Traffic Impact and Access Study

Proposed Mill Street Residential & Retail Development 30-50 Mill Street Arlington, Massachusetts

Prepared for:

Wood Partners
Concord, MA

MS Transportation Systems/ New England Engineering Group

April 2010
Revised September 2010

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& Retail Development 30-50 Mill Street
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Introduction

This traffic impact and access study provides an analysis of the traffic impacts, area circulation and access-egress characteristics associated with the proposed residential development project to be located in the Town of Arlington, Massachusetts. In general, the development is proposed on a parcel of land on the north side of Millbrook Drive extending from Mill Street on the east to the high school property on the west. Currently, the site is occupied by buildings that formerly housed the Brigham's Ice Cream corporate headquarters, manufacturing plant and restaurant. The project location, with respect to the area's roadway system, is shown on Figure 1.

The project proponent proposes to construct a multi-family building. The total development will include 116 units and a small amount of retail (3,500 square feet). A total of 179 parking spaces are provided in the proposed plan including 6 handicap stalls. Access to the facility will be provided through a driveway that directly intersects with Mill Street as well as a connection to Millbrook Drive. A portion of the project parking will be under the building.

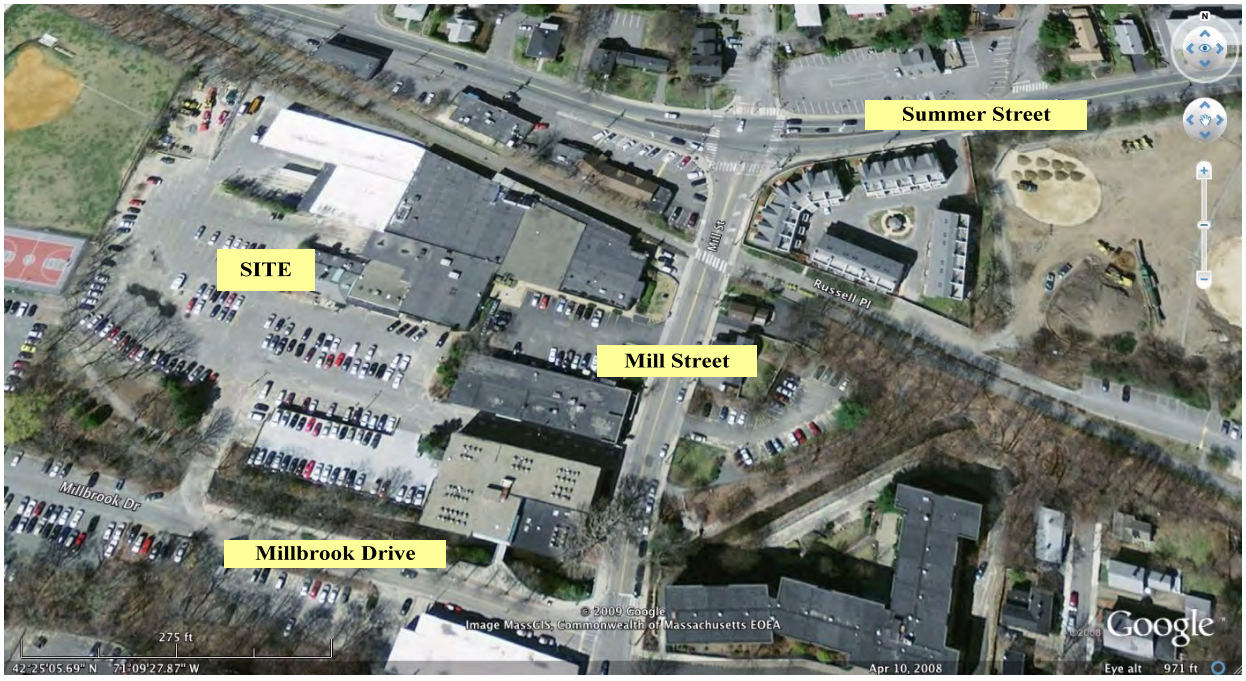


Figure 1 Project Site

This study includes analysis and evaluation of existing and future (No-Build and Build) traffic volume network, roadway/site access, traffic circulation and safety considerations. While the project is not anticipated to require State access permits, the study followed the guidelines of the Massachusetts Executive Office of Engineering and Environmental Affairs (EOEEA) and the Massachusetts Department of Transportation (MassDOT) as well as those of the Institute of Transportation Engineers for conducting traffic impact and access studies. Discussions with the Town's Planning Department and Transportation Advisory Committee (TAC) were also conducted during the course of the study.

Executive Summary

This traffic study was completed for the purpose of assessing potential traffic impacts, area circulation and future access-egress characteristics associated with the proposed housing development in Arlington, Massachusetts. At full build-out, the development will consist of 116 residential units and a small amount of commercial/retail space.

This study includes analysis and evaluation of existing and future (No-Build and Build) traffic volume network, roadway/site access, traffic circulation and safety considerations. While the project is not anticipated to require State access permits, the study followed the guidelines and practices generally accepted and used in the Commonwealth. The approach utilized in several areas resulted in somewhat conservative analysis and findings. Areas of conservative assumptions were:

- in forecasting background development traffic, traffic volumes predicted for the reuse of the former Symmes Hospital site were taken into account,
- the No-Build scenario assumes re-tenanting only 10% of the existing building on site assuming, and
- only 20% of the site traffic in the peak direction was assumed to be by non-auto modes during the peak times despite the ideal project location for walking, bicycling or transit.

The following paragraphs summarize key aspects of the analysis conditions and findings.

Existing Conditions

Currently, the project site is partly occupied by the buildings that are currently vacant. There is also a large surface parking lot. Millbrook Drive, Mill Street, and the Minuteman Trail abut the project site. The site is currently 95% developed and impervious. Mill Street is a two lane street on the east side of the project site that is the location of the primary site access. Mill Street connects Summer Street with Massachusetts Avenue. There is a driveway that directly links the site with Mill Street as well. The traffic analysis focused on Mill Street and its intersections.

In addition to volume studies, a review of the accident history was completed. The research and subsequent discussions with Town officials have resulted in noted concerns including characteristics at the Massachusetts Avenue at Mill Street and Jason Street being one of the Town's higher crash locations and the trail crossing at Mill Street. The operations analysis indicated that under current conditions there are some moderately long delays experienced at the Massachusetts Avenue intersection with Mill Street and some concentrated though limited congestion on Millbrook Drive at Mill Street with the morning high school arrival period. This period lasts only 15-20 minutes generally between 7:45AM and 8:15AM. While queuing occurs on Mill Street during portions of the peak periods, overall conditions appear manageable with the duration of long queues dissipating in a relatively short time.

Future Conditions

Traffic was estimated for the proposed development with a full build-out of 116 residential

apartments and the 3,500 square feet of retail/commercial space. The forecasts were based on the Institute of Transportation Engineer (ITE) trip generation database, tempered by work trip mode data from the 2000 census. Based on the ITE trip rate and accounting for a reported average non-auto work trip by Town residents of 20%, it was estimated that the development would generate approximately 896 vehicle trips over the 24-hour weekday and 55 and 84 vehicle trips during the morning and evening peak hours, respectively. This estimate of non-auto use is likely conservatively low given the prime location of the project relative to institutional and commercial uses on Massachusetts Avenue, the MBTA bus service that uses Mill Street, the high school location and the abutting Minuteman Trail. Consequently, with a greater number of non-auto trips, the actual number of vehicle trips could be lower than those estimated and analyzed in this report. Traffic observations[1] performed for the Town at similar type developments further supports this supposition. The majority of morning traffic generated by the project is expected to exit the site, while during the evening the majority of site traffic is expected to enter the site. Existing traffic patterns in the area were used to estimate a trip distribution for the project with the majority of peak hour traffic oriented toward Massachusetts Avenue.

In developing future networks, a five-year forecast was developed. This was done by applying a background growth rate as well as incorporating known ongoing site specific developments that may influence traffic flows in the study area. Currently, there are two developments in close proximity, which could potentially impact the project. These include the CVS store presently under construction on Massachusetts Avenue just west of Mill Street and the originally approved Symmes Reuse Project. Previous studies completed for these developments and the use of the ITE models provided the site specific traffic estimates. In addition to the site specific developments, a background growth rate of 0.5% per year was incorporated into the analysis. In the No-Build condition, the continued use and occupancy of a small portion of the existing buildings on the site including the restaurant was also assumed.

The analysis showed that the future operating conditions of the study area intersections would not change significantly from the No-Build condition to the Build condition with small or moderate increases in average vehicle delays. The Massachusetts Avenue/Mill Street/Jason Street intersection is estimated to operate with relatively long delays in both the No-Build and Build conditions with small changes due to the proposed project. There are also long delays projected for motorists exiting Millbrook Drive during the morning peak hour currently as well as in the future regardless of the proposed project primarily due to the magnitude and concentration of high school arrival trips.

While the proposed project can be accommodated on study area roadways with small impacts, a series of recommended mitigation measures have been developed to improve traffic operations and safety in the vicinity of the project. A number of these actions are desirable even without the project as they address existing concerns. The recommendations are as follows:

- A pedestrian connection between the internal site area and the retail building as well as both Mill Street and Millbrook Drive should be provided. Several options may

[1] The Louis Berger Group, Inc., Trip Generation Study, prepared for the Department of Planning and Community Development, Town of Arlington, May 2003

exist depending on the use of the site drive. Additionally, a direct connection from the project to the Minuteman Trail should be provided.

- A crosswalk should be delineated across the proposed new site drive at the sidewalk along Mill Street. This could be accomplished with alternative surface treatments or pavement markings.

- Three options for the existing site drive to Mill Street were evaluated and based on the analysis and considering multiple factors, the option that restricts traffic to "exit only" is our preferred plan. This option has several benefits including minimizing vehicle conflicts during the morning on Millbrook Drive and discouraging high school traffic from cutting through the residential site. Signage would be posted throughout the site to direct exiting residents to use the site drive to Mill Street rather than the driveway to Mill Brook Drive. The project proponent does not control the driveway to Mill Brook Drive, however, the easement between the site and Millbrook Drive remains a two way connection under all these site drive alternatives.

- Related to the site drive, a STOP sign and STOP bar should be placed on the site drive approach to Mill Street.

- It is also recommended that pedestrian warning devices be placed on the site drive to warn pedestrians on any oncoming vehicles on the site drive approach to Mill Street. A stop bar, crosswalk and stop sign are also recommended.

- While signs exist in advance of the Trail crossing, it is desirable to enhance the warning to Summer Street and Mill Street motorists and ensure that the markings at the crossing are highly maintained. In addition, better control of trail users at the crossing is also recommended to minimize conflicts with traffic on Mill Street. Based on input from Town officials, committees and boards, it is recommended that split gates or splitter island be installed to slow or stop bicycle traffic and indicate the presence of a busy street. To enhance visibility of bicyclists and pedestrians at the edge of the trail entering Mill Street, the vegetation on the side of the trail should be trimmed adequately. Also, a warning beacon directed toward motorists turning off of Summer Street onto Mill Street is also recommended.

- In order to improve traffic flow under both current and proposed conditions, the Town should consider signal timing modifications and optimizing for efficiencies at the two signalized intersections included in the study.

- In order to reduce congestion on the northbound approach to Massachusetts Avenue on Jason Street, a modification to the traffic island to accommodate a short two lane approach is recommended. The action would include reducing the width of the median island and/or shifting it to the west. Based on our current understanding of the street layouts, this action can be done within the existing right of way.

In conclusion, the proposed project as currently planned is expected to have a relatively small impact on traffic operations within the study area particularly when compared to the former use, projected reuse of a small portion of the existing building, or reasonable alternative redevelopment scenarios. The project can be accommodated on the existing roadway system with site residents able to enter and exit safely and efficiently to the local streets while maintaining safety for motorists and pedestrians utilizing these streets. However, the above-noted actions enhance safety for the project and non-project related constituents and further reduces the impact of the project. The project's location also will encourage non-auto travel to and from the site.

Existing Conditions

The initial step in conducting a traffic impact study is to conduct inventories and collect data in order to understand the transportation network and the project area. The following sections describe the existing transportation system in terms of physical and operational characteristics.

A. EXISTING ROADWAY NETWORK

The identification of the study area was based on the network, proposed access points and size/type of the project. It focused on the evaluation of a set of roadways and intersections in the vicinity of the site that would be most impacted by the proposed project. The study area intersections included:

- Mill Street at Massachusetts Avenue/Jason Street
- Mill Street at Bacon Street
- Mill Street at Millbrook Drive
- Mill Street at Summer Street and Cutter Hill Road

A general description of these roadways follows:

Mill Street

Mill Street is oriented in a north-south direction between Massachusetts Avenue and Summer Street. It is a two lane street with time limited parking on the east side between Millbrook Drive and the Minuteman Bikeway and on the west side in front of 20 Mill Street. In general, the roadway surface and pavement markings were observed to be in good condition in the vicinity of the site. In total, it is about 900 feet in length. In addition to the major intersections with Massachusetts Avenue and with Summer Street, Mill Street also intersects with Bacon Street, Millbrook Drive and the aforementioned bikeway. Sidewalks exist along both sides of the street.

Mill Street looking South Near Millbrook Drive

Summer Street Eastbound Approach to Mill Street

The intersection of Mill Street with Summer Street is under signalized control. Along with Cutter Hill Road, it is a four-way intersection. The Summer Street approaches provide multiple

lanes allowing for an exclusive right turn lane in the eastbound direction and an exclusive left turn lane in the westbound direction. Raised median islands exist on both legs of Summer Street. The Mill Street approach includes one right turn lane and a through/left turn lane. Cutter Hill Road consists of a single lane on its approach. There are crosswalks across each street and an exclusive pedestrian actuated phase is included in the signal operation. The existing traffic signal operates with multiple phases (westbound advance) with "skip" phasing and an overlap phase for the northbound right turn movement with the westbound advance.

The Minuteman Trail crosses Mill Street between Summer Street and the proposed Site drive. While the pavement markings are somewhat faded at this time, the trail crossing is signed on both approaches along Mill Street. It was noted in the field that while good visibility along Mill Street exists, the trail's close proximity to Summer Street and the relatively high speed right turns from eastbound Summer Street to Mill Street is a concern. Land uses on the street include retail and office uses as well as a variety of residential buildings.

Minuteman trail Crossing on Mill Street

Millbrook Drive

This two-way, two lane street of 600 feet provides not only access to parking for businesses that front Mill Street, but also provides for an access to the high school and Pierce Field. A sidewalk exists along the north side of the street. Several off-street parking areas are accessed via Millbrook Drive including the existing 30-50 Mill Street site. The only curb side parking allowed is along the side of Halovak & Coughlin (20 Mill Street) which has been signed as restricted use for that address though the spaces appear to be in the public layout. Parking lots for 22 Mill Street can also be accessed from Millbrook Drive.

The Millbrook Drive intersection with Mill Street is controlled by a STOP sign. Each approach has a single lane. Across from Millbrook Drive is the driveway serving the apartments located at

17 Mill Street. There are crosswalks on both Mill Street and Millbrook Drive at the intersection.

Millbrook Drive Approach to Mill Street

Existing Site Drive

A driveway exists that connects Mill Street with the interior of the former Brigham's site. Located approximately 140 feet north of Millbrook Drive, this drive is generally between 24 and 27 feet in width. The drive is level and the pavement surface is in average condition. Buildings directly abut the drive. In addition, Shattuck Hardware has a door to its basement on the drive.

The driveway currently, as in the past, operates as a two-way drive. The approach to Mill Street functions as a STOP controlled approach though there is no sign in place.

The drive currently leads to the site's existing parking supply (approx. 120 spaces). It also provides an alternative access to parking for 22 Mill Street. It was noted in the field that some parking is occurring on site despite the Brigham's building unoccupied. Some of this was related to 22 Mill Street but there were also between 35 and 40 parked cars that appeared to be related to high school demand. It should be noted that the high school related parking that occurs is unauthorized. Approximately 38 spaces on the Brigham's site had been leased in the past to 22 Mill Street. While the agreement has expired, parking related to 22 Mill Street continues to occur. Under the current development proposal, it is expected that parking related to 22 Mill Street may continue at some level.

Summer Street

Summer Street is a two-way roadway under local jurisdiction. Except for the intersection at Mill Street, it contains one travel lane per direction connecting with Route 60 in the east and with

Lowell Street in the west. In general, the pavement condition of the roadway is in fairly good condition. A double yellow centerline is provided on the roadway pavement. Sidewalks exist along Summer Street. Land use along Summer Street is primarily residential.

Massachusetts Avenue

Massachusetts Avenue is a major urban arterial in Arlington oriented in the east-west direction. It connects the Town with Cambridge to the east and Lexington to the west. In the immediate study area, it functions as a four lane street with two travel lanes per direction. Parking is allowed on each side of the street serving businesses and the nearby institutional uses (i.e. Town Hall, the library, high school, etc.).

Massachusetts Avenue at Mill Street and Jason Street

The intersection of Massachusetts Avenue with Mill Street and Jason Street (forming the fourth leg) is under traffic signal control. The signal timing provides an advance in the eastbound direction. One issue raised in the past by Town representatives is there is no separation of the "conflicts" between northbound and southbound traffic flow (i.e. movement from each approach occurs at the same time). Mill Street has a two lane approach with a right turn lane and a through/left lane. The Massachusetts Avenue approaches have two lanes. Jason Street has a "wide" single lane approach that at times operates as two lanes for a short distance, particularly with smaller vehicles. Small median islands exist on Mill Street and Jason Street at the intersection. Crosswalks and pedestrian control are also provided. As shown in the following photographs, the existing island on Jason Street affects the ability of motorists turning right to pass by motorists waiting to turn left or proceed straight.

Median island on Jason Street

Motorists attempt to form two lanes.

Bacon Street

Bacon Street is a short (350 foot) street that connects Central Street (one-way northbound) with Mill Street and serves abutting residential uses. Bacon Street is restricted to one-way east to west. Sidewalks are on each side of the street although much of the south side is made up of driveways to the homes. Curbside parking is allowed on the north side where the curb exists.

B. TRAFFIC VOLUMES

The existing traffic volumes were compiled from counts conducted in early 2010 as well as historical data from previously completed studies. The new counts included manual turning movement counts (TMC) at the study intersections. In general, the turning movement counts were conducted from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM during the week of January 4, 2010. Schools were in session the week of traffic counting. Twenty-four counts were conducted on the key streets as well. A series of short counts were also taken in March to verify and supplement the January data. In addition, PM peak hour base traffic count data for the Massachusetts Avenue/Mill Street intersection from the CVS traffic study[2] were utilized with adjustments in relation to volume balancing and data collection on Mill Street. General observations at the trail crossing were also noted during the January peak periods. As would be expected, the volume of trail traffic in January was considered "light". As presented in a subsequent section, additional trail crossing data was collected during June. Table 1 summarizes the 24-hour traffic data collected for the study at the request of TAC.

- **Seasonal Adjustments**

Permanent traffic count station data maintained by MassHighway were reviewed to determine if seasonal adjustments are warranted for developing analysis networks. The review of District 4 group data for arterials indicated that the January traffic on an urban arterial is between 3 and 8

[2] GEOD Consulting, Inc., Traffic Impact Study, Proposed CVS Pharmacy, 2009.

percent lower than the year average month. Based on this finding, the January count data would need to be increased to obtain average month conditions. Aside from the group data analysis, the January data collected would tend to appear to be typical given the location of the project near the Town's business district, government center and the high school. Taking all of this into account, the January count data was increased by 6 percent to estimate average month conditions. In addition, the collected data was adjusted to a degree in terms of balancing the network volumes. Figure 2 illustrates the estimated existing average weekday morning and weekday evening peak hour traffic volume networks.

TABLE 1
SUMMARY OF OBSERVED
TRAFFIC DATA[1]
(May 2010)

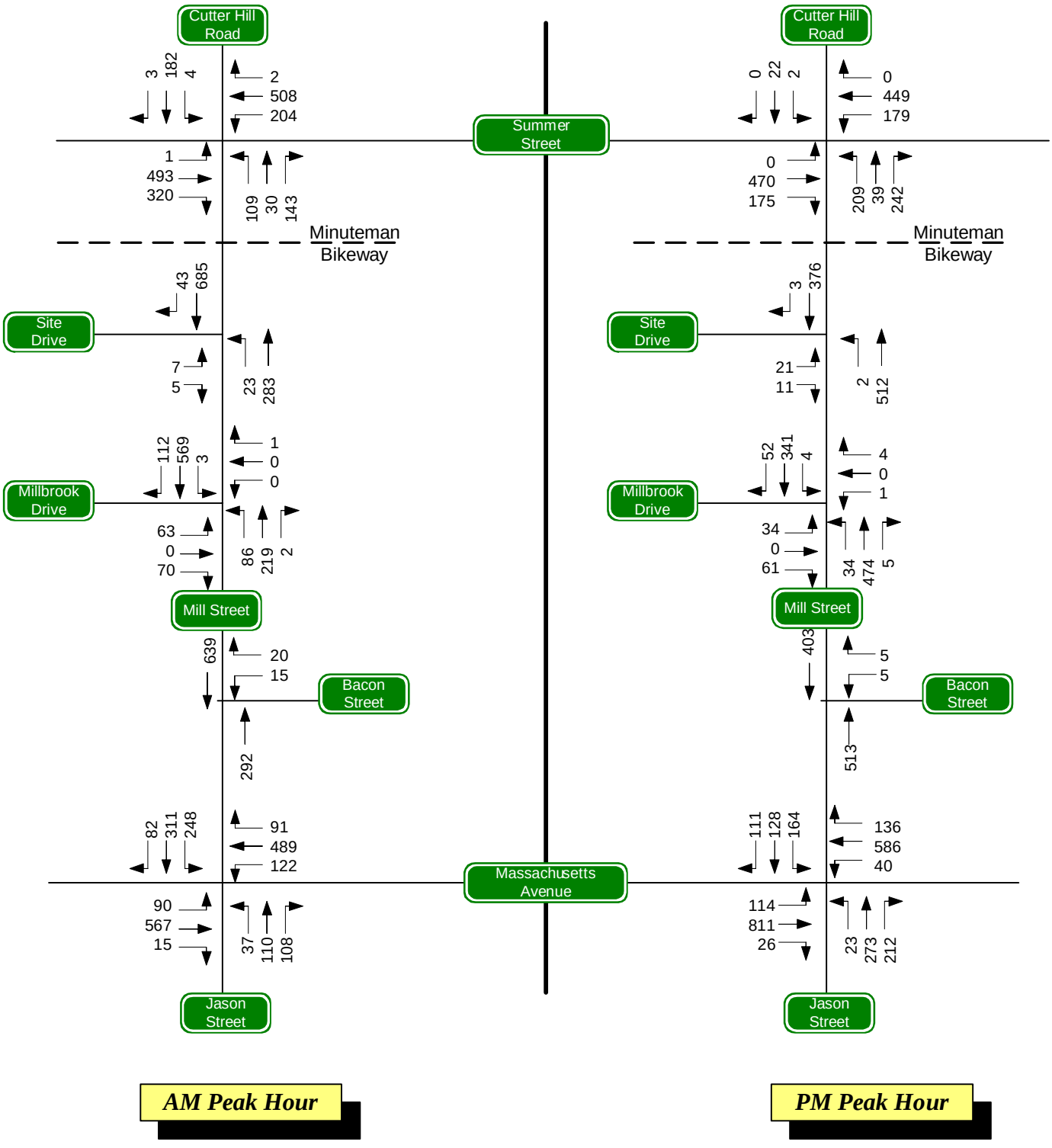
Street	Location	Weekday	AM Peak Hour	% of Weekday	PM Peak Hour	% of Weekday
Massachusetts Avenue	West of Mill Street	19,000	1,250	6.6%	1,520	8.0%
Mill Street	South of Summer Street	9,250	930	10.1%	910	9.8%
Millbrook Drive	West of Mill Street	1,960	260	13.3%	170	8.7%

[1] - Based on automatic recorder traffic counts conducted during May 2010

C. ACCIDENT DATA REVIEW

Accident data reported for the Town of Arlington was obtained from the MassDOT Accident Record System (ARS) to review accident history at the study intersections for the most recent three year period (2005-2007) for which data was available. Table 2 summarizes the crash history based on MassDOT data.

Discussions with the safety officer generally indicated the Town's safety concerns at the Massachusetts Avenue intersection with Mill Street and Jason Street as well as the Mill Street area near the trail crossing. While data from State records did not indicate anything out of the ordinary, our discussions with TAC and information from the safety officer pointed to several concerns that may warrant further attention by the Town regardless of this proposed redevelopment project. Based on information from the safety officer indicated an average of approximately seven crashes reported per year at the Massachusetts Avenue/Mill Street intersection. The local data also indicates a number of reported crashes along Mill Street between Summer Street and Massachusetts Avenue and on Millbrook Drive including pedestrians and bicyclists related crashes. Some of these may have occurred in the private lots off these two streets as well. While there may be some differences between the State and local data, safety concerns have been identified and possible actions to improve safety are discussed in the report.



Estimated Existing Traffic Volumes

FIGURE 2

N
W E
S

Not to Scale

TABLE 2
SUMMARY OF ACCIDENT DATA (2005-2007)

Mill Street at:	Mass Avenue	Bacon Street	Millbrook Drive	Summer Street	Mill Street loc NR	total
Year 2005	3	0	3	1	0	7
Year 2006	3	0	1	2	1	7
Year 2007	2	2	2	2	0	8
total	8	2	6	5	1	22
property damage only	4	2	5	2	1	14
personal injury	3	0	0	1	0	4
fatal	0	0	0	0	0	0
rear end	4	0	2	1	0	7
angle	0	1	1	1	0	3
sideswipe	1	1	2	0	0	4
other/NR	3	0	1	3	1	8
clear	5	2	3	3	0	13
rain/wet	3	0	3	2	0	8
snow	0	0	0	0	0	0
peak	3	0	1	1	0	5
off-peak	5	2	5	4	1	17

Source: Massachusetts Department of Transportation (MassDOT).

In general, the data shows a relatively low annual crash frequency at the study locations on an annual basis. The Massachusetts Avenue/Mill Street had the highest frequency with eight (8) reported crashes over three years for an average of 2.7 crashes per year. The Mill Street intersections with Millbrook Drive (6 reported crashes) and Summer Street (5 reported crashes) had frequencies of 2.0 reported crashes per year or less. One location was unreported.

Of the total 22 reported crashes for all study locations, three (3) reported accidents were of angle type (31%), seven (7) reported accident were of rear-end type (35%) and four (4) reported accidents were side swipe collision (8%). The nature of the remaining accident was not defined. There were no reported fatalities at these intersections during the three year study period. The data showed that 14 (63%) of the 22 reported accidents resulted in property damage only. Most (77%) of the reported crashes occurred during non-peak hours.

As indicated previously, discussions with TAC and the Town's safety officer indicated that the local records showed a notably higher crash experience than interpreted in the State records. The key concerns had been identified and were reviewed for possible actions that would alleviate the safety concerns.

As part of this safety review, the "crash rate" for the study intersections was also determined

based on the State data. The crash rate takes into account the amount of traffic that enters the intersection, and relates the number of accidents at this location to the amount of traffic that passes through the location. Thus, it potentially becomes a more meaningful measure for identifying potentially hazardous locations as compared to simple annual accident averages. The current MHD District 4 (which the Town of Arlington is part of) crash rates for signalized and unsignalized intersections are 0.78 and 0.58 crashes per million entering vehicles (MEV), respectively. Intersections experiencing crash rates greater than the above average are potentially experiencing an unusually high number or higher than expected number of crashes relative to traffic volumes at that particular location and may warrant further investigation or improvements.

Table 3 presents crash rates and the average number of accident per year of the study intersections. As can be seen in Table 3, crash rates at the study intersections are well below the District 4 average based on the State data. Based on these calculations, it can be concluded that these locations do not exhibit safety related issues specifically related to crash experience. Accident data obtained as part of this study and the MHD intersection crash worksheets are included in the Appendix.

TABLE 3
SUMMARY OF INTERSECTION CRASH RATE (2005-2007)

Intersection	Type of Control	Total No. of Accidents (3 Years)	Average No. of Acc./Year	Crash Rate (per MEV)	Exceeding MHD Criteria
Massachusetts Avenue at Mill Street/Jason Street	Signalized	8	2.67	0.26	No
Mill Street/Millbrook Drive	Unsignalized	6	2.00	0.39	No
Mill Street/Bacon Street	Unsignalized	2	0.67	0.15	No
Mill Street/Summer Street/Cutter Hill Road	Signalized	5	1.67	0.18	No

Note: Unsignalized intersections: MHD District 4 average crash rate: 0.58
Signalized intersections: MHD District 4 average crash rate: 0.78

While this review did not indicate something out of the ordinary is occurring in this project area, there were safety issues on Mill Street that became apparent based on observations or those discussed with local officials. This was particularly in the area of the trail crossing. Maintaining good visibility, enhancing signage and other cues in key locations and further encouraging non-auto modes of travel would serve to reduce the impacts and create a safer environment in the area of the project. These will be discussed further later in the report.

D. EXISTING PARKING CONDITIONS

The existing site serving the former Brigham's buildings provided for 120 parking spaces in the lower lot area. In addition, there are 11 spaces in the lot shared with Shattuck's Hardware. Immediately adjacent to the site is the parking for 22 Mill Street that has a parking deck and parking spaces abutting the parking deck. Access to the 22 Mill Street spaces is provided by the driveway for 30-50 Mill Street (via an easement) as well as a connection to Millbrook Drive. In addition to the deck and the adjacent spaces, 22 Mill Street also has a small parking lot on Millbrook Drive (approx. 30 spaces) and there is a small fee to park.

When Brigham's was operating out of 30-50 Mill Street, 22 Mill Street had a lease to use 38 spaces, included the 15 spaces abutting the parking deck. These 15 spaces are on the property of 22 Mill Street, but are granted by easement to Brigham's for their sole and exclusive use. Brigham's was therefore leasing these spaces back to 22 Mill Street. The 22 Mill Street Association has indicated that a need exists going forward to "share" at least the amount of parking previously leased. The Applicant intends to release its rights to the 15 parking spaces abutting the parking deck at 22 Mill Street. In addition, the Applicant has proposed a sufficient supply of parking that would provide for some additional parking need of 22 Mill Street, as well as to adequately serve the residents of the project, and provide some additional spaces to accommodate visitors.

General observations of the site activity during this study period has indicated the following:

- The available space was observed to be used in part by high school related demands, particularly near the western edge of the property.

- An observation conducted when school was not in session indicated more than 129 parked vehicles estimated to be related to medical office building at 22 Mill Street were noted although there were some spaces open in its pay lot off Millbrook Drive as well as in the parking deck.

E. TRANSIT SERVICE

The project area is served by several MBTA bus routes. The primary route relative to the project is Route #67 that travels Mill Street and provides a connection to the Alewife Station (red line subway) via Massachusetts Avenue. A designated stop is located in the vicinity of Millbrook Drive. There is also a route along Massachusetts Avenue that can be easily accessed to reach other parts of Cambridge including Harvard Square.

F. MINUTEMAN BIKEWAY

As indicated preciously in the report, the Minuteman Bikeway, which is a multi-purpose trail, is located on the north side of the project site. The Trail crosses Mill Street approximately 230 feet north of the 30-50 Mill Street site drive and 130 feet south of Summer Street. The following photographs depict the trail in the vicinity of Mill Street.

As part of the traffic analysis for the project and in response to a request from the Town's Transportation Advisory Committee (TAC), counts of pedestrians and bicyclists were conducted at the Mill Street crossing in June 2010. One hour observations during the weekday morning and afternoon (when high school was in session) and on a Saturday midday were completed. Table 4 below summarizes the data.

Approach to Trail from Summer Street

Trail Approach to Mill Street from East

TABLE 4
MINUTEMAN TRAIL OBSERVATIONS
JUNE 2010

Date	Day	Time	Eastbound		Westbound		Total	
			Pedestrians	Bicycles	Pedestrians	Bicycles	Pedestrians	Bicycles
6/18	Friday	8:45-9:45AM	16	70	21	78	37	148
6/14	Monday	3:30-4:30PM	20	39	17	50	37	89
6/26	Saturday	11:30-12:30PM	27	162	27	145	54	307

As can be seen, the weekday hourly flow of both bicyclists and pedestrians totaled 89 and 148 in both directions during the morning and afternoon, respectively. The Saturday midday period showed slightly more than 300 pedestrians and bicyclists crossing Mill Street.

Probable Impacts of the Project

In this section of the report, the study evaluates the impact of the proposed residential housing development project on the surrounding roadway network under future No-Build and Build conditions. For the purposes of this analysis, it was assumed that the project would be built-out and occupied over five (5) years. The year 2015 No-Build traffic network was developed by considering existing traffic volumes, area traffic growth over five years, and traffic from site-specific (background) developments together. To generate the Build traffic network, the No-Build volumes associated with the reuse of the existing building were removed and the site-generated traffic volumes (trips generated and assigned for proposed development) added to the to the No-Build traffic volume network.

A. NO-BUILD TRAFFIC VOLUMES

This section of the report analyzes potential impacts to area traffic conditions taking into account traffic growth on area roadways and traffic from unbuilt but approved (site-specific or background) developments in the immediate vicinity of the site. For this analysis, under the No-Build condition only 10% of the building(s) would be reused, though it should be noted that most, if not all of the building(s) could be reused.

For this study, year 2015 was assumed as the build-out year of the proposed development. The year 2015 No-Build scenario represents the traffic situation at analysis intersections five years into the future, and excludes traffic from the proposed development from the traffic network. General growth in traffic and traffic from site-specific developments contribute to the No-Build traffic scenario.

1. Background Traffic Growth

To establish a traffic growth rate for the study area (MassDOT) formerly known as MassHighway, traffic count data from the Massachusetts Department of Transportation were reviewed. This included group data for urban roads in District 4 of which Arlington is part of.

The calculated growth rate was compared with the annual traffic growth of the District 4 urban roadways group data provided by the MassDOT. The comparison indicated that the District 4 urban roadways annual growth rate between 2002 and 2006 is approximately -0.1%. However, a conservative 0.5% annual growth rate was selected as a background growth rate and cumulatively applied to the adjusted existing peak hour traffic volumes for five (5) years to obtain growth in traffic volumes.

2. Site-specific Development

The Planning Department of the Town of Arlington was contacted in regards to identifying potential site specific developments that could affect traffic in the project area. These discussions identified ongoing developments within the study area such as the CVS Pharmacy development on Massachusetts Avenue east of Mill Street and the re-development of the former Symmes Hospital site. These projects are expected to have some impact on the study area network and

were incorporated into the analysis. In addition to the above two projects, the commercial property on Summer Street east of Mill Street is currently vacant and could be re-occupied within the 5 year period. However, there is no proposal at this time and discussions with planning staff indicated the previous use was a relatively low generator. It was presumed for analysis purposes that the background growth rate would account for some re-use of that property.

Traffic studies[3,4] for the two noted site specific projects included in the analysis were reviewed and their respective forecasts (including trip generation and assignment) incorporated into the networks. The Symmes forecast is based on the originally approved plans although discussions were taking place in early 2010 about a smaller size development for that site. Consequently, the No-Build forecasts used in this analysis are likely to be conservative or a "worst case" scenario. The forecasts for the two site specific developments are shown in Table 5.

TABLE 5
SUMMARY OF ESTIMATED TRIP GENERATION
OF BACKGROUND DEVELOPMENT

	Symmes Re-Use			CVS		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Morning Peak Hour	85	113	198	19	15	34
Evening Peak Hour	125	138	263	54	57	111

3. Re-Use of Existing Site

If the current proposal did not move forward, it is possible and likely that the buildings presently on-site would be reused to a large extent without any major permitting. For the purpose of this analysis, it was assumed that the restaurant and a small amount of office space could be re-tenanted in the No-Build scenario. This was estimated to consist of approximately 3,500 square feet of restaurant space and 3,500 square feet of office space. This is a conservative assumption as the existing building totals approximately 70,000 square feet. Traffic was estimated for the restaurant and office use using the trip generation models compiled by the Institute of Transportation Engineers (ITE) with an adjustment for passby traffic pertaining to the restaurant. The traffic associated with the reuse of the existing buildings were assigned to the existing site drive. The estimate of new peak hour traffic for these elements are shown in Table 6 and are 31 vehicle trips (18 enter/13 exit) during the AM peak hour and 30 vehicle trips (16 enter/14 exit) during the PM peak hour.

It should be noted that more floor space in the existing building complex could be reused than was assumed in the traffic analysis. The 7,000 sf assumed presents a conservative analysis in terms of impact. Later in the report, however, a traffic estimate is made for the former Brigham use and a comparison made with the new proposed use is completed.

[3] Howard Stein Hudson, Traffic Impact Study, Proposed Summer Re-Use Plan, September 13, 2004.
[4] GEOD Consulting, Inc., Traffic Impact Study, Proposed CVS Pharmacy, 2009.

TABLE 6
SUMMARY OF ESTIMATED TRIP GENERATION
OF REUSE OF EXISTING SITE BUILDINGS

	Office Use			Restaurant Use*			Total		
	In	Out	Total	In	Out	Total	In	Out	Total
Morning Peak Hour	4	1	5	14	12	26	18	13	31
Evening Peak Hour	1	4	5	15	10	25	16	14	30

Source: ITE Trip Generation Land Use Code 710, 932
* - represents new trips only – passby rate of 35% assumed for restaurant

4. No-Build Traffic Volumes

Based on the above, the 2015 No-Build traffic volume network was developed by adding the five-year background traffic volume growth of 0.5 percent per year, the site specific trips for the two noted development projects and the site re-use estimates to the existing traffic volume network. The 2015 No-Build traffic volumes projected for the weekday morning and evening peak hours at the study intersections are shown in Figure 3.

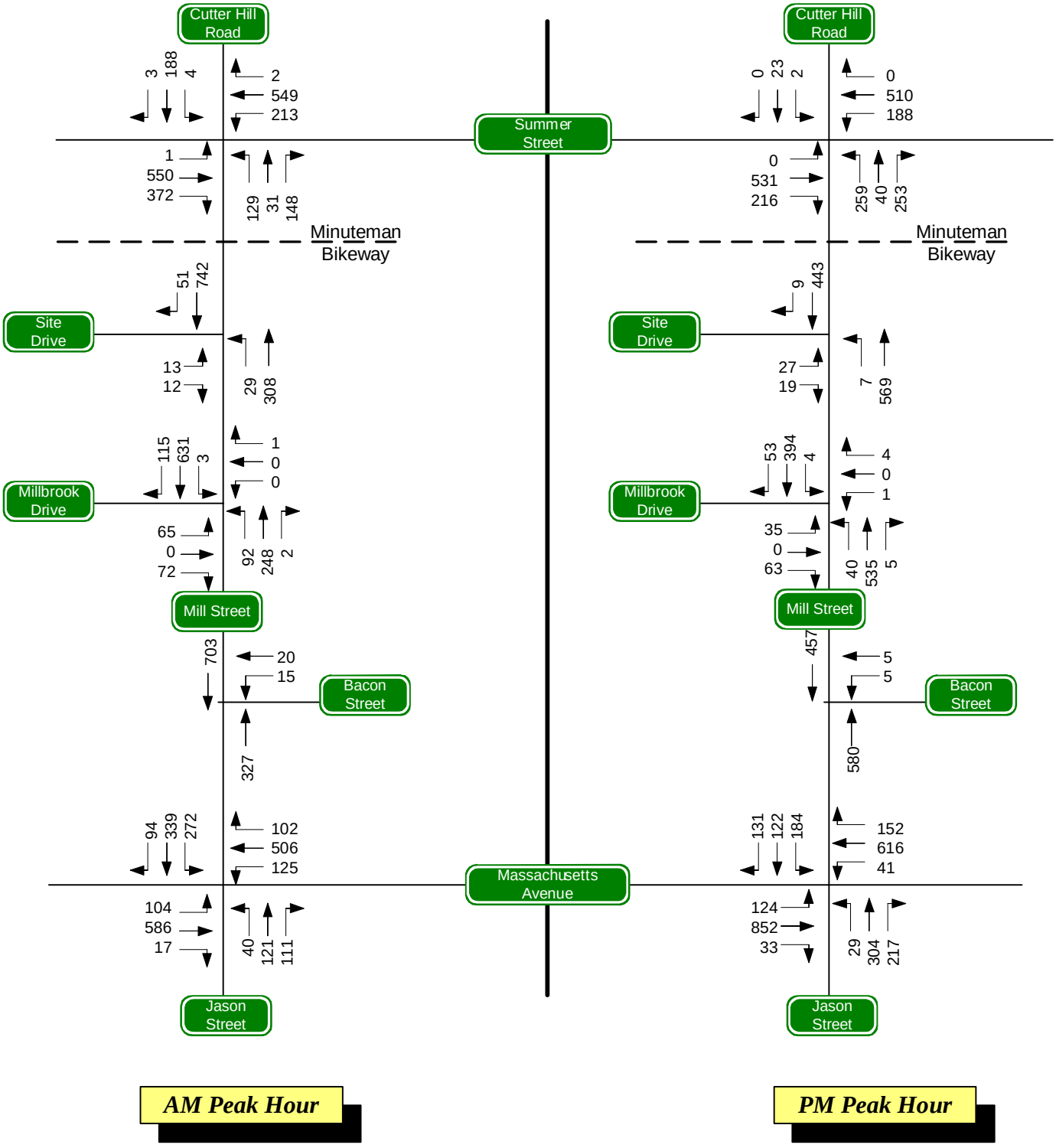
B. BUILD TRAFFIC VOLUMES

In the next stage of the analysis, traffic associated with the proposed development at the site was estimated and assigned to the roadway network using a trip distribution determined for the project. Traffic volumes were then added to the No-Build traffic volume networks after removing the volumes associated with site reuse to develop the Build traffic conditions. The proposed project is to consist of 116 apartment units with a 3,500 square foot commercial/retail component fronting Mill Street.

1. Trip Generation

Trip generation is the number of vehicle trips expected to enter and exit the project site. Estimates of trip generation are typically based on data collected on the land uses under study. Over the past twenty-five years or so, the Institute of Transportation Engineers has compiled a substantial amount of trip data for a large number of land uses. The data, once compiled, is published in a report known as Trip Generation[5]. Based on a review of the land uses in the report, ITE Land Use Code 220 Apartments was selected and used to estimate the total trips that will be generated by the proposed development. Using the independent variable of "number of units", trips were projected for the site for a total of 116 residential units. ITE Land Use Code 820 was used for the potential commercial/retail use. Table 7 presents the estimated trips generated by the project site based on ITE rates and not adjusted for likely transit use.

[5] Institute of Transportation Engineers, Trip Generation, 8th Edition, Washington, D.C. 2008.



Estimated Future No-Build Traffic Volumes

FIGURE 3

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TABLE 7
SUMMARY OF ESTIMATED PROJECT TRIP GENERATION
Unadjusted (updated)

	Residential Use			Retail Use			Total		
	In	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Weekday	414	414	828	75	75	150	489	489	978
Morning Peak Hour	12	49	61	2	2	4	14	51	65
Evening Peak Hour	53	28	81	6	7	13	59	35	94

Source: ITE Trip Generation Land Use Code 220

As shown in Table 7, the project including both the residential and retail components and based on ITE Trip Generation is estimated to generate 978 vehicle trips (unadjusted) over the course of an average day with 489 entering and 489 exiting trips. The peak hour vehicle trips (unadjusted) are estimated to generate 65 (14 entering/51 exiting), and 94 (59 entering/35 exiting) vehicle trips during the morning and afternoon peak hours, respectively. The remaining trips would be spread over the course of the 24-hour day. The ITE trip models for both the residential and retail uses and resulting estimates are generally reflective of suburban locations without significant transit service or opportunities to use alternative modes.

A review of the 2000 Census Transportation Planning Package (CTPP) indicated that 20 percent of the total work force residing in the Town of Arlington uses public transportation, bicycles or walks to work. The data also shows a relatively large portion of Arlington residents work in Boston or Cambridge where public transit use becomes more advantageous. The MBTA bus route #67 that uses Mill Street connects with the Red line subway at the Alewife Station. There are also bus routes that travel along Massachusetts Avenue through Cambridge. The 20% non-auto value may represent an average and due to the project's location, could be conservative. There is a high potential that a greater proportion of residents of this project could use transit, bicycle or walk to travel given its location. For non-winter months, the Minuteman Bikeway becomes a significant travel option. While the non-auto value could be higher, the estimated exiting residential trips in the morning peak hour based on unadjusted ITE rates (shown on Table 3) were reduced by twenty (20) percent for analysis purposes. The resulting quantity of non-auto morning peak hour trips (10) was deducted from the PM peak hour entering residential auto trips, assuming all residents leaving in the morning by means other than an automobile return in the evening by similar means. Daily trips related to the residential use were adjusted by an assumed ten percent factor. While a portion of the traffic associated with the retail use will be made by motorists already on the streets or by residents of the project – thus reducing the estimated number of vehicle trips, no adjustment was made in relation to the retail trips that result in some conservatism.

This results in an adjusted vehicle trip estimate for this project of 896 daily vehicle trips and peak hour trips of 55 and 84 for the morning and evening, respectively. Table 8 presents the adjusted estimate of vehicle trips. Trip generation calculations for the site are included in the Appendix.

TABLE 8
SUMMARY OF ESTIMATED ADJUSTED
PROJECT TRIP GENERATION

Time Period	In	Out	Total
Weekday	448	448	896
AM Peak Hour	14	41	55
PM Peak Hour	49	35	84

As stated previously, this estimate of project related traffic in our opinion represents a conservative estimate and is likely to be lower due to the aforementioned reasons. The Berger study previously cited and completed for the Town several years ago further supports this finding. That study included a series of traffic counts conducted at a number of residential developments completed in the town included The Legacy and the Watermill Place apartments, which are most similar to the proposed project. Table 9 compares the resulting trip rates for 30-50 Mill Street using ITE with some adjustment with those observed trip rates at the average of the above two sites.

TABLE 9
COMPARISON OF TRIP RATES[1]
30-50 MILL STREET VS. LEGACY/WATERMILL

	Proposed 30-50 Mil Street Total In/Out	Legacy - Watermill Place Total In/Out
Morning Peak Hour	0.40	0.25
Evening Peak Hour	0.56	0.22

[1] – trips per unit

As shown, the trip rates resulting from the forecasts for 30-50 Mill Street are approximately 60% to 154% greater than what was actually observed at the two existing apartment complexes included in the Town's study during the morning and afternoon peak hours, respectively. Consequently, it could be considered that an ITE based forecast will represent a significantly conservative or "worst case" condition and given the project's location, one could expect that vehicle trip characteristics will be substantially lower than analyzed in this report.

2. Alternative Uses

It was recognized that if this residential project did not go forward, there are alternative uses that could be developed. These include retail type uses and office/medical office. For analysis purposes and broadening the understanding of the proposed project, a comparison with potential alternative uses was completed. Based on sketch planning techniques, up to 25,000 square feet of retail use (a small grocery store) or up to 40,000 square feet of medical office could feasibly be developed. Based on these sizes, daily and peak hour (PM) trip estimates for the retail and medical office uses were computed using the ITE guide.

These are summarized for comparison purposes in Table 10.

TABLE 10
COMPARISON OF TRIP GENERATION FOR
ALTERNATIVE USES WITH PROPOSED PROGRAM

Use	Size	Daily Trip Estimate	AM Peak Hour Estimate	PM Peak Hour Estimate
Residential	116	896	55	84
Medical Office	40,000	1,278	83	101
Retail	25,000	2,482	61	201

As shown in the Table, the possible alternative re-uses of the site with sizes that appear to be feasible from a design/permitting perspective would result in noticeably greater trip generation for both the daily and PM peak hour periods compared to the proposed redevelopment project. The retail use results in more than double the trip estimate of the proposed program.

For the purposes of further comparison, the Zoning Board of Appeals asked that a comparison of alternative uses designed to maximize FAR be provided. Because the FAR for the B2A zoning district is 1.0 for retail and office uses, this equates to approximately 168,000 square feet of these uses. Table 11 below illustrates that traffic volumes associated with the full FAR buildout of alternative uses on the site.

TABLE 11
COMPARISON OF TRIP GENERATION FOR
ALTERNATIVE USES AT FAR OF 1.0 WITH PROPOSED PROGRAM

Use	Size	Daily Trip Estimate	AM Peak Hour Estimate	PM Peak Hour Estimate
Residential	116	896	55	84
Medical Office	168,000	6,654	386	445
Retail	168,000	9,516	168	901

As can be seen, the uses that could be built under the allowed zoning and FAR generate substantially greater amounts of traffic than is predicted for the proposed project.

3. Site Trip Distribution/Assignment

Once the number of trips projected to be generated by the development is determined, the estimated site trips are assigned to the site driveway and study area roadways/intersections based on an estimated trip distribution for the site. In order to accomplish this, current travel patterns within the study area were reviewed.

Figure 4 represents the percentage of estimated site related traffic arrival and departure distribution patterns for the weekday morning and evening peak hour. Most of the site trips were initially assigned to the site drive rather than Millbrook Drive except for trips oriented to Massachusetts Avenue. The detailed network trip assignment calculations for the weekday morning and evening peak hours are included in the Appendix.

Initially, the forecasts and analysis were completed assuming full use and two-way traffic on the site drive. During the course of the study and following input from Town officials, the analysis was expanded to consider a one-way flow pattern on the site drive. Consequently, the operations analysis includes evaluating three options for the site drive: a) two-way flow; b) one-way exit only; and c) one-way enter only. The evaluation is discussed following the level of service analysis discussion.

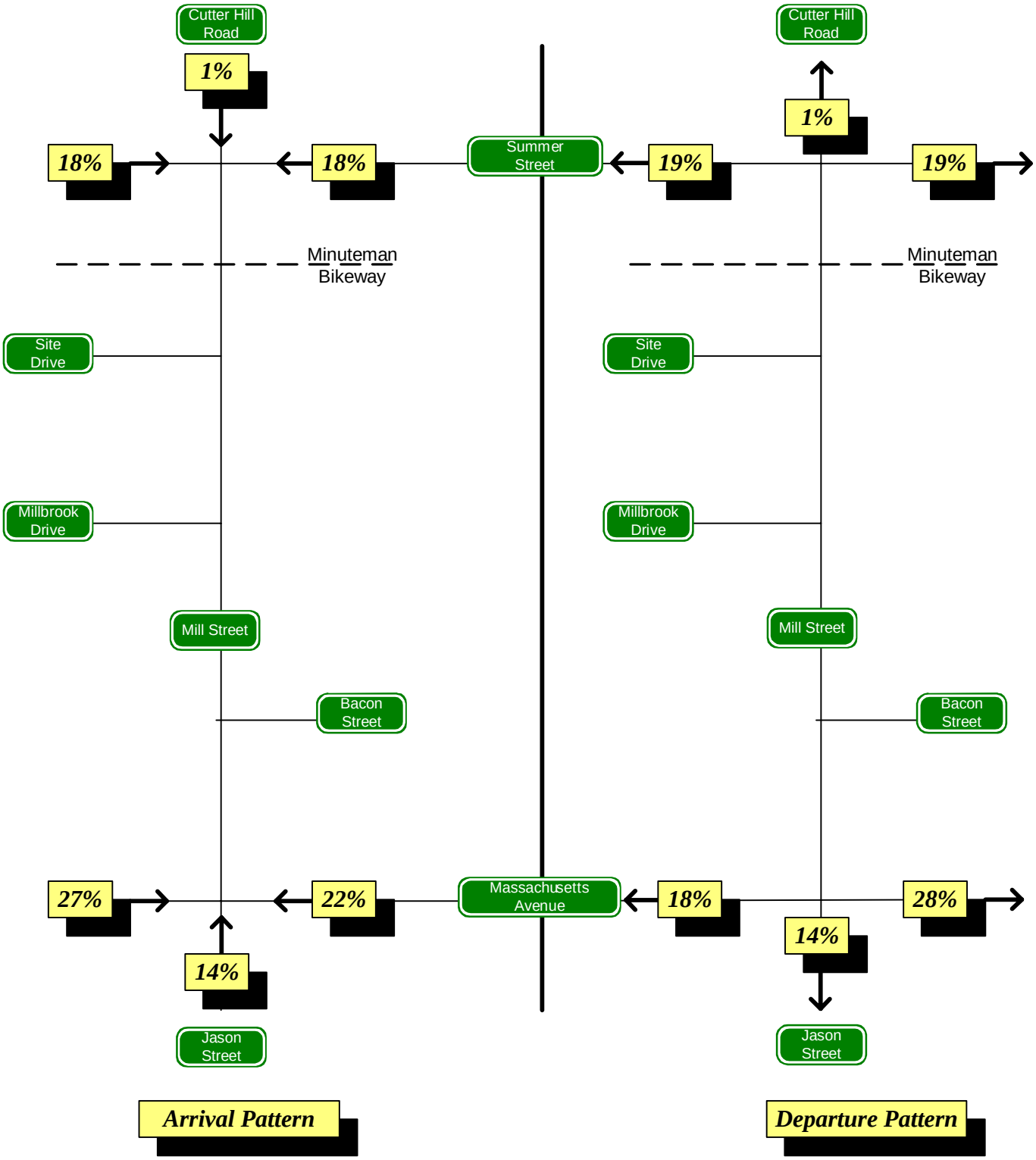
4. Build Traffic Volumes

After removing the traffic volume associated with the No-Build scenario limited reuse of the existing building, peak hour site generated traffic volumes estimated for the proposed development project were added to the peak hour No-Build traffic volumes shown in Figure 3 to establish the peak hour Build condition traffic volumes. Figure 5 illustrates how the site trips were assigned to the network while the resulting morning and evening peak hour Build traffic volume networks are presented in Figure 6.

C. ANALYSIS

This traffic impact and access study focused on the analysis of various roadways and intersections identified previously within the study area. Previous sections of this report developed the No-Build and Build traffic volume network considering annual traffic growth, site-specific developments and estimated site traffic.

Included in this section is an examination of the incremental increases in traffic expected on study area roadways under Build conditions, capacity/Level of Service (LOS) analysis for the study intersections under all scenarios and sight distance evaluation at the proposed site access/egress locations.



Estimated Project Trip Distribution

FIGURE 4

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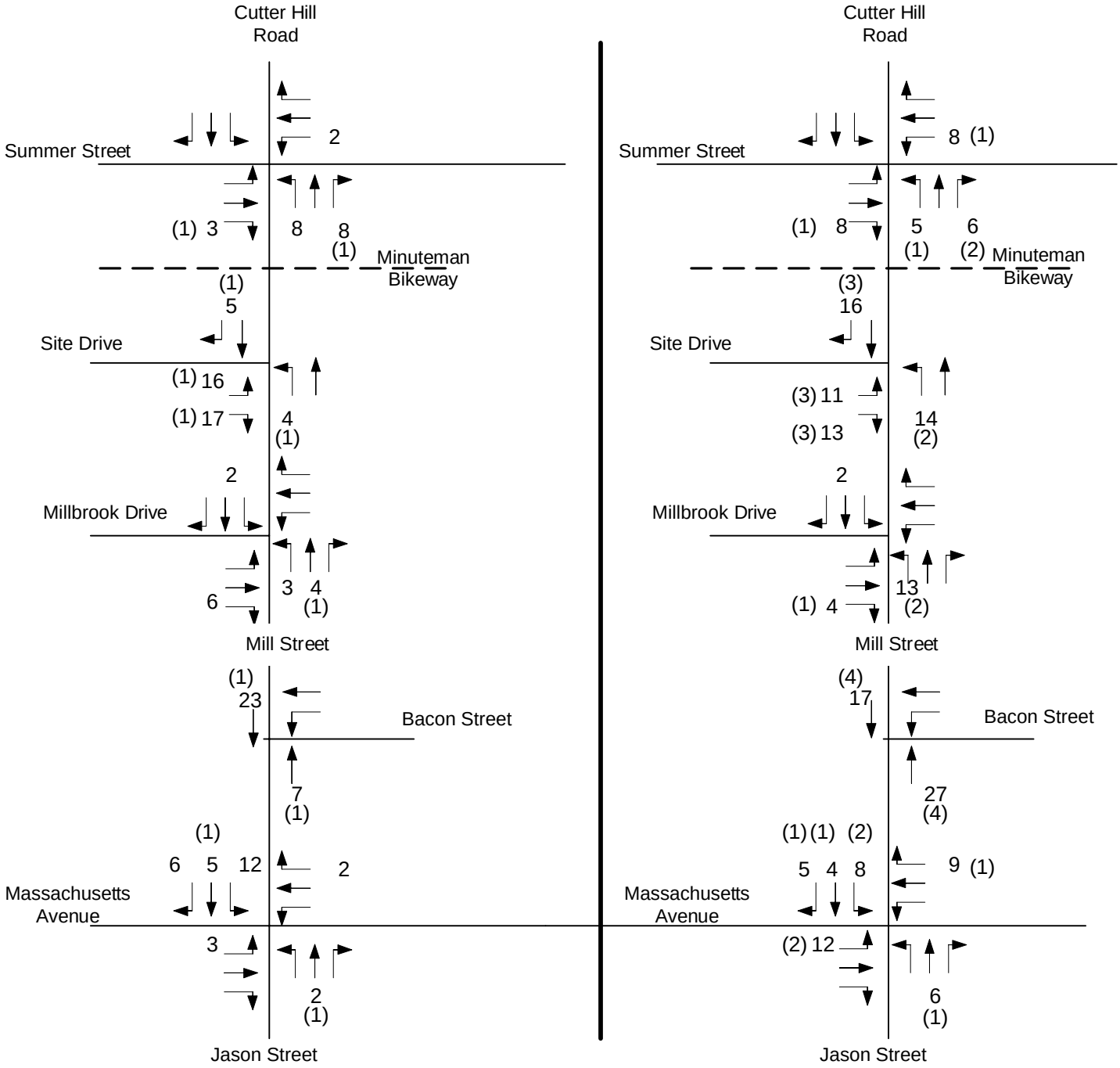

xx - residential trips
(xx) - retail trips

Site Traffic Assignment

FIGURE 5

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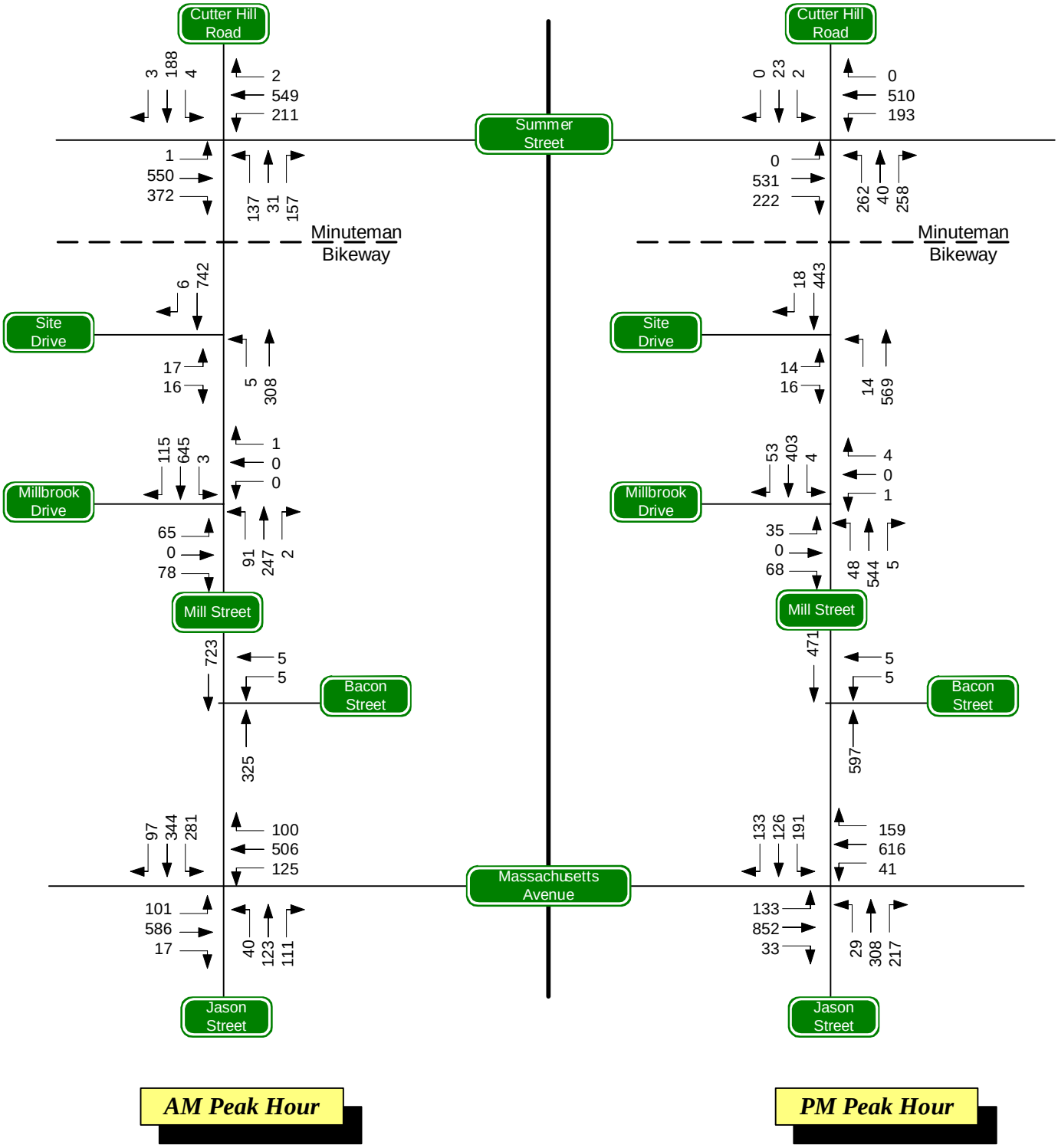

Estimated Future Build Traffic Volumes

FIGURE 6

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1. Traffic Volume Increases

The traffic expected to be generated by the proposed residential project is predicted to result in some traffic increases on the adjacent roadways based on the forecasting assumptions included in the analysis.

As discussed previously, the project would redevelop the site that accommodated Brigham's restaurant, the corporate offices and its manufacturing plant. Consequently, the site had generated a number of vehicle trips in the past and the resulting impact or net change in site vehicle trips. As part of this study and as noted earlier in this report, assumptions were made as to the re-use of existing buildings on-site including the restaurant and a small amount of office space (i.e. 3,500 square feet).

Table 12 compares the estimated peak trips for the assumed re-use option analyzed in this report that reflects the former Brigham's facility (restaurant and small office) with the proposed new use. As can be seen, the proposed project's estimated net site generated peak hour traffic increase is reduced by 30 to 31 vehicle trips when taking into account some reuse of the existing building space. If additional floor space of the former Brigham's complex were re-tenanted, the net differences would be smaller than shown in the table. Also, if the proposed project actually generates traffic at a lower rate than used in the analysis (based on the Legacy/Watermill Place observations), the net differences would also be smaller than what is shown in Table 12.

TABLE 12
COMPARISON OF NEW PEAK HOUR TRIPS
RE-USE OPTION vs. PROPOSED PLAN

	Re-Tenant Option	Proposed Plan	Net[1] Change
AM Peak Hour	31	55	+24
PM Peak Hour	30	84	+54

[1] - The comparison does not include trips related to the full reuse of the existing Brigham's facility, which would reduce the net increase shown in the table.

While the traffic analysis has assumed the reuse of a small portion of the former Brigham's facility, another perspective in judging the potential impact of change the project would have on traffic flow in the general area would be to compare it to what the typical traffic activity was on the site when the Brigham's facility was in full operation. To that end, traffic was estimated for the former site based on ITE trip generation guidance. In addition to the restaurant, there would be approximately 20,000 square feet of office and approximately 46,500 square feet of manufacturing/warehouse space. Based on ITE guidelines, the weekday and peak hour site generated trips were estimated and are shown in Table 13 with a comparison to the proposed project's estimated trip characteristics for the same time periods. As shown in the table, the former use may have generated similar trip activity over the course of the day but would generate a greater number of peak hour trips. In addition, with the manufacturing plant, a higher number of truck trips would have occurred under the former use than will occur with the proposed use.

TABLE 13
COMPARISON OF TRIP GENERATION
PROPOSED PROGRAM vs. FORMER USE

Use	Daily Trip Estimate	AM Peak Hour Estimate	PM Peak Hour Estimate
Proposed Residential Project	896	55	84
Former Brigham's Operation[1]	854	112	160

1 – includes a 35% passby rate for the restaurant related trips that could be made by traffic on abutting street as well as patrons abutting the site (i.e. 22 Mill Street, Brigham's, high school, etc.) thereby receiving site generated trips

In addition to the site generated traffic comparison, estimated peak hour traffic volumes on the abutting roadways were also determined and a comparison between the No-Build and Build conditions was completed. The data is summarized in Table 14. As shown, the project is projected to result in relatively small increases in volume on the different roadway segments. The increases in peak hour volumes on these major street segments represent increases of one half of one percent (0.5%) to one percent (1%).

TABLE 14
COMPARISON OF ESTIMATED ROADWAY
PEAK HOUR TRAFFIC VOLUMES
No-Build vs. Build Condition

Location	Morning Peak Hour			Evening Peak Hour		
	No-Build	Build	Δ Volume	No-Build	Build	Δ Volume
Massachusetts Avenue						
East of Mill Street	1,702	1,709	7	2,062	2,076	14
West of Mill Street	1,347	1,347	0	1,785	1,796	11
Summer Street						
East of Mill Street	1,466	1,473	7	1,484	1,494	10
West of Mill Street	1,604	1,612	8	1,516	1,525	9

2. Capacity/Level of Service Analysis

In this section, the study intersections and site driveway were examined with regard to flow rates, capacity and delay characteristics to determine the Level of Service (LOS) provided under existing and future (No-Build and Build) network conditions. Level of Service is an indicator of operating conditions which occur on a given roadway feature while accommodating varying levels of traffic volumes. It is a qualitative measure that accounts for a number of operational

factors including roadway geometry, speed, traffic composition, peak hour factors, travel delay, freedom to maneuver and driver expectation. When all of these measures are assessed and a Level of Service is assigned to a roadway or intersection, it is equivalent to presenting an "index" to the operational qualities of the section under study. It should be noted that for unsignalized intersections, the Level of Service is determined by the computed or measured control delay for the individual critical movement and not for the intersection as a whole. Level of Service is classified in the 2000 Highway Capacity Manual (2000 HCM)[7] into six levels that are designated 'A' through 'F' based on the control delay ranges they fall under. These are presented in Table 15 for both unsignalized and signalized intersections.

TABLE 15
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

Level of Service	Unsignalized Intersections Control Delay Range (sec)	Signalized Intersections Control Delay Range (sec)
A	<= 10	<= 10
B	> 10 and <= 15	> 10 and <= 20
C	> 15 and <= 25	> 20 and <= 35
D	> 25 and <= 35	> 35 and <= 55
E	> 35 and <= 50	> 55 and <= 80
F	> 50	> 80

The study intersections were evaluated as per techniques published in the 2000 Highway Capacity Manual (HCM). The computer software known as Synchro that follows the procedures established in the HCM, was used to analyze the study intersections. Using existing roadway features and intersection controls as well as planned transportation improvements within the study area under future conditions, traffic operation at the study area intersections were evaluated for existing as well as future conditions. Analysis results for the above are presented in Table 16 for the study intersections. Tables 17 and 18 present the estimated vehicle queues that may exist at the intersections during the peak hours under all analysis conditions.

As shown in Table 16, the Level of Service (LOS) analysis indicated that:

- Currently, the two major signalized intersections are operating at generally acceptable or tolerated levels of service although certain movements experience long peak hour delays. There are greater delays during the afternoon (commuter) peak hour.
- Field observations indicated that during the morning when the high school arrival period occurs, there is a peaking of activity on Mill Street and specifically Millbrook Drive causing some additional delay and vehicle queuing in this area.
- The analysis shows that during the morning peak hour, Millbrook Drive operates at LOS 'F', however, observations indicate that this occurs for a relatively short duration (i.e. 15-20 minute) at the critical high school arrival period when drop-offs occur.

[7] Transportation Research Board. 2000 Highway Capacity Manual, Washington, D.C. 2000.

- The analysis indicates that there will be no changes in levels of service and minimal changes are estimated between the No-Build and Build conditions.

- Site traffic is expected to be able to enter and exit the site with relatively short or moderate delays (LOS 'C' or better). This base analysis presumes two way flow on the site drive.

- The most significant finding when reviewing the queue analysis summaries is there is not a large difference between No-Build and Build conditions at the intersections.

TABLE 16
SUMMARY OF LEVEL OF SERVICE ANALYSIS

Intersections	Existing				No-Build				Build			
	Morning Peak		Evening Peak		Morning Peak		Evening Peak		Morning Peak		Evening Peak	
	Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mill Street at Millbrook Drive Unsignalized)												
NB Left	4.2	A	0.9	A	4.7	A	1.0	A	4.7	A	1.2	A
EB Left/Right	91.1	F	17.2	C	190.7	F	15.4	C	209.6	F	21.1	C
WB left/Right	9.7	A	14.0	B	10.0	A	20.3	C	10.0	A	15.9	C
Summer Street)/ Mill Street/ Cutter Hill Road/(Signalized)												
NB Left/Thru	37.3	D	39.8	D	47.2	D	81.1	F	52.6	D	79.3	E
NB Right	13.9	B	13.5	B	14.0	B	11.8	B	14.1	B	13.7	B
SB Left/Thru/right	25.5	C	18.1	B	25.8	C	18.6	B	25.8	C	18.2	B
WB Thru/right	12.8	B	9.4	A	14.0	B	12.3	B	14.0	B	10.2	B
WB Left	100.0	F	40.2	D	113.6	F	53.3	D	109.8	F	46.4	D
EB Left/Thru/	41.0	D	26.5	C	65.8	E	41.3	D	65.8	E	36.3	D
EB Right	24.4	C	16.3	B	30.7	C	19.6	B	30.7	C	17.1	B
Overall	33.7	C	22.9	C	43.3	D	32.1	C	43.2	D	32.8	C
Mill Street/Bacon Street (Unsignalized)												
WB Left/Right	16.2	C	15.4	C	15.9	C	17.1	C	16.1	C	17.6	C
Massachusetts Avenue/Mill Street/Jason Street (Signalized)												
EB Left/Thru/Right	17.7	B	52.9	D	17.8	B	85.9	F	14.2	B	79.3	E
WB Left/Thru/Right	52.9	D	27.5	C	36.5	D	29.7	C	42.6	D	26.7	C
NB Left/Thru/Right	20.7	C	67.8	E	28.5	C	93.3	F	33.7	C	105.4	F
SB Left/Thru/Right	35.6	D	38.7	D	77.9	E	44.9	D	102.4	E	50.6	D
Overall	33.9	C	46.2	D	41.2	D	64.7	E	51.1	D	64.7	E
Mill Street at Site Drive (Unsignalized)												
EB Left/Right	19.2	C	16.5	C	22.0	C	19.2	C	24.1	C	20.6	C
NB Left	1.1	A	0.1	A	1.3	A	0.2	A	1.3	A	0.4	A

[a] Avg. Total Delay for the Lane Group or Movement (sec/veh) [b] Level of Service

TABLE 17
SUMMARY OF ESTIMATED
VEHICLE QUEUES (in feet)
(AM Peak Hour)

Intersection/Movement		Existing		No-Build		Build	
		Avg Q	95th Q	Avg Q	95th Q	Avg Q	95th Q
Massachusetts Avenue at Mill Street/Jason Street							
Eastbound		118	165	127	175	126	173
Westbound		191	315	197	323	206	337
Northbound		106	183	131	247	140	272
Southbound		166	274	234	345	258	371
Mill Street at Millbrook Drive							
Eastbound		-	172	-	249	-	269
Northbound		-	12	-	15	-	15
Mill Street at Site Drive							
Eastbound		-	-	-	-	-	19
Summer Street at Mill Street							
Eastbound		276	415	342	489	342	489
Eastbound Right		158	230	195	292	195	292
Westbound Left		134	241	145	254	142	255
Westbound		188	255	213	288	213	288
Northbound		84	149	108	194	108	210
Northbound Right		42	71	44	73	47	77
Southbound		91	141	95	146	95	146

TABLE 18
SUMMARY OF ESTIMATED
VEHICLE QUEUES (in feet)
(PM Peak Hour)

Intersection/Movement		Existing		No-Build		Build	
		Avg Q	95th Q	Avg Q	95th Q	Avg Q	95th Q
Massachusetts Avenue at Mill Street/Jason Street							
Eastbound		284	454	314	563	375	567
Westbound		267	347	296	385	285	371
Northbound		427	661	521	746	507	767
Southbound		157	226	179	273	190	292
Mill Street at Millbrook Drive							
Eastbound		-	24	-	31	-	34
Northbound		-	2	-	3	-	4
Mill Street at Site Drive							
Eastbound		-	-	-	-	-	21
Summer Street at Mill Street							
Eastbound		185	339	221	406	221	406
Eastbound Right		56	105	71	130	74	134
Westbound Left		78	174	83	186	86	192
Westbound		110	180	132	215	132	215
Northbound		122	257	157	323	162	327
Northbound Right		56	103	58	108	61	110
Southbound		7	23	8	25	8	25

3. Parking Impact Analysis

The proposed project provides a total of 179 (6 HP) parking spaces that includes 12 spaces in the upper area where the small retail space will be constructed. It also includes 77 spaces in the lower level of the building and the remaining being surface spaces in the lower lot. There are 167 spaces designated for the residential use, which amounts to a parking supply to unit ratio of 1.4 spaces per unit. This ratio is consistent with research data on residential parking demand compiled by the Institute of Transportation Engineers (ITE)[8]. Many of the communities in the Metro Boston region require projects such as this to provide 2 spaces per unit. The proposed parking ratio for the 30-50 Mill Street project is 30% lower than this ratio. Based on ITE models and assuming an average between the urban and suburban models, the peak demand for the proposed project is estimated to be 128 parked vehicles on average with an 85th percentile demand of 153 parked vehicles.

The Legacy at Arlington Center, an apartment development consisting of 134 units on Massachusetts Avenue in Arlington Center, constructed 167 spaces for a parking ratio of 1.24. There is no similar adjacent parking need at this site. If the proposed project at 30-50 Mill Street were to provide the same ratio of parking for its residents, the resulting residential parking would be 144 spaces. With the proposed residential parking count of 167 spaces, this would leave 23 spaces available for use by 22 Mill Street. Combined with the 15 spaces on the 22 Mill Street property to which the owner of the Brigham's site currently has exclusive right, and which the project proponent intends to release to 22 Mill Street, the project would be able to provide the same number of parking spaces previously leased to 22 Mill Street by the owner of the Brigham's property.

By way of comparison, management at The Residences at River's Edge, a newly constructed apartment project in Medford, Massachusetts, reports that there are currently 255 parking spaces *occupied* on their property of 207 units. This equates to a parking *demand* ratio of 1.23. In contrast to The Legacy at Arlington Center, this property is very comparable to the proposed development in terms of finishes, amenities and price point, and will therefore attract a similar resident profile. It is important to note that despite its location less than a half-mile from the Wellington Station of the MBTA's Orange Line, parking demand is well over one space per unit.

4. Sight Distance Analysis

Although the project is in a more urbanized area, as part of the driveway safety assessment, driver sight distances relative to Mill Street at the proposed site driveway were reviewed. The most substantive factor noted in the field was the effect the building corners have on each side of the drive. There are also some small shrubs located on the northern corner of the drive and building at 22 Mill Street. In general, motorists driving along Mill Street have good visibility of the site drive and motorists exiting the drive when the vehicle is nearly at the street edge. Based on a travel speed of 30 mph, it was determined that the approach stopping sight distance (SSD) criteria at this speed is 200 feet which is more than available. Exiting motorists secure good visibility once they go past the STOP line and building edge and encroach on the sidewalk. As

[8] Institute of Transportation Engineers, Parking Generation, 3rd Edition, Washington, D.C., 2004.

long as pedestrians have adequate warning of an exiting vehicle, then safe use of the drive for exiting traffic would be expected. The project proponent is proposing several measures to improve pedestrian warning, as discussed at the end of the report.

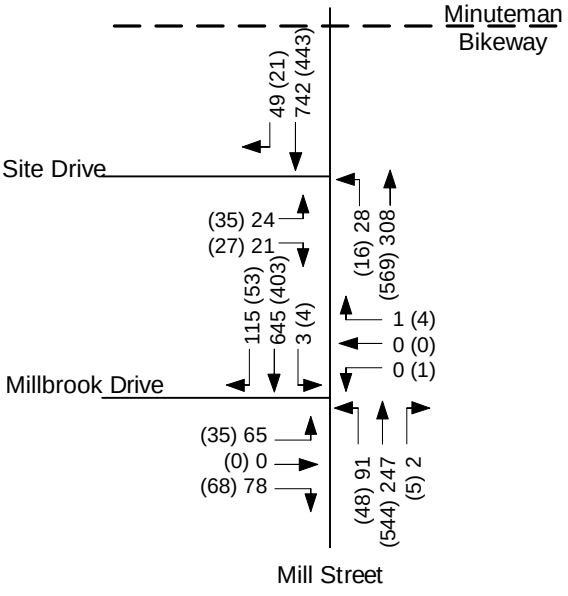
4. Site Drive Evaluation

During the course of the site design process, there have been discussions between the Applicant and various Town officials. One concern raised in their discussions was the use of the existing site drive. The initial approach to the planning and traffic analysis has been to presume it to be a two way street as it is used today and was used in the past. However, Town officials raised the possibility of it becoming a one way street. In response to this concern, one way options were reviewed and compared with the two way street plan. The following paragraphs summarize this review. Figure 7 illustrates the traffic flow conditions under the three different options in addition to highlighting the key characteristics of each.

The existing driveway, shown in the photograph below, is between 24 and 27 feet wide and is essentially level from its intersection with Mill Street to the beginning of the parking area. There is a loading door in the Shattucks Hardware building that opens to this drive, however, this door is used infrequently.

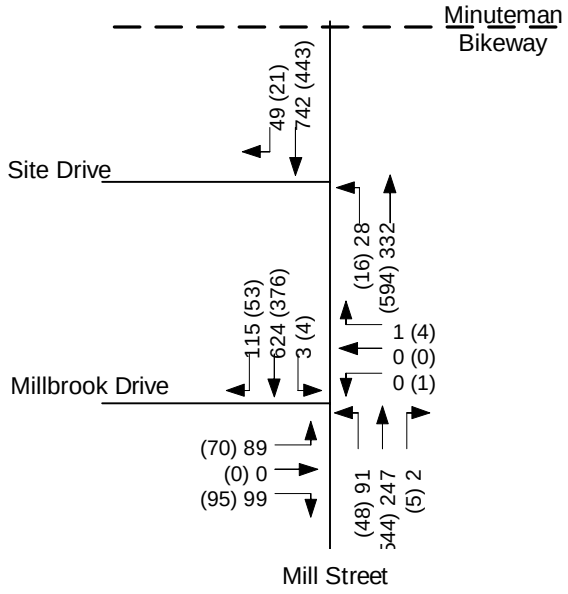
Looking down site drive from Mill Street.

The existing driveway is used by employees/visitors to 22 Mill Street and motorists related to the high school. In the past, it provided two way access for Brigham's employees. While the drive is 24 feet or more in width, the adjacent buildings form a "cavern" type feel and as a result, the perceived or "effective" width of the drive may be lower. There are also several utility poles along the north side of the drive further having an effect on the use of the drive.



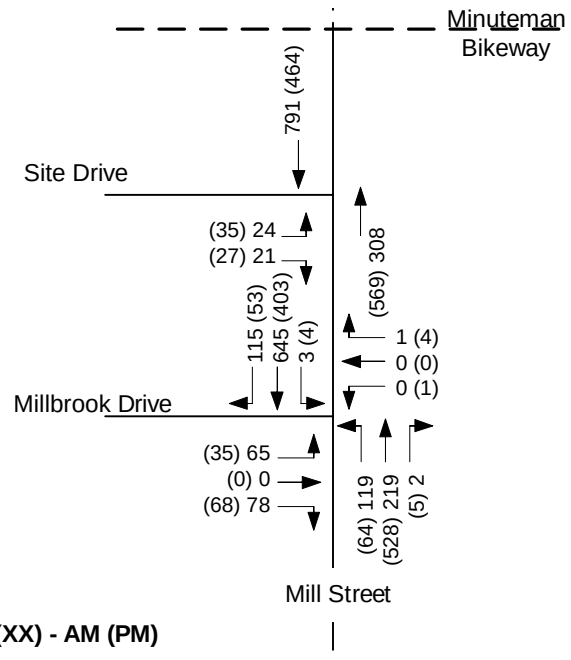
OPTION A - TWO-WAY

- maintains current traffic patterns
- separates project traffic with school/businesses
- encourages high school "cut thru"
- potential conflicts increase with more balanced flows
- increased driver discomfort due to drive width and buildings
- minimal impact on Millbrook Drive



OPTION B - ONE-WAY ENTER

- signifianctly increases delay on Millbrook Drive
- results in higher left turn enter demand and related stopping on Mill Street
- encourages high school "cut thru"
- lower driver discomfort on drive due to width and building constraints
- maintains business delivery access



OPTION C - ONE-WAY EXIT

- smaller effect on Millbrook Drive during peak periods
- discourages high school "cut thru"
- minimizes any conflict with school related traffic on Millbrook Drive during morning peak hour
- lowers driver discomfort on drive due to width and building constraints
- maintains business delivery access

XX/(XX) - AM (PM)

Alternative Site Drive Flows

FIGURE 7

It did not appear from field observations that there were any significant problems related to flow on the existing drive. However, current flows are highly directional during peak periods and low volumes occur during the off-peak times. When the project is built, there will be additional volumes using the driveway. Although the residential component will have fairly pronounced peak directional flow (exit during the AM peak, enter during PM peak), the predominant flow is basically opposite the pattern of 22 Mill Street (medical office) where the predominant flow will be entering in the morning peak hour and exiting in the PM peak hour. Generally, this condition results in a "balanced" flow on the driveway generated by the "mixed" land uses. In this specific case, however, with greater two way flow, the driveway width may result in a higher level of discomfort potentially affecting the efficiency of the traffic movement along the existing site drive. The one way flow options overcome the increased flow and effect of the driveway width, as a width of 18 feet would comfortably accommodate the one way flow.

The one way flow pattern, whether it is entering or exiting the site, results in a greater use of Millbrook Drive by project related traffic. The one-way pattern will allow for the hardware store loading/unloading continue occurring and the need for a minimum of 18 foot width allows for some "clear" zone from the buildings on each side of the drive and utility poles. A sidewalk will also be constructed to separate pedestrian and vehicular traffic.

The operations of the alternative site drive configurations were evaluated. Table 19 compares the level of service results under the Build conditions for the Mill Street/Millbrook Drive and Mill Street/ Site Drive intersections. As shown in Table 19, the one-way options generally result in similar operations on the site drive when the remaining key movements are compared. However, each of the one-way options results in longer delays on Millbrook Drive, particularly during the AM peak hour. The "Enter Only" option for the site drive results in the worst operational condition on Millbrook Drive during peak hours.

Aside from the LOS operations, the "Exit Only" would be expected to reduce the amount of high school related traffic that presently uses the property either as a "short cut" or for unauthorized parking that occurs on the site. The "Exit Only" option is also expected to be a safer option than the other two and minimize the possible conflicts between project traffic and high school traffic and pedestrians on Millbrook Drive.

TABLE 19
LEVEL OF SERVICE ANALYSIS SUMMARY
COMPARISION OF SITE DRIVE OPTIONS

Site Drive Option	Mill Street at Millbrook Drive				Mill Street at Site Drive			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Del	LOS	Del	LOS	Del	LOS	Del	LOS
Two Way Option								
Exit	209.6	F	21.1	C	24.1	C	20.6	C
Left Turn Enter	4.7	A	1.2	A	1.3	A	0.4	A
One Way Enter Option								
Exit	345.5	F	30.3	D	-	-	-	-
Left Turn Enter	4.6	A	1.2	A	1.2	A	0.4	A
One Way Exit Option								
Exit	301.9	F	22.1	C	22.9	C	19.9	C
Left Turn Enter	6.5	A	1.6	A	-	-	-	-

All of the options provide for maintaining access to the Shattuck Hardware loading/unloading door that exists off the site drive, although the one-way options may result in less of a flow issue when a truck is unloading.

Finally, the one-way options do allow for some increased degree of comfort for motorists using the site drive, as an 18 foot wide travel way is adequate to accommodate one way flow. The edges on the drive would be defined by a 5 foot walkway along one side.

Conclusions/Recommendations

The previous sections of this traffic report detailed the data, analysis procedures and results of this traffic study. As a result of the study, the following conclusions can be made:

- The analysis has shown that the proposed project would result in small increases in volume on the nearby streets, particularly when compared with the reuse of some of the former facility.

- Given the project's location, it is anticipated that there will be a significant amount of site trips that would be made by transit as well as walking. The analysis has assumed the Town of Arlington's average of 20% non-auto trip making characteristics during the peak hour commutes. However, given the project's advantageous location, non-auto use could become greater than the assumed value.

- The operations analysis showed that no changes in level of service would occur as a result of the development.

- The analysis showed that site traffic would be able to enter and exit the site in a safe, efficient manner.

While the proposed project can be accommodated on area roads, a series of recommendations have been developed to improve traffic operation and safety in the vicinity of the site drive. They are as follows:

- A pedestrian connection between the internal site area and the retail building as well as both Mill Street and Millbrook Drive should be provided. Several options may exist depending on the use of the site drive. Additionally, a direct connection from the project to the Minuteman Trail should be provided.

- A crosswalk should be delineated across the proposed new site drive at the sidewalk along Mill Street. This could be accomplished with alternative surface treatments or pavement markings.

- Three options for the existing site drive to Mill Street were evaluated and based on the analysis and considering multiple factors; the option that restricts traffic to "exit only" is our preferred plan. This option has several benefits including minimizing vehicle conflicts during the morning on Millbrook Drive and discouraging high school traffic from cutting through the residential site. As opposed to the two-way scenario, it enables greater pedestrian safety along the site drive and minimizes conflicts between vehicles exiting the 22 Mill Street garage and those entering the site in the evening peak hour. The easement between the site and Millbrook Drive remains a two way connection under all these site drive alternatives.

- Related to the site drive, a STOP sign and STOP bar should be placed on the site drive approach to Mill Street.

- It is also recommended that visual and possibly audible warning devices be placed on the site drive to warn pedestrians on any oncoming vehicles on the site drive approach to Mill Street. The devices may need to be mounted on short posts near the sidewalk.

- While signs exist in advance of the Trail crossing, it is desirable to enhance the warning to Summer Street and Mill Street motorists and ensure that the markings at the crossing are highly maintained. Better control of trail users at the crossing is also recommended to ensure stopping prior to entering the street. Based upon discussions with the Transportation Advisory Committee and the Arlington Bicycle Advisory Committee, it is recommended that split gates be installed to slow bicyclists and warn Bikeway users of the presence of a busy street, crosswalk pavement markings be improved to warn motorists of the presence of the Bikeway, and a warning device directed toward motorists turning off of Summer Street onto Mill Street be added. Due to the close proximity of Summer Street to the Bikeway, a warning device will improve motorists' ability to stop for pedestrians and bicyclists crossing Mill Street at the Bikeway. In addition, modifying the landscape features near the street would also improve visibility.

- Regardless of the proposed project, the Town should consider signal timing modifications and optimizing for efficiencies at the two signalized intersections included in the study.

- In order to reduce congestion on the northbound approach to Massachusetts Avenue on Jason Street, a modification to the traffic island to accommodate a short two lane approach is recommended. The action would include reducing the width of the median island and/or shifting it to the west. Based on our current understanding of the street layouts, this action can be done within the existing right of way. There is approximately 20 feet between the 8 foot island and the outside curb.

  Figure 8 provides a graphic sketch of possible improvement. The action would include reducing the width of the median island to four (4) feet and/or shifting it to the west. Modifying the island could result in an approach of at least 22 feet in width enabling a short, but more complete two 11-foot lane approach. The second lane that could accommodate between 2 and 4 vehicles would be designated for right turns only. An analysis of LOS with these improvements as well as signal timing adjustments showed that a noticeable reduction in overall delay is possible. While the existing 8 foot wide median island provides some refuge for pedestrians crossing the street as well as an area for plantings, shifting the island and possibly reducing the width to between 4 and 6 feet results in a positive reduction in vehicle delay at the intersection.

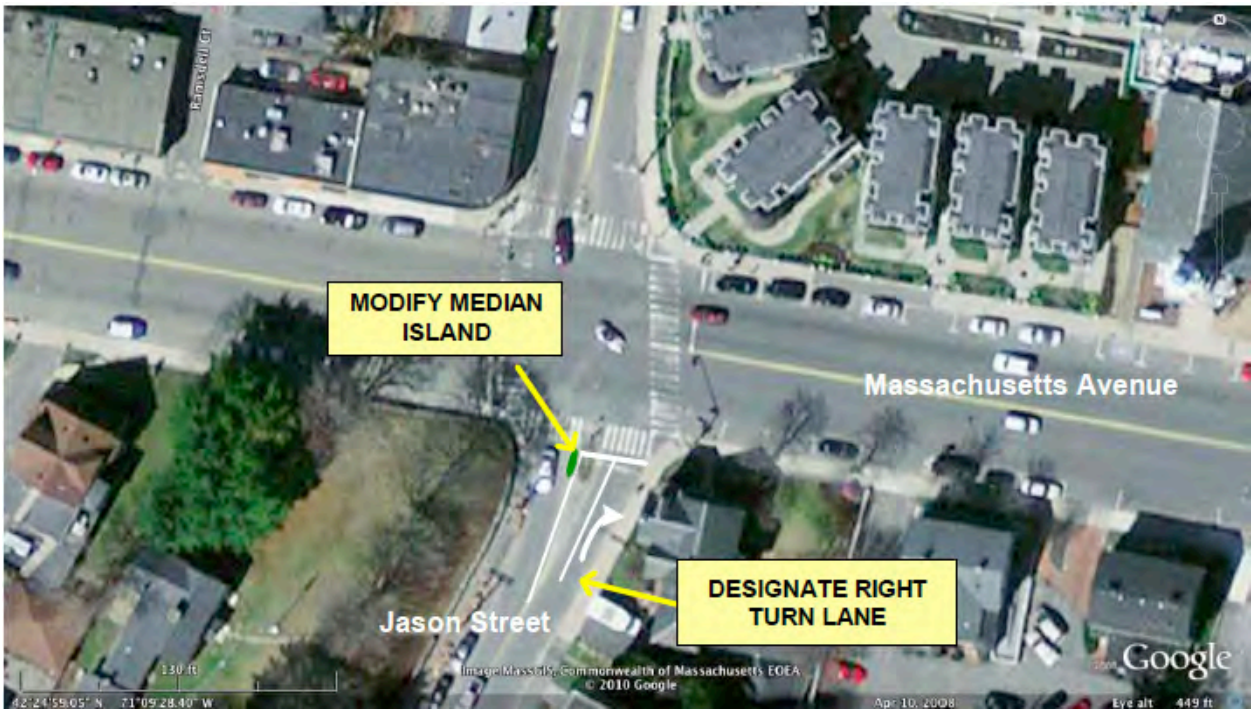


Figure 8. Potential Modifications at Massachusetts Avenue and Jason Street.

• Site Plan Circulation: In response to a series of questions by Town staff, TAC and Board members, an overall conceptual circulation plan that provides guidance as to signage, markings as well as summarizes some of the actions noted above was prepared (Figure 9). Actions include:

a. alternative surface treatment for pedestrian crossing areas,
b. signage to encourage slow speeds by motorists as well as making them aware of the likely moderately high volume of pedestrians and bicyclists,
c. a pedestrian warning device at the driveway's connection with the Mill Street sidewalk,
d. internal walkways and sidewalk connections to Mill Street, and
e. signage to manage flow in order to reduce or eliminate exiting traffic to Millbrook Drive.

- Finally, during the course of the project development phase and analysis, a travel demand management (TDM) plan has been developed that is designed to encourage residents of the project to use transit, bicycles and walk for many of their trips. The TDM consists of marketing materials, specific information on transit at the office and on the website and the provision of bicycle "rentals". Other services will be provided to residents of the project as needed or identified going forward.

In conclusion, the proposed project as currently planned is expected to have small and manageable impacts on traffic operations within the study area and represents the least impact on such traffic operations of the viable alternative site redevelopment strategies. The project can be accommodated on the existing roadway system with site residents able to enter and exit safely and relatively small impacts on the local streets. While the project will add traffic to roadway network, the actions noted above will enhance safety both related to site access/egress and address existing concerns along this section of Mill Street.

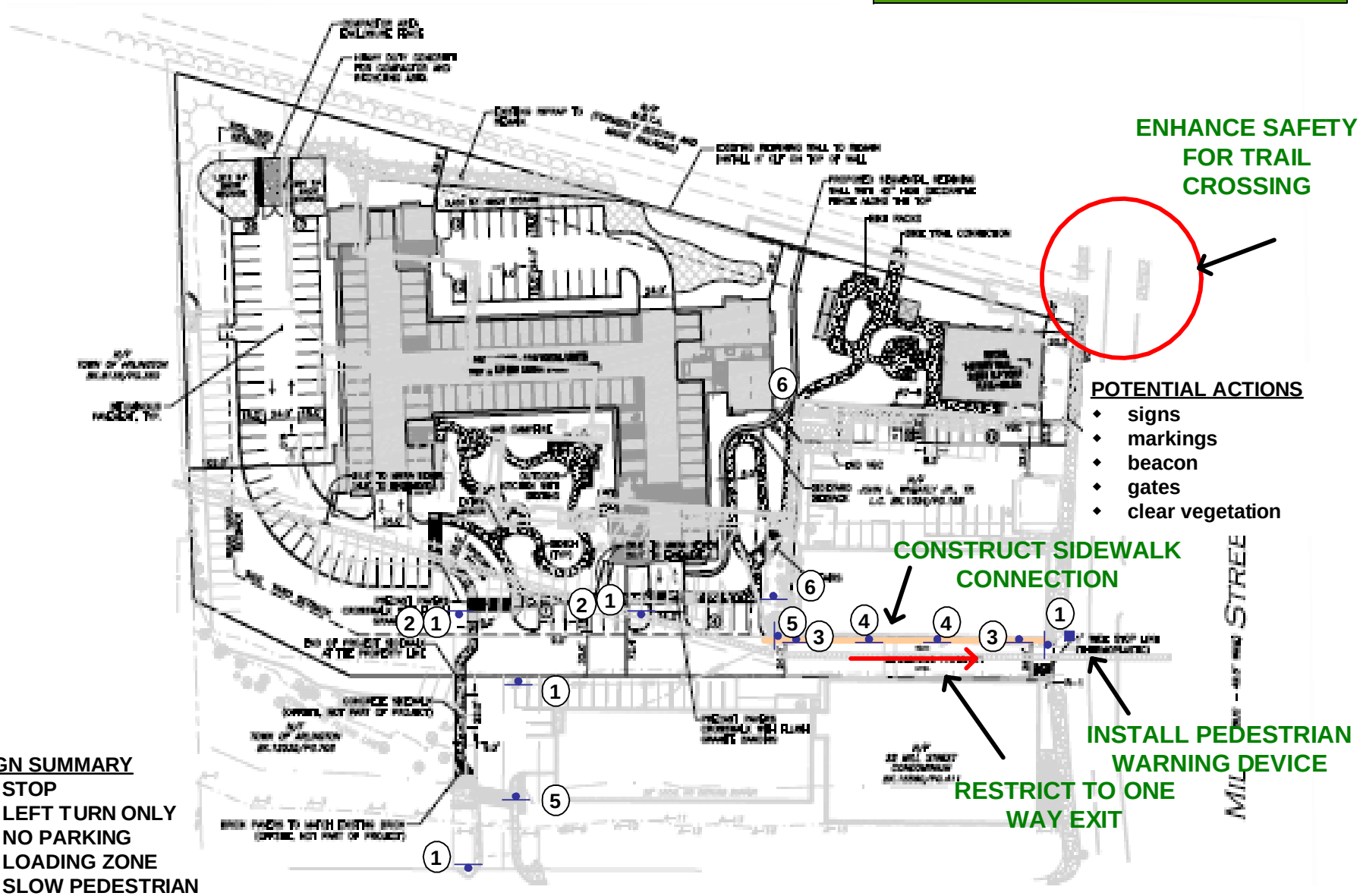


Figure 9

TRAFFIC MANAGEMENT PLAN

New England Engineering Group, LLC

REFERENCE: ALLEN & MAJOR ASSOCIATES, INC.,
PROPOSED LAYOUT PLAN, 6/16/10

Appendix

- **TMC Data**
- **Traffic Growth Data**
- **MHD Crash Rates**
- **Trip Generation Calculations**
- **LOS Analysis**
  - **Existing**
  - **No-Build**
  - **Build**

PRECISION
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INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Massachusetts Avenue
west of Mill Street
City,State: Arlington, MA
Client: NEEG LLC/ K. Oldfield

102177 A Volume
Site Code: 1011

Start	WB				EB				Combined				04-May-10
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	14		146		14		143		28		289		
12:15	9		159		13		120		22		279		
12:30	10		152		7		155		17		307		
12:45	6	39	134	591	10	44	146	564	16	83	280	1155	
01:00	7		174		2		180		9		354		
01:15	8		153		4		138		12		291		
01:30	4		157		4		166		8		323		
01:45	4	23	154	638	6	16	146	630	10	39	300	1268	
02:00	2		178		2		160		4		338		
02:15	2		176		2		144		4		320		
02:30	6		196		2		176		8		372		
02:45	9	19	166	716	2	8	175	655	11	27	341	1371	
03:00	4		177		2		183		6		360		
03:15	5		160		2		152		7		312		
03:30	0		164		4		153		4		317		
03:45	2	11	154	655	2	10	158	646	4	21	312	1301	
04:00	7		189		4		182		11		371		
04:15	6		164		10		178		16		342		
04:30	7		186		10		156		17		342		
04:45	7	27	181	720	20	44	161	677	27	71	342	1397	
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05:15	14		187		20		194		34		381		
05:30	20		172		18		188		38		360		
05:45	32	76	190	744	32	82	200	772	64	158	390	1516	
06:00	37		166		38		204		75		370		
06:15	48		182		62		204		110		386		
06:30	66		154		74		174		140		328		
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07:15	111		124		116		152		227		276		
07:30	142		123		159		112		301		235		
07:45	194	541	104	489	146	551	104	533	340	1092	208	1022	
08:00	163		106		182		132		345		238		
08:15	156		115		182		102		338		217		
08:30	134		104		144		102		278		206		
08:45	138	591	72	397	152	660	97	433	290	1251	169	830	
09:00	166		83		140		98		306		181		
09:15	136		77		138		78		274		155		
09:30	131		93		138		70		269		163		
09:45	111	544	63	316	144	560	57	303	255	1104	120	619	
10:00	152		73		127		60		279		133		
10:15	126		53		152		41		278		94		
10:30	120		46		128		36		248		82		
10:45	164	562	31	203	120	527	36	173	284	1089	67	376	
11:00	136		35		130		36		266		71		
11:15	150		28		138		20		288		48		
11:30	130		26		172		16		302		42		
11:45	118	534	18	107	194	634	16	88	312	1168	34	195	
Total	3182		6230		3411		6200		6593		12430		
Percent	48.3%		50.1%		51.7%		49.9%						
Day Total		9412				9611				19023			
Peak	07:30		04:30		07:30		05:30		07:30		05:00		
Vol.	655		749		669		796		1324		1516		
P.H.F.	0.844		0.960		0.919		0.975		0.959		0.972		

PRECISION
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Mill Street
south of Summer Street
City,State: Arlington, MA
Client: NEEG LLC/ K. Oldfield

102177 B Volume
Site Code: 1011

Start	NB				SB				Combined				04-May-10
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	4		54		1		60		5		114		
12:15	2		52		1		62		3		114		
12:30	5		56		3		74		8		130		
12:45	2	13	62	224	1	6	72	268	3	19	134	492	
01:00	0		68		0		71		0		139		
01:15	1		64		0		60		1		124		
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02:15	0		73		0		88		0		161		
02:30	2		86		0		96		2		182		
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03:00	1		90		3		96		4		186		
03:15	1		97		0		73		1		170		
03:30	0		98		1		94		1		192		
03:45	0	2	90	375	1	5	68	331	1	7	158	706	
04:00	0		114		1		80		1		194		
04:15	1		84		1		78		2		162		
04:30	1		80		1		70		2		150		
04:45	2	4	108	386	2	5	92	320	4	9	200	706	
05:00	5		118		5		112		10		230		
05:15	3		137		8		94		11		231		
05:30	4		140		10		96		14		236		
05:45	4	16	99	494	14	37	116	418	18	53	215	912	
06:00	6		118		16		104		22		222		
06:15	11		112		30		78		41		190		
06:30	10		82		39		72		49		154		
06:45	25	52	86	398	78	163	58	312	103	215	144	710	
07:00	28		56		96		46		124		102		
07:15	26		52		121		38		147		90		
07:30	42		46		195		41		237		87		
07:45	70	166	44	198	218	630	33	158	288	796	77	356	
08:00	86		64		179		40		265		104		
08:15	56		40		176		45		232		85		
08:30	80		31		147		33		227		64		
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Vol.	292		503		768		418		1022		912		
P.H.F.	0.849		0.898		0.881		0.901		0.887		0.966		

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Millbrook Drive
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102177 C Volume
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Start	EB				WB				Combined				04-May-10
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue
12:00	0		12		0		7		0		19		
12:15	0		4		0		11		0		15		
12:30	0		13		0		15		0		28		
12:45	0	0	9	38	0	0	11	44	0	0	20	82	
01:00	0		7		0		11		0		18		
01:15	0		21		1		19		1		40		
01:30	0		18		0		9		0		27		
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Total	295		637		505		524		800		1161		
Percent	36.9%		54.9%		63.1%		45.1%						
Day Total		932				1029				1961			
Peak	07:45		02:30		07:30		02:15		07:30		02:15		
Vol.	103		155		214		124		308		269		
P.H.F.	0.526		0.760		0.575		0.795		0.542		0.791		

TURNING MOVEMENT COUNT REDUCTION WORKSHEET *New England Engineering Group*

INTERSECTION Massachusetts Avenue at Mill Street/Jason Street Counted By:
COUNT DATE: 1/20/2010 Weather Conditions: clear, dry

TIME:	Massachusetts Avenue EB				Massachusetts Avenue WB				Jason Street NB				Mill Street SB				TOTAL (15 Min.)	TOTAL (Hour)
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:00 - 7:15	6	103	2	111	7	45	15	67	4	7	6	17	25	35	10	70	265	
7:15 - 7:30	9	123	5	137	16	73	11	100	4	14	12	30	47	59	13	119	386	
7:30 - 7:45	19	106	3	128	15	22	19	56	6	30	19	55	56	51	21	128	367	
7:45 - 8:00	16	112	5	133	28	29	16	73	9	36	32	77	44	68	29	141	424	1442
8:00 - 8:15	23	166	5	194	32	141	7	180	4	36	22	62	55	72	22	149	585	1762
8:15 - 8:30	27	140	0	167	25	101	36	162	11	31	34	76	69	82	18	169	574	1950
8:30 - 8:45	19	126	3	148	36	106	20	162	16	15	15	46	52	66	21	139	495	2078
8:45 - 9:00	16	103	6	125	22	113	23	158	4	22	31	57	53	67	14	134	474	2128
TOTAL 7:00 - 9:00	135	979	29	1143	181	630	147	958	58	191	171	420	401	500	148	1049	3570	
16:00 - 16:15				0				0				0				0	0	
16:15 - 16:30				0				0				0				0	0	
16:30 - 16:45				0				0				0				0	0	
16:45 - 17:00				0				0				0				0	0	0
17:00 - 17:15				0				0				0				0	0	0
17:15 - 17:30				0				0				0				0	0	0
17:30 - 17:45				0				0				0				0	0	0
17:45 - 18:00				0				0				0				0	0	0
TOTAL 4:00 - 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR VOLUMES:

TIME: MORNING PEAK PERIOD	Street EB				Street WB				Street NB				Street SB				TOTAL (Hour)	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
8:00 - 8:15	23	166	5	194	32	141	7	180	4	36	22	62	55	72	22	149	585	
8:15 - 8:30	27	140	0	167	25	101	36	162	11	31	34	76	69	82	18	169	574	
8:30 - 8:45	19	126	3	148	36	106	20	162	16	15	15	46	52	66	21	139	495	
8:45 - 9:00	16	103	6	125	22	113	23	158	4	22	31	57	53	67	14	134	474	
	85	535	14	634	115	461	86	662	35	104	102	241	229	287	75	591	2128	

TIME: EVENING	Street EB	Massachusetts Avenue WB	Jason Street NB	Mill Street SB	TOTAL (Hour)	

TURNING MOVEMENT COUNT REDUCTION WORKSHEET *New England Engineering Group*

INTERSECTION Mill Street at Millbrook Drive — Counted By:
COUNT DATE: 1/6/2010 — Weather Conditions: clear, dry
1/12/2010

TIME:	Millbrook Drive EB				Apt Drive WB				Mill Street NB				Mill Street SB				TOTAL (15 Min.)	TOTAL (Hour)
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:00 - 7:15				0				0				0				0	0	
7:15 - 7:30	2	0	6	8	0	0	0	0	9	26	0	35	0	103	24	127	170	
7:30 - 7:45	10	0	10	20	0	0	0	0	10	31	0	41	2	94	15	111	172	
7:45 - 8:00	36	0	34	70	0	0	1	1	36	62	1	99	0	121	61	182	352	694
8:00 - 8:15	9	0	11	20	0	0	0	0	11	56	0	67	3	144	18	165	252	946
8:15 - 8:30	6	0	4	10	0	0	0	0	15	56	0	71	0	147	18	165	246	1022
8:30 - 8:45	9	0	18	27	0	0	0	0	19	50	1	70	0	136	12	148	245	1095
8:45 - 9:00	6	0	9	15	0	0	1	1	8	40	2	50	2	68	9	79	145	888
TOTAL 7:00 - 9:00	78	0	92	170	0	0	2	2	108	321	4	433	7	813	157	977	1582	
16:00 - 16:15				0				0				0				0	0	
16:15 - 16:30	12	0	16	28	1	0	0	1	7	84	0	91	0	65	7	72	192	
16:30 - 16:45	3	0	6	9	0	0	1	1	3	53	1	57	0	66	2	68	135	
16:45 - 17:00	16	0	17	33	1	0	1	2	11	52	1	64	2	64	5	71	170	497
17:00 - 17:15	5	0	11	16	1	0	2	3	8	89	2	99	2	64	10	76	194	691
17:15 - 17:30	4	0	5	9	0	0	1	1	5	102	1	108	0	59	5	64	182	681
17:30 - 17:45	9	0	11	20	0	0	1	1	6	88	1	95	2	65	14	81	197	743
17:45 - 18:00	8	0	18	26	0	0	0	0	7	86	1	94	0	62	9	71	191	764
TOTAL 4:00 - 6:00	57	0	84	141	3	0	6	9	47	554	7	608	6	445	52	503	1261	

PEAK HOUR VOLUMES:

TIME: MORNING PEAK PERIOD	Street EB				Street WB				Street NB				Street SB				TOTAL (Hour)	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:45 - 8:00	36	0	34	70	0	0	1	1	36	62	1	99	0	121	61	182	352	
8:00 - 8:15	9	0	11	20	0	0	0	0	11	56	0	67	3	144	18	165	252	
8:15 - 8:30	6	0	4	10	0	0	0	0	15	56	0	71	0	147	18	165	246	
8:30 - 8:45	9	0	18	27	0	0	0	0	19	50	1	70	0	136	12	148	245	
	60	0	67	127	0	0	1	1	81	224	2	307	3	548	109	660	1095	

TIME: EVENING	Street EB	Apt Drive WB	Mill Street NB	Mill Street SB	TOTAL (Hour)	

TURNING MOVEMENT COUNT REDUCTION WORKSHEET *New England Engineering Group*

INTERSECTION Summer Street at Mill Street — Counted By:
COUNT DATE: 1/6/2010 — Weather Conditions: clear, dry
1/5/2010

TIME:	Summer Street EB				Summer Street WB				Mill Street NB				Cutter Hill Road SB				TOTAL (15 Min.)	TOTAL (Hour)
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:00 - 7:15				0				0				0				0	0	
7:15 - 7:30	0	48	25	73	41	75	1	117	9	1	13	23	1	12	1	14	227	
7:30 - 7:45	1	130	83	214	61	115	0	176	21	1	30	52	1	35	0	36	478	
7:45 - 8:00	0	112	82	194	77	148	1	226	35	16	27	78	0	65	1	66	564	1269
8:00 - 8:15	0	120	50	170	34	117	1	152	27	4	50	81	3	38	1	42	445	1714
8:15 - 8:30	0	103	70	173	20	99	0	119	20	7	28	55	0	34	1	35	382	1869
8:30 - 8:45	0	111	61	172	114	104	0	218	21	1	27	49	1	18	0	19	458	1849
8:45 - 9:00	0	91	53	144	59	113	1	173	31	3	28	62	1	8	0	9	388	1673
TOTAL 7:00 - 9:00	1	715	424	1140	406	771	4	1181	164	33	203	400	7	210	4	221	2942	
16:00 - 16:15				0				0				0				0	0	
16:15 - 16:30	0	97	26	123	29	101	2	132	24	7	36	67	0	7	0	7	329	
16:30 - 16:45	0	94	28	122	23	111	2	136	46	7	46	99	0	6	0	6	363	
16:45 - 17:00	1	106	35	142	39	112	0	151	40	7	46	93	0	10	0	10	396	1088
17:00 - 17:15	0	101	43	144	38	95	0	133	52	11	69	132	0	4	0	4	413	1501
17:15 - 17:30	0	101	42	143	36	96	0	132	49	9	72	130	0	3	0	3	408	1580
17:30 - 17:45	0	125	41	166	40	121	0	161	56	7	44	107	1	3	0	4	438	1655
17:45 - 18:00	0	116	31	147	46	112	0	158	42	10	43	95	1	9	0	10	410	1669
TOTAL 4:00 - 6:00	1	740	246	987	251	748	4	1003	309	58	356	723	2	42	0	44	2757	

PEAK HOUR VOLUMES:

TIME: MORNING PEAK PERIOD	Street EB				Street WB				Street NB				Street SB				TOTAL (Hour)	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:30 - 7:45	1	130	83	214	61	115	0	176	21	1	30	52	1	35	0	36	478	
7:45 - 8:00	0	112	82	194	77	148	1	226	35	16	27	78	0	65	1	66	564	
8:00 - 8:15	0	120	50	170	34	117	1	152	27	4	50	81	3	38	1	42	445	
8:15 - 8:30	0	103	70	173	20	99	0	119	20	7	28	55	0	34	1	35	382	
	1	465	285	751	192	479	2	673	103	28	135	266	4	172	3	179	1869	

TIME: EVENING	Street EB	Summer Street WB	Mill Street NB	Cutter Hill Road SB	TOTAL (Hour)	

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : ARLINGTON COUNT DATE : Jan-10

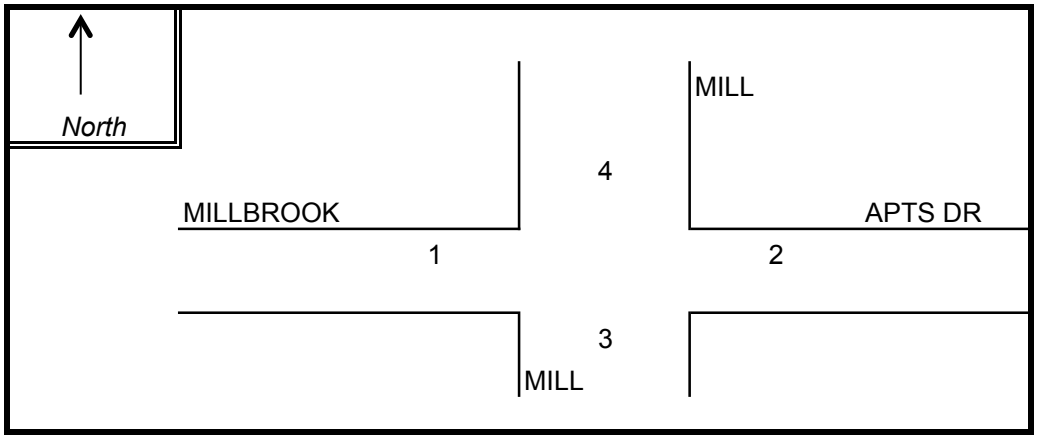
DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : MILL STREET

MINOR STREET(S) : MILLBROOK DRIVE

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	EB	WB	NB	SB		
VOLUMES (AM/PM) :	133	1	302	684		1,120

" K " FACTOR : 0.080 APPROACH ADT : 14,000 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES :	6	# OF YEARS :	3	AVERAGE # OF CRASHES (**A**) :	2.00

CRASH RATE CALCULATION : 0.39 RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

Comments : rate lower than Dist 4 average

Project Title & Date: 30-50 Mill Street Redevelopment

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : ARLINGTON COUNT DATE : Jan-10

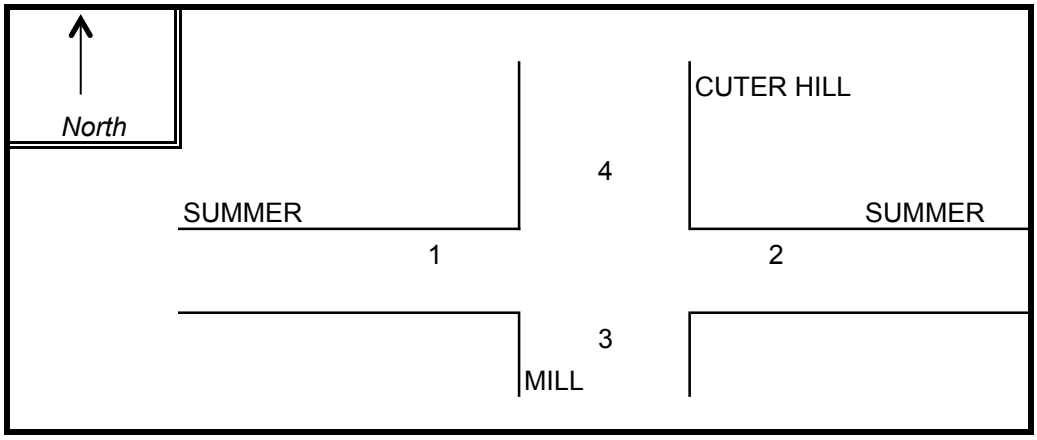
DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : SUMMER STREET

MINOR STREET(S) : MILL STREET

INTERSECTION DIAGRAM (Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	EB	WB	NB	SB		
VOLUMES (AM/PM) :	814	714	282	189		1,999

" K " FACTOR : 0.080 APPROACH ADT : 24,988 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 5 # OF YEARS : 3 AVERAGE # OF CRASHES (**A**) : 1.67

CRASH RATE CALCULATION : 0.18 RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

Comments : rate lower than Dist 4 average

Project Title & Date: 30-50 Mill Street Redevelopment

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : ARLINGTON COUNT DATE : Jan-10

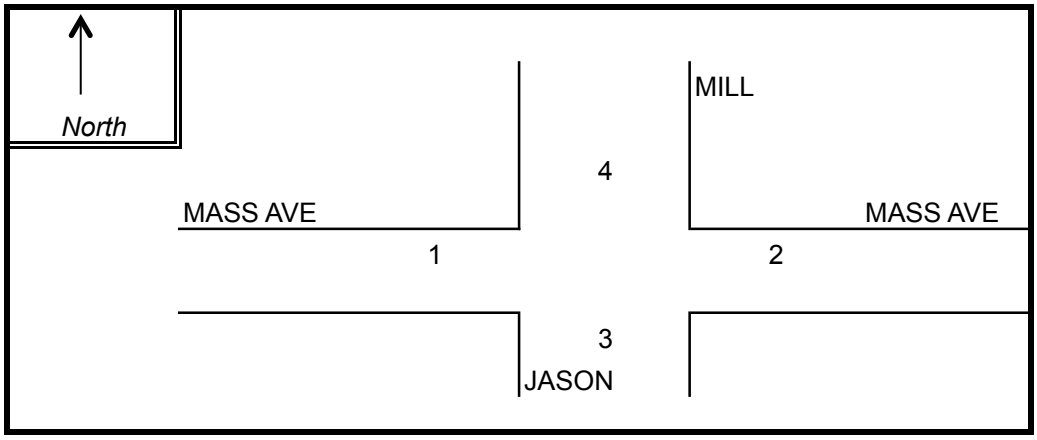
DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : MASSACHUSETTS AVENUE

MINOR STREET(S) : MILL STREET

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	EB	WB	NB	SB		
VOLUMES (AM/PM) :	672	702	255	641		2,270

" K " FACTOR : 0.080 APPROACH ADT : 28,375 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 8 # OF YEARS : 3 AVERAGE # OF CRASHES (**A**) : 2.67

CRASH RATE CALCULATION : 0.26 RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

Comments : rate lower than Dist 4 average

Project Title & Date: 30-50 Mill Street Redevelopment

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : ARLINGTON COUNT DATE : Jan-10

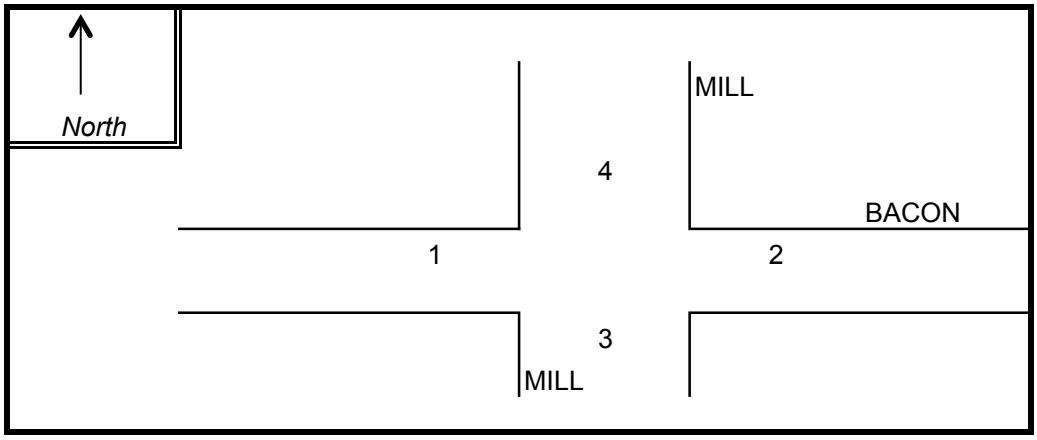
DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : MILL STREET

MINOR STREET(S) : BACON STREET

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	EB	WB	NB	SB		
VOLUMES (AM/PM) :	0	35	292	639		966

" K " FACTOR : 0.080 APPROACH ADT : 12,075 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES :	2	# OF YEARS :	3	AVERAGE # OF CRASHES (**A**) :	0.67

CRASH RATE CALCULATION : 0.15 RATE = $\frac{(A * 1{,}000{,}000)}{ADT * 365}$ (

Comments : rate lower than Dist 4 average

Project Title & Date: 30-50 Mill Street Redevelopment

MS TRANSPORTATION SYSTEMS, INC.

TRIP GENERATION WORKSHEET

LAND USE: *Apartment*
LAND USE CODE: 220 Independent Variable---Dwelling Units

PROJECT NAME: Arlington Mill St
PROJECT #: Number of Units: 116

WEEKDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.65	1.27	12.50	50%	50%	88
AM PEAK	0.51	0.10	1.02	20%	80%	78
PM PEAK	0.62	0.10	1.64	65%	35%	90
PK GEN AM	0.55	0.10	1.08	29%	71%	83
PK GEN PM	0.67	0.10	1.64	61%	39%	85

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	771	386	386	827	414	414	0.87
AM PEAK	59	12	47	61	12	49	0.83
PM PEAK	72	47	25	81	53	28	0.77
PK GEN AM	64	19	45	65	19	46	0.82
PK GEN PM	78	48	30	85	52	33	0.80

SATURDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	6.39	2.84	8.40	50%	50%	16
PEAK HR	0.52	0.26	1.05	-	-	14

	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	741	371	371	654	327	327	0.85
PEAK HR	60	-	-	67	-	-	0.56

SUNDAY

RATES:	Total Trip Ends			Directional Dist.		Number
	Average	Low	High	Enter	Exit	of Studies
DAILY	5.86	3.21	7.53	50%	50%	14
PEAK HR	0.51	0.26	1.43	50%	50%	13

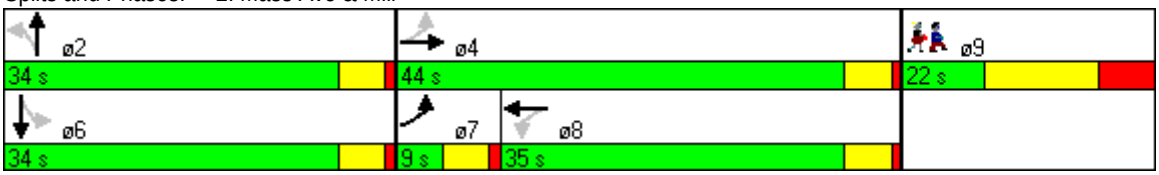
	BY AVERAGE			BY REGRESSION			
	Total	Enter	Exit	Total	Enter	Exit	R^2
DAILY	680	340	340	644	322	322	0.82
PEAK HR	59	30	30	*** Not Given ***			

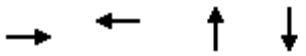
SOURCE: Trip Generation, 8th Edition, Institute of Transportation Engineers, 2008.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	90	567	122	489	37	110	248	311	
Turn Type	pm+pt		Perm		Perm		Perm		
Protected Phases	7	4		8		2		6	9
Permitted Phases	4		8		2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	9.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	22.0
Total Split (s)	9.0	44.0	35.0	35.0	34.0	34.0	34.0	34.0	22.0
Total Split (%)	9.0%	44.0%	35.0%	35.0%	34.0%	34.0%	34.0%	34.0%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	None
Act Effct Green (s)		39.0		30.0		29.0		29.0	
Actuated g/C Ratio		0.50		0.38		0.37		0.37	
v/c Ratio		0.72		0.99		0.56		0.89	
Control Delay		19.3		55.6		24.6		39.3	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		19.3		55.6		24.6		39.3	
LOS		B		E		C		D	
Approach Delay		19.3		55.6		24.6		39.3	
Approach LOS		B		E		C		D	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 78	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 36.8	Intersection LOS: D
Intersection Capacity Utilization 96.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Mass Ave & Mill

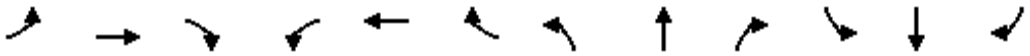




Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	738	771	281	705
v/c Ratio	0.72	0.99	0.56	0.89
Control Delay	19.3	55.6	24.6	39.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.3	55.6	24.6	39.3
Queue Length 50th (ft)	118	191	106	166
Queue Length 95th (ft)	165	#315	183	#274
Internal Link Dist (ft)	442	435	130	113
Turn Bay Length (ft)				
Base Capacity (vph)	1027	780	505	789
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.99	0.56	0.89

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	567	15	122	489	91	37	110	108	248	311	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			4%	
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			0.95	
Frt		1.00			0.98			0.94			0.98	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		2949			2895			1601			3004	
Flt Permitted		0.66			0.69			0.84			0.69	
Satd. Flow (perm)		1952			2028			1358			2122	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	99	623	16	134	537	100	41	121	119	273	342	90
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	738	0	0	771	0	0	281	0	0	705	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Parking (#/hr)		6			6							
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.0			30.0			29.0			29.0	
Effective Green, g (s)		39.0			30.0			29.0			29.0	
Actuated g/C Ratio		0.50			0.38			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1027			780			505			789	
v/s Ratio Prot		c0.04										
v/s Ratio Perm		0.32			c0.38			0.21			c0.33	
v/c Ratio		0.72			0.99			0.56			0.89	
Uniform Delay, d1		15.2			23.8			19.4			23.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.4			29.0			1.3			12.5	
Delay (s)		17.7			52.9			20.7			35.6	
Level of Service		B			D			C			D	
Approach Delay (s)		17.7			52.9			20.7			35.6	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	20	639	0	0	292
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	22	695	0	0	317
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			235			626
pX, platoon unblocked						
vC, conflicting volume	1012	695			695	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	695			695	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	95			100	
cM capacity (veh/h)	265	442			901	

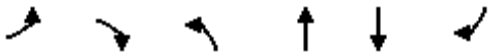
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	38	695	317
Volume Left	16	0	0
Volume Right	22	0	0
cSH	344	1700	1700
Volume to Capacity	0.11	0.41	0.19
Queue Length 95th (ft)	9	0	0
Control Delay (s)	16.8	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.8	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	0	70	0	0	1	86	219	2	3	569	112
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	81	0	90	0	0	1	110	281	3	4	729	144
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked												
vC, conflicting volume	1313	1313	801	1401	1383	282	873			283		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1313	1313	801	1401	1383	282	873			283		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	33	100	77	100	100	100	86			100		
cM capacity (veh/h)	121	137	387	81	124	762	781			1291		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	171	1	394	877
Volume Left	81	0	110	4
Volume Right	90	1	3	144
cSH	190	762	781	1291
Volume to Capacity	0.90	0.00	0.14	0.00
Queue Length 95th (ft)	172	0	12	0
Control Delay (s)	91.1	9.7	4.2	0.1
Lane LOS	F	A	A	A
Approach Delay (s)	91.1	9.7	4.2	0.1
Approach LOS	F	A		

Intersection Summary				
Average Delay	12.0			
Intersection Capacity Utilization	84.6%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	5	23	283	685	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	5	25	308	745	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1126	768	791			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1094	707	732			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	97			
cM capacity (veh/h)	214	405	814			

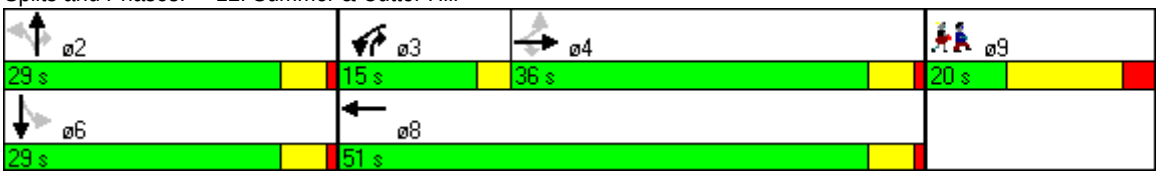
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	333	791
Volume Left	8	25	0
Volume Right	5	0	47
cSH	266	814	1700
Volume to Capacity	0.05	0.03	0.47
Queue Length 95th (ft)	4	2	0
Control Delay (s)	19.2	1.1	0.0
Lane LOS	C	A	
Approach Delay (s)	19.2	1.1	0.0
Approach LOS	C		

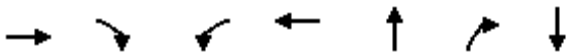
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	1	493	320	204	508	109	30	143	4	182	
Turn Type	Perm		Perm	Prot		Perm		pm+ov	Perm		
Protected Phases		4		3	8		2	3		6	9
Permitted Phases	4		4			2		2	6		
Detector Phase	4	4	4	3	8	2	2	3	6	6	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	25.0	25.0	25.0	8.0	25.0	25.0	25.0	8.0	25.0	25.0	20.0
Total Split (s)	36.0	36.0	36.0	15.0	51.0	29.0	29.0	15.0	29.0	29.0	20.0
Total Split (%)	36.0%	36.0%	36.0%	15.0%	51.0%	29.0%	29.0%	15.0%	29.0%	29.0%	20%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				Yes			
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max	None
Act Effct Green (s)		31.0	31.0	12.0	46.0		24.0	41.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.58		0.30	0.51		0.30	
v/c Ratio		0.92	0.70	1.03	0.64		0.68	0.22		0.45	
Control Delay		45.3	28.8	102.9	15.2		39.4	11.8		26.1	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay		45.3	28.8	102.9	15.2		39.4	11.8		26.1	
LOS		D	C	F	B		D	B		C	
Approach Delay		38.8			40.3		26.8			26.1	
Approach LOS		D			D		C			C	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 80	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 36.4	Intersection LOS: D
Intersection Capacity Utilization 98.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 12: Summer & Cutter Hill



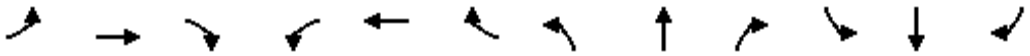


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	595	386	246	614	184	155	228
v/c Ratio	0.92	0.70	1.03	0.64	0.68	0.22	0.45
Control Delay	45.3	28.8	102.9	15.2	39.4	11.8	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.3	28.8	102.9	15.2	39.4	11.8	26.1
Queue Length 50th (ft)	276	158	~134	188	84	42	91
Queue Length 95th (ft)	#415	230	#241	255	#149	71	141
Internal Link Dist (ft)	425			425	311		115
Turn Bay Length (ft)		75	75				
Base Capacity (vph)	649	552	239	964	272	694	509
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.70	1.03	0.64	0.68	0.22	0.45

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	493	320	204	508	2	109	30	143	4	182	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	0.95		1.00	
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.97	1.00		1.00	
Satd. Flow (prot)		1676	1425	1593	1676			1517	1354		1704	
Flt Permitted		1.00	1.00	0.95	1.00			0.58	1.00		0.99	
Satd. Flow (perm)		1675	1425	1593	1676			908	1354		1696	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	1	594	386	246	612	2	131	36	172	5	219	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	595	386	246	614	0	0	184	155	0	228	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm	Prot			Perm		pm+ov	Perm		
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4				2		2	6		
Actuated Green, G (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Effective Green, g (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.57			0.30	0.45		0.30	
Clearance Time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		649	552	239	964			272	609		509	
v/s Ratio Prot				c0.15	0.37				0.04			
v/s Ratio Perm		c0.36	0.27					c0.20	0.08		0.13	
v/c Ratio		0.92	0.70	1.03	0.64			0.68	0.25		0.45	
Uniform Delay, d1		23.3	20.6	34.0	11.4			24.6	13.7		22.6	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		17.7	3.9	66.0	1.4			12.7	0.2		2.8	
Delay (s)		41.0	24.4	100.0	12.8			37.3	13.9		25.5	
Level of Service		D	C	F	B			D	B		C	
Approach Delay (s)		34.5			37.7			26.6			25.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

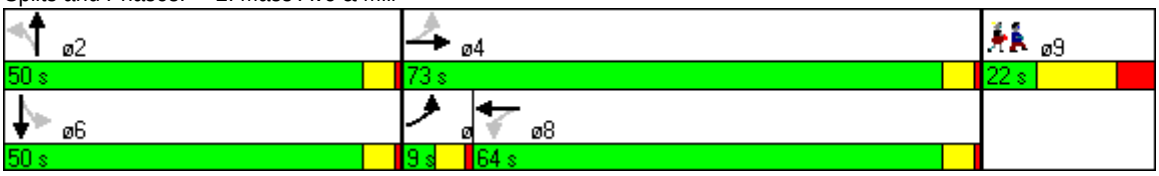
c Critical Lane Group

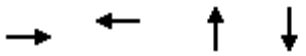
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	114	811	40	586	23	273	164	128	
Turn Type	pm+pt		Perm		Perm		Perm		
Protected Phases	7	4		8		2		6	9
Permitted Phases	4		8		2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	9.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	22.0
Total Split (s)	9.0	73.0	64.0	64.0	50.0	50.0	50.0	50.0	22.0
Total Split (%)	6.2%	50.3%	44.1%	44.1%	34.5%	34.5%	34.5%	34.5%	15%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	None
Act Effct Green (s)		68.0		59.0		45.0		45.0	
Actuated g/C Ratio		0.55		0.48		0.37		0.37	
v/c Ratio		0.99		0.72		0.97		1.08dl	
Control Delay		52.9		29.7		69.6		42.8	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		52.9		29.7		69.6		42.8	
LOS		D		C		E		D	
Approach Delay		52.9		29.7		69.6		42.8	
Approach LOS		D		C		E		D	

Intersection Summary

Cycle Length: 145
Actuated Cycle Length: 123
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 47.8 Intersection LOS: D
Intersection Capacity Utilization 115.2% ICU Level of Service H
Analysis Period (min) 15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Mass Ave & Mill

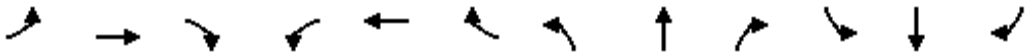




Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1034	828	552	438
v/c Ratio	0.99	0.72	0.97	1.08dl
Control Delay	52.9	29.7	69.6	42.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	52.9	29.7	69.6	42.8
Queue Length 50th (ft)	284	267	427	157
Queue Length 95th (ft)	#454	347	#661	226
Internal Link Dist (ft)	442	435	130	113
Turn Bay Length (ft)				
Base Capacity (vph)	1042	1156	570	593
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.99	0.72	0.97	0.74

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

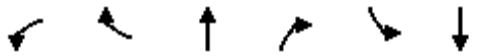


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	811	26	40	586	136	23	273	212	164	128	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			4%	
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			0.95	
Frt		1.00			0.97			0.94			0.96	
Flt Protected		0.99			1.00			1.00			0.98	
Satd. Flow (prot)		2956			2899			1610			2951	
Flt Permitted		0.61			0.83			0.97			0.54	
Satd. Flow (perm)		1819			2410			1559			1621	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	882	28	43	637	148	25	297	230	178	139	121
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1034	0	0	828	0	0	552	0	0	438	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	0%	2%
Parking (#/hr)		5			5							
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		68.0			59.0			45.0			45.0	
Effective Green, g (s)		68.0			59.0			45.0			45.0	
Actuated g/C Ratio		0.55			0.48			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1043			1156			570			593	
v/s Ratio Prot		c0.03										
v/s Ratio Perm		c0.52			0.34			c0.35			0.27	
v/c Ratio		0.99			0.72			0.97			1.08dl	
Uniform Delay, d1		27.2			25.4			38.3			33.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		25.7			2.1			29.5			4.8	
Delay (s)		52.9			27.5			67.8			38.7	
Level of Service		D			C			E			D	
Approach Delay (s)		52.9			27.5			67.8			38.7	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	123.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	115.2%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	513	0	0	403
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	558	0	0	438
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			235			626
pX, platoon unblocked						
vC, conflicting volume	996	558			558	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	996	558			558	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	271	529			1013	

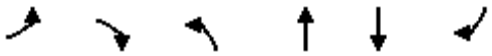
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	558	438
Volume Left	5	0	0
Volume Right	5	0	0
cSH	359	1700	1700
Volume to Capacity	0.03	0.33	0.26
Queue Length 95th (ft)	2	0	0
Control Delay (s)	15.4	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.4	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	0	61	1	0	4	34	474	5	4	341	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	35	0	63	1	0	4	35	489	5	4	352	54
Pedestrians								10			10	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked												
vC, conflicting volume	962	951	388	1021	975	501	405			494		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	962	951	388	1021	975	501	405			494		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	90	99	100	99	97			100		
cM capacity (veh/h)	228	253	659	189	245	569	1165			1080		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	5	529	409
Volume Left	35	1	35	4
Volume Right	63	4	5	54
cSH	393	406	1165	1080
Volume to Capacity	0.25	0.01	0.03	0.00
Queue Length 95th (ft)	24	1	2	0
Control Delay (s)	17.2	14.0	0.9	0.1
Lane LOS	C	B	A	A
Approach Delay (s)	17.2	14.0	0.9	0.1
Approach LOS	C	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	21	11	2	512	376	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	12	2	557	409	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked						
vC, conflicting volume	971	410	412			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	971	410	412			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	98	100			
cM capacity (veh/h)	280	641	1147			

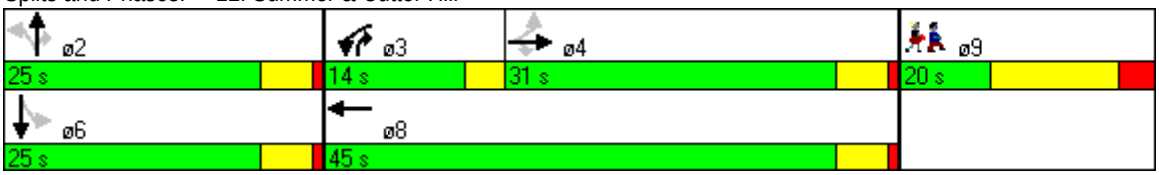
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	35	559	412
Volume Left	23	2	0
Volume Right	12	0	3
cSH	347	1147	1700
Volume to Capacity	0.10	0.00	0.24
Queue Length 95th (ft)	8	0	0
Control Delay (s)	16.5	0.1	0.0
Lane LOS	C	A	
Approach Delay (s)	16.5	0.1	0.0
Approach LOS	C		

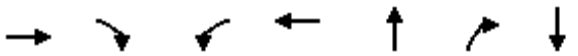
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations										
Volume (vph)	470	175	179	449	209	39	242	2	20	
Turn Type		Perm	Prot		Perm		pm+ov	Perm		
Protected Phases	4		3	8		2	3		6	9
Permitted Phases		4			2		2	6		
Detector Phase	4	4	3	8	2	2	3	6	6	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	25.0	25.0	8.0	25.0	25.0	25.0	8.0	25.0	25.0	20.0
Total Split (s)	31.0	31.0	14.0	45.0	25.0	25.0	14.0	25.0	25.0	20.0
Total Split (%)	34.4%	34.4%	15.6%	50.0%	27.8%	27.8%	15.6%	27.8%	27.8%	22%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes				Yes			
Recall Mode	None	None	Min	None	Min	Min	Min	Min	Min	None
Act Effct Green (s)	26.0	26.0	11.0	40.0		20.0	36.0		20.0	
Actuated g/C Ratio	0.37	0.37	0.16	0.57		0.29	0.51		0.29	
v/c Ratio	0.79	0.35	0.75	0.49		0.84	0.33		0.05	
Control Delay	31.3	18.3	49.4	11.2		48.0	11.6		18.5	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	31.3	18.3	49.4	11.2		48.0	11.6		18.5	
LOS	C	B	D	B		D	B		B	
Approach Delay	27.8			22.0		31.9			18.5	
Approach LOS	C			C		C			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 93.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 12: Summer & Cutter Hill

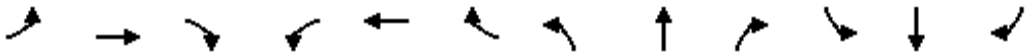




Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	495	184	188	473	287	229	23
v/c Ratio	0.79	0.35	0.75	0.49	0.84	0.33	0.05
Control Delay	31.3	18.3	49.4	11.2	48.0	11.6	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	18.3	49.4	11.2	48.0	11.6	18.5
Queue Length 50th (ft)	185	56	78	110	122	56	7
Queue Length 95th (ft)	#339	105	#174	180	#257	103	23
Internal Link Dist (ft)	425			425	311		115
Turn Bay Length (ft)		75	75				
Base Capacity (vph)	623	529	250	958	341	696	476
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.35	0.75	0.49	0.84	0.33	0.05

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	470	175	179	449	0	209	39	242	2	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	0.95		1.00	
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)		1676	1425	1593	1676			1513	1354		1703	
Flt Permitted		1.00	1.00	0.95	1.00			0.76	1.00		0.97	
Satd. Flow (perm)		1676	1425	1593	1676			1196	1354		1667	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	495	184	188	473	0	220	41	255	2	21	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	495	184	188	473	0	0	287	229	0	23	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm	Prot			Perm		pm+ov	Perm		
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4				2		2	6		
Actuated Green, G (s)		26.0	26.0	11.0	40.0			20.0	31.0		20.0	
Effective Green, g (s)		26.0	26.0	11.0	40.0			20.0	31.0		20.0	
Actuated g/C Ratio		0.37	0.37	0.16	0.57			0.29	0.44		0.29	
Clearance Time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		623	529	250	958			342	600		476	
v/s Ratio Prot		c0.30		c0.12	0.28				0.06			
v/s Ratio Perm			0.13					c0.24	0.11		0.01	
v/c Ratio		0.79	0.35	0.75	0.49			0.84	0.38		0.05	
Uniform Delay, d1		19.6	15.9	28.2	9.0			23.5	13.1		18.1	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		6.9	0.4	12.0	0.4			16.3	0.4		0.0	
Delay (s)		26.5	16.3	40.2	9.4			39.8	13.5		18.1	
Level of Service		C	B	D	A			D	B		B	
Approach Delay (s)		23.8			18.1			28.1			18.1	
Approach LOS		C			B			C			B	

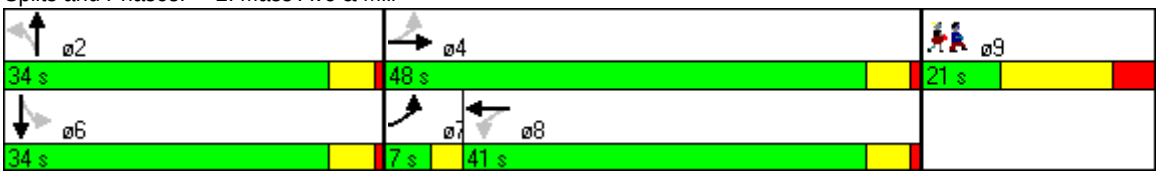
Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	104	586	125	506	40	121	272	339	
Turn Type	pm+pt		Perm		Perm		Perm		
Protected Phases	7	4		8		2		6	9
Permitted Phases	4		8		2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	7.0	48.0	38.0	38.0	30.0	30.0	30.0	30.0	21.0
Total Split (s)	7.0	48.0	41.0	41.0	34.0	34.0	34.0	34.0	21.0
Total Split (%)	6.8%	46.6%	39.8%	39.8%	33.0%	33.0%	33.0%	33.0%	20%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0
All-Red Time (s)	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	None
Act Effct Green (s)		43.0		36.0		29.0		29.0	
Actuated g/C Ratio		0.52		0.44		0.35		0.35	
v/c Ratio		0.76		0.92		0.71		1.06	
Control Delay		20.7		39.8		34.2		79.5	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		20.7		39.8		34.2		79.5	
LOS		C		D		C		E	
Approach Delay		20.7		39.8		34.2		79.5	
Approach LOS		C		D		C		E	

Intersection Summary	
Cycle Length: 103	
Actuated Cycle Length: 82	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 45.2	Intersection LOS: D
Intersection Capacity Utilization 101.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Mass Ave & Mill

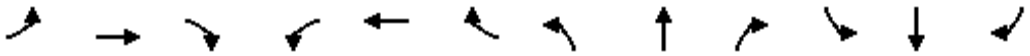


Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	777	805	299	775
v/c Ratio	0.76	0.92	0.71	1.06
Control Delay	20.7	39.8	34.2	79.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.7	39.8	34.2	79.5
Queue Length 50th (ft)	127	197	131	~234
Queue Length 95th (ft)	175	#323	#247	#345
Internal Link Dist (ft)	442	435	130	113
Turn Bay Length (ft)				
Base Capacity (vph)	1028	874	420	729
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.76	0.92	0.71	1.06

Intersection Summary

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

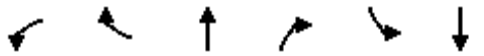
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	586	17	125	506	102	40	121	111	272	339	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			4%	
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			0.95	
Frt		1.00			0.98			0.94			0.98	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		2946			2891			1604			3001	
Flt Permitted		0.65			0.68			0.74			0.67	
Satd. Flow (perm)		1915			1991			1188			2061	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	114	644	19	137	556	112	44	133	122	299	373	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	777	0	0	805	0	0	299	0	0	775	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Parking (#/hr)		6			6							
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		43.0			36.0			29.0			29.0	
Effective Green, g (s)		43.0			36.0			29.0			29.0	
Actuated g/C Ratio		0.52			0.44			0.35			0.35	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1055			874			420			729	
v/s Ratio Prot		c0.04										
v/s Ratio Perm		0.35			c0.40			0.25			c0.38	
v/c Ratio		0.74			0.92			0.71			1.06	
Uniform Delay, d1		15.1			21.7			22.9			26.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.7			14.8			5.6			51.4	
Delay (s)		17.8			36.5			28.5			77.9	
Level of Service		B			D			C			E	
Approach Delay (s)		17.8			36.5			28.5			77.9	
Approach LOS		B			D			C			E	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	20	327	0	0	703
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	22	355	0	0	764
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			235			626
pX, platoon unblocked						
vC, conflicting volume	1120	355			355	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1120	355			355	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	97			100	
cM capacity (veh/h)	229	689			1203	

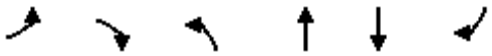
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	38	355	764
Volume Left	16	0	0
Volume Right	22	0	0
cSH	370	1700	1700
Volume to Capacity	0.10	0.21	0.45
Queue Length 95th (ft)	9	0	0
Control Delay (s)	15.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.9	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	0	72	0	0	1	92	248	2	3	631	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	83	0	92	0	0	1	118	318	3	4	809	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1447	1447	883	1538	1519	319	956			321		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1444	1444	848	1540	1520	319	925			321		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	9	100	73	100	100	100	83			100		
cM capacity (veh/h)	91	105	345	57	94	726	706			1251		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	176	1	438	960
Volume Left	83	0	118	4
Volume Right	92	1	3	147
cSH	149	726	706	1251
Volume to Capacity	1.18	0.00	0.17	0.00
Queue Length 95th (ft)	249	0	15	0
Control Delay (s)	190.7	10.0	4.7	0.1
Lane LOS	F	A	A	A
Approach Delay (s)	190.7	10.0	4.7	0.1
Approach LOS	F	A		

Intersection Summary			
Average Delay	22.6		
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	13	12	29	308	742	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	13	32	335	807	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1232	834	862			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1208	775	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	96	96			
cM capacity (veh/h)	180	368	760			

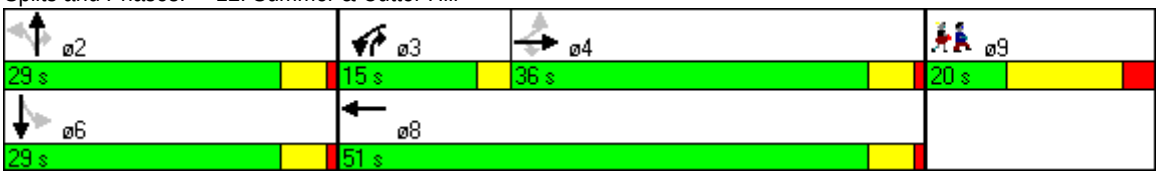
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	366	862
Volume Left	14	32	0
Volume Right	13	0	55
cSH	238	760	1700
Volume to Capacity	0.11	0.04	0.51
Queue Length 95th (ft)	10	3	0
Control Delay (s)	22.0	1.3	0.0
Lane LOS	C	A	
Approach Delay (s)	22.0	1.3	0.0
Approach LOS	C		

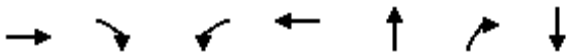
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	1	550	372	213	549	129	31	148	4	188	
Turn Type	Perm		Perm	Prot		Perm		pm+ov	Perm		
Protected Phases		4		3	8		2	3		6	9
Permitted Phases	4		4			2		2	6		
Detector Phase	4	4	4	3	8	2	2	3	6	6	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	25.0	25.0	25.0	8.0	25.0	25.0	25.0	8.0	25.0	25.0	20.0
Total Split (s)	36.0	36.0	36.0	15.0	51.0	29.0	29.0	15.0	29.0	29.0	20.0
Total Split (%)	36.0%	36.0%	36.0%	15.0%	51.0%	29.0%	29.0%	15.0%	29.0%	29.0%	20%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				Yes			
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max	None
Act Effct Green (s)		31.0	31.0	12.0	46.0		24.0	41.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.58		0.30	0.51		0.30	
v/c Ratio		1.02	0.81	1.08	0.69		0.80	0.23		0.46	
Control Delay		68.2	35.9	115.6	16.6		50.0	11.9		26.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay		68.2	35.9	115.6	16.6		50.0	11.9		26.4	
LOS		E	D	F	B		D	B		C	
Approach Delay		55.1			44.3		33.5			26.4	
Approach LOS		E			D		C			C	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 80	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 45.8	Intersection LOS: D
Intersection Capacity Utilization 105.7%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Summer & Cutter Hill



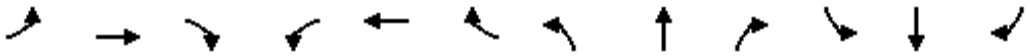


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	664	448	257	663	210	160	236
v/c Ratio	1.02	0.81	1.08	0.69	0.80	0.23	0.46
Control Delay	68.2	35.9	115.6	16.6	50.0	11.9	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	35.9	115.6	16.6	50.0	11.9	26.4
Queue Length 50th (ft)	~342	195	~145	213	101	44	95
Queue Length 95th (ft)	#489	#292	#254	288	#194	73	146
Internal Link Dist (ft)	425			425	311		115
Turn Bay Length (ft)		75	75				
Base Capacity (vph)	649	552	239	964	264	694	509
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.81	1.08	0.69	0.80	0.23	0.46

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	550	372	213	549	2	129	31	148	4	188	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	0.95		1.00	
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)		1676	1425	1593	1676			1516	1354		1704	
Flt Permitted		1.00	1.00	0.95	1.00			0.56	1.00		0.99	
Satd. Flow (perm)		1675	1425	1593	1676			879	1354		1696	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	1	663	448	257	661	2	155	37	178	5	227	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	664	448	257	663	0	0	210	160	0	236	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm	Prot			Perm		pm+ov	Perm		
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4				2		2	6		
Actuated Green, G (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Effective Green, g (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.57			0.30	0.45		0.30	
Clearance Time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		649	552	239	964			264	609		509	
v/s Ratio Prot				c0.16	0.40				0.04			
v/s Ratio Perm		c0.40	0.31					c0.24	0.08		0.14	
v/c Ratio		1.02	0.81	1.08	0.69			0.80	0.26		0.46	
Uniform Delay, d1		24.5	21.9	34.0	12.0			25.7	13.7		22.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		41.3	8.9	79.6	2.1			21.5	0.2		3.0	
Delay (s)		65.8	30.7	113.6	14.0			47.2	14.0		25.8	
Level of Service		E	C	F	B			D	B		C	
Approach Delay (s)		51.7			41.8			32.8			25.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		

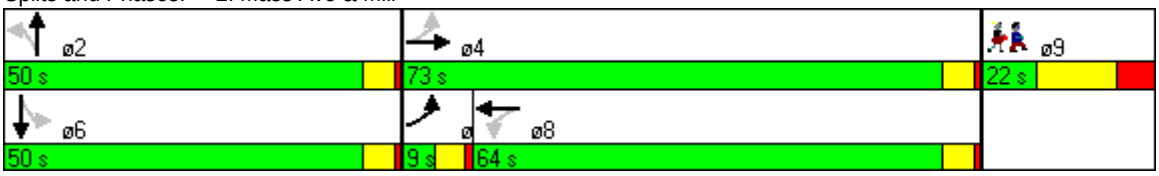
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	124	852	41	616	29	304	184	122	
Turn Type	pm+pt		Perm		Perm		Perm		
Protected Phases	7	4		8		2		6	9
Permitted Phases	4		8		2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	9.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	22.0
Total Split (s)	9.0	73.0	64.0	64.0	50.0	50.0	50.0	50.0	22.0
Total Split (%)	6.2%	50.3%	44.1%	44.1%	34.5%	34.5%	34.5%	34.5%	15%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	None
Act Effct Green (s)		68.0		59.0		45.0		45.0	
Actuated g/C Ratio		0.55		0.48		0.37		0.37	
v/c Ratio		1.10		0.77		1.06		1.32dl	
Control Delay		85.6		32.2		92.4		49.2	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		85.6		32.2		92.4		49.2	
LOS		F		C		F		D	
Approach Delay		85.6		32.2		92.4		49.2	
Approach LOS		F		C		F		D	

Intersection Summary

Cycle Length: 145
Actuated Cycle Length: 123
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 65.8 Intersection LOS: E
Intersection Capacity Utilization 122.3% ICU Level of Service H
Analysis Period (min) 15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Mass Ave & Mill



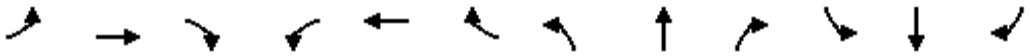
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1097	880	598	475
v/c Ratio	1.10	0.77	1.06	1.32dl
Control Delay	85.6	32.2	92.4	49.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	85.6	32.2	92.4	49.2
Queue Length 50th (ft)	~374	296	~521	179
Queue Length 95th (ft)	#565	385	#746	#273
Internal Link Dist (ft)	442	435	130	113
Turn Bay Length (ft)				
Base Capacity (vph)	1000	1140	565	575
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.10	0.77	1.06	0.83

Intersection Summary

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

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

dl Defacto Left Lane. Recode with 1 though lane as a left lane.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	852	33	41	616	152	29	304	217	184	122	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			4%	
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			0.95	
Frt		1.00			0.97			0.95			0.96	
Flt Protected		0.99			1.00			1.00			0.98	
Satd. Flow (prot)		2953			2895			1615			2936	
Flt Permitted		0.59			0.82			0.95			0.52	
Satd. Flow (perm)		1740			2377			1544			1572	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	135	926	36	45	670	165	32	330	236	200	133	142
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1097	0	0	880	0	0	598	0	0	475	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	0%	2%
Parking (#/hr)		5			5							
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		68.0			59.0			45.0			45.0	
Effective Green, g (s)		68.0			59.0			45.0			45.0	
Actuated g/C Ratio		0.55			0.48			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1001			1140			565			575	
v/s Ratio Prot		c0.04										
v/s Ratio Perm		c0.57			0.37			c0.39			0.30	
v/c Ratio		1.10			0.77			1.06			1.32dl	
Uniform Delay, d1		27.5			26.4			39.0			35.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		58.4			3.3			54.3			9.4	
Delay (s)		85.9			29.7			93.3			44.9	
Level of Service		F			C			F			D	
Approach Delay (s)		85.9			29.7			93.3			44.9	
Approach LOS		F			C			F			D	

Intersection Summary			
HCM Average Control Delay	64.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	123.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	122.3%	ICU Level of Service	H
Analysis Period (min)	15		

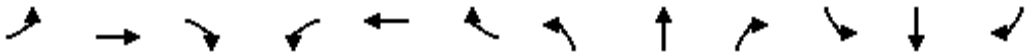
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	580	0	0	457
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	630	0	0	497
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			235			626
pX, platoon unblocked						
vC, conflicting volume	1127	630			630	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1127	630			630	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	226	481			952	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	630	497
Volume Left	5	0	0
Volume Right	5	0	0
cSH	308	1700	1700
Volume to Capacity	0.04	0.37	0.29
Queue Length 95th (ft)	3	0	0
Control Delay (s)	17.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	17.1	0.0	0.0
Approach LOS	C		

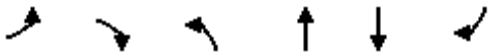
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	0	63	1	0	4	40	535	5	4	394	53
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	0	65	1	0	4	41	552	5	4	406	55
Pedestrians								10			10	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked												
vC, conflicting volume	1092	1081	444	1153	1106	564	461			557		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1092	1081	444	1153	1106	564	461			557		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	100	89	99	100	99	96			100		
cM capacity (veh/h)	185	211	613	151	204	524	1111			1024		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	5	598	465
Volume Left	36	1	41	4
Volume Right	65	4	5	55
cSH	335	351	1111	1024
Volume to Capacity	0.30	0.01	0.04	0.00
Queue Length 95th (ft)	31	1	3	0
Control Delay (s)	20.3	15.4	1.0	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	20.3	15.4	1.0	0.1
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	79.9%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	19	7	569	443	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	21	8	618	482	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked						
vC, conflicting volume	1120	486	491			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1120	486	491			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	99			
cM capacity (veh/h)	227	581	1072			

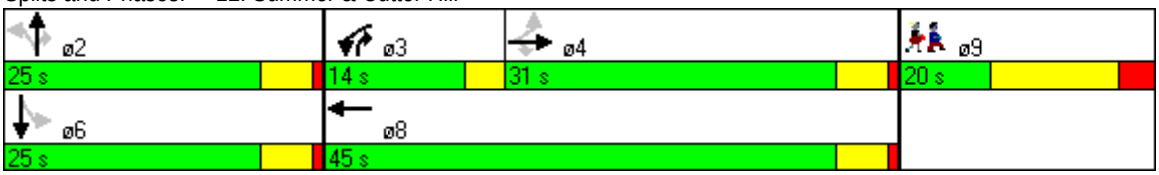
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	50	626	491
Volume Left	29	8	0
Volume Right	21	0	10
cSH	303	1072	1700
Volume to Capacity	0.16	0.01	0.29
Queue Length 95th (ft)	15	1	0
Control Delay (s)	19.2	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	19.2	0.2	0.0
Approach LOS	C		

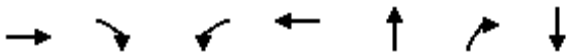
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations										
Volume (vph)	531	216	188	510	259	40	253	2	23	
Turn Type		Perm	Prot		Perm		pm+ov	Perm		
Protected Phases	4		3	8		2	3		6	9
Permitted Phases		4			2		2	6		
Detector Phase	4	4	3	8	2	2	3	6	6	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	25.0	25.0	8.0	25.0	25.0	25.0	8.0	25.0	25.0	20.0
Total Split (s)	31.0	31.0	14.0	45.0	25.0	25.0	14.0	25.0	25.0	20.0
Total Split (%)	34.4%	34.4%	15.6%	50.0%	27.8%	27.8%	15.6%	27.8%	27.8%	22%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes				Yes			
Recall Mode	None	None	Min	None	Min	Min	Min	Min	Min	None
Act Effct Green (s)	26.0	26.0	11.0	40.0		20.0	36.0		20.0	
Actuated g/C Ratio	0.37	0.37	0.16	0.57		0.29	0.51		0.29	
v/c Ratio	0.90	0.43	0.79	0.56		1.01	0.34		0.05	
Control Delay	41.3	19.6	53.3	12.3		81.1	11.8		18.6	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	41.3	19.6	53.3	12.3		81.1	11.8		18.6	
LOS	D	B	D	B		F	B		B	
Approach Delay	35.0			23.3		52.6			18.6	
Approach LOS	D			C		D			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 104.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Summer & Cutter Hill



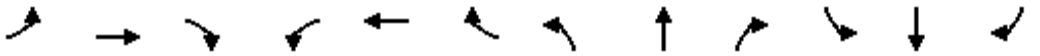


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	559	227	198	537	342	239	26
v/c Ratio	0.90	0.43	0.79	0.56	1.01	0.34	0.05
Control Delay	41.3	19.6	53.3	12.3	81.1	11.8	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	19.6	53.3	12.3	81.1	11.8	18.6
Queue Length 50th (ft)	221	71	83	132	~157	58	8
Queue Length 95th (ft)	#406	130	#186	215	#323	108	25
Internal Link Dist (ft)	425			425	311		115
Turn Bay Length (ft)		75	75				
Base Capacity (vph)	623	529	250	958	338	696	476
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.43	0.79	0.56	1.01	0.34	0.05

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	531	216	188	510	0	259	40	253	2	23	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	0.95		1.00	
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)		1676	1425	1593	1676			1513	1354		1703	
Flt Permitted		1.00	1.00	0.95	1.00			0.75	1.00		0.97	
Satd. Flow (perm)		1676	1425	1593	1676			1183	1354		1667	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	559	227	198	537	0	273	42	266	2	24	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	559	227	198	537	0	0	342	239	0	26	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm	Prot			Perm		pm+ov	Perm		
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4				2		2	6		
Actuated Green, G (s)		26.0	26.0	11.0	40.0			20.0	31.0		20.0	
Effective Green, g (s)		26.0	26.0	11.0	40.0			20.0	31.0		20.0	
Actuated g/C Ratio		0.37	0.37	0.16	0.57			0.29	0.44		0.29	
Clearance Time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		623	529	250	958			338	600		476	
v/s Ratio Prot		c0.33		c0.12	0.32				0.06			
v/s Ratio Perm			0.16					c0.29	0.11		0.02	
v/c Ratio		0.90	0.43	0.79	0.56			1.01	0.40		0.05	
Uniform Delay, d1		20.7	16.5	28.4	9.5			25.0	13.2		18.1	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		15.6	0.6	15.6	0.8			52.0	0.4		0.0	
Delay (s)		36.3	17.0	44.0	10.2			77.0	13.6		18.2	
Level of Service		D	B	D	B			E	B		B	
Approach Delay (s)		30.7			19.3			50.9			18.2	
Approach LOS		C			B			D			B	

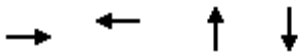
Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	ø9
Lane Configurations									
Volume (vph)	101	586	125	506	40	123	281	344	
Turn Type	pm+pt		Perm		Perm		Perm		
Protected Phases	7	4		8		2		6	9
Permitted Phases	4		8		2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	7.0	48.0	38.0	38.0	20.0	20.0	20.0	20.0	21.0
Total Split (s)	7.0	50.0	43.0	43.0	34.0	34.0	34.0	34.0	21.0
Total Split (%)	6.7%	47.6%	41.0%	41.0%	32.4%	32.4%	32.4%	32.4%	20%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0
All-Red Time (s)	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag		Lead	Lead					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	None
Act Effct Green (s)		45.0		38.0		29.0		29.0	
Actuated g/C Ratio		0.54		0.45		0.35		0.35	
v/c Ratio		0.70		0.95		0.77		1.13	
Control Delay		19.0		45.9		40.4		103.2	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		19.0		45.9		40.4		103.2	
LOS		B		D		D		F	
Approach Delay		19.0		45.9		40.4		103.2	
Approach LOS		B		D		D		F	

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 84	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 54.5	Intersection LOS: D
Intersection Capacity Utilization 101.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Mass Ave & Mill



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	774	803	301	794
v/c Ratio	0.70	0.95	0.77	1.13
Control Delay	19.0	45.9	40.4	103.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.0	45.9	40.4	103.2
Queue Length 50th (ft)	126	206	140	~258
Queue Length 95th (ft)	173	#337	#272	#371
Internal Link Dist (ft)	442	435	130	113
Turn Bay Length (ft)				
Base Capacity (vph)	1106	841	389	704
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.95	0.77	1.13

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	586	17	125	506	100	40	123	111	281	344	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			0%			4%	
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			0.95	
Frt		1.00			0.98			0.95			0.98	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		2946			2892			1605			3000	
Flt Permitted		0.68			0.64			0.70			0.67	
Satd. Flow (perm)		2023			1862			1129			2040	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	111	644	19	137	556	110	44	135	122	309	378	107
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	774	0	0	803	0	0	301	0	0	794	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Parking (#/hr)		6			6							
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		47.0			38.0			29.0			29.0	
Effective Green, g (s)		47.0			38.0			29.0			29.0	
Actuated g/C Ratio		0.56			0.45			0.35			0.35	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1176			842			390			704	
v/s Ratio Prot		c0.03										
v/s Ratio Perm		0.34			c0.43			0.27			c0.39	
v/c Ratio		0.66			0.95			0.77			1.13	
Uniform Delay, d1		12.9			22.2			24.5			27.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.3			20.4			9.1			74.9	
Delay (s)		14.2			42.6			33.7			102.4	
Level of Service		B			D			C			F	
Approach Delay (s)		14.2			42.6			33.7			102.4	
Approach LOS		B			D			C			F	

Intersection Summary			
HCM Average Control Delay	51.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	20	325	0	0	723
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	22	353	0	0	786
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			235			626
pX, platoon unblocked						
vC, conflicting volume	1139	353			353	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1139	353			353	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	97			100	
cM capacity (veh/h)	222	690			1205	

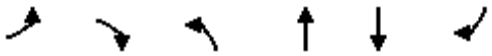
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	38	353	786
Volume Left	16	0	0
Volume Right	22	0	0
cSH	363	1700	1700
Volume to Capacity	0.10	0.21	0.46
Queue Length 95th (ft)	9	0	0
Control Delay (s)	16.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.1	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	0	78	0	0	1	91	247	2	3	645	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	83	0	100	0	0	1	117	317	3	4	827	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1461	1461	901	1560	1533	318	974			319		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1459	1459	866	1563	1535	318	944			319		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	6	100	70	100	100	100	83			100		
cM capacity (veh/h)	89	102	336	53	92	727	695			1252		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	183	1	436	978
Volume Left	83	0	117	4
Volume Right	100	1	3	147
cSH	148	727	695	1252
Volume to Capacity	1.23	0.00	0.17	0.00
Queue Length 95th (ft)	269	0	15	0
Control Delay (s)	209.6	10.0	4.7	0.1
Lane LOS	F	A	A	A
Approach Delay (s)	209.6	10.0	4.7	0.1
Approach LOS	F	A		

Intersection Summary			
Average Delay	25.4		
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	24	21	28	308	742	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	23	30	335	807	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1229	833	860			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1205	774	803			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	94	96			
cM capacity (veh/h)	181	369	762			

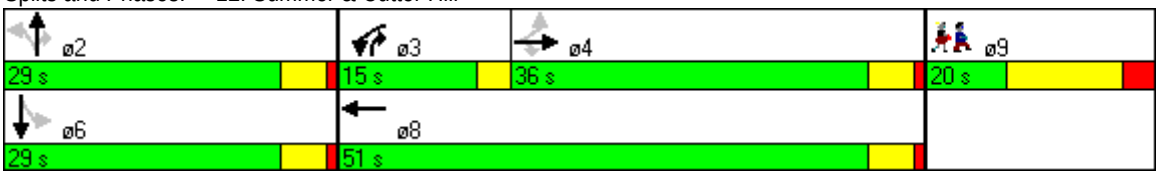
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	365	860
Volume Left	26	30	0
Volume Right	23	0	53
cSH	237	762	1700
Volume to Capacity	0.21	0.04	0.51
Queue Length 95th (ft)	19	3	0
Control Delay (s)	24.1	1.3	0.0
Lane LOS	C	A	
Approach Delay (s)	24.1	1.3	0.0
Approach LOS	C		

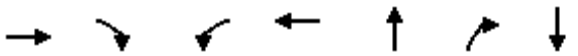
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	1	550	372	211	549	137	31	157	4	188	
Turn Type	Perm		Perm	Prot		Perm		pm+ov	Perm		
Protected Phases		4		3	8		2	3		6	9
Permitted Phases	4		4			2		2	6		
Detector Phase	4	4	4	3	8	2	2	3	6	6	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0
Minimum Split (s)	25.0	25.0	25.0	8.0	25.0	25.0	25.0	8.0	25.0	25.0	20.0
Total Split (s)	36.0	36.0	36.0	15.0	51.0	29.0	29.0	15.0	29.0	29.0	20.0
Total Split (%)	36.0%	36.0%	36.0%	15.0%	51.0%	29.0%	29.0%	15.0%	29.0%	29.0%	20%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	10.0
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				Yes			
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max	None
Act Effct Green (s)		31.0	31.0	12.0	46.0		24.0	41.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.58		0.30	0.51		0.30	
v/c Ratio		1.02	0.81	1.06	0.69		0.84	0.24		0.46	
Control Delay		68.2	35.9	112.0	16.6		56.2	12.1		26.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay		68.2	35.9	112.0	16.6		56.2	12.1		26.4	
LOS		E	D	F	B		E	B		C	
Approach Delay		55.1			43.0		37.0			26.4	
Approach LOS		E			D		D			C	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 80	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 45.7	Intersection LOS: D
Intersection Capacity Utilization 106.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Summer & Cutter Hill



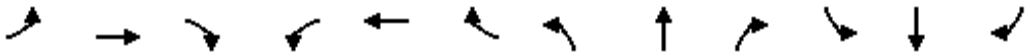


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	664	448	254	663	221	170	236
v/c Ratio	1.02	0.81	1.06	0.69	0.84	0.24	0.46
Control Delay	68.2	35.9	112.0	16.6	56.2	12.1	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	35.9	112.0	16.6	56.2	12.1	26.4
Queue Length 50th (ft)	~342	195	~142	213	108	47	95
Queue Length 95th (ft)	#489	#292	#251	288	#210	77	146
Internal Link Dist (ft)	425			425	311		115
Turn Bay Length (ft)		75	75				
Base Capacity (vph)	649	552	239	964	262	694	509
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.81	1.06	0.69	0.84	0.24	0.46

Intersection Summary

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

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



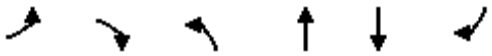
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	550	372	211	549	2	137	31	157	4	188	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95	0.95		1.00	
Frt		1.00	0.85	1.00	1.00			0.99	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)		1676	1425	1593	1676			1516	1354		1704	
Flt Permitted		1.00	1.00	0.95	1.00			0.56	1.00		0.99	
Satd. Flow (perm)		1675	1425	1593	1676			875	1354		1695	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	1	663	448	254	661	2	165	37	189	5	227	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	664	448	254	663	0	0	221	170	0	236	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm	Prot			Perm		pm+ov	Perm		
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4		4				2		2	6		
Actuated Green, G (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Effective Green, g (s)		31.0	31.0	12.0	46.0			24.0	36.0		24.0	
Actuated g/C Ratio		0.39	0.39	0.15	0.57			0.30	0.45		0.30	
Clearance Time (s)		5.0	5.0	3.0	5.0			5.0	3.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		649	552	239	964			263	609		509	
v/s Ratio Prot				c0.16	0.40				0.04			
v/s Ratio Perm		c0.40	0.31					c0.25	0.08		0.14	
v/c Ratio		1.02	0.81	1.06	0.69			0.84	0.28		0.46	
Uniform Delay, d1		24.5	21.9	34.0	12.0			26.2	13.8		22.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		41.3	8.9	75.8	2.1			26.4	0.3		3.0	
Delay (s)		65.8	30.7	109.8	14.0			52.6	14.1		25.8	
Level of Service		E	C	F	B			D	B		C	
Approach Delay (s)		51.7			40.5			35.8			25.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	43.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Level of Service Analysis

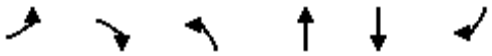
One Way Options



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	16	594	443	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	17	646	482	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked						
vC, conflicting volume	1173	493	504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1173	493	504			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	209	576	1060			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	663	504
Volume Left	0	17	0
Volume Right	0	0	23
cSH	1700	1060	1700
Volume to Capacity	0.00	0.02	0.30
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	0.4	0.0
Approach LOS	A		

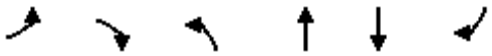
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	27	0	569	464	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	29	0	618	504	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked						
vC, conflicting volume	1123	504	504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1123	504	504			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	95	100			
cM capacity (veh/h)	228	568	1060			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	67	618	504
Volume Left	38	0	0
Volume Right	29	0	0
cSH	308	1060	1700
Volume to Capacity	0.22	0.00	0.30
Queue Length 95th (ft)	20	0	0
Control Delay (s)	19.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	19.9	0.0	0.0
Approach LOS	C		

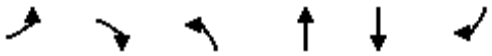
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	28	332	742	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	30	361	807	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1255	833	860			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1233	774	803			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	174	369	762			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	391	860
Volume Left	0	30	0
Volume Right	0	0	53
cSH	1700	762	1700
Volume to Capacity	0.00	0.04	0.51
Queue Length 95th (ft)	0	3	0
Control Delay (s)	0.0	1.2	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	24	21	0	308	791	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	23	0	335	860	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				470	391	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1195	860	860			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1167	803	803			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	94	100			
cM capacity (veh/h)	198	355	762			

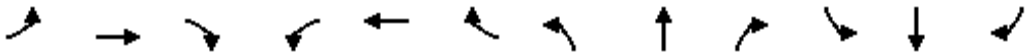
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	335	860
Volume Left	26	0	0
Volume Right	23	0	0
cSH	250	762	1700
Volume to Capacity	0.20	0.00	0.51
Queue Length 95th (ft)	18	0	0
Control Delay (s)	22.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	22.9	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	0	95	1	0	4	48	544	5	4	376	53
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	72	0	98	1	0	4	49	561	5	4	388	55
Pedestrians								10			10	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked												
vC, conflicting volume	1100	1088	425	1194	1113	573	442			566		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1100	1088	425	1194	1113	573	442			566		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	60	100	84	99	100	99	96			100		
cM capacity (veh/h)	181	207	628	133	200	518	1128			1016		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	170	5	615	446
Volume Left	72	1	49	4
Volume Right	98	4	5	55
cSH	307	328	1128	1016
Volume to Capacity	0.55	0.02	0.04	0.00
Queue Length 95th (ft)	79	1	3	0
Control Delay (s)	30.3	16.1	1.2	0.1
Lane LOS	D	C	A	A
Approach Delay (s)	30.3	16.1	1.2	0.1
Approach LOS	D	C		

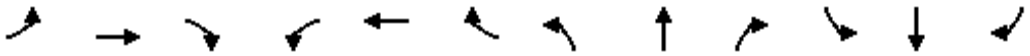
Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	89.0%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	0	68	1	0	4	64	528	5	4	403	74
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	0	70	1	0	4	66	544	5	4	415	76
Pedestrians								10			10	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked												
vC, conflicting volume	1155	1143	464	1221	1179	557	492			549		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1155	1143	464	1221	1179	557	492			549		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	88	99	100	99	94			100		
cM capacity (veh/h)	164	189	598	132	180	529	1082			1030		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	106	5	615	496
Volume Left	36	1	66	4
Volume Right	70	4	5	76
cSH	315	330	1082	1030
Volume to Capacity	0.34	0.02	0.06	0.00
Queue Length 95th (ft)	36	1	5	0
Control Delay (s)	22.1	16.1	1.6	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	22.1	16.1	1.6	0.1
Approach LOS	C	C		

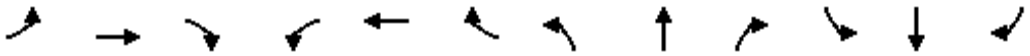
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	0	78	0	0	1	119	219	2	3	645	164
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	83	0	100	0	0	1	153	281	3	4	827	210
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1528	1528	932	1627	1632	282	1037			283		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1530	1530	891	1636	1642	282	1004			283		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	69	100	100	100	77			100		
cM capacity (veh/h)	74	84	321	43	72	762	651			1291		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	183	1	436	1041
Volume Left	83	0	153	4
Volume Right	100	1	3	210
cSH	127	762	651	1291
Volume to Capacity	1.44	0.00	0.23	0.00
Queue Length 95th (ft)	313	0	23	0
Control Delay (s)	301.9	9.7	6.5	0.1
Lane LOS	F	A	A	A
Approach Delay (s)	301.9	9.7	6.5	0.1
Approach LOS	F	A		

Intersection Summary			
Average Delay	35.1		
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	89	0	99	0	0	1	91	247	2	3	624	115
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	114	0	127	0	0	1	117	317	3	4	800	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								332			529	
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	1434	1434	874	1560	1506	318	947			319		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1430	1430	838	1563	1507	318	916			319		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	64	100	100	100	84			100		
cM capacity (veh/h)	93	107	349	48	96	727	712			1252		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	241	1	436	951
Volume Left	114	0	117	4
Volume Right	127	1	3	147
cSH	152	727	712	1252
Volume to Capacity	1.59	0.00	0.16	0.00
Queue Length 95th (ft)	414	0	15	0
Control Delay (s)	345.5	10.0	4.6	0.1
Lane LOS	F	A	A	A
Approach Delay (s)	345.5	10.0	4.6	0.1
Approach LOS	F	A		

Intersection Summary				
Average Delay	52.4			
Intersection Capacity Utilization	93.5%	ICU Level of Service	F	
Analysis Period (min)	15			