to ensure that minimum recommended sight lines are available at the proposed Site Driveway intersection with Lexington Street. The evaluation documents sight lines under proposed conditions for vehicles as they relate to these roadways with comparison to recommended guidelines.

The American Association of State Highway and Transportation Officials' (AASHTO) standards[1] reference two types of sight distance which are relevant at the intersection: stopping sight distance (SSD) and intersection sight distance (ISD). Sight lines for critical vehicle movements at the proposed Site Driveway intersection along Lexington Street was compared to minimum SSD and ISD recommendations for the regulatory and observed travel speeds in the area.

[1] *A policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2018.

Stopping Sight Distance

Sight distance is the length of roadway visible to the motorist to a fixed object. The minimum sight distance available on a roadway should be sufficiently long enough to enable a below-average operator, traveling at or near the design speed limit, to stop safely before reaching a stationary object in its path, in this case, a vehicle exiting onto Lexington Street. The SSD criteria are defined by AASHTO based on design and operating speeds, anticipated driver behavior and vehicle performance, as well as physical roadway conditions. SSD includes the length of roadway traveled during the perception and reaction time of a driver to an object, and the distance traveled during brake application on wet level pavement. Adjustment factors are applied to account for roadway grades when applicable.

SSD was estimated in the field using AASHTO standards for driver's eye (3.5 feet) and object height equivalent to the taillight height of a passenger car (2.0 feet) for the Lexington Street approaches to the proposed Site Driveway. **Table 3** presents a summary of the available SSD as they relate to Lexington Street and AASHTO's recommended SSD based on regulatory and observed speeds.

TABLE 3
STOPPING SIGHT DISTANCE SUMMARY
LEXINGTON STREET APPROACHES TO PROPOSED SITE DRIVEWAY

Approach/ Travel Direction	Available SSD	AASHTO Recommended[1]	
		Regulatory Speed Limit[2]	85th Percentile Travel Speed[3]
Northbound	>500 Feet	155 Feet	190 Feet
Southbound	>500 Feet	155 Feet	190 Feet

[1]Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet to object height of 2.0 feet.
[2] Regulatory speed limits: 25 mph NB & SB
[3]85th Percentile travel speed: 29 mph NB & SB

As summarized in **Table 3,** analysis results indicate that the available sight lines will exceed AASHTO's recommended SSD criteria along Lexington Street for the regulatory and observed 85th percentile travel speeds. Stopping sight distance calculations are provided in the **Attachments**.

Intersection Sight Distance

Clear sight lines provide sufficient sight distance for a stopped driver on a minor-road approach to depart from the intersection and enter or cross the major road. As stated under AASHTO's Intersection Sight Distance (ISD) considerations, "*…If the available sight distance for an entering …vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to avoid collisions…To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road*." AASHTO's ISD criteria are defined into several "cases". In this case, the proposed Site Driveway approach will be under "STOP" control. The ISD in question relates to the ability to turn either right or left onto Lexington Street.

Available ISD was estimated in the field using AASHTO standards for driver's eye (3.5 feet), object height (3.5 feet) and decision point (8 to 14.5 feet from the edge of the travel lane) for the northbound and southbound travel directions on Lexington Street. **Table 4** presents a summary of the available ISD for the departures from the proposed Site Driveway and AASHTO's recommended ISD assuming clearing and maintenance of vegetation within the sight line triangles.

TABLE 4
INTERSECTION SIGHT DISTANCE SUMMARY
PROPOSED SITE DRIVEWAY DEPARTURES TO LEXINGTON STREET

Approach/ Travel Direction	Available ISD	AASHTO Minimum[1] 85th Percentile Travel Speed[3]	AASHTO Ideal[1] Regulatory Speed Limit[2]
Looking North	>500 Feet	190 Feet	240 Feet
Looking South	>500 Feet	190 Feet	280 Feet

[1]Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet to object height of 2.0 feet. Minimum value as noted represents SSD per AASHTO guidance.
[2] Regulatory speed limits: 25 mph NB & SB
[3]85th Percentile travel speed: 29 mph NB & SB

The results of the ISD analysis presented in **Table 4** indicate that the available sight lines looking north and south from the proposed Site Driveway onto Lexington Street will exceed the sight line requirements from AASHTO for the regulatory and 85th percentile travel speeds. MDM recommends that any new plantings (shrubs, bushes) or physical landscape features to be located within the sight lines should also be maintained at a height of 2 feet or less above the adjacent roadway grade to ensure unobstructed lines of sight.

Intersection Crash History

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT for the City of Newton for the five-year period 2014 through 2018 (the most recent data currently available from MassDOT). Crash data for the study intersection is summarized in **Table 5** with detailed data provided in the **Attachments.**

Crash rates were calculated for the study area intersections as reported in **Table 5**. This rate quantifies the number of crashes per million entering vehicles. MassDOT has determined the official District 6 (which includes the City of Newton) crash rate to be 0.71 for signalized intersections and 0.52 for unsignalized intersections. These rates represent MassDOT's "average" crash experience for District 6 communities and serves as a basis for comparing reported crash rates for the study intersections. Where calculated crash rates notably exceed the district average, some form of safety countermeasures may be warranted. A review of Highway Safety Improvement Project (HSIP) locations was also conducted.

TABLE 5
INTERSECTION CRASH SUMMARY
2014 THROUGH 2018[1]

Data Category	Lexington Street at Rumford Avenue/River Street	Lexington Street at Milton Avenue
Traffic Control	Signalized	Unsignalized
Crash Rate[2]	**0.37**	**0.04**
MHD Dist. 6 Avg[3]	0.71	0.52
Year:		
2014	1	0
2015	5	0
2016	2	0
2017	2	1
2018	3	0
Total	**13**	**1**
Type:		
Angle	4	0
Rear-End	5	1
Head-On	0	0
Sideswipe	2	0
Single Vehicle	2	0
Severity:		
P. Damage Only	9	1
Personal Injury	4	0
Fatality	0	0
Conditions:		
Dry	11	1
Wet	1	0
Snow	1	0
Time:		
7:00 to 9:00 AM	1	0
4:00 to 6:00 PM	1	0
Rest of Day	11	1

[1]Source: MassDOT Crash Database
[2]Crashes per million entering vehicles (MEV)
[3]District 6 Average Crash Rate

As summarized in **Table 5**:

- *Lexington Street at Rumford Avenue/River Street.* A total of thirteen (13) crashes were reported at the intersection during the five-year study period resulting crash rate of 0.37. The crashes involved six (6) angle/sideswipe type collisions (46%), five (5) rear-end collisions (38%), and two (2) single vehicle type collision. The majority (69%) resulted in property damage only type collisions with 85% of the collisions occurring under dry roadway conditions. The majority (785) of the crashes occurring outside the peak commuter periods. There was one injury type pedestrian related crash and no reported fatalities.

- *Lexington Street at Milton Avenue.* One (1) crash was reported at the intersection during the five-year study period resulting crash rate of 0.04. The reported crash was a rear-end collision which resulted in property damage only and occurred under dry roadway conditions. The crash occurred outside the peak commuter periods and no pedestrians were involved.

- *Lexington Street at 15-21 Lexington Street.* There were no reported crashes reported along Lexington Street near the existing site driveways during the study period.

In summary, the study intersections experienced crash rates well below the District 6 average and none of the intersections as high crash locations (HSIP eligible) by MassDOT. No immediate safety countermeasures are warranted based on the crash history at the study intersections.

Public Transportation Facilities

The Massachusetts Bay Transit Authority (MBTA) operates four (4) bus Routes with service within ¼ mile of the Site as follows:

- Route 170 provides service between Central Square in Waltham and Central Square in Waltham with a stop in the immediate Site vicinity at the corner of Lexington Street and Whitlowe Road. Service is generally provided Monday through Friday 5:11 am to 1:19 am, Saturdays between 5:40 am and 1:27 am and Sundays between 6:45 am and 1:23 am.

- Routes 505/553/554 provide service between Central Square in Waltham and Waverly Square in downtown Boston with a stop in the immediate Site vicinity at the corner of Lexington Street and Whitlowe Road. Service is generally provided Monday through Friday 5:55 am to 10:29 pm and Saturdays between 6:25 am and 7:46 pm.

To remain conservative no credit (trip reduction) was taken for the use of nearby public transportation. Specific route and schedule information is provided in the **Attachments**.

FUTURE CONDITIONS

Evaluation of the proposed development impacts requires the establishment of a future baseline analysis condition. This section estimates future roadway and traffic conditions with and without the proposed development. To be consistent with industry standard guidelines for projects not requiring State review, a five-year planning horizon was selected.

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 a future year condition. Traffic volumes on the roadway network at that time, in the absence of the development (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 that is currently under review at the local and/or state level. Consideration of these factors resulted in the development of No-Build traffic volumes. Anticipated Site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop future Build conditions.

The following sections provide an overview of future No-Build traffic volumes and projected Build traffic volumes.

Background Traffic Growth

Nearby permanent count station data published by MassDOT indicates a 0.1 percent per year growth rate. For purposes of this evaluation, a 0.5-percent compounded annual growth rate was used (2.5 percent increase over a 5-year horizon). This growth rate is higher than historic rates and is also expected to account for any small fluctuation in hourly traffic as may occur from time to time in the study area and traffic associated with other potential small developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Attachments.**

Additionally, based on a review of the MEPA database and discussions with the City of Newton Planning Staff there is one (1) site-specific area development project under construction at the time of the traffic counts that may increase traffic at the study intersections compared to baseline conditions:

- ***143 Rumford Avenue***: This development is a three story 107,397 s.f. self-storage facility and a separate 5,520 s.f. medical office building that was under construction at the time of the traffic counts on Rumford Avenue in Newton, MA. Traffic associated with this development were estimated based on industry standard rates for mini warehousing (ITE LUC 151) and for Medical-Dental Office Building (ITE LUC 720) and distributed on the traffic volume network based on existing traffic patterns. The site-specific trip tracings are provided in the **Attachments**.

2023 No-Build Traffic Volume Networks

To account for future traffic growth in the study area, the 0.5 percent annual growth rate was applied to existing traffic volumes over a five-year period as well as traffic associated with the one site-specific development in the area. Future 2023 No-Build traffic volumes are displayed in **Figure 4**.

Site-Generated Traffic – ITE Basis

The trip generation estimates for the proposed development are provided for the weekday morning and weekday evening peak hours, which correspond to the critical analysis periods for the proposed use and adjacent street traffic flow. New traffic generated by the project was estimated using trip rates published in ITE's *Trip Generation*[2] for the Land Use Code (LUC) 220– Multifamily Housing – Low Rise. **Table 6** presents the trip-generation estimates for the proposed development based on ITE methodology.

TABLE 6
TRIP-GENERATION SUMMARY

	Site Trips		
Period/Direction	**Existing[1]**	**Proposed[2]**	**Δ**
Weekday Morning Peak Hour:			
Entering	0	3	**3**
Exiting	2	8	**6**
Total	2	11	**9**
Weekday Evening Peak Hour:			
Entering	2	8	**6**
Exiting	1	5	**4**
Total	3	13	**10**
Weekday Daily (24 hours)	32	176	**144**

[1]Based on ITE LUC 210 (Single Family Home) applied to 1 unit and 220 (Multifamily Housing – Low Rise) applied to 3 units.
[2]Based on ITE LUC 220 (Multifamily Housing – Low Rise) applied to 24 dwelling units

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

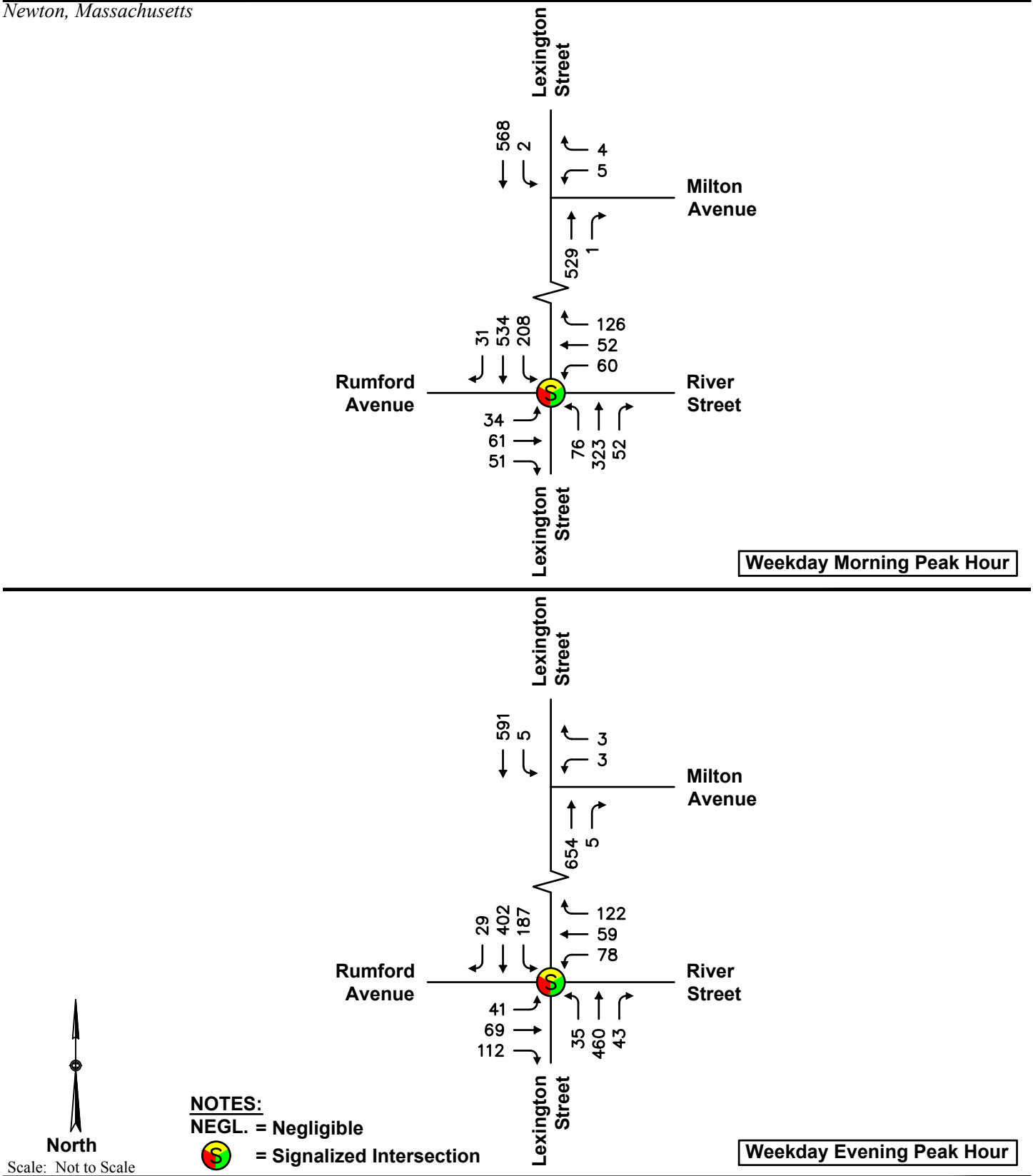

Figure 4

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2023 No-Build Conditions
Weekday Peak Hour Traffic Volumes

Date: September 2019
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As summarized in **Table 6**, the proposed development is estimated to generate approximately 11 vehicle trips (3 entering and 8 exiting) during the weekday morning peak hour and 13 vehicle trips (8 entering and 5 exiting) during the weekday evening peak hour. On a daily basis, the proposed development is estimated to generate approximately 176 vehicle trips on a weekday. Compared to the existing homes the project will generate approximately 9 additional trips during the weekday morning peak hour, 10 additional trips during the weekday evening peak hour and 144 trips over the course of a day. The resulting trip increase is nominal and will result in an additional vehicular trip every 6 to 7 minutes during the peak hours. Trip generation calculations are provided in the **Attachments**.

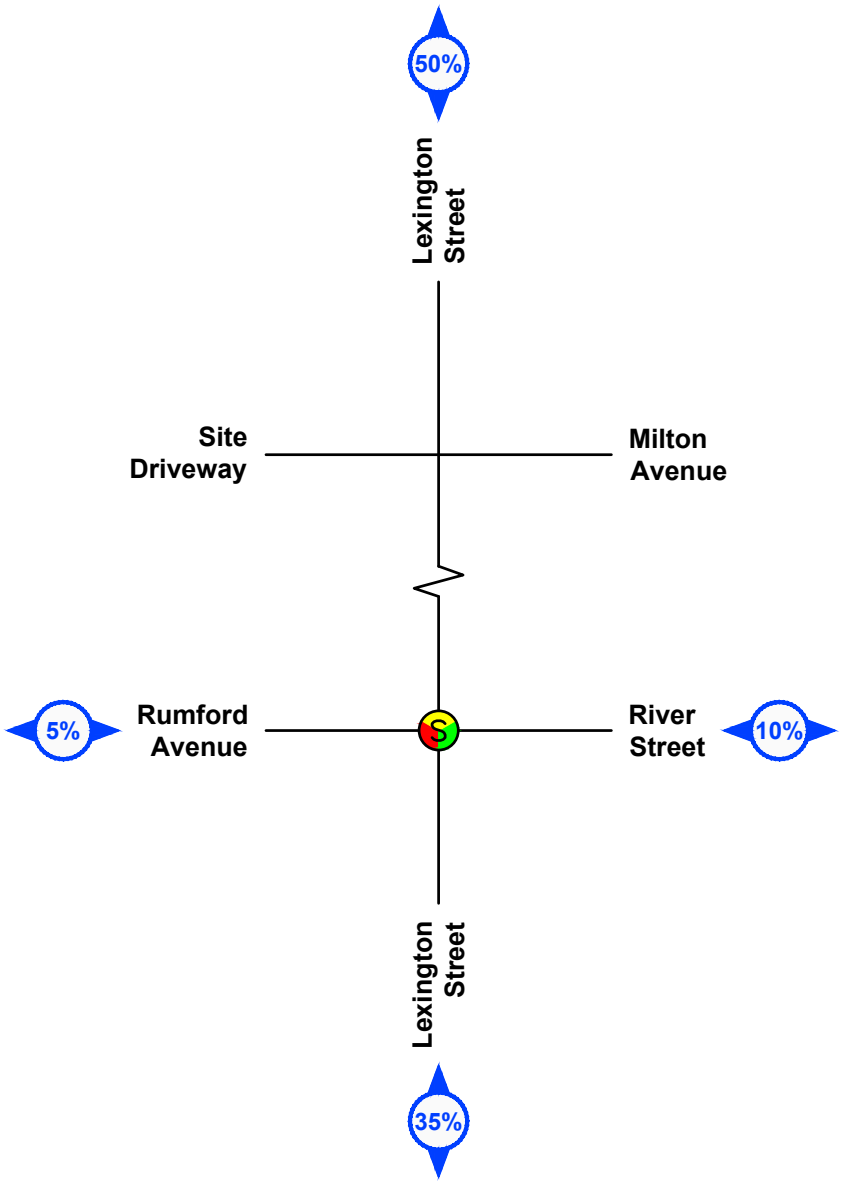
Trip Distribution

The directional distribution of development-generated trips on the roadway network is a function of a number of variables including area population centers and the efficiency of these roadways leading to the Site. Existing traffic patterns served as the primary basis for determining the trip distribution pattern for the project. Detailed calculations are provided in the **Attachments**.

Development-related trips for the proposed apartment development are assigned to the roadway network using the trip-generation estimates shown for the proposed Site in **Table 6** and the distribution patterns presented in **Figure 5**. To remain conservative no credit (trip reduction) was taken for existing residential units at the Site. Development-related trips at each intersection approach for the weekday morning and weekday evening peak hours are quantified in **Figure 6**.

Build Traffic Volumes

Build condition traffic volumes are derived by adding incremental traffic increases for the proposed apartments to the No-Build traffic volume networks. The resulting 2023 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours are displayed in **Figure 7**.



North

Scale: Not to Scale

Figure 5

Trip Distribution

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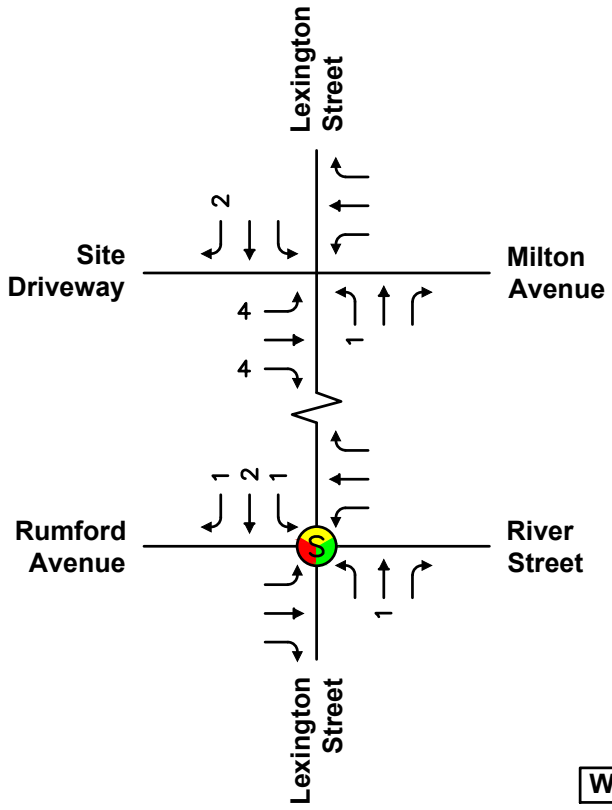
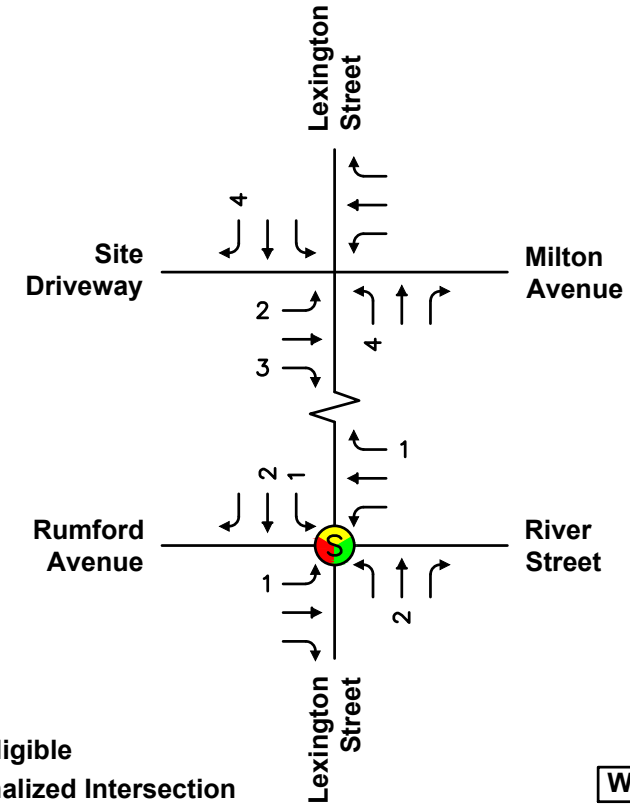
SITE TRIPS	
Enter	3
Exit	8
Total	11



Weekday Morning Peak Hour

SITE TRIPS	
Enter	8
Exit	5
Total	13



North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
S = Signalized Intersection

Weekday Evening Peak Hour

Figure 6

MDM TRANSPORTATION CONSULTANTS, INC.
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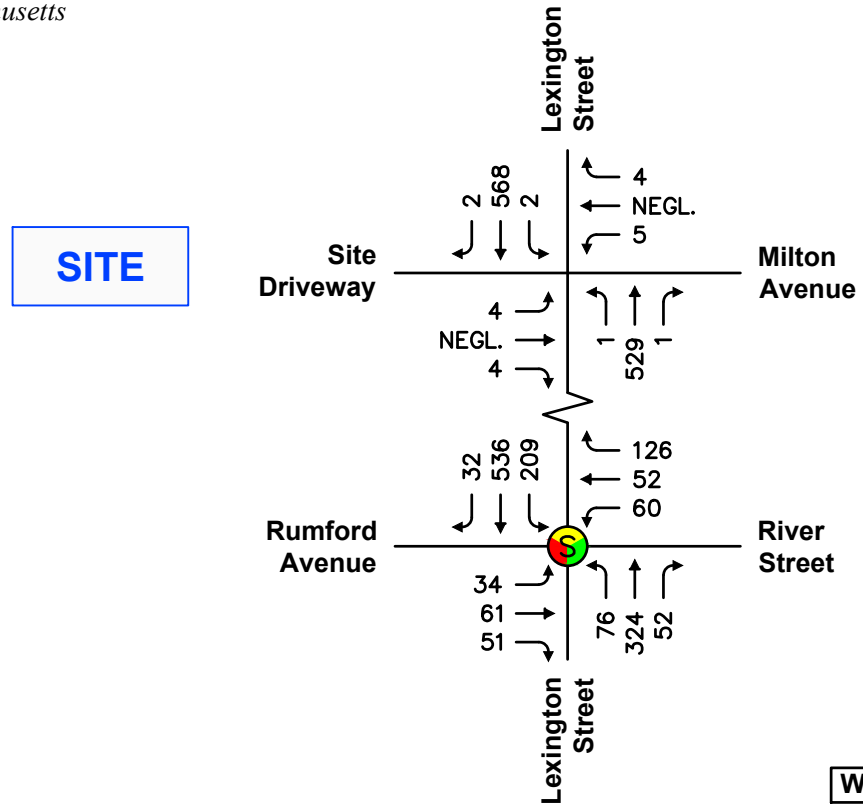
Site Generated Trips
Weekday Peak Hour Traffic Volumes

Date: September 2019
Dwg No. 888 MR01.dwg



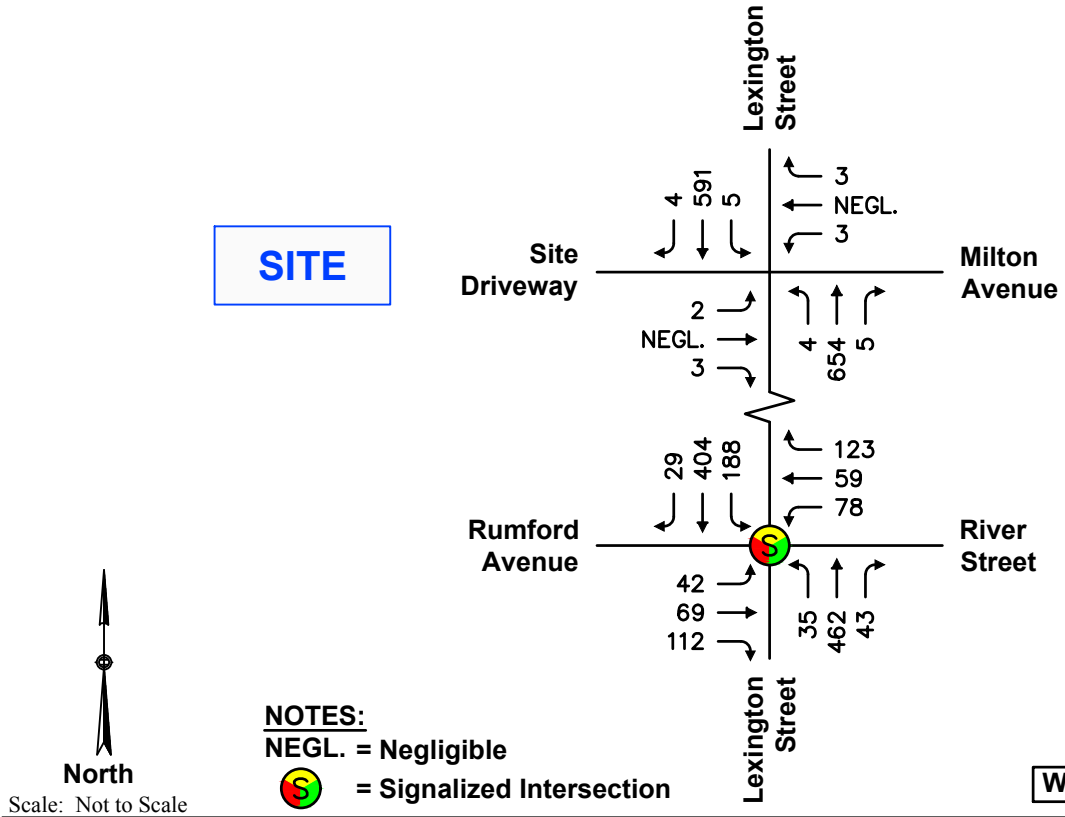


Figure 7

MDM TRANSPORTATION CONSULTANTS, INC.
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2023 Build Conditions
Weekday Peak Hour Traffic Volumes

Date: September 2019
Dwg No. 888 MR01.dwg

CAPACITY ANALYSIS

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements and delays greater than 80 seconds for signalized movements). The specific control delays and associated LOS designations are presented in the **Attachments**.

Level-of-Service (LOS) analyses were conducted for the Baseline, No-Build, and Build conditions for the study intersections. The results of the intersection capacity are summarized below in **Table 7** and **Table 8**. Detailed analysis results are presented in the **Attachments**.

TABLE 7
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

		2018 Baseline			2023 No-Build			2023 Build		
Peak Hour	**Approach**	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Lexington Street	Eastbound	0.43	25	C	0.47	26	C	0.47	26	C
at Rumford	Westbound	0.44	19	B	0.47	20	B	0.47	20	B
Avenue/River	Northbound	0.49	8	A	0.53	9	A	0.53	9	A
Street	Southbound	0.90	26	C	0.94	33	C	0.95	34	C
	Overall	**0.90**	**20**	**C**	**0.94**	**23**	**C**	**0.95**	**24**	**C**
Lexington Street	EB Exit	n/a	n/a	n/a	n/a	n/a	n/a	0.01	12	B
at Site Driveway	WB Exit	0.03	17	C	0.03	17	C	0.04	20	C
Milton Avenue	Northbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A

[1] Volume-to-capacity ratio
[2] Average control delay per vehicle (in seconds)
[3] Level of service

TABLE 8
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

		2018 Baseline			2023 No-Build			2023 Build		
Peak Hour	**Approach**	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Lexington Street	Eastbound	0.50	23	C	0.59	27	C	0.60	27	C
at Rumford	Westbound	0.62	26	C	0.69	29	C	0.69	29	C
Avenue/River	Northbound	0.46	7	A	0.49	8	A	0.49	8	A
Street	Southbound	0.69	13	B	0.73	14	B	0.73	14	B
	Overall	**0.69**	**14**	**B**	**0.73**	**16**	**B**	**0.73**	**16**	**B**
Lexington Street	EB Exit	n/a	n/a	n/a	n/a	n/a	n/a	0.02	20	C
at Site Driveway	WB Exit	0.02	18	C	0.02	19	C	0.03	22	C
Milton Avenue	Northbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	0.01	<5	A	0.01	<5	A	0.01	<5	A

[1] Volume-to-capacity ratio
[2] Average control delay per vehicle (in seconds)
[3] Level of service

As shown in **Table 7 and Table 8:**

- *Lexington Street at Rumford Avenue/River Street.* Under No-Build conditions the signalized intersection will operate at an overall LOS C or better during peak hours. The proposed development does not result in any significant change in operations at the signalized intersection compared to No-Build conditions.

- *Lexington Street at Site Driveway/ Milton Avenue.* Under Build conditions the site driveway approach to the Lexington Street will operate with at LOS C or better during peak hours.

In summary, the proposed development does not result in any significant change in operations at the study intersections compared to No-Build conditions.

RECOMMENDATIONS AND CONCLUSIONS

Trip generation for the development is projected to be nominal during commuter peak hours. MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. The study intersection exhibits a below-average crash rate based on historic crash data; safety countermeasures are therefore not warranted. Likewise, the available sight lines at the proposed Site Driveway intersection with Lexington Street exceed the recommended sight line requirements from AASHTO.

MDM recommends the following improvements to enhance safety and capacity:

- *Signage and Markings.* A STOP sign (R1-1) and STOP line pavement markings are recommended on the proposed Site Driveway approach to Lexington Street. The sign and pavement markings shall be compliant with the Manual on Uniform Traffic Control Devices (MUTCD).

- *On-Site Circulation & Driveway Design.* The proposed site driveway intersection Lexington Street should be designed to accommodate the City's largest fire apparatus (ladder truck), refuse trucks, and single unit delivery vehicles. Likewise, the final design of the circulation aisles and parking layout should provide adequate maneuvering area for the largest potential responding vehicle (ladder truck).

- *Pedestrian Accommodation.* A sidewalk connection between the building and parking will be provided. Additionally, a sidewalk connection to the existing sidewalk system along Lexington Street will be provided.

- *Bicycle Accommodations.* The development has incorporated weather protected bicycle storage within the multi-family building for residents.

- *Sight Line Maintenance.* Any new plantings (shrubs, bushes) or physical landscape features to be located within the project driveway sight lines should also be maintained at a height of 2 feet or less above the adjacent roadway grade to ensure unobstructed lines of sight.

In summary, trip generation for the development is projected to be modest. MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. The available sight lines at the Site Driveway intersection with Lexington Street exceed the recommended sight line requirements from AASHTO. Implementation of recommended improvements will satisfy all applicable design and safety criteria.

Attachments

- □ Traffic Volume Data
- □ Speed Data
- □ Seasonal/Yearly Growth Data
- □ Crash Data
- □ Public Transportation Facilities
- □ Sight Line Analysis
- □ Background Growth
- □ Trip Generation Calculations
- □ Trip Distribution Calculations
- □ Capacity Analysis

□ Traffic Volume Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752
508-303-0370
www.mdmtrans.com

Lexington Street
At Waltham Town Line
North of Site Drive
Newton, MA

Date Start: Tuesday, November 06, 2018
Site Code: 888
Station ID:

Date Start: Tuesday, November 06, 2018

Start Time	Tuesday, Tue	Southbound		Hour Totals		Northbound				Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		9	96			18	100				
12:15		5	101			10	105				
12:30		5	115			17	102				
12:45		5	122	24	434	7	124	52	431	76	865
01:00		2	93			7	121				
01:15		7	108			7	110				
01:30		5	100			5	102				
01:45		1	107	15	408	6	127	25	460	40	868
02:00		4	114			2	114				
02:15		1	115			3	135				
02:30		3	118			2	120				
02:45		3	98	11	445	2	126	9	495	20	940
03:00		2	134			0	129				
03:15		4	128			3	128				
03:30		2	123			6	141				
03:45		2	111	10	496	2	124	11	522	21	1018
04:00		4	92			6	142				
04:15		6	107			4	143				
04:30		8	88			7	130				
04:45		16	84	34	371	8	126	25	541	59	912
05:00		20	92			17	124				
05:15		33	97			25	138				
05:30		40	82			31	140				
05:45		45	80	138	351	56	158	129	560	267	911
06:00		53	85			50	165				
06:15		86	57			64	148				
06:30		113	65			68	137				
06:45		113	60	365	267	93	117	275	567	640	834
07:00		118	63			74	103				
07:15		109	72			107	101				
07:30		135	72			101	86				
07:45		100	71	462	278	108	73	390	363	852	641
08:00		100	61			130	83				
08:15		99	56			122	68				
08:30		94	59			143	60				
08:45		101	50	394	226	140	69	535	280	929	506
09:00		99	34			134	51				
09:15		76	45			126	63				
09:30		72	34			127	64				
09:45		81	35	328	148	132	52	519	230	847	378
10:00		98	29			119	44				
10:15		75	35			112	42				
10:30		93	32			91	45				
10:45		104	21	370	117	87	27	409	158	779	275
11:00		108	26			106	24				
11:15		110	22			94	25				
11:30		85	16			111	29				
11:45		87	17	390	81	96	14	407	92	797	173
Total		2541	3622			2786	4699			5327	8321
Percent		41.2%	58.8%			37.2%	62.8%			39.0%	61.0%
Combined Total		6163				7485				13648	

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Lexington Street
At Waltham Town Line
North of Site Drive
Newton, MA

Date Start: Tuesday, November 06, 2018
Site Code: 888
Station ID:

Date Start: Tuesday, November 06, 2018

Start Time	Wednesda Wed	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Northbound Morning	Northbound Afternoon	Morning	Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		7	95			17	105				
12:15		14	119			17	102				
12:30		7	105			11	115				
12:45		3	88	31	407	10	98	55	420	86	827
01:00		10	96			9	115				
01:15		3	130			6	122				
01:30		4	115			8	109				
01:45		4	120	21	461	7	102	30	448	51	909
02:00		6	109			3	102				
02:15		4	99			0	103				
02:30		7	131			5	101				
02:45		5	114	22	453	5	117	13	423	35	876
03:00		3	127			0	115				
03:15		2	134			2	113				
03:30		7	137			6	128				
03:45		3	108	15	506	3	131	11	487	26	993
04:00		4	147			5	144				
04:15		13	141			15	123				
04:30		7	109			7	131				
04:45		17	126	41	523	9	153	36	551	77	1074
05:00		22	145			11	154				
05:15		28	153			22	154				
05:30		45	145			30	160				
05:45		60	132	155	575	54	161	117	629	272	1204
06:00		65	118			63	166				
06:15		88	126			72	152				
06:30		120	110			80	138				
06:45		119	102	392	456	76	123	291	579	683	1035
07:00		144	121			89	126				
07:15		95	99			75	118				
07:30		127	72			91	95				
07:45		144	77	510	369	107	100	362	439	872	808
08:00		153	87			117	83				
08:15		144	87			126	82				
08:30		105	68			150	68				
08:45		144	61	546	303	124	64	517	297	1063	600
09:00		115	59			132	75				
09:15		103	73			152	51				
09:30		106	38			117	71				
09:45		97	53	421	223	104	49	505	246	926	469
10:00		98	52			121	68				
10:15		91	54			103	70				
10:30		102	38			74	42				
10:45		99	22	390	166	78	28	376	208	766	374
11:00		86	25			101	42				
11:15		92	25			102	26				
11:30		100	17			109	23				
11:45		94	17	372	84	109	17	421	108	793	192
Total		2916	4526			2734	4835			5650	9361
Percent		39.2%	60.8%			36.1%	63.9%			37.6%	62.4%
Combined Total		7442				7569				15011	

MDM Transportation Consultants, INC.

28 Lord Road, Suite 280
Marlborough, MA

N/S: Lexington Street
E/W: River Street/Rumford Avenue
Newton, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

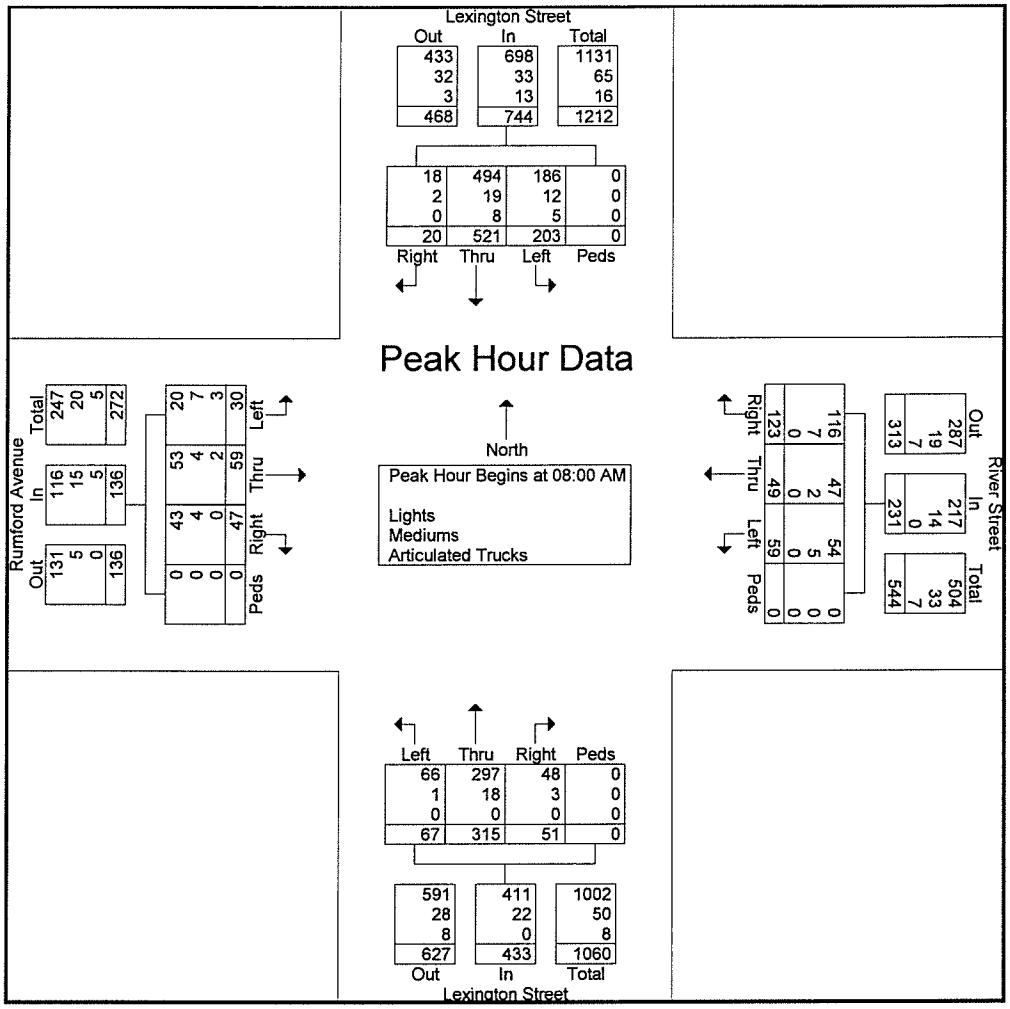
	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	62	17	0	79	3	6	7	0	16	2	45	12	0	59	9	1	1	0	11	165
07:15 AM	1	93	28	0	122	14	7	5	0	26	2	62	19	0	83	8	5	3	0	16	247
07:30 AM	9	104	45	0	158	7	2	13	0	22	7	67	15	0	89	9	8	5	0	22	291
07:45 AM	7	106	45	0	158	15	12	12	0	39	9	67	15	0	91	11	10	11	0	32	320
Total	17	365	135	0	517	39	27	37	0	103	20	241	61	0	322	37	24	20	0	81	1023
08:00 AM	6	123	48	0	177	17	9	13	0	39	10	63	16	0	89	13	11	13	0	37	342
08:15 AM	6	111	50	0	167	36	16	19	0	71	16	84	13	0	113	13	18	7	0	38	389
08:30 AM	6	147	48	0	201	33	9	17	0	59	8	77	14	0	99	13	15	4	0	32	391
08:45 AM	2	140	57	0	199	37	15	10	0	62	17	91	24	0	132	8	15	6	0	29	422
Total	20	521	203	0	744	123	49	59	0	231	51	315	67	0	433	47	59	30	0	136	1544
04:00 PM	4	114	39	0	157	23	11	8	0	42	6	105	16	0	127	31	21	9	0	61	387
04:15 PM	11	111	51	0	173	50	6	18	0	74	10	100	8	0	118	15	8	5	0	28	393
04:30 PM	4	89	32	0	125	37	10	18	0	65	14	101	8	0	123	20	10	5	0	35	348
04:45 PM	6	102	38	0	146	34	13	16	0	63	11	107	12	0	130	21	12	11	0	44	383
Total	25	416	160	0	601	144	40	60	0	244	41	413	44	0	498	87	51	30	0	168	1511
05:00 PM	6	102	38	0	146	33	17	19	0	69	6	115	6	0	127	30	16	6	0	52	394
05:15 PM	6	101	48	0	155	29	16	21	0	66	15	111	9	0	135	25	17	8	0	50	406
05:30 PM	5	85	41	0	131	36	11	18	0	65	9	114	7	0	130	23	15	8	0	46	372
05:45 PM	4	104	55	0	163	21	13	18	0	52	12	109	7	0	128	22	16	6	0	44	387
Total	21	392	182	0	595	119	57	76	0	252	42	449	29	0	520	100	64	28	0	192	1559
Grand Total	83	1694	680	0	2457	425	173	232	0	830	154	1418	201	0	1773	271	198	108	0	577	5637
Apprch %	3.4	68.9	27.7	0		51.2	20.8	28	0		8.7	80	11.3	0		47	34.3	18.7	0		
Total %	1.5	30.1	12.1	0	43.6	7.5	3.1	4.1	0	14.7	2.7	25.2	3.6	0	31.5	4.8	3.5	1.9	0	10.2	
Lights	73	1627										1363									
% Lights	88	96	95.1	0	95.5	93.9	91.3	96.6	0	94.1	97.4	96.1	96	0	96.2	91.5	94.4	81.5	0	90.6	95
Mediums	9	55	28	0	92	24	15	8	0	47	4	52	7	0	63	20	9	11	0	40	242
% Mediums																					
Articulated Trucks	1	12	5	0	18	2	0	0	0	2	0	3	1	0	4	3	2	9	0	14	38
% Articulated Trucks	1.2	0.7	0.7	0	0.7	0.5	0	0	0	0.2	0	0.2	0.5	0	0.2	1.1	1	8.3	0	2.4	0.7

MDM Transportation Consultants, INC.

28 Lord Road, Suite 280
Marlborough, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 2

	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	**6**	123	48	0	177	17	9	13	0	39	10	63	16	0	89	**13**	11	**13**	0	37	342
08:15 AM	6	111	50	0	167	36	**16**	**19**	0	**71**	16	84	13	0	113	13	**18**	7	0	**38**	389
08:30 AM	6	**147**	48	0	**201**	33	9	17	0	59	8	77	14	0	99	13	15	4	0	32	391
08:45 AM	2	140	**57**	0	199	**37**	15	10	0	62	**17**	**91**	**24**	0	**132**	8	15	6	0	29	**422**
Total Volume	20	521	203	0	744	123	49	59	0	231	51	315	67	0	433	47	59	30	0	136	1544
% App. Total	2.7	70	27.3	0		53.2	21.2	25.5	0		11.8	72.7	15.5	0		34.6	43.4	22.1	0		
PHF	.833	.886	.890	.000	.925	.831	.766	.776	.000	.813	.750	.865	.698	.000	.820	.904	.819	.577	.000	.895	.915
Lights	18	494	186	0	698	116	47	54	0	217	48	297	66	0	411	43	53	20	0	116	1442
% Lights	90.0	94.8	91.6	0	93.8	94.3	95.9	91.5	0	93.9	94.1	94.3	98.5	0	94.9	91.5	89.8	66.7	0	85.3	93.4
Mediums	2	19	12	0	33	7	2	5	0	14	3	18	1	0	22	4	4	7	0	15	84
% Mediums	10.0	3.6	5.9	0	4.4	5.7	4.1	8.5	0	6.1	5.9	5.7	1.5	0	5.1	8.5	6.8	23.3	0	11.0	5.4
Articulated Trucks																					
% Articulated Trucks	0	1.5	2.5	0	1.7	0	0	0	0	0	0	0	0	0	0	0	3.4	10.0	0	3.7	1.2



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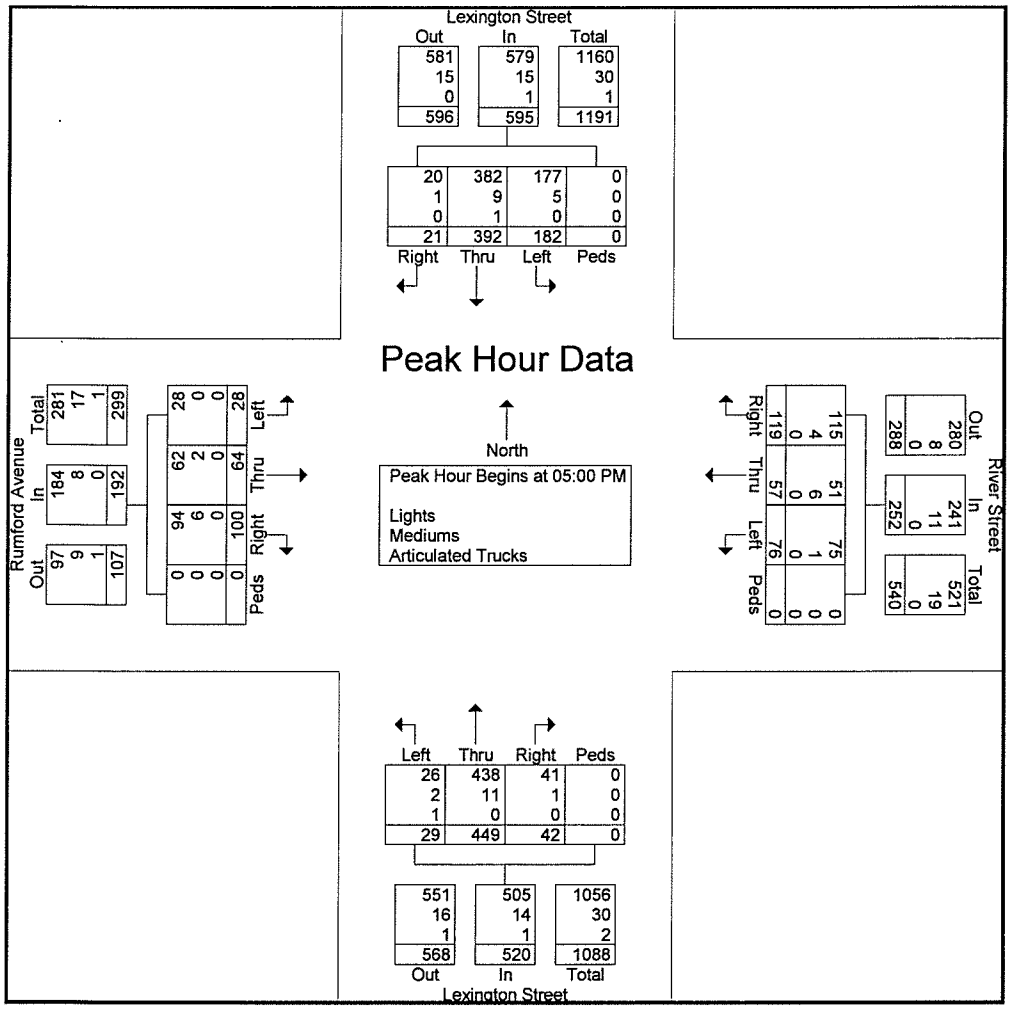
28 Lord Road, Suite 280
Marlborough, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 3

	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**6**	102	38	0	146	33	**17**	19	0	**69**	6	**115**	6	0	127	**30**	16	6	0	**52**	394
05:15 PM	6	101	48	0	155	29	16	**21**	0	66	**15**	111	**9**	0	**135**	25	**17**	**8**	0	50	**406**
05:30 PM	5	85	41	0	131	**36**	11	18	0	65	9	114	7	0	130	23	15	8	0	46	372
05:45 PM	4	**104**	**55**	0	**163**	21	13	18	0	52	12	109	7	0	128	22	16	6	0	44	387
Total Volume	21	392	182	0	595	119	57	76	0	252	42	449	29	0	520	100	64	28	0	192	1559
% App. Total	3.5	65.9	30.6	0		47.2	22.6	30.2	0		8.1	86.3	5.6	0		52.1	33.3	14.6	0		
PHF	.875	.942	.827	.000	.913	.826	.838	.905	.000	.913	.700	.976	.806	.000	.963	.833	.941	.875	.000	.923	.960
Lights	20	382	177	0	579	115	51	75	0	241	41	438	26	0	505	94	62	28	0	184	1509
% Lights	95.2	97.4	97.3	0	97.3	96.6	89.5	98.7	0	95.6	97.6	97.6	89.7	0	97.1	94.0	96.9	100	0	95.8	96.8
Mediums	1	9	5	0	15	4	6	1	0	11	1	11	2	0	14	6	2	0	0	8	48
% Mediums							10.5	1.3	0	4.4	2.4	2.4	6.9	0	2.7	6.0	3.1	0	0	4.2	3.1
Articulated Trucks																					
% Articulated Trucks	0	0.3	0	0	0.2	0	0	0	0	0	0	0	3.4	0	0.2	0	0	0	0	0	0.1



MDM Transportation Consultants, INC.

28 Lord Road, Suite 280
Marlborough, MA

N/S: Lexington Street
E/W: River Street/Rumford Avenue
Newton, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 1

Groups Printed- Bicycles on Road - Pedestrians

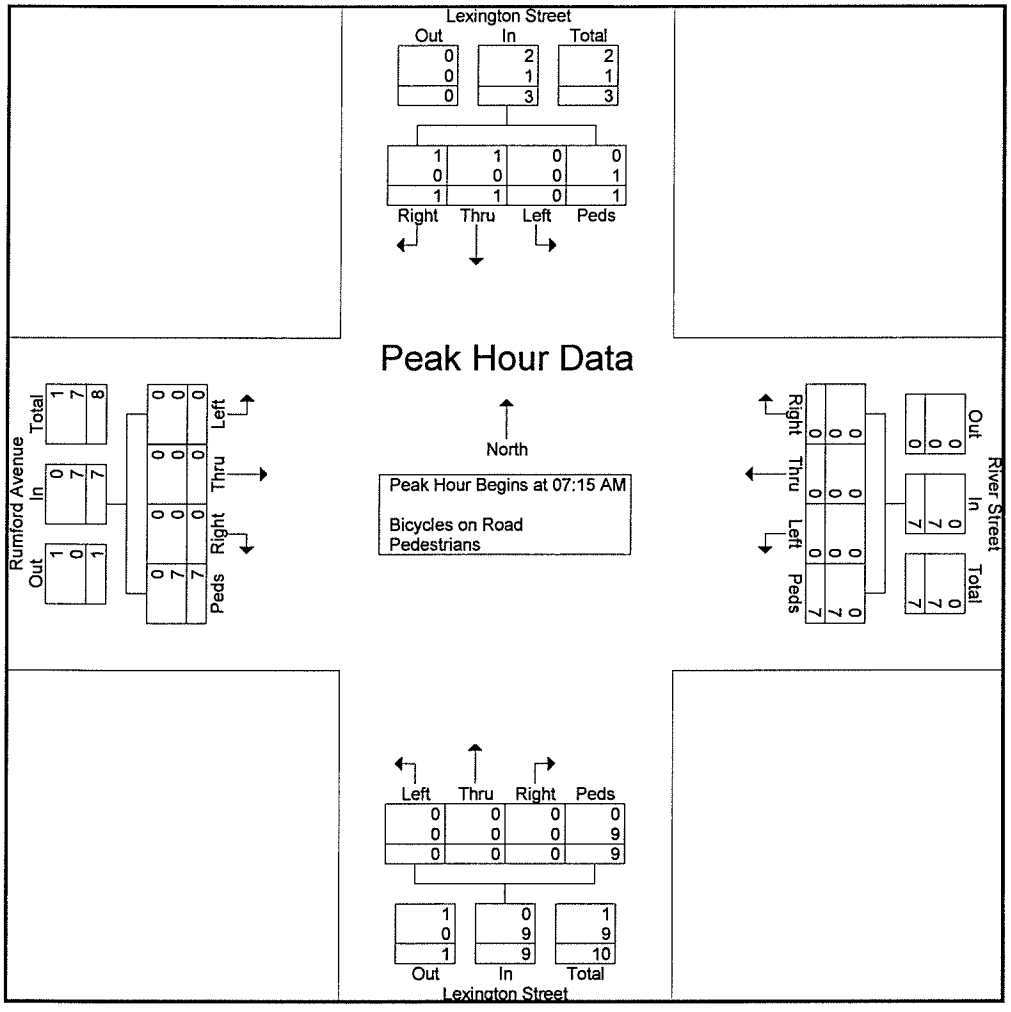
	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2	0	0	0	2	2	5
07:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	4
07:45 AM	0	1	0	0	1	0	0	0	3	3	0	0	0	2	2	0	0	0	3	3	9
Total	1	1	0	1	3	0	0	0	4	4	0	0	0	7	7	0	0	0	5	5	19
08:00 AM	0	0	0	1	1	0	0	0	3	3	0	0	0	2	2	0	0	0	2	2	8
08:15 AM	0	0	0	3	3	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	5
08:45 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	3	3	5
Total	0	0	0	5	5	0	0	0	4	4	0	0	0	3	3	0	0	0	6	6	18
04:00 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	18	18	0	0	0	1	1	21
04:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
04:30 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2
Total	0	0	0	1	1	0	0	0	4	4	0	0	0	19	19	0	0	0	5	5	29
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2
05:45 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	7	7	0	0	0	0	0	8
Grand Total	1	1	0	8	10	0	0	0	12	12	0	0	0	36	36	0	0	0	16	16	74
Apprch %	10	10	0	80		0	0	0	100		0	0	0	100		0	0	0	100		
Total %	1.4	1.4	0	10.8	13.5	0	0	0	16.2	16.2	0	0	0	48.6	48.6	0	0	0	21.6	21.6	
Bicycles on Road																					
% Bicycles on Road	100	100	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.7
Pedestrians	0	0	0	8	8	0	0	0	12	12	0	0	0	36	36	0	0	0	16	16	72
% Pedestrians	0	0	0	100	80	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	97.3

MDM Transportation Consultants, INC.

28 Lord Road, Suite 280
Marlborough, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 2

	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 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	1	1	0	0	0	2	2	0	0	0	2	2	5
07:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	4
07:45 AM	0	1	0	0	1	0	0	0	3	3	0	0	0	2	2	0	0	0	3	3	9
08:00 AM	0	0	0	1	1	0	0	0	3	3	0	0	0	2	2	0	0	0	2	2	8
Total Volume	1	1	0	1	3	0	0	0	7	7	0	0	0	9	9	0	0	0	7	7	26
% App. Total	33.3	33.3	0	33.3		0	0	0	100		0	0	0	100		0	0	0	100		
PHF	.250	.250	.000	.250	.750	.000	.000	.000	.583	.583	.000	.000	.000	.750	.750	.000	.000	.000	.583	.583	.722
Bicycles on Road																					
% Bicycles on Road	100	100	0	0	66.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.7
Pedestrians	0	0	0	1	1	0	0	0	7	7	0	0	0	9	9	0	0	0	7	7	24
% Pedestrians	0	0	0	100	33.3	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	92.3

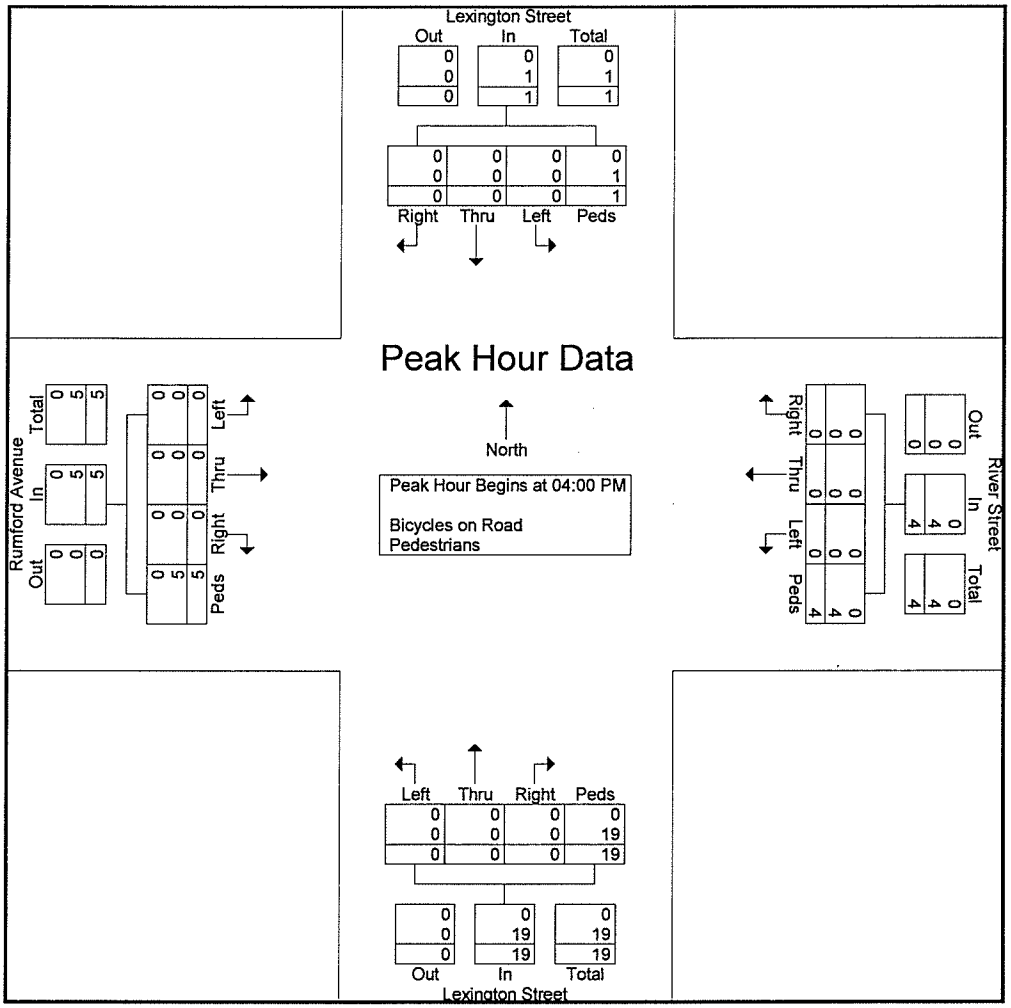


MDM Transportation Consultants, INC.

28 Lord Road, Suite 280
Marlborough, MA

File Name : 888_Lexington_St_Signal_11-06-2018
Site Code : 888
Start Date : 11/6/2018
Page No : 3

	Lexington Street From North					River Street From East					Lexington Street From South					Rumford Avenue From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 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	**2**	**2**	0	0	0	**18**	**18**	0	0	0	1	1	**21**
04:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
04:30 PM	0	0	0	**1**	**1**	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**	**2**	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2
Total Volume	0	0	0	1	1	0	0	0	4	4	0	0	0	19	19	0	0	0	5	5	29
% App. Total	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
PHF	.000	.000	.000	.250	.250	.000	.000	.000	.500	.500	.000	.000	.000	.264	.264	.000	.000	.000	.625	.625	.345
Bicycles on Road																					
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	1	0	0	0	4	4	0	0	0	19	19	0	0	0	5	5	29
% Pedestrians	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	100



- Speed Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752
508-303-0370
www.mdmtrans.com

Lexington Street
At Waltham Town Line
North of Site Drive
Newton, MA

Date Start: 06-Nov-18
Site Code: 888
Station ID:

Date Start: 06-Nov-18

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
11/06/18	1	2	7	12	2	0	0	0	0	0	0	0	0	0	24	29
01:00	0	0	4	8	3	0	0	0	0	0	0	0	0	0	15	31
02:00	0	0	2	7	2	0	0	0	0	0	0	0	0	0	11	30
03:00	0	0	0	7	1	1	0	1	0	0	0	0	0	0	10	37
04:00	1	6	7	11	6	3	0	0	0	0	0	0	0	0	34	33
05:00	1	2	28	79	27	1	0	0	0	0	0	0	0	0	138	31
06:00	1	24	147	164	27	1	0	1	0	0	0	0	0	0	365	29
07:00	38	86	205	124	9	0	0	0	0	0	0	0	0	0	462	27
08:00	7	34	140	164	45	4	0	0	0	0	0	0	0	0	394	29
09:00	0	24	122	141	36	5	0	0	0	0	0	0	0	0	328	29
10:00	0	15	148	158	48	1	0	0	0	0	0	0	0	0	370	29
11:00	0	22	124	206	34	4	0	0	0	0	0	0	0	0	390	29
12 PM	2	43	236	129	23	1	0	0	0	0	0	0	0	0	434	28
13:00	2	37	206	140	22	1	0	0	0	0	0	0	0	0	408	28
14:00	2	64	214	145	18	2	0	0	0	0	0	0	0	0	445	28
15:00	2	55	282	141	16	0	0	0	0	0	0	0	0	0	496	27
16:00	8	41	187	123	9	3	0	0	0	0	0	0	0	0	371	28
17:00	3	67	192	86	2	1	0	0	0	0	0	0	0	0	351	27
18:00	1	42	127	93	4	0	0	0	0	0	0	0	0	0	267	28
19:00	1	30	140	92	14	1	0	0	0	0	0	0	0	0	278	28
20:00	1	13	108	88	16	0	0	0	0	0	0	0	0	0	226	28
21:00	1	9	57	64	15	2	0	0	0	0	0	0	0	0	148	29
22:00	0	8	40	51	15	3	0	0	0	0	0	0	0	0	117	30
23:00	0	4	35	32	8	2	0	0	0	0	0	0	0	0	81	29

Statistics		
	10 MPH Pace Speed :	21-30 MPH
	85th Percentile :	28 MPH
	95th Percentile :	31 MPH
	Number of Vehicles > 25 MPH :	2705
	Percent of Vehicles > 25 MPH :	43.9%
	Mean Speed(Average) :	25 MPH

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Lexington Street
At Waltham Town Line
North of Site Drive
Newton, MA

Date Start: 06-Nov-18
Site Code: 888
Station ID:

Date Start: 06-Nov-18

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
11/07/18	0	1	16	9	5	0	0	0	0	0	0	0	0	0	31	30
01:00	0	0	6	7	8	0	0	0	0	0	0	0	0	0	21	33
02:00	0	0	6	10	6	0	0	0	0	0	0	0	0	0	22	32
03:00	0	1	1	8	5	0	0	0	0	0	0	0	0	0	15	32
04:00	0	1	10	16	7	6	1	0	0	0	0	0	0	0	41	35
05:00	0	2	26	82	34	10	1	0	0	0	0	0	0	0	155	33
06:00	14	28	141	161	43	5	0	0	0	0	0	0	0	0	392	29
07:00	49	87	206	144	22	2	0	0	0	0	0	0	0	0	510	28
08:00	6	51	189	240	55	5	0	0	0	0	0	0	0	0	546	29
09:00	2	13	118	198	85	3	2	0	0	0	0	0	0	0	421	31
10:00	0	15	121	206	45	3	0	0	0	0	0	0	0	0	390	29
11:00	1	18	137	162	51	3	0	0	0	0	0	0	0	0	372	29
12 PM	3	18	172	175	35	3	1	0	0	0	0	0	0	0	407	29
13:00	1	31	203	189	36	1	0	0	0	0	0	0	0	0	461	29
14:00	3	34	156	206	50	4	0	0	0	0	0	0	0	0	453	29
15:00	9	52	207	184	46	7	1	0	0	0	0	0	0	0	506	29
16:00	15	79	227	167	33	2	0	0	0	0	0	0	0	0	523	28
17:00	1	98	324	138	12	2	0	0	0	0	0	0	0	0	575	27
18:00	6	55	237	135	21	2	0	0	0	0	0	0	0	0	456	28
19:00	1	41	179	126	21	1	0	0	0	0	0	0	0	0	369	28
20:00	0	19	126	134	24	0	0	0	0	0	0	0	0	0	303	29
21:00	0	6	83	112	21	1	0	0	0	0	0	0	0	0	223	29
22:00	0	7	57	79	23	0	0	0	0	0	0	0	0	0	166	29
23:00	0	5	16	43	18	2	0	0	0	0	0	0	0	0	84	32

Statistics		
	10 MPH Pace Speed :	21-30 MPH
	85th Percentile :	29 MPH
	95th Percentile :	32 MPH
	Number of Vehicles > 25 MPH :	3705
	Percent of Vehicles > 25 MPH :	49.8%
	Mean Speed(Average) :	25 MPH

Stats		
	Mean Speed(Average) :	25 MPH
	85th Percentile :	29 MPH
	95th Percentile :	32 MPH
	Number of Vehicles > 25 MPH :	6410
	Percent of Vehicles > 25 MPH :	47.1%

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Lexington Street
At Waltham Town Line
North of Site Drive
Newton, MA

Date Start: 06-Nov-18
Site Code: 888
Station ID:

Date Start: 06-Nov-18

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
11/06/18	1	7	21	14	5	1	2	1	0	0	0	0	0	0	52	31
01:00	0	5	5	9	5	1	0	0	0	0	0	0	0	0	25	32
02:00	0	1	1	4	3	0	0	0	0	0	0	0	0	0	9	32
03:00	1	0	3	5	2	0	0	0	0	0	0	0	0	0	11	30
04:00	1	1	3	9	7	3	1	0	0	0	0	0	0	0	25	35
05:00	2	12	31	54	24	5	0	1	0	0	0	0	0	0	129	32
06:00	2	25	72	128	38	9	1	0	0	0	0	0	0	0	275	30
07:00	10	30	150	150	49	0	0	1	0	0	0	0	0	0	390	29
08:00	4	59	189	209	61	12	1	0	0	0	0	0	0	0	535	29
09:00	21	43	152	237	57	9	0	0	0	0	0	0	0	0	519	29
10:00	13	51	132	162	43	6	2	0	0	0	0	0	0	0	409	29
11:00	9	23	122	176	66	11	0	0	0	0	0	0	0	0	407	31
12 PM	20	78	145	147	36	5	0	0	0	0	0	0	0	0	431	29
13:00	21	80	173	151	32	3	0	0	0	0	0	0	0	0	460	28
14:00	20	79	200	145	48	3	0	0	0	0	0	0	0	0	495	29
15:00	23	82	225	158	31	3	0	0	0	0	0	0	0	0	522	28
16:00	28	87	285	126	14	1	0	0	0	0	0	0	0	0	541	27
17:00	24	124	272	131	9	0	0	0	0	0	0	0	0	0	560	27
18:00	21	119	270	141	16	0	0	0	0	0	0	0	0	0	567	27
19:00	7	61	171	115	9	0	0	0	0	0	0	0	0	0	363	28
20:00	2	31	123	102	19	3	0	0	0	0	0	0	0	0	280	29
21:00	3	8	98	105	14	2	0	0	0	0	0	0	0	0	230	29
22:00	3	11	54	73	15	2	0	0	0	0	0	0	0	0	158	29
23:00	1	5	28	41	15	1	1	0	0	0	0	0	0	0	92	31

Statistics		
	10 MPH Pace Speed :	21-30 MPH
	85th Percentile :	29 MPH
	95th Percentile :	32 MPH
	Number of Vehicles > 25 MPH :	3301
	Percent of Vehicles > 25 MPH :	44.1%
	Mean Speed(Average) :	25 MPH

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Lexington Street
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Newton, MA

Date Start: 06-Nov-18
Site Code: 888
Station ID:

Date Start: 06-Nov-18

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
11/07/18	0	6	16	16	14	3	0	0	0	0	0	0	0	0	55	33
01:00	1	3	8	10	5	3	0	0	0	0	0	0	0	0	30	33
02:00	1	0	1	6	4	1	0	0	0	0	0	0	0	0	13	33
03:00	1	0	0	7	2	1	0	0	0	0	0	0	0	0	11	33
04:00	0	2	6	10	15	3	0	0	0	0	0	0	0	0	36	34
05:00	0	9	23	63	20	2	0	0	0	0	0	0	0	0	117	31
06:00	5	18	67	138	51	11	1	0	0	0	0	0	0	0	291	31
07:00	7	60	95	144	47	8	1	0	0	0	0	0	0	0	362	30
08:00	14	53	150	217	74	7	1	1	0	0	0	0	0	0	517	30
09:00	19	49	144	208	74	11	0	0	0	0	0	0	0	0	505	30
10:00	8	37	84	165	70	11	0	1	0	0	0	0	0	0	376	31
11:00	10	40	125	175	62	9	0	0	0	0	0	0	0	0	421	30
12 PM	17	27	150	162	58	4	2	0	0	0	0	0	0	0	420	30
13:00	9	35	160	200	41	3	0	0	0	0	0	0	0	0	448	29
14:00	12	29	134	184	55	7	2	0	0	0	0	0	0	0	423	30
15:00	24	58	175	173	52	5	0	0	0	0	0	0	0	0	487	29
16:00	45	112	206	150	32	6	0	0	0	0	0	0	0	0	551	28
17:00	48	165	297	110	9	0	0	0	0	0	0	0	0	0	629	26
18:00	32	150	254	131	11	1	0	0	0	0	0	0	0	0	579	27
19:00	5	49	200	145	37	3	0	0	0	0	0	0	0	0	439	29
20:00	3	37	96	123	33	5	0	0	0	0	0	0	0	0	297	29
21:00	3	14	77	121	26	5	0	0	0	0	0	0	0	0	246	29
22:00	1	9	55	101	34	7	1	0	0	0	0	0	0	0	208	31
23:00	1	8	18	52	27	1	0	0	1	0	0	0	0	0	108	32

Statistics		
	10 MPH Pace Speed :	21-30 MPH
	85th Percentile :	29 MPH
	95th Percentile :	33 MPH
	Number of Vehicles > 25 MPH :	3792
	Percent of Vehicles > 25 MPH :	50.1%
	Mean Speed(Average) :	25 MPH

Stats		
	Mean Speed(Average) :	25 MPH
	85th Percentile :	29 MPH
	95th Percentile :	33 MPH
	Number of Vehicles > 25 MPH :	7093
	Percent of Vehicles > 25 MPH :	47.1%

□ Seasonal/Yearly Growth Data

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 691 - QUINCY - RTE.I-93 - NORTH OF RTE.28

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	173,000	175,000	177,697	194,334	196,834	199,477	196,208	194,125	190,885	186,291	176,509	174,000	186,197
	-2%	0%	4%	-1%	-1%	0%	-1%	-1%	1%	1%	3%	4%	0.5%
11	166,541	175,019	190,696	192,155	193,034	197,594	193,303	191,197	193,140	188,694	187,378	187,895	188,054
	-2%	6%	0%	0%	1%	-1%	-1%	3%	-1%	-2%	0%	-3%	-0.1%
12	164,007	185,226	190,193	192,337	194,846	195,145	191,419	196,457	190,548	185,609	186,469	181,669	187,827
	9%	-1%	-5%	-3%	-1%	0%	0%	1%	0%	2%	-1%	-3%	-0.1%
13	179,468	182,613	180,861	187,402	193,159	194,612	192,130	197,467	191,411	*190,128*	185,233	176,163	187,554
	-8%	-7%	3%	3%	1%	2%	1%	0%	1%	1%	0%	5%	0.2%
14	165,955	170,581	187,003	193,263	194,348	198,176	193,591	197,456	193,827	*192,895*	185,667	185,147	188,159
	3%	-7%	-8%	-10%	-8%	-13%	-3%	3%	3%	2%	4%	4%	-1.4%
15	171,029	159,322	171,290	174,319	178,128	172,060	187,071	202,569	198,773	*197,111*	192,381	192,770	183,069
	4%	9%	8%	7%	7%	3%	5%	1%	1%	1%	1%	1%	3.8%
17	185,127	189,054	199,012	199,259	202,004	181,236	205,446	207,586	200,920	*199,524*	198,080	194,984	196,853
Seasonal Adjustment Factor	1.09	1.07	1.02	0.99	0.98	0.99	0.97	0.95	0.97	0.98	1.01	1.02	
(to average month)												**Growth**	**0.47%**

STATION 703 - ABINGTON - RTE.123 - AT THE BROCKTON C.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	12,251	13,199	13,301	13,660	13,231	13,817	13,354	*13,212*	14,037	13,712	13,161	13,327	13,372
	0%	0%	2%	1%	5%	1%	0%	1%	-1%	0%	2%	-1%	0.8%
10	12,196	13,134	13,560	14,051	13,835	13,900	13,353	13,338	13,928	13,733	13,414	*13,225*	13,472
	-5%	-4%	-1%	-4%	-3%	-2%	-3%	-2%	-1%	-2%	0%	1%	-2.0%
11	11,629	12,651	13,451	13,518	13,476	13,655	12,907	*13,088*	13,778	13,495	13,434	13,377	13,205
	5%	4%	0%	-1%	0%	-1%	-6%	0%	-2%	1%	0%	-2%	-0.3%
12	12,181	13,151	13,410	13,379	13,452	13,479	12,127	*13,103*	13,441	13,679	13,452	13,136	13,166
	1%	-6%	-4%	2%	0%	-1%	7%	0%	0%	0%	-2%	0%	-0.3%
13	12,347	12,336	12,870	13,591	13,426	13,372	12,964	*13,064*	13,462	13,726	13,217	13,081	13,121
	-4%	3%	3%	-2%	-1%	1%	-2%	-1%	-1%	-3%	-3%	2%	-0.5%
14	11,894	12,651	13,252	13,385	13,345	13,524	12,759	*12,893*	13,376	13,379	12,882	13,315	13,055
	1%	-5%	-5%	-2%	0%	-1%	1%	0%	-1%	-1%	0%	-2%	-1.3%
15	11,974	11,975	12,649	13,151	13,378	13,433	12,829	12,941	13,230	*13,222*	12,868	12,985	12,886
	1%	3%	3%	-1%	-2%	1%	-1%	0%	-1%	-1%	-1%	0%	0.1%
16	12,035	12,304	13,075	13,076	13,171	13,574	12,742	12,986	13,061	*13,140*	12,743	12,940	12,904
Seasonal Adjustment Factor	1.09	1.04	1.00	0.97	0.98	0.97	1.02	1.01	0.97	0.97	1.00	1.00	
(to average month)												**Growth**	**-0.50%**

STATION 4165 - I-95/ ROUTE 128 SOUTH OF I-90

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
12	130,033	133,659	138,451	142,034	158,583	148,787	138,599	*144,999*	141,340	146,271	140,898	128,666	141,027
	1%	-6%	0%	3%	-7%	1%	10%	3%	6%	5%	2%	1%	1.4%
13	131,812	125,662	138,122	145,780	147,000	149,925	151,813	149,393	150,507	153,009	143,498	130,116	143,053
	-5%	1%	3%	3%	3%	3%	-5%	0%	1%	-1%	-1%	6%	0.6%
14	125,340	127,134	142,024	150,125	151,576	153,916	144,679	149,503	151,538	152,148	141,875	137,826	143,974
	6%	1%	2%	0%	1%	1%	1%	1%	0%	1%	2%	0%	1.2%
16	139,436	130,154	148,054	149,295	153,957	156,496	147,414	151,081	152,186	154,663	146,935	137,768	147,287
	-3%	0%	-12%	-3%	0%	0%	0%	-1%	1%	1%	1%	7%	-0.8%
17	134,884	130,641	129,731	144,492	153,434	156,333	147,884	149,113	154,281	155,618	149,129	147,141	146,057
Seasonal Adjustment Factor	1.09	1.12	1.04	0.99	0.94	0.94	0.99	0.97	0.96	0.95	1.00	1.06	
(to average month)												**Growth**	**0.60%**

STATION 6255 - WEYMOUTH - RTE.3 - NORTH OF RTE.18

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	120,200	123,983	124,807	134,354	135,239	143,114	143,685	144,937	140,079	137,288	138,708	136,428	135,235
	4%	3%	6%	-1%	0%	-1%	-1%	-2%	-3%	-3%	-1%	-7%	-0.6%
10	125,304	127,637	132,301	133,124	135,880	141,633	141,706	142,327	135,767	133,473	137,526	127,100	134,482
	-3%	-1%	-1%	-6%	0%	0%	-1%	0%	-1%	-2%	-3%	-1%	-1.5%
12	118,936	125,494	129,712	116,911	136,235	140,277	139,048	142,140	132,674	128,923	129,593	125,409	130,446
	4%	-7%	-4%	13%	0%	-1%	1%	0%	1%	4%	-1%	-1%	0.3%
13	123,783	116,501	124,813	131,533	136,712	138,977	140,057	141,851	133,978	134,144	128,712	124,607	131,306
	-8%	2%	2%	0%	-1%	0%	5%	4%	2%	-1%	11%	4%	0.9%
14	113,701	116439	127037	131150	135,571	139,606	147,748	147,593	136,789	132,227	143,498	130,116	133,623
	3%	1%	1%	1%	1%	1%	-2%	-2%	0%	1%	-5%	0%	-0.2%
16	120,926	121003	128951	132915	138,071	142,406	140,685	142,991	135,630	134,163	129,976	128,837	133,046
	3%	3%	0%	1%	0%	0%	-1%	-1%	-1%	-1%	1%	0%	0.1%
17	124,154	124154	129045	134625	137,743	142,253	139,660	141,524	134,110	133,079	131,317	128,775	133,370
Seasonal Adjustment Factor	1.10	1.09	1.04	1.02	0.98	0.94	0.94	0.93	0.98	1.00	0.99	1.03	
(to average month)												**Growth**	**-0.16%**

Average	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Seasonal Adjustment Factor	*1.09*	*1.08*	*1.02*	*0.99*	*0.97*	*0.96*	*0.98*	*0.96*	*0.97*	*0.98*	*1.00*	*1.03*
(to average month)												

ITALICS = ESTIMATED DATA

MADT

Average Yearly Growth Calculated 0.1%

Yearly Growth Factor Used 0.5%

□ Crash Data

Moving Massachusetts Forward. massDOT Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Newton, MA COUNT DATE : Nov-18

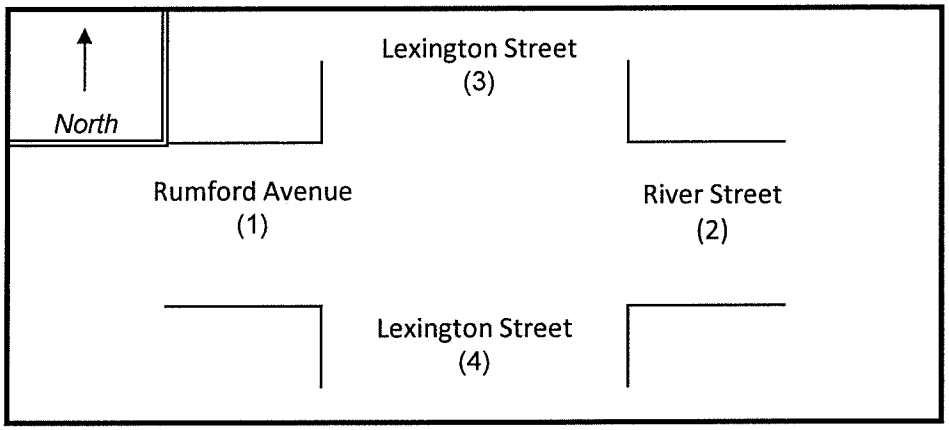
DISTRICT : 6 UNSIGNALIZED : [ ] SIGNALIZED : [X]

~ INTERSECTION DATA ~

MAJOR STREET : Lexigton Street

MINOR STREET(S) : Rumford Avenue/River Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB		
PEAK HOURLY VOLUMES (PM) :	192	252	595	520		1,559

" K " FACTOR : **0.080**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **19,488**

TOTAL # OF CRASHES : 13

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.60**

CRASH RATE CALCULATION : **0.37**

RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : MassDOT District 6 Avg: Signalized = 0.71; Unsignalized = 0.52

Project Title & Date: 888 - Newton

Moving Massachusetts Forward. massDOT Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Newton, MA COUNT DATE : Nov-18

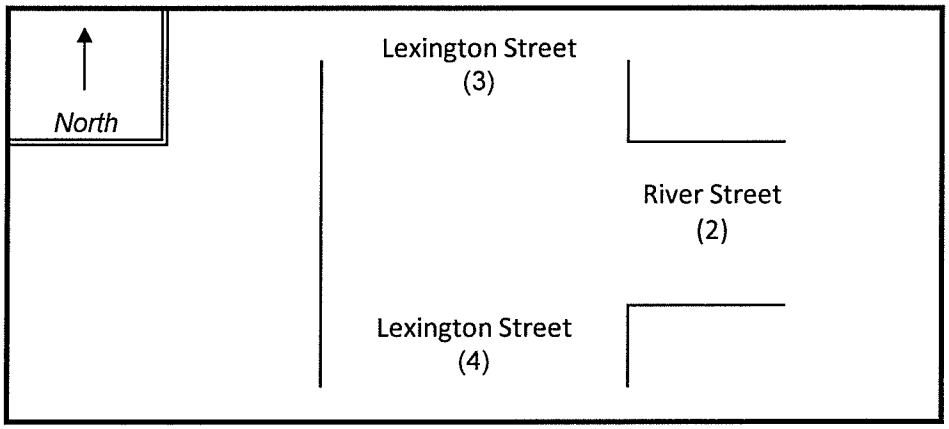
DISTRICT : 6 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Lexigton Street

MINOR STREET(S) : Milton Avenue

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	SB	NB		
PEAK HOURLY VOLUMES (PM) :		9	546	514		1,069

" K " FACTOR :	0.080	INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME :	13,363
TOTAL # OF CRASHES :	1	# OF YEARS : 5	AVERAGE # OF CRASHES PER YEAR (**A**) : 0.20

CRASH RATE CALCULATION : 0.04 RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : MassDOT District 6 Avg: Signalized = 0.71; Unsignalized = 0.52

Project Title & Date: 888 - Newton

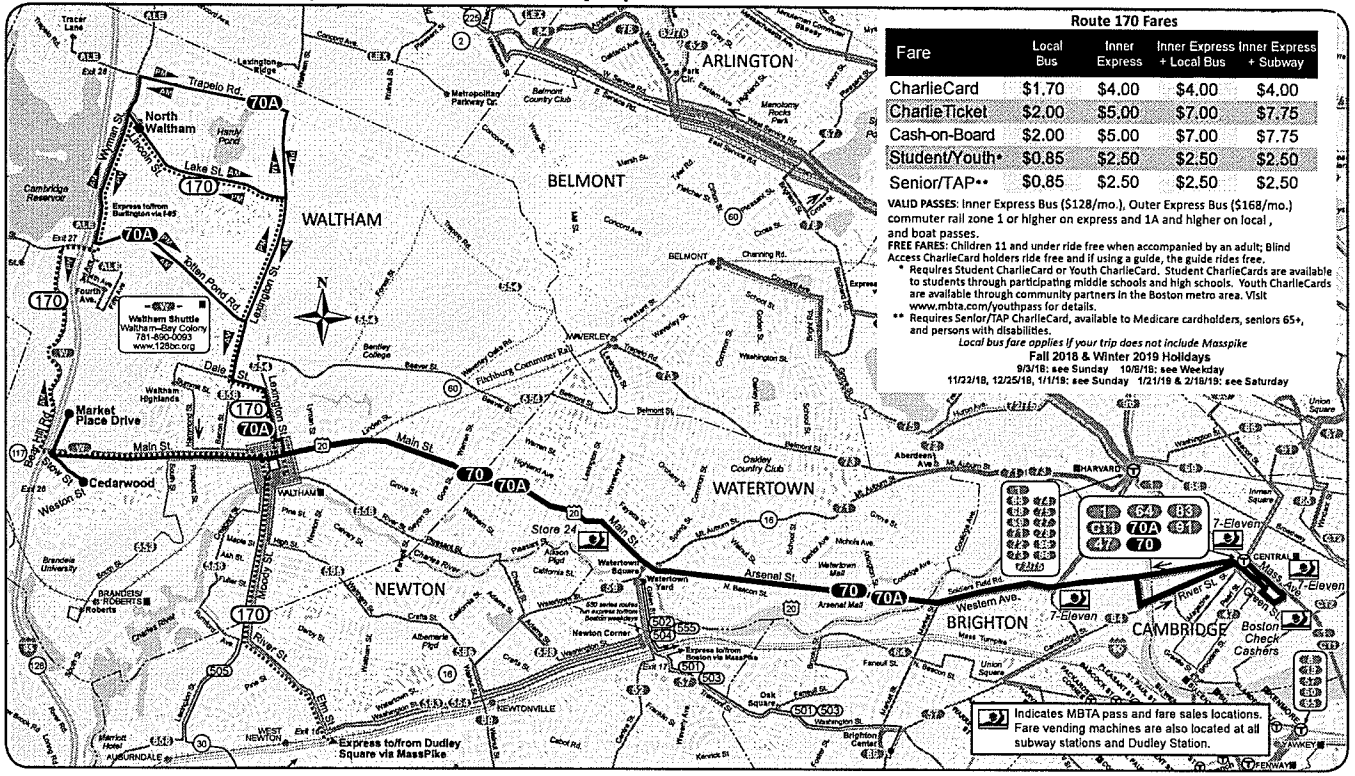
massDOT

MassDOT Crash Report for Newton for the years 2014 - 2018

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Non-fatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
2014																					
3949680	NEWTON	28-Aug-2014	8:01 PM	Non-fatal injury	1	1	0	Single vehicle crash	V1: Turning right	V1:Northbound	V1: Collision with pedestrian	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Daylight	Clear	LEXINGTON ST / RIVER ST					P1:Pedestrian
2015																					
4109211	NEWTON	15-Oct-2015	10:31 AM	Non-fatal injury	3	2	0	Rear-end	V1: Slowing or stopped in traffic / V2:Slowing or stopped in traffic / V3:Travelling straight ahead	V1:Southbound / V2:Southbound / V3:Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic / V3: Collision with motor vehicle in traffic	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires / V2:Passenger car / V3:Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Daylight	Clear	LEXINGTON ST / RIVER ST					
4076918	NEWTON	23-Aug-2015	6:22 AM	Non-fatal injury	1	1	0	Angle	V1: Turning right	V1:Eastbound	V1: Collision with cyclist (bicycle, tricycle, unicycle, pedal car)	V1: Passenger car	Wet	Dawn	Cloudy	LEXINGTON ST / RUMFORD AVE					P3:Pedalcyclist (bicycle, tricycle, unicycle, pedal car)
4009279	NEWTON	11-Feb-2015	7:33 AM	Property damage only (none injured)	2	0	0	Rear-end	V1: Slowing or stopped in traffic / V2:Travelling straight ahead	V1:Westbound / V2:Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Single-unit truck (2-axle, 6-tire) / V2:Passenger car	Slush	Daylight	Clear	LEXINGTON STREET / RIVER STREET					
4111029	NEWTON	14-Nov-2015	5:39 AM	Property damage only (none injured)	2	0	0	Angle	V1: Travelling straight ahead / V2:Turning left	V1:Northbound / V2:Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Dawn	Clear	LEXINGTON STREET / RIVER STREET					
4062249	NEWTON	07-Jul-2015	6:29 AM	Property damage only (none injured)	2	0	0	Angle	V1: Travelling straight ahead / V2:Turning left	V1:Northbound / V2:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Passenger car	Dry	Dawn	Clear/Clear	RIVER ST / LEXINGTON ST					
2016																					
4175557	NEWTON	29-Mar-2016	4:40 PM	Property damage only (none injured)	2	0	0	Sideswipe, opposite direction	V1: Slowing or stopped in traffic / V2:Turning left	V1:Southbound / V2:Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Unknown heavy truck, cannot classify	Dry	Daylight	Clear	LEXINGTON STREET / RUMFORD AVENUE					
4215188	NEWTON	28-Apr-2016	9:16 AM	Property damage only (none injured)	2	0	0	Sideswipe, opposite direction	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:Southbound / V2:Northbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	Dry	Daylight	Clear	LEXINGTON STREET / RUMFORD AVENUE					
2017																					
4408169	NEWTON	6-Jan-2017	6:09 PM	Property damage only (none injured)	3	0	0	Rear-end	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1:Southbound / V2:Southbound / V3:Southbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) / V3:(Collision with motor vehicle in traffic)	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car) / V3:(Passenger car)	Dry	Dark - lighted roadway	Clear	LEXINGTON ST / MILTON AVE					
4408779	NEWTON	29-Jul-2017	10:02 AM	Property damage only (none injured)	2	0	0	Rear-end	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1:Westbound / V2:Westbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	Dry	Daylight	Cloudy	RUMFORD AVE / LEXINGTON ST					
4436222	NEWTON	4-Oct-2017	12:05 PM	Property damage only (none injured)	2	0	0	Rear-end	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1:Westbound / V2:Westbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car)	Dry	Daylight	Clear	LEXINGTON STREET / RUMFORD AVENUE					
2018																					
4579598	NEWTON	20-Jul-2018	3:17 PM	Non-fatal injury	1		1	0 Single vehicle crash	V1: Travelling straight ahead	V1: Southbound	V1:(Collision with pedestrian)		Dry	Daylight	Clear	LEXINGTON STREET / RUMFORD AVENUE					
4628466	NEWTON	21-Aug-2018	9:05 AM	Property damage only (none injured)	2	0	0	Angle	V1: Travelling straight ahead / V2: Turning left	V1:Southbound / V2:Westbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car)	Dry	Daylight	Cloudy	LEXINGTON STREET / RUMFORD AVENUE					
4645599	NEWTON	11-Dec-2018	9:37 AM	Property damage only (none injured)	2	0	0	Rear-end	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1:Westbound / V2:Westbound	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	V1:(Passenger car) / V2:(Passenger car)	Dry	Daylight	Clear	LEXINGTON STREET / RUMFORD AVENUE					

□ Public Transportation Facilities

Route 70 Cedarwood, Market Place Drive, or Central Square, Waltham - University Park
Route 70A North Waltham - University Park
Route 170 Central Square, Waltham - Dudley Square



Route 170 Fares

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student/Youth*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.) commuter rail zone 1 or higher on express and 1A and higher on local, 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.
Local bus fare applies if your trip does not include Masspike

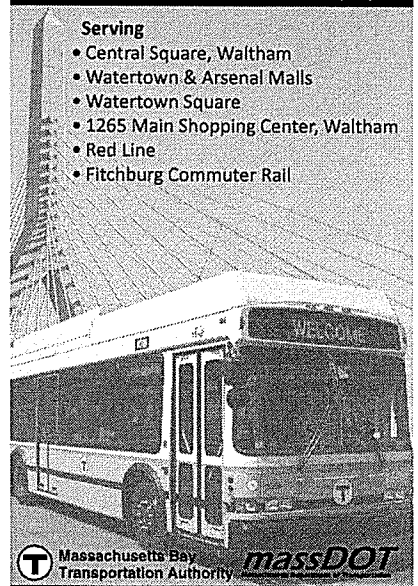
Fall 2018 & Winter 2019 Holidays
9/3/18: see Sunday 10/8/18: see Weekday
11/22/18, 12/25/18, 1/1/19: see Sunday 1/21/19 & 2/18/19: see Saturday

70/70A•170

Effective September 2, 2018

70 Cedarwood, Market Place Drive, or Central Square, Waltham-University Park
70A North Waltham-University Park
170 Central Square, Waltham-Dudley Sq.

Serving
- Central Square, Waltham
- Watertown & Arsenal Malls
- Watertown Square
- 1265 Main Shopping Center, Waltham
- Red Line
- Fitchburg Commuter Rail



Massachusetts Bay Transportation Authority massDOT

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

70/70A Weekday

Inbound				Outbound			
Leave Cedarwood	Leave North Waltham	Arrive Watertown Sq.	Arrive University Park	Leave University Park	Arrive Watertown Sq.	Arrive North Waltham	Arrive Cedarwood
5:11A	.....	5:31A	5:53A	4:31A	4:46A	.....	5:04A
5:30	.....	5:50	6:12	4:50	5:05	.....	5:23
5:50	.....	6:10	6:33	5:05	5:20	.....	5:38
6:10	.....	6:30	6:58	5:20	5:35	.....	5:53
.....	g 6:10A	6:45	7:07	g 5:30	5:47	6:04A	.....
6:30	.....	6:49	7:17	5:40	5:55	.....	6:18
m 6:45	.....	7:07	7:38	m 5:55	6:13	.....	6:39
7:00	.....	7:23	7:54	g 6:03	6:20	6:41	.....
.....	g 6:55	7:30	8:07	6:08	6:27	.....	6:53
7:18	.....	7:41	8:12	g 6:21	6:39	7:04	.....
m 7:27	.....	7:50	8:21	6:25	6:44	.....	7:10
e 7:44	.....	7:56	8:27	m 6:34	6:53	.....	7:19
.....	g 7:29	8:08	8:48	6:45	7:04	.....	7:30
7:47	.....	8:10	8:41	g 6:53	7:13	7:39	.....
8:00	.....	8:23	8:54	b 7:00	7:16	.....	b 7:27
.....	g 7:55	8:33	9:06	7:06	7:25	.....	7:51
m 8:25	.....	8:48	9:18	m 7:15	7:34	.....	8:00
.....	g 8:28	9:05	9:32	g 7:30	7:58	8:24	.....
8:50	.....	9:11	9:39	7:45	8:08	.....	8:34
m 9:10	.....	9:31	9:59	g 8:00	8:28	8:54	.....
.....	g 9:00	9:35	10:02	m 8:10	8:35	.....	9:01
9:30	.....	9:51	10:19	8:20	8:45	.....	9:11
.....	g 9:25	10:00	10:24	g 8:30	8:58	9:22	.....
m 9:50	.....	10:11	10:39	m 8:45	9:10	.....	9:36
.....	g 9:55	10:24	10:48	g 8:55	9:20	9:47	.....
10:20	.....	10:41	11:09	9:15	9:40	.....	10:06
m 10:40	.....	11:01	11:29	m 9:35	10:00	.....	10:26
11:05	.....	11:26	11:54	9:55	10:20	.....	10:46
.....	g 11:08	11:42	12:15P	g 10:08	10:33	11:03	.....
m 11:30	.....	11:51	12:23	m 10:30	10:55	.....	11:21
11:55	.....	12:18P	12:51	10:50	11:15	.....	11:41
				g 11:10	11:33	12:03P	.....
m 12:15P	.....	12:38P	1:11P	m 11:16	11:41	.....	12:08P
.....	g 12:08P	12:38	1:11	11:40	12:06P	.....	12:34
12:45	.....	1:08	1:41				
m 1:10	.....	1:33	2:06	m 12:00N	12:27P	.....	12:55P
.....	h 1:25	1:49	2:22	h 12:20P	12:43	1:19P	.....
1:40	.....	2:03	2:36	12:35	1:02	.....	1:30
m 2:00	.....	2:23	2:56	m 12:55	1:22	.....	1:50
2:25	.....	2:48	3:20	h 1:15	1:40	2:17	.....
.....	h 2:30	2:56	3:27	1:25	1:52	.....	2:20
m 2:46	.....	3:11	3:46	m 1:45	2:12	.....	2:40
e 3:20	.....	3:31	3:58	2:08	2:35	.....	3:02
3:17	.....	3:45	4:20	h 2:20	2:47	3:26	.....
.....	h 3:30	3:57	4:30	e 2:30	2:56	.....	e 3:09
m 3:45	.....	4:13	4:48	m 2:40	3:08	.....	3:35
4:08	.....	4:36	5:11	3:00	3:30	.....	3:57
e 4:25	.....	4:36	5:08	h 3:10	3:36	4:15	.....
m 4:30	.....	4:58	5:33	m 3:22	3:52	.....	4:19
.....	h 4:25	4:53	5:26	e 3:30	3:56	.....	e 4:13
e 4:55	.....	5:06	5:38	h 3:40	4:07	4:49	.....
4:59	.....	5:27	6:02	3:50	4:20	.....	4:47
.....	h 4:55	5:28	6:00	e 4:00	4:30	.....	e 4:46
e 5:24	.....	5:35	6:07	h 4:10	4:38	5:20	.....
m 5:30	.....	5:58	6:29	m 4:20	4:50	.....	5:17
.....	h 5:28	6:01	6:29	e 4:30	5:00	.....	e 5:16
6:00	.....	6:23	6:54	h 4:40	5:08	5:50	.....
.....	h 6:00	6:24	6:52	4:50	5:20	.....	5:47
m 6:12	.....	6:35	7:06	m 5:00	5:30	.....	5:57
6:30	.....	6:53	7:19	h 5:10	5:40	6:22	.....
.....	h 6:30	6:54	7:22	5:20	5:50	.....	6:17
m 6:40	.....	7:01	7:26	m 5:30	6:00	.....	6:27
7:00	.....	7:17	7:42	h 5:40	6:10	6:51	.....
.....	h 7:00	7:23	7:50	5:50	6:20	.....	6:47
m 7:15	.....	7:32	7:57	m 6:05	6:35	.....	7:02
7:28	.....	7:45	8:10	h 6:15	6:45	7:25	.....
.....	h 7:30	7:53	8:20	6:25	6:55	.....	7:19
m 7:45	.....	8:02	8:27	m 6:40	7:08	.....	7:31
8:00	.....	8:17	8:42	7:00	7:24	.....	7:47
m 8:15	.....	8:32	8:57	m 7:15	7:39	.....	8:02
8:31	.....	8:48	9:13	7:35	7:59	.....	8:22
m 9:03	.....	9:20	9:45	m 8:10	8:34	.....	8:57
9:35	.....	9:52	10:17	8:40	9:04	.....	9:27
m 10:00	.....	10:17	10:42	m 9:05	9:29	.....	9:52
10:30	.....	10:47	11:10	9:35	9:59	.....	10:22
11:05	.....	11:22	11:43	10:10	10:33	.....	10:54
11:40	.....	11:54	12:14A	10:50	11:10	.....	11:31
12:15A	.....	12:29A	12:49	11:25	11:45	.....	12:06A
b 12:40	.....	12:47	b 1:04	e 12:10A	12:27A	.....	o 12:35
				aw 1:04	1:19	.....	.....

Route 70A indicated by shaded areas

Running time from Central Square and University Park is approximately 2 minutes.

a - Central Square, Cambridge - Watertown Square.
b - To/from Central Square, Waltham - Central Square, Cambridge
e - To/from Central Square, Waltham - University Park
g - AM routing - serves Totten Pond Road & Wyman Street outbound, and Smith Street & Trapelo Road inbound
h - PM routing - serves Smith Street & Trapelo Road outbound, and Totten Pond Road & Wyman Street inbound
m - To/From 1265 Main Shopping Center (Market Place Dr.), Waltham.
w - Waits for last train to arrive at Central Square Station.

170 Weekday

Inbound			Outbound		
Leave Central Sq. Waltham	Arrive Back Bay	Arrive Dudley Station	Leave Dudley Station	Arrive Back Bay	Arrive Central Sq. Waltham
3:55P	4:50P	5:03P	6:15A	6:26A	7:21A
4:55P	6:01P	6:11P	6:40A	6:52A	7:48A

No service on weekends and Holidays- see fare information on reverse

Route 70/70A
Cedarwood, Market Place Dr., N. Waltham or Central Sq., Waltham - University Park

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.70	$1.70	$2.25	$2.25
CharlieTicket	$2.00	$2.00	$2.75	$4.75
Cash-on-Board	$2.00	$4.00	$2.75	$4.75
Student/Youth*	$0.85	$0.85	$1.10	$1.10
Senior/TAP**	$0.85	$0.85	$1.10	$1.10

VALID PASSES: LinkPass ($84.50/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.

Holiday information on map side.

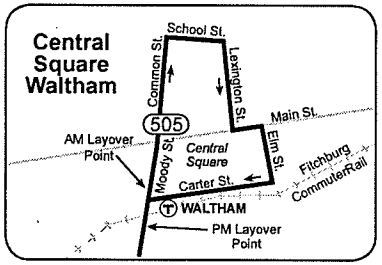
70/70A Saturday

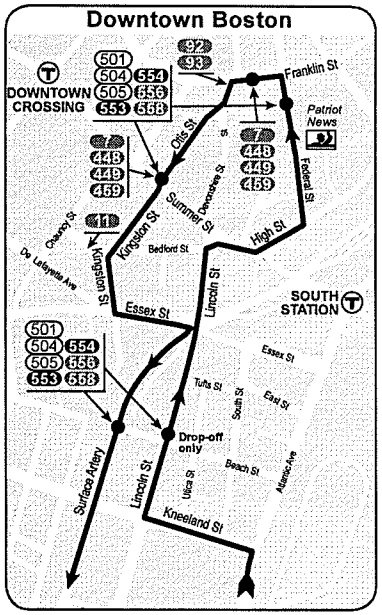
Inbound				Outbound			
Leave Cedarwood	Leave North Waltham	Arrive Watertown Sq.	Arrive University Park	Leave University Park	Leave Watertown Sq.	Arrive North Waltham	Arrive Cedarwood
5:40A	.....	5:56A	6:19A	5:00A	5:15A	.....	5:34A
6:10	.....	6:26	6:49	5:30	5:45	.....	6:04
6:45	.....	7:01	7:27	6:00	6:18	.....	6:39
m 7:20	.....	7:39	8:05	m 6:30	6:48	.....	7:10
e 8:00	.....	8:10	8:37	g 7:00	7:21	7:47A	.....
.....	g 7:55A	8:28	8:56	7:20	7:41	.....	e 7:52
8:35	.....	8:54	9:20	7:45	8:06	.....	8:30
.....	g 9:10	9:43	10:13	g 8:15	8:36	9:02	.....
m 9:45	.....	10:06	10:36	m 8:45	9:06	.....	9:31
.....	g 10:05	10:40	11:11	g 9:10	9:31	9:57	.....
10:30	.....	10:55	11:25	9:30	9:53	.....	10:23
e 10:50	.....	11:01	11:29	g 9:55	10:16	10:42	.....
.....	g 10:50	11:24	11:56	10:05	10:28	.....	e 10:42
m 11:15	.....	11:40	12:12	m 10:15	10:38	.....	11:08
e 11:45	.....	11:56	12:24	g 10:35	10:56	11:23	.....
.....	g 11:30	12:06P	12:38P	10:50	11:13	.....	11:43
				11:00	11:23	.....	e 11:37
e 12:10P	.....	12:21P	12:49P	g 11:15	11:38	12:10P	.....
12:00N	.....	12:25	12:57	11:25	11:48	.....	e 12:02P
e 12:30	.....	12:41	1:09	m 11:35	11:58	.....	12:28
.....	g 12:15P	12:51	1:21	11:45	12:08	.....	e 12:22
m 12:35	.....	12:58	1:30				
e 1:10	.....	1:21	1:49	h 12:00N	12:23P	1:01P	.....
.....	h 1:10	1:33	2:03	12:15P	12:38	.....	1:08P
1:20	.....	1:43	2:15	12:25	12:48	.....	e 1:02
e 1:35	.....	1:46	2:14	h 12:40	1:03	1:41	.....
e 1:55	.....	2:06	2:36	12:50	1:13	.....	e 1:27
.....	h 1:50	2:13	2:42	m 1:00	1:23	.....	1:53
m 2:05	.....	2:28	3:00	1:10	1:33	.....	e 1:47
e 2:35	.....	2:44	3:16	h 1:20	1:44	2:22	.....
.....	h 2:30	2:54	3:23	1:35	1:58	.....	2:28
2:40	.....	3:03	3:34	1:45	2:08	.....	e 2:22
e 3:10	.....	3:19	3:51	h 2:00	2:22	3:00	.....
.....	h 3:06	3:30	3:59	m 2:15	2:38	.....	3:08
m 3:15	.....	3:38	4:09	2:25	2:48	.....	e 3:02
e 3:35	.....	3:44	4:16	h 2:35	2:57	3:33	.....
e 3:50	.....	3:59	4:31	2:45	3:08	.....	e 3:22
.....	h 3:45	4:09	4:38	2:55	3:18	.....	3:48
3:55	.....	4:18	4:49	3:05	3:28	.....	e 3:42
e 4:15	.....	4:24	4:56	h 3:15	3:37	4:13	.....
e 4:30	.....	4:39	5:11	3:25	3:48	.....	e 4:02
.....	h 4:20	4:44	5:13	m 3:35	3:58	.....	4:28
m 4:40	.....	5:03	5:33	3:45	4:08	.....	e 4:22
e 5:00	.....	5:09	5:38	h 4:00	4:22	4:58	.....
.....	h 5:05	5:29	5:58	4:15	4:38	.....	e 4:52
e 5:28	.....	5:36	6:02	4:25	4:48	.....	5:17
5:25	.....	5:45	6:10	h 4:35	4:57	5:33	.....
e 5:45	.....	5:53	6:19	4:45	5:08	.....	e 5:20
.....	h 5:40	6:04	6:33	m 4:55	5:18	.....	5:46
m 5:55	.....	6:15	6:40	5:05	5:27	.....	e 5:39
e 6:10	.....	6:18	6:44	h 5:20	5:42	6:18	.....
e 6:20	.....	6:28	6:54	5:30	5:52	.....	e 6:04
.....	h 6:25	6:49	7:16	5:40	6:02	.....	e 6:14
6:45	.....	7:05	7:30	5:50	6:12	.....	6:38
e 7:10	.....	7:18	7:44	h 6:00	6:22	6:56	.....
.....	h 7:05	7:26	7:49	m 6:15	6:36	.....	7:01
m 7:10	.....	7:30	7:55	6:30	6:50	.....	e 7:02
7:55	.....	8:12	8:37	h 6:45	7:08	7:42	.....
.....	h 7:55	8:16	8:39	7:00	7:20	.....	7:45
m 8:18	.....	8:35	9:00	m 7:30	7:50	.....	8:12
e 8:33	.....	8:40	9:04	7:55	8:15	.....	e 8:26
8:55	.....	9:12	9:37	8:05	8:25	.....	8:46
e 9:25	.....	9:32	9:56	8:42	9:02	.....	e 9:13
9:55	.....	10:12	10:37	9:10	9:30	.....	9:51
m 10:30	.....	10:47	11:12	m 9:45	10:05	.....	10:26
11:10	.....	11:22	11:47	10:25	10:45	.....	11:06
12:00M	.....	12:12	12:37	11:15	11:35	.....	11:56
b 12:45A	.....	12:50	b 1:09	e 12:10A	12:30A	.....	e 12:41A
				aw 1:10	1:27	.....	.....

70 Sunday

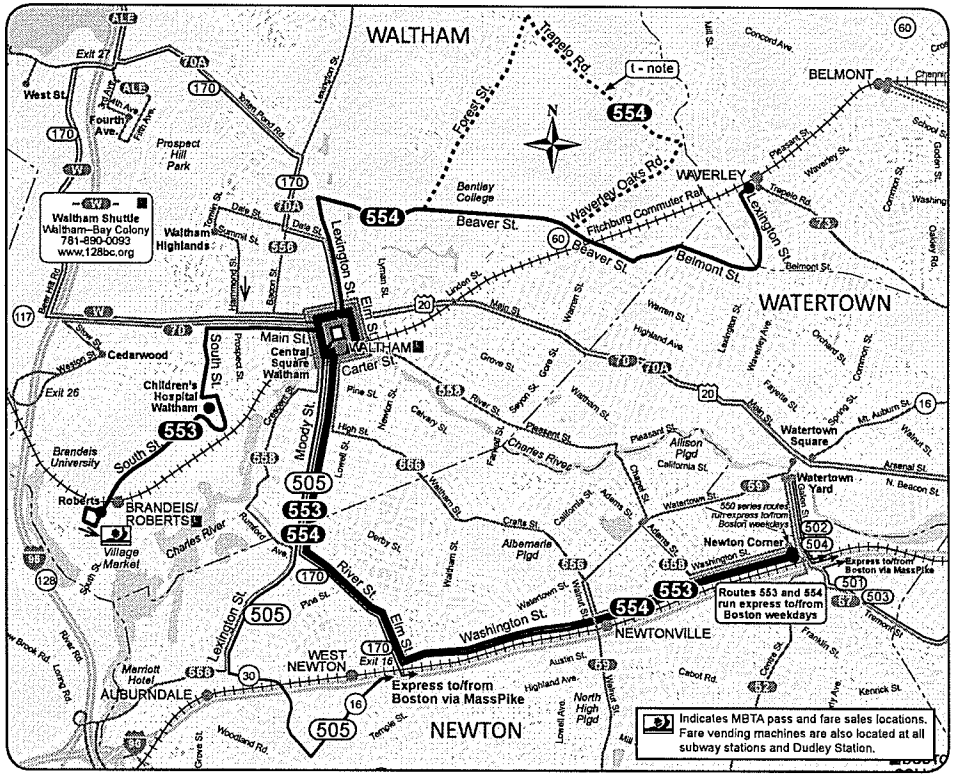
Inbound			Outbound		
Leave Cedarwood	Arrive Watertown Square	Arrive University Park	Leave University Park	Arrive Watertown Square	Arrive Cedarwood
6:45A	7:02A	7:25A	6:00A	6:16A	6:35A
m 7:30	7:47	8:10	m 6:45	7:02	7:23
8:15	8:34	8:57	7:30	7:47	8:08
m 9:00	9:19	9:42	m 8:15	8:33	8:54
9:25	9:44	10:08	8:40	8:58	9:19
m 10:00	10:20	10:46	m 9:10	9:28	9:52
10:25	10:45	11:11	9:35	9:54	10:18
m 10:50	11:10	11:36	m 9:55	10:14	10:38
11:15	11:35	12:01P	10:20	10:40	11:04
m 11:40	12:00N	12:28	m 10:45	11:05	11:29
			11:05	11:27	11:51
12:00N	12:21P	12:49P	m 11:25	11:47	12:11P
m 12:20P	12:41	1:09	11:45	12:07P	12:31
12:40	1:01	1:29			
m 1:00	1:21	1:49	m 12:05P	12:27P	12:52P
1:20	1:41	2:10	12:25	12:48	1:13
m 1:40	2:00	2:30	m 12:45	1:08	1:33
2:00	2:19	2:49	1:00	1:23	1:48
m 2:20	2:39	3:09	m 1:20	1:43	2:08
2:40	2:59	3:29	1:40	2:03	2:28
m 3:00	3:19	3:50	m 2:00	2:23	2:48
3:20	3:39	4:10	2:20	2:43	3:08
m 3:40	3:59	4:30	m 2:40	3:03	3:28
4:00	4:19	4:50	3:00	3:23	3:48
m 4:20	4:39	5:10	m 3:20	3:46	4:10
4:40	4:59	5:30	3:40	4:05	4:29
m 5:00	5:19	5:51	m 4:00	4:25	4:49
5:20	5:40	6:13	4:20	4:45	5:09
m 5:40	6:00	6:32	m 4:40	5:05	5:29
6:00	6:20	6:50	5:00	5:25	5:49
m 6:20	6:39	7:07	m 5:20	5:45	6:10
6:40	6:57	7:25	5:40	6:05	6:30
m 7:00	7:17	7:45	m 6:00	6:22	6:47
7:20	7:37	8:04	6:20	6:42	7:06
m 7:35	7:52	8:19	m 6:40	7:02	7:26
7:55	8:11	8:38	7:00	7:22	7:46
m 8:15	8:31	8:58	m 7:20	7:42	8:06
8:35	8:51	9:16	7:40	8:02	8:26
9:05	9:21	9:44	8:15	8:35	8:57
9:38	9:52	10:13	8:50	9:08	9:30
10:13	10:27	10:48	9:25	9:43	10:05
10:45	10:59	11:19	10:00	10:18	10:40
11:20	11:33	11:53	10:35	10:53	11:13
11:55	12:07A	12:27A	11:10	11:26	11:46
b 12:41A	12:47	b 1:03	e 12:05A	12:21A	e 12:32A
			aw 1:10	1:23	.....

All buses are accessible to persons with disabilities





Route 505 Express Bus–Central Square, Waltham - Downtown Boston
Route 553 Roberts - Downtown Boston
Route 554 Waverley Square - Downtown Boston

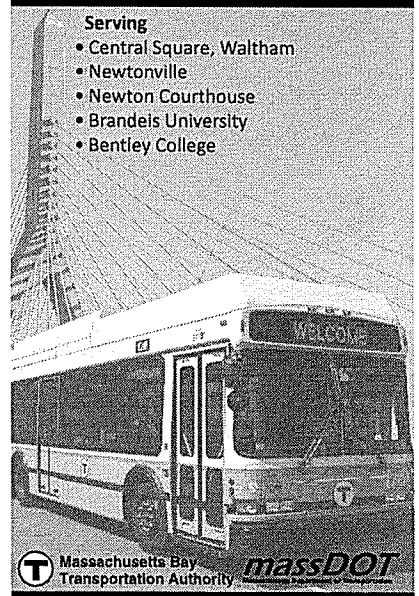


505•553•554

Effective September 2, 2018

505 Express–Central Square, Waltham-Downtown Boston
553 Roberts-Downtown Boston
554 Waverley Square-Downtown Boston

Serving
- Central Square, Waltham
- Newtonville
- Newton Courthouse
- Brandeis University
- Bentley College



Massachusetts Bay Transportation Authority

massDOT

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

505 Weekday

Inbound			Outbound		
Leave Central Sq. Waltham	Arrive West Newton	Arrive Federal & Franklin	Leave Federal & Franklin	Arrive West Newton	Arrive Central Sq. Waltham
5:55A	6:10A	6:29A	6:02A	6:18A	6:26A
6:10	6:25	6:44	6:31	6:49	7:00
6:25	6:40	6:59	6:48	7:06	7:17
6:40	6:55	7:20	7:05	7:24	7:36
6:53	7:08	7:35	7:23	7:43	7:55
7:05	7:21	7:50	7:40	8:00	8:12
7:17	7:33	8:06	7:58	8:18	8:30
7:28	7:44	8:19	8:18	8:39	8:51
7:39	7:57	8:32	8:40	9:01	9:12
7:50	8:09	8:44	9:05	9:24	9:35
8:03	8:22	8:57	9:35	9:54	10:05
8:17	8:36	9:11			
8:32	8:50	9:22	3:10P	3:31P	3:51P
8:49	9:05	9:33	3:40	4:07	4:27
9:07	9:22	9:48	4:00	4:27	4:47
9:25	9:39	10:05	4:15	4:42	5:03
9:46	10:00	10:25	4:30	4:57	5:22
10:15	10:29	10:49	4:45	5:16	5:41
			5:00	5:32	5:57
3:57P	4:09P	4:30P	5:15	5:47	6:09
4:30	4:43	5:07	5:30	6:01	6:21
4:53	5:06	5:30	5:45	6:13	6:33
5:10	5:23	5:47	6:00	6:25	6:45
5:29	5:42	6:06	6:15	6:40	7:00
5:49	6:02	6:26	6:35	7:00	7:16
6:02	6:15	6:35	6:55	7:16	7:32
6:25	6:37	6:55	7:20	7:40	7:56
6:38	6:50	7:08			
6:51	7:03	7:21			

Route 505
Outer Express Bus–
Central Square, Waltham-
Downtown Boston

No Route 505 service on weekends

The 505 route is not intended for local non-highway travel. Inbound bus stops before the route enters the highway are pickup only. Outbound bus stops after the route exits the highway are dropoff only. For local travel, please use Route 553, 554, or 558.

553 & 554 Weekday

Inbound					Outbound				
Leave Roberts	Leave Waverley Square	Lv/Arrive Central Sq. Waltham	Arrive Newton Corner	Arrive Downtown Boston	Leave Downtown Boston	Arrive Newton Corner	Arrive Central Sq. Waltham	Arrive Waverley Square	Arrive Roberts
6:25A	.....	6:36A	6:58A	7:19A	t 5:51A	6:04A	6:20A	6:41A	.....
6:50	.....	7:00	7:22	.....	5:58	6:13	6:29	.....	6:41A
.....	7:00A	7:14	7:37	8:02	t 6:15	6:28	6:45	7:07	.....
7:15	.....	7:26	7:49	8:18	6:20	6:35	6:51	.....	7:03
.....	7:30	7:44	8:07	8:32	6:43	6:58	7:14	.....	7:26
7:45	.....	7:58	8:21	8:50	t 6:50	7:07	7:24	7:46	.....
.....	8:10	8:24	8:47	9:10	7:40	7:56	8:18	.....	8:39
8:45	.....	8:58	9:21	9:42	8:10	8:27	8:48	9:04	.....
.....	9:10	9:22	9:42	10:01	8:40	8:56	9:17	.....	9:33
9:45	.....	9:56	10:17	10:34	9:16	9:31	9:53	10:07	.....
.....	10:10	10:22	10:42	11:01	9:45	10:01	10:22	.....	10:38
10:45	.....	10:56	11:17	11:37	10:10	10:23	10:45	10:59	.....
.....	11:10	11:22	11:42	12:01	10:40	10:56	11:17	.....	11:36
11:40	.....	11:53	12:17P	12:37P	11:10	11:23	11:45	11:59	.....
					11:40	11:54	12:16P	.....	12:38P
.....	12:10P	12:22P	12:42P	1:01P					
12:40P	.....	12:53	1:17	1:36	12:10P	12:25P	12:47P	1:03P	.....
.....	1:10	1:22	1:42	2:01	12:40	12:55	1:17	.....	1:34P
1:40	.....	1:53	2:16	2:36	1:10	1:25	1:47	2:03	.....
.....	2:10	2:22	2:42	3:02	1:40	1:55	2:17	.....	2:33
2:40	.....	2:53	3:16	3:36	2:10	2:25	2:49	3:07	.....
.....	3:10	3:23	3:44	4:04	2:40	2:56	3:23	.....	3:37
3:45	.....	3:58	4:21	4:41	3:10	3:25	3:52	4:04	.....
.....	4:15	4:28	4:51	5:16	3:45	4:01	4:28	.....	4:42
4:50	.....	5:03	5:26	5:46	4:05	4:22	4:52	5:09	.....
.....	t 5:20	5:37	5:59	6:26	4:35	4:51	5:18	.....	5:37
5:50	.....	6:03	6:26	6:46	5:04	5:33	6:06	6:23	.....
.....	t 6:28	6:45	7:05	7:25	5:35	6:01	6:28	.....	6:41
6:50	.....	7:01	7:19	7:38	6:10	6:37	7:04	7:19	.....
.....	t 7:25	7:42	7:59	8:19	6:40	6:56	7:22	.....	7:35
.....	.....	c 7:50	8:07	8:30	c 7:00	7:22	7:47	.....	.....
.....	.....	c 8:20	8:37	9:00	c 7:30	7:50	8:10	.....	.....
.....	.....	c 9:05	9:20	9:41	c 7:50	8:11	8:28	.....	.....
					c 8:20	8:41	9:00	.....	.....
					c 9:50	10:10	10:29	.....	.....

Route 554 indicated by shaded areas

c - To/from Central Square, Waltham via Copley Square
t - Via Trapelo Road

Route 553
Roberts or Central Square, Waltham-Downtown Boston

Route 554
Waverley Square-Downtown Boston

553 Saturday

Inbound		
Leave Roberts	Arrive Central Sq. Waltham	Arrive Newton Corner
6:30A	6:38A	6:56A
7:15	7:23	7:41
8:00	8:10	8:29
8:45	8:55	9:14
9:30	9:40	10:03
10:15	10:25	10:46
11:00	11:12	11:33
11:45	11:58	12:21P
12:30P	12:43P	1:07P
1:15	1:26	1:50
2:00	2:12	2:34
2:45	2:57	3:19
3:30	3:42	4:04
4:15	4:27	4:49
5:00	5:12	5:35
5:45	5:56	6:20
6:30	6:40	7:01
7:15	7:25	7:46

553 Saturday

Outbound		
Leave Newton Corner	Arrive Central Sq. Waltham	Arrive Roberts
6:30A	6:42A	6:54A
7:15	7:28	7:41
8:00	8:13	8:26
8:45	9:00	9:14
9:30	9:45	9:59
10:15	10:33	10:49
11:00	11:18	11:34
11:45	12:06P	12:22P
12:30P	12:50P	1:05P
1:15	1:35	1:50
2:00	2:19	2:33
2:45	3:04	3:18
3:30	3:49	4:03
4:15	4:33	4:47
5:00	5:18	5:32
5:45	6:03	6:17
6:30	6:48	7:02
7:15	7:31	7:45

No Route 553 service on Sunday

No Route 554 service on weekends

All buses are accessible to persons with disabilities

Outer Express–Route 505 fares

Fare	Outer Express	Outer Express + Local Bus	Outer Express + Subway
CharlieCard	$5.25	$5.25	$5.25
CharlieTicket	$7.00	$9.00	$9.75
Cash-on-Board	$7.00	$9.00	$9.75
Student/Youth*	$3.50	$3.50	$3.50
Senior/TAP**	$3.50	$3.50	$3.50

VALID PASSES: 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+, and persons with disabilities.

NO local fare applies for any portion of Route 505

Route 553 & 554 fares

Fare	Local Bus	Inner Express	Inner Express + Local Bus	Inner Express + Subway
CharlieCard	$1.70	$4.00	$4.00	$4.00
CharlieTicket	$2.00	$5.00	$7.00	$7.75
Cash-on-Board	$2.00	$5.00	$7.00	$7.75
Student/Youth*	$0.85	$2.50	$2.50	$2.50
Senior/TAP**	$0.85	$2.50	$2.50	$2.50

VALID PASSES: Inner Express Bus ($128/mo.), Outer Express Bus ($168/mo.) commuter rail zone 1 or higher on express and 1A and higher on local, 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.

Local bus fare applies if your trip does not include Masspike

Fall 2018 & Winter 2019 Holidays
9/3/18: see Sunday 10/8/18: see Weekday
11/22/18, 12/25/18, 1/1/19: see Sunday 1/21/19 & 2/18/19: see Saturday

□ Sight Line Analysis

Stopping Sight Distance - Posted

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	25	91.875	59.9	151.8
Direction 2	SB	25	91.875	59.9	151.8

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	25	25
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance - 85th Percentile

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	29	106.575	80.6	187.2
Direction 2	SB	29	106.575	80.6	187.2

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	29	29
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Intersection Sight Distance Calculations

Source: *A Policy on Geometric Design of Highways and Street, 6th Edition;* AASHTO; 2011.

Passenger Car
ISD = 1.47 * V * t

V = speed
t = time gap

t = 7.5 s for a passenger car for Left Turn from a Stop
t = 6.5 s for a passenger car for Right Turn from a Stop

Posted (Regulatory) Speed Limit

Lexington Street North ISD = 1.47 * 25 * 7.5 = 276 ft **SAY 280 ft**
(left-turn from a stop)

Lexington Street South ISD = 1.47 * 25 * 6.5 = 239 ft **SAY 240 ft**
(right-turn from a stop)

□ Background Growth

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 691 - QUINCY - RTE.I-93 - NORTH OF RTE.28

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	173,000	175,000	177,697	194,334	196,834	199,477	196,208	194,125	190,885	186,291	176,509	174,000	186,197
	-2%	0%	4%	-1%	-1%	0%	-1%	-1%	1%	1%	3%	4%	0.5%
11	166,541	175,019	190,696	192,155	193,034	197,594	193,303	191,197	193,140	188,694	187,378	187,895	188,054
	-2%	6%	0%	0%	1%	-1%	-1%	3%	-1%	-2%	0%	-3%	-0.1%
12	164,007	185,226	190,193	192,337	194,846	195,145	191,419	196,457	190,548	185,609	186,469	181,669	187,827
	9%	-1%	-5%	-3%	-1%	0%	0%	1%	0%	2%	-1%	-3%	-0.1%
13	179,468	182,613	180,861	187,402	193,159	194,612	192,130	197,467	191,411	*190,128*	185,233	176,163	187,554
	-8%	-7%	3%	3%	1%	2%	1%	0%	1%	1%	0%	5%	0.2%
14	165,955	170,581	187,003	193,263	194,348	198,176	193,591	197,456	193,827	*192,895*	185,667	185,147	188,159
	3%	-7%	-8%	-10%	-8%	-13%	-3%	3%	3%	2%	4%	4%	-1.4%
15	171,029	159,322	171,290	174,319	178,128	172,060	187,071	202,569	198,773	*197,111*	192,381	192,770	183,069
	4%	9%	8%	7%	7%	3%	5%	1%	1%	1%	1%	1%	3.8%
17	185,127	189,054	199,012	199,259	202,004	181,236	205,446	207,586	200,920	*199,524*	198,080	194,984	196,853
Seasonal Adjustment Factor	1.09	1.07	1.02	0.99	0.98	0.99	0.97	0.95	0.97	0.98	1.01	1.02	
(to average month)												**Growth**	**0.47%**

STATION 703 - ABINGTON - RTE.123 - AT THE BROCKTON C.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	12,251	13,199	13,301	13,860	13,231	13,817	13,354	*13,212*	14,037	13,712	13,161	13,327	13,372
	0%	0%	2%	1%	5%	1%	0%	1%	-1%	0%	2%	-1%	0.8%
10	12,196	13,134	13,560	14,051	13,835	13,900	13,353	13,338	13,928	13,733	13,414	*13,225*	13,472
	-5%	-4%	-1%	-4%	-3%	-2%	-3%	-2%	-1%	-2%	0%	1%	-2.0%
11	11,629	12,651	13,451	13,518	13,476	13,655	12,907	*13,088*	13,778	13,495	13,434	13,377	13,205
	5%	4%	0%	-1%	0%	-1%	-6%	0%	-2%	1%	0%	-2%	-0.3%
12	12,181	13,151	13,410	13,379	13,452	13,479	12,127	*13,103*	13,441	13,679	13,452	13,136	13,166
	1%	-6%	-4%	2%	0%	-1%	7%	0%	0%	0%	-2%	0%	-0.3%
13	12,347	12,336	12,870	13,591	13,426	13,372	12,964	*13,064*	13,462	13,726	13,217	13,081	13,121
	-4%	3%	3%	-2%	-1%	1%	-2%	-1%	-1%	-3%	-3%	2%	-0.5%
14	11,894	12,651	13,252	13,385	13,345	13,524	12,759	*12,893*	13,376	13,379	12,882	13,315	13,055
	1%	-5%	-5%	-2%	0%	-1%	1%	0%	-1%	-1%	0%	-2%	-1.3%
15	11,974	11,975	12,649	13,151	13,378	13,433	12,829	12,941	13,230	*13,222*	12,868	12,985	12,886
	1%	3%	3%	-1%	-2%	1%	-1%	0%	-1%	-1%	-1%	0%	0.1%
16	12,035	12,304	13,075	13,076	13,171	13,574	12,742	12,986	13,061	*13,140*	12,743	12,940	12,904
Seasonal Adjustment Factor	1.09	1.04	1.00	0.97	0.98	0.97	1.02	1.01	0.97	0.97	1.00	1.00	
(to average month)												**Growth**	**-0.50%**

STATION 4165 - I-95/ ROUTE 128 SOUTH OF I-90

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
12	130,033	133,659	138,451	142,034	158,583	148,787	138,599	*144,999*	141,340	146,271	140,898	128,666	141,027
	1%	-6%	0%	3%	-7%	1%	10%	3%	6%	5%	2%	1%	1.4%
13	131,812	125,662	138,122	145,760	147,000	149,925	151,813	149,393	150,507	153,009	143,498	130,116	143,053
	-5%	1%	3%	3%	3%	3%	-5%	0%	1%	-1%	-1%	6%	0.6%
14	125,340	127,134	142,024	150,125	151,576	153,916	144,679	149,503	151,538	152,148	141,875	137,826	143,974
	6%	1%	2%	0%	1%	1%	1%	1%	0%	1%	2%	0%	1.2%
16	139,436	130,154	148,054	149,295	153,957	156,496	147,414	151,081	152,186	154,663	146,935	137,768	147,287
	-3%	0%	-12%	-3%	0%	0%	0%	-1%	1%	1%	1%	7%	-0.8%
17	134,884	130,641	129,731	144,492	153,434	156,333	147,884	149,113	154,281	155,618	149,129	147,141	146,057
Seasonal Adjustment Factor	1.09	1.12	1.04	0.99	0.94	0.94	0.99	0.97	0.96	0.95	1.00	1.06	
(to average month)												**Growth**	**0.60%**

STATION 6255 - WEYMOUTH - RTE.3 - NORTH OF RTE.18

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
09	120,200	123,983	124,807	134,354	135,239	143,114	143,685	144,937	140,079	137,288	138,708	136,428	135,235
	4%	3%	6%	-1%	0%	-1%	-1%	-2%	-3%	-3%	-1%	-7%	-0.6%
10	125,304	127,637	132,301	133,124	135,880	141,633	141,706	142,327	135,767	133,473	137,526	127,100	134,482
	-3%	-1%	-1%	-6%	0%	0%	-1%	0%	-1%	-2%	-3%	-1%	-1.5%
12	118,936	125,494	129,712	116,911	136,235	140,277	139,048	142,140	132,674	128,923	129,593	125,409	130,446
	4%	-7%	-4%	13%	0%	-1%	1%	0%	1%	4%	-1%	-1%	0.3%
13	123,783	116,501	124,813	131,533	136,712	138,977	140,057	141,851	133,978	134,144	128,712	124,607	131,306
	-8%	2%	2%	0%	-1%	0%	5%	4%	2%	-1%	11%	4%	0.9%
14	113,701	118439	127037	131150	135,571	139,606	147,748	147,593	136,789	132,227	143,498	130,116	133,623
	3%	1%	1%	1%	1%	1%	-2%	-2%	0%	1%	-5%	0%	-0.2%
16	120,926	121003	128951	132915	138,071	142,406	140,685	142,991	135,630	134,163	129,976	128,837	133,046
	3%	3%	0%	1%	0%	0%	-1%	-1%	-1%	-1%	1%	0%	0.1%
17	124,154	124154	129045	134625	137,743	142,253	139,660	141,524	134,110	133,079	131,317	128,775	133,370
Seasonal Adjustment Factor	1.10	1.09	1.04	1.02	0.98	0.94	0.94	0.93	0.98	1.00	0.99	1.03	
(to average month)												**Growth**	**-0.16%**

Average	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Seasonal Adjustment Factor	*1.09*	*1.08*	*1.02*	*0.99*	*0.97*	*0.96*	*0.98*	*0.96*	*0.97*	*0.98*	*1.00*	*1.03*
(to average month)												

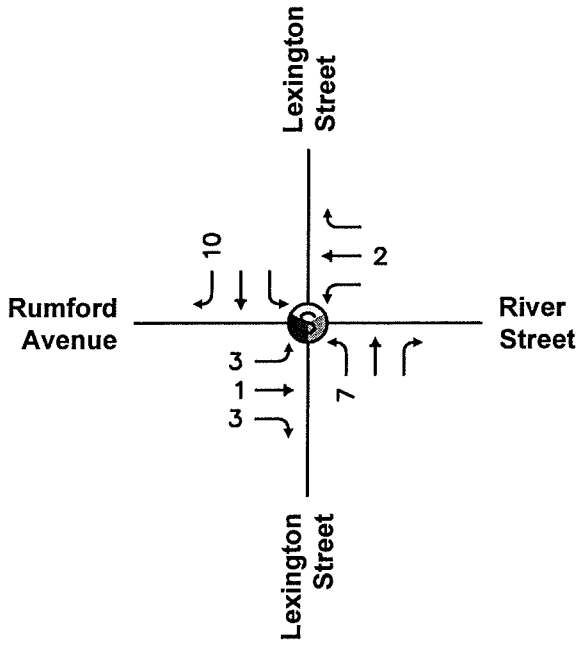
ITALICS = ESTIMATED DATA

MADT

Average Yearly Growth Calculated 0.1%

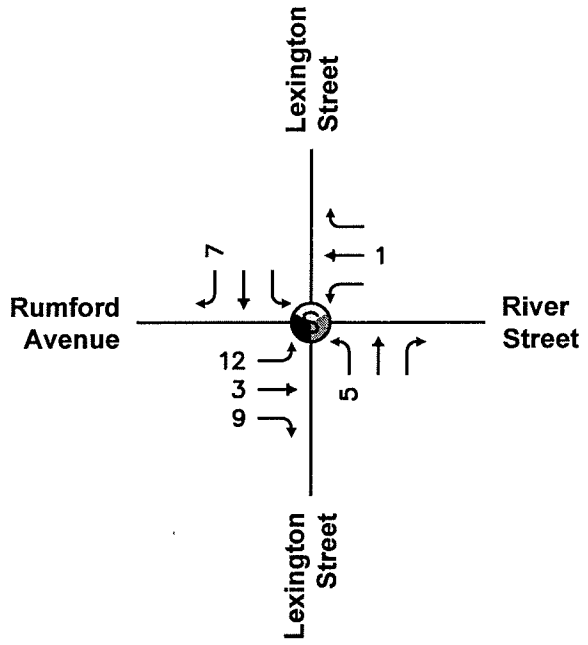
Yearly Growth Factor Used 0.5%

	Medical	Storage	Total
Enter	12	7	19
Exit	3	4	7
Total	15	11	26



Weekday Morning Peak Hour

	Medical	Storage	Total
Enter	5	8	13
Exit	14	10	24
Total	19	18	37



North

Scale: Not to Scale

NOTES:

NEGL. = Negligible

= Signalized Intersection

Weekday Evening Peak Hour

Attachments

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

143 Rumford Avenue
Site Generated Trips
Weekday Peak Hour Traffic Volumes

Date: December 2018
Dwg No. 888 MR01.dwg

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 151 - Mini Warehousing

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
Independent Variable (X): 107.397

AVERAGE WEEKDAY DAILY

T = 1.51 * (X)
T = 1.51 * 107.397
T = 162.17
T = 162 vehicle trips
with 50% (81 vpd) entering and 50% (81 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.10 * (X)
T = 0.10 * 107.397
T = 10.74
T = 11 vehicle trips
with 60% (7 vph) entering and 40% (4 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.17 * (X)
T = 0.17 * 107.397
T = 18.26
T = 18 vehicle trips
with 47% (8 vph) entering and 53% (10 vph) exiting.

SATURDAY DAILY

T = 1.95 * (X) (Small Sample Size - Use with Caution)
T = 1.95* 107.397
T = 209.42
T = 210 vehicle trips
with 50% (105 vpd) entering and 50% (105 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.31 * (X) (Small Sample Size - Use with Caution)
T = 0.31 * 107.397
T = 33.29
T = 33 vehicle trips
with 59% (19 vph) entering and 41% (14 vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition

Land Use Code (LUC) 720 - Medical-Dental Office Building

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
Independent Variable (X): 5.52

Average Weekday Daily

T = 34.80 * (X)
T = 34.80 * 5.52
T = 192.10
T = 192 vehicle trips
with 50% (96 vpd) entering and 50% (96 vpd) exiting.

Weekday Morning Peak Hour Of Adjacent Street Traffic

T = 2.78* (X)
T = 2.78* 5.52
T = 15.35
T = 15 vehicle trips
with 79% (12 vpd) entering and 21% (3 vpd) exiting.

Weekday Evening Peak Hour Of Adjacent Street Traffic

T = 3.46* (X)
T = 3.46* 5.52
T = 19.10
T = 19 vehicle trips
with 28% (5 vpd) entering and 72% (14 vpd) exiting.

Saturday Daily

T = 8.57 * (X) (Small Sample Size - Use with Caution)
T = 8.57 * 5.52
T = 47.31
T = 48 vehicle trips
with 50% (24 vpd) entering and 50% (24 vpd) exiting.

Saturday Midday Peak Hour Of Generator

T = 3.10 * (X) (Small Sample Size - Use with Caution)
T = 3.10 * 5.52
T = 17.11
T = 17 vehicle trips
with 57% (10 vph) entering and 43% (7 vph) exiting.

□ Trip Generation Calculations

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 210 - Single-Family Detached Housing

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 1

AVERAGE WEEKDAY DAILY

T = 9.5* (X)
T = 9.5* 1
T = 9.50
T = 10 vehicle trips
with 50% (5 vpd) entering and 50% (5 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.74* (X)
T = 0.74 * 1
T = 0.74
T = 1 vehicle trips
with 25% (0 vph) entering and 75% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.99* (X)
T = 0.99* 1
T = 0.99
T = 1 vehicle trips
with 63% (1 vph) entering and 37% (0 vph) exiting.

SATURDAY DAILY

T = 9.54* (X)
T = 9.54* 1
T = 9.54
T = 10 vehicle trips
with 50% (5 vph) entering and 50% (5 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.93* (X)
T = 0.93* 1
T = 0.93
T = 1 vehicle trips
with 54% (1 vph) entering and 46% (0 vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 220 - Multifamily Housing (Low-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 3

AVERAGE WEEKDAY DAILY

T = 7.32 * X
T = 7.32 * 3
T = 21.96
T = 22 vehicle trips
with 50% (**11** vpd) entering and 50% (**11** vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.46 * X
T = 0.46 * 3
T = 1.38
T = 1 vehicle trips
with 23% (**0** vph) entering and 77% (**1** vph) exiting.

WEEKDAY MORNING PEAK HOUR OF GENERATOR

T = 0.56 * X
T = 0.56 * 0
T = 1.68
T = 2 vehicle trips
with 28% (**1** vph) entering and 72% (**1** vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.56 * X
T = 0.56 * 3
T = 1.68
T = 2 vehicle trips
with 63% (**1** vph) entering and 37% (**1** vph) exiting.

WEEKDAY EVENING PEAK HOUR OF GENERATOR

T = 0.67 * X
T = 0.67 * 0
T = 2.01
T = 2 vehicle trips
with 59% (**1** vph) entering and 41% (**1** vph) exiting.

SATURDAY DAILY

T = 8.14 * X
T = 8.14 * 3
T = 24.42
T = 24 vehicle trips
with 50% (**12** vpd) entering and 50% (**12** vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.70 * X
T = 0.70 * 3
T = 2.10
T = 2 vehicle trips
with 49% (**1** vph) entering and 51% (**1** vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 220 - Multifamily Housing (Low-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 24

AVERAGE WEEKDAY DAILY

T = 7.32 * X
T = 7.32 * 24
T = 175.68
T = 176 vehicle trips
with 50% (88 vpd) entering and 50% (88 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.46 * X
T = 0.46 * 24
T = 11.04
T = 11 vehicle trips
with 23% (3 vph) entering and 77% (8 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.56 * X
T = 0.56 * 24
T = 13.44
T = 13 vehicle trips
with 63% (8 vph) entering and 37% (5 vph) exiting.

SATURDAY DAILY

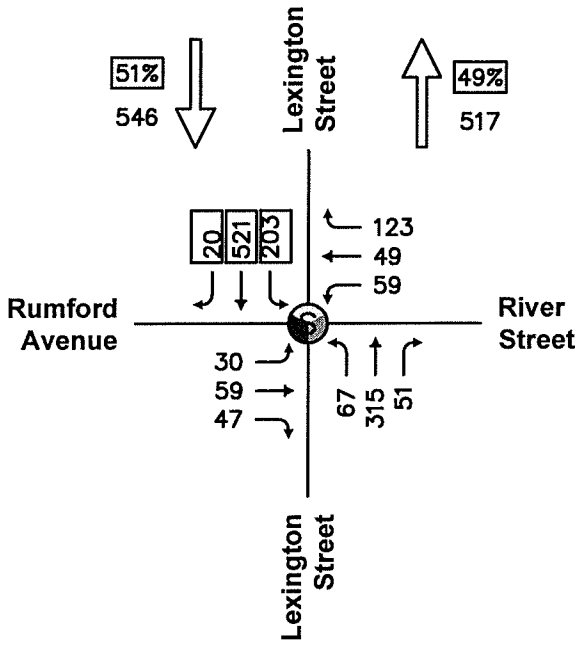
T = 8.14 * X
T = 8.14 * 24
T = 195.36
T = 196 vehicle trips
with 50% (98 vpd) entering and 50% (98 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.70 * X
T = 0.70 * 24
T = 16.80
T = 17 vehicle trips
with 49% (8 vph) entering and 51% (9 vph) exiting.

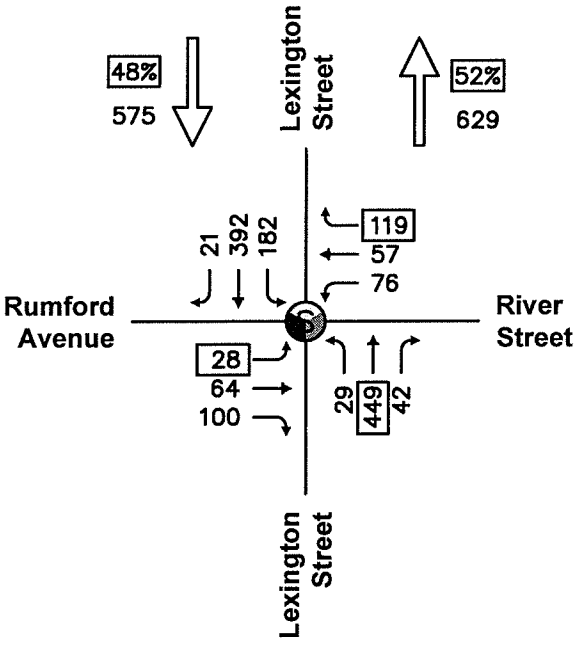
□ Trip Distribution Calculations

VOLUME OUT	%
203	14%
521	36%
20	1%
744	51%



Weekday Morning Peak Hour

VOLUME IN	%
119	10%
449	39%
28	3%
596	52%



North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
= Signalized Intersection

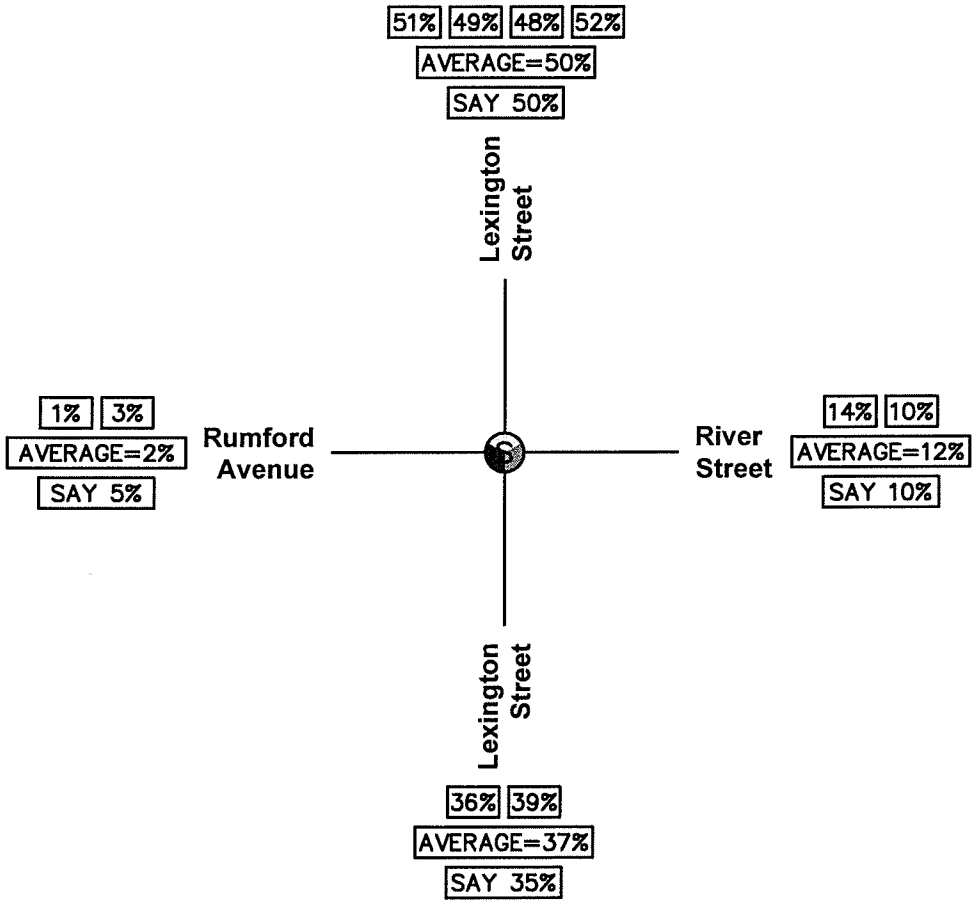
Weekday Evening Peak Hour

Attachments

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Trip Distribution Calculation

Date: December 2018
Dwg No. 888 MR01.dwg



Scale: Not to Scale

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Trip Distribution Calculation

Date: December 2018
Dwg No. 888 MR01.dwg

□ Capacity Analysis

LEVEL OF SERVICE METHODOLOGY

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

Signalized Intersection Performance Measures

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with 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 over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

The LOS for signalized intersections are calculated using the operational analysis methodology of the 2010 *Highway Capacity Manual*.[1] This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. LOS 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 A1** summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table A1
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[1]

Level of Service	Control (Signal) Delay per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[1]Source: *Highway Capacity Manual 2010;* Transportation Research Board; Washington, DC; 2010.

[1]*Highway Capacity Manual* 2010; Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersection Performance Measures

The six LOS designations 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 LOS designations of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual.*[2] LOS 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 LOS at unsignalized intersections are also given in the *Highway Capacity Manual 2010*. **Table A2** summarizes the relationship between LOS and average control delay.

Table A2
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[1]

Average Control Delay (seconds per vehicle)	Level of Service	
	v/c ≤ 1	v/c > 1
≤ 10.0	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
>50.0	F	F

[1]Source: *Highway Capacity Manual 2010,* Transportation Research Board; Washington, DC; 2010.

[2] ibid

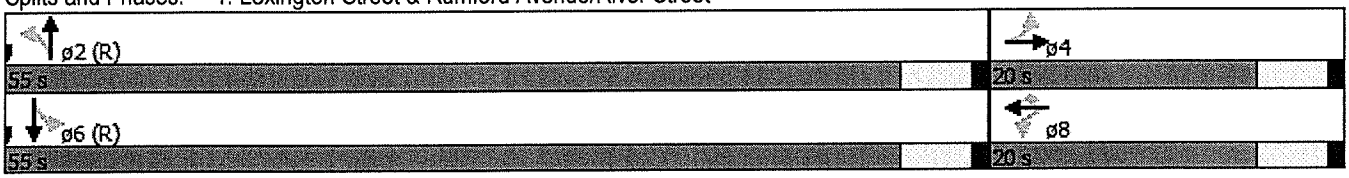
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	59	47	59	49	123	67	315	51	203	521	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850		0.984			0.996	
Flt Protected		0.989			0.973			0.992			0.987	
Satd. Flow (prot)	0	1716	0	0	1732	1473	0	1760	0	0	1758	0
Flt Permitted		0.909			0.747			0.809			0.757	
Satd. Flow (perm)	0	1577	0	0	1330	1473	0	1435	0	0	1349	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				134		19			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	33%	10%	9%	9%	4%	6%	2%	6%	6%	9%	5%	10%
Adj. Flow (vph)	33	64	51	64	53	134	73	342	55	221	566	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	0	0	117	134	0	470	0	0	809	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.43			0.44	0.33		0.49			0.90	
Control Delay		25.0			32.4	7.8		8.0			26.3	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		25.0			32.4	7.8		8.0			26.3	
LOS		C			C	A		A			C	
Approach Delay		25.0			19.3			8.0			26.3	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)		47			48	0		87			265	
Queue Length 95th (ft)		100			97	42		149			#565	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		341			266	401		963			900	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.43			0.44	0.33		0.49			0.90	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 20.0 Intersection LOS: C
Intersection Capacity Utilization 90.0% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	4	513	1	2	544
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	98	98	98	98	98	98
Heavy Vehicles, %	0	0	6	0	0	5
Mvmt Flow	5	4	523	1	2	555

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1083	524	0	0	524	0
Stage 1	524	-	-	-	-	-
Stage 2	559	-	-	-	-	-
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	243	557	-	-	1053	-
Stage 1	598	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	242	557	-	-	1053	-
Mov Cap-2 Maneuver	242	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	574	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	323	1053	-
HCM Lane V/C Ratio	-	-	0.028	0.002	-
HCM Control Delay (s)	-	-	16.5	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

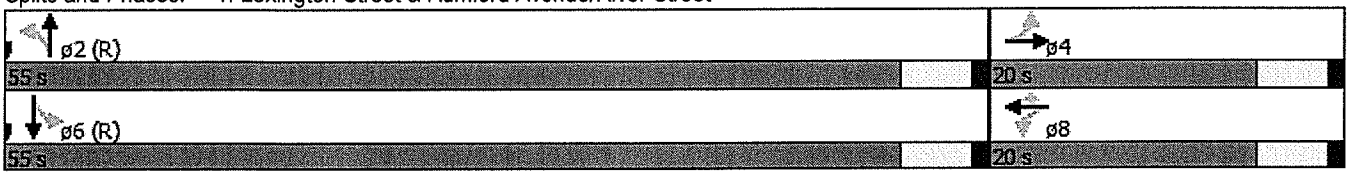
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	64	100	76	57	119	29	449	42	182	392	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.930				0.850		0.989			0.995	
Flt Protected		0.993			0.972			0.997			0.985	
Satd. Flow (prot)	0	1854	0	0	1754	1531	0	1829	0	0	1838	0
Flt Permitted		0.937			0.619			0.954			0.718	
Satd. Flow (perm)	0	1749	0	0	1117	1531	0	1750	0	0	1340	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				119		13			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	6%	1%	11%	2%	10%	2%	2%	2%	1%	1%
Adj. Flow (vph)	29	67	104	79	59	124	30	468	44	190	408	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	200	0	0	138	124	0	542	0	0	620	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.50			0.62	0.31		0.46			0.69	
Control Delay		22.7			41.4	8.4		7.4			12.8	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		22.7			41.4	8.4		7.4			12.8	
LOS		C			D	A		A			B	
Approach Delay		22.7			25.8			7.4			12.8	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)		55			59	2		101			151	
Queue Length 95th (ft)		117			#132	43		160			272	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		401			223	401		1171			895	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.50			0.62	0.31		0.46			0.69	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 14.3 Intersection LOS: B
Intersection Capacity Utilization 116.8% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	3	3	626	5	5	570
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	98	98	98	98	98	98
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	3	3	639	5	5	582

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1233	641	0	0	644	0
Stage 1	641	-	-	-	-	-
Stage 2	592	-	-	-	-	-
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	197	478	-	-	951	-
Stage 1	528	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	195	478	-	-	951	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.3	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	277	951	-
HCM Lane V/C Ratio	-	-	0.022	0.005	-
HCM Control Delay (s)	-	-	18.3	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

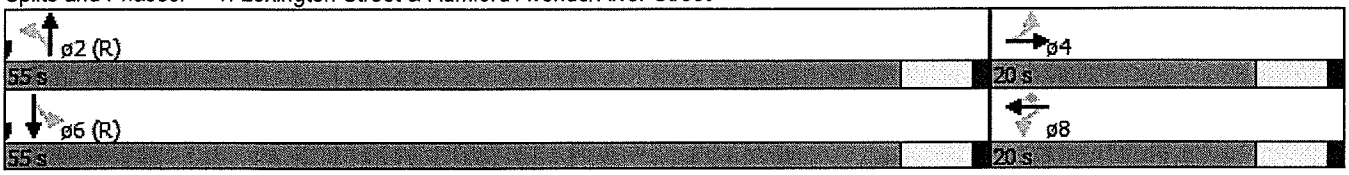
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↰	↱		↕			↕	
Volume (vph)	34	61	51	60	52	126	76	323	52	208	534	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850		0.984			0.995	
Flt Protected		0.988			0.974			0.992			0.987	
Satd. Flow (prot)	0	1711	0	0	1735	1473	0	1761	0	0	1756	0
Flt Permitted		0.900			0.734			0.782			0.751	
Satd. Flow (perm)	0	1558	0	0	1307	1473	0	1388	0	0	1336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				137		19			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	33%	10%	9%	9%	4%	6%	2%	6%	6%	9%	5%	10%
Adj. Flow (vph)	37	66	55	65	57	137	83	351	57	226	580	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	158	0	0	122	137	0	491	0	0	840	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.47			0.47	0.34		0.53			0.94	
Control Delay		26.2			33.3	7.8		8.7			32.7	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		26.2			33.3	7.8		8.7			32.7	
LOS		C			C	A		A			C	
Approach Delay		26.2			19.8			8.7			32.7	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)		52			51	0		95			297	
Queue Length 95th (ft)		107			101	43		165			#602	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		337			261	404		931			892	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.47			0.47	0.34		0.53			0.94	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 23.4 Intersection LOS: C
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	4	529	1	2	568
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	98	98	98	98	98	98
Heavy Vehicles, %	0	0	6	0	0	5
Mvmt Flow	5	4	540	1	2	580

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1124	540	0	0	541	0
Stage 1	540	-	-	-	-	-
Stage 2	584	-	-	-	-	-
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	229	546	-	-	1038	-
Stage 1	588	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	546	-	-	1038	-
Mov Cap-2 Maneuver	228	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	559	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	308	1038	-
HCM Lane V/C Ratio	-	-	0.03	0.002	-
HCM Control Delay (s)	-	-	17	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

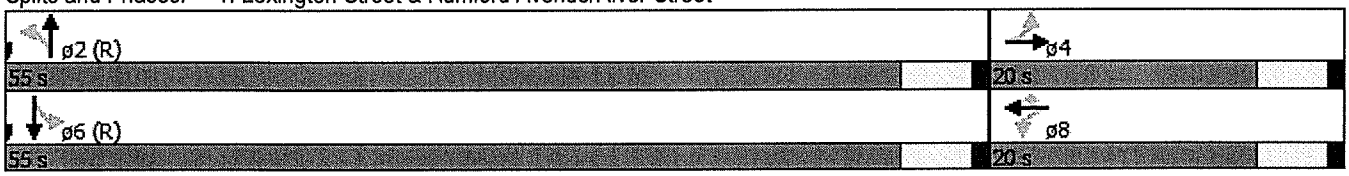
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	69	112	78	59	122	35	460	43	187	402	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.932				0.850		0.989			0.994	
Flt Protected		0.991			0.972			0.997			0.985	
Satd. Flow (prot)	0	1857	0	0	1754	1531	0	1828	0	0	1836	0
Flt Permitted		0.912			0.575			0.941			0.712	
Satd. Flow (perm)	0	1709	0	0	1038	1531	0	1725	0	0	1327	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61				118		13			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	6%	1%	11%	2%	10%	2%	2%	2%	1%	1%
Adj. Flow (vph)	43	72	117	81	61	127	36	479	45	195	419	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	142	127	0	560	0	0	644	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.59			0.69	0.32		0.49			0.73	
Control Delay		27.0			47.3	8.8		7.7			14.0	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		27.0			47.3	8.8		7.7			14.0	
LOS		C			D	A		A			B	
Approach Delay		27.0			29.1			7.7			14.0	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)		71			62	3		106			163	
Queue Length 95th (ft)		142			#144	45		170			300	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		390			207	400		1154			887	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.59			0.69	0.32		0.49			0.73	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 115.3% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	3	3	654	5	5	591
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	98	98	98	98	98	98
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	3	3	667	5	5	603

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1283	670	0	0	672	0
Stage 1	670	-	-	-	-	-
Stage 2	613	-	-	-	-	-
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	184	460	-	-	928	-
Stage 1	512	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	183	460	-	-	928	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	512	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	262	928	-
HCM Lane V/C Ratio	-	-	0.023	0.005	-
HCM Control Delay (s)	-	-	19.1	8.9	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

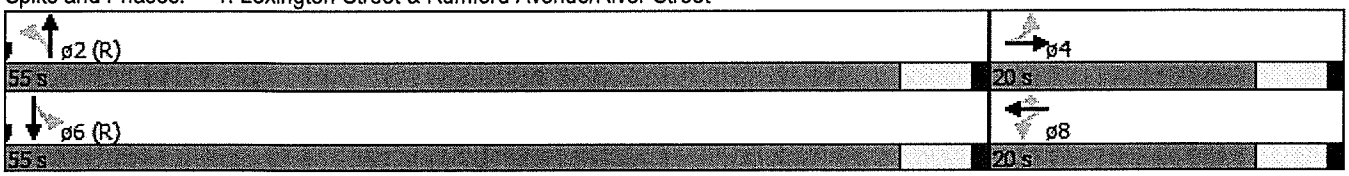
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	61	51	60	52	126	76	324	52	209	536	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850		0.984			0.994	
Flt Protected		0.988			0.974			0.992			0.987	
Satd. Flow (prot)	0	1711	0	0	1735	1473	0	1761	0	0	1754	0
Flt Permitted		0.900			0.734			0.781			0.750	
Satd. Flow (perm)	0	1558	0	0	1307	1473	0	1386	0	0	1333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				137		19			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	33%	10%	9%	9%	4%	6%	2%	6%	6%	9%	5%	10%
Adj. Flow (vph)	37	66	55	65	57	137	83	352	57	227	583	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	158	0	0	122	137	0	492	0	0	845	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.47			0.47	0.34		0.53			0.95	
Control Delay		26.2			33.3	7.8		8.7			34.1	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		26.2			33.3	7.8		8.7			34.1	
LOS		C			C	A		A			C	
Approach Delay		26.2			19.8			8.7			34.1	
Approach LOS		C			B			A			C	
Queue Length 50th (ft)		52			51	0		96			303	
Queue Length 95th (ft)		107			101	43		166			#608	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		337			261	404		930			890	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.47			0.47	0.34		0.53			0.95	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 24.2 Intersection LOS: C
Intersection Capacity Utilization 90.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	0	4	5	0	4	1	529	1	2	568	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	4	0	0	0	0	6	0	0	5	0
Mvmt Flow	0	0	4	5	0	4	1	540	1	2	580	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1129	1128	581	1129	1128	540	582	0	0	541	0	0
Stage 1	585	585	-	542	542	-	-	-	-	-	-	-
Stage 2	544	543	-	587	586	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
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	3.5	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	183	206	510	183	206	546	1002	-	-	1038	-	-
Stage 1	501	501	-	528	523	-	-	-	-	-	-	-
Stage 2	527	523	-	499	500	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	181	205	510	181	205	546	1002	-	-	1038	-	-
Mov Cap-2 Maneuver	181	205	-	181	205	-	-	-	-	-	-	-
Stage 1	500	499	-	527	522	-	-	-	-	-	-	-
Stage 2	523	522	-	494	499	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	19.5	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	510	258	1038	-	-
HCM Lane V/C Ratio	0.001	-	-	0.008	0.036	0.002	-	-
HCM Control Delay (s)	8.6	0	-	12.1	19.5	8.5	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

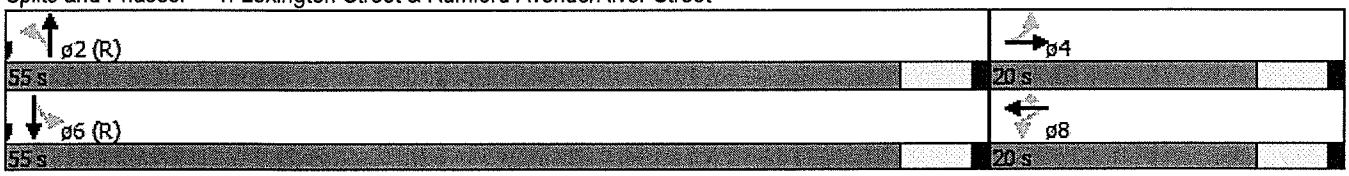
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	69	112	78	59	123	35	462	43	188	404	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		30	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	1.00	1.00	1.00	1.00	1.00
Frt		0.932				0.850		0.989			0.994	
Flt Protected		0.991			0.972			0.997			0.985	
Satd. Flow (prot)	0	1857	0	0	1754	1531	0	1828	0	0	1836	0
Flt Permitted		0.910			0.575			0.941			0.711	
Satd. Flow (perm)	0	1705	0	0	1038	1531	0	1725	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61				119		13			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			600	
Travel Time (s)		22.7			22.7			22.7			13.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	6%	1%	11%	2%	10%	2%	2%	2%	1%	1%
Adj. Flow (vph)	44	72	117	81	61	128	36	481	45	196	421	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	233	0	0	142	128	0	562	0	0	647	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	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	55.0	55.0		55.0	55.0	
Total Split (%)	26.7%	26.7%		26.7%	26.7%	26.7%	73.3%	73.3%		73.3%	73.3%	
Maximum Green (s)	15.0	15.0		15.0	15.0	15.0	50.0	50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	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			0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		15.0			15.0	15.0		50.0			50.0	
Actuated g/C Ratio		0.20			0.20	0.20		0.67			0.67	
v/c Ratio		0.60			0.69	0.32		0.49			0.73	
Control Delay		27.2			47.3	8.8		7.8			14.2	
Queue Delay		0.0			0.0	0.0		0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		27.2			47.3	8.8		7.8			14.2	
LOS		C			D	A		A			B	
Approach Delay		27.2			29.0			7.8			14.2	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)		72			62	3		107			165	
Queue Length 95th (ft)		142			#144	45		171			303	
Internal Link Dist (ft)		920			920			920			520	
Turn Bay Length (ft)						30						
Base Capacity (vph)		389			207	401		1154			886	
Starvation Cap Reductn		0			0	0		0			0	
Spillback Cap Reductn		0			0	0		0			0	
Storage Cap Reductn		0			0	0		0			0	
Reduced v/c Ratio		0.60			0.69	0.32		0.49			0.73	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 115.3% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Lexington Street & Rumford Avenue/River Street



Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	0	3	3	0	3	4	654	5	5	591	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	1	4
Mvmt Flow	2	0	3	3	0	3	4	667	5	5	603	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1293	1294	603	1293	1291	670	603	0	0	672	0	0
Stage 1	613	613	-	678	678	-	-	-	-	-	-	-
Stage 2	680	681	-	615	613	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
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	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	141	164	503	141	165	460	984	-	-	928	-	-
Stage 1	483	486	-	445	455	-	-	-	-	-	-	-
Stage 2	444	453	-	482	486	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	139	162	503	139	163	460	984	-	-	928	-	-
Mov Cap-2 Maneuver	139	162	-	139	163	-	-	-	-	-	-	-
Stage 1	480	482	-	442	452	-	-	-	-	-	-	-
Stage 2	438	450	-	475	482	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.9	22.4	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	984	-	-	246	213	928	-	-
HCM Lane V/C Ratio	0.004	-	-	0.021	0.029	0.005	-	-
HCM Control Delay (s)	8.7	0	-	19.9	22.4	8.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-