



West Acton Village Ecology Project

Addendum to Traffic Impact Study (August 2009)

Prepared for:

537 Mass Avenue LLC
543 Massachusetts Avenue
West Acton, MA 01270

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AECOM Project No. 104310

INTRODUCTION

This document represents an Addendum to the Traffic Impact Study completed in August 2009 for the West Acton Village Ecology Project. This Addendum identifies revisions to the August project program and potential changes in traffic and parking impacts as a result of the revised project program. The revised project program is summarized below:

Previous Project Program	Current Project Program	Change
• Retail – 8,576 SF	14,000 SF	+5,424 SF
• Restaurant – 57 seats	67 Seats	+ 10 seats
• Office – 17,761 SF	15,000 SF	- 2,661 +/-
• Existing #541 ¹ – 3,275 SF	#541 ¹ – 3,275 SF	0
• Cultural Space weekday - 50 seats	20 seats (off-site occupants)	- 30 seats
• Cultural Space nights/weekends 300 seats	200 seats	-100 seats
• 72 on-site parking spaces	71 on-site parking spaces	- 1 parking space
• 20 new on-street parking spaces	20 new on-street parking spaces	0

While the total project footprint and size (approximately 46,000 square feet) will remain the same, the sizes of the project components have been revised. The retail component will increase by roughly 5,000 square feet and the restaurant will increase by 10 seats. These increases will be more than off-set by the reduction of 100 seats for the cultural space on nights and weekends and 30 seats during weekdays.

Table 1 below summarizes the differences in vehicle trip generation between the previous and current project programs.

Table 1 – Difference in Project Vehicle Trip Generation

	Without Event			With Event		
	AM Pk Hr	PM Pk Hr	Daily	AM Pk Hr	PM Pk Hr	Daily
Previous Project Program	97	130	1,166	97	198	1,526
Current Project Program	89	116	1,188	89	144	1,416
Difference	-8	-14	+22	-8	-54	-110

Table 1 shows that the new project program will generate fewer trips than the previous project program for all conditions and time periods, except the daily trips without event, which is a marginal increase. Because the peak hour vehicle trips for the new project program are less than the previous project program, the analysis results presented in the August Traffic Impact Study are conservatively high. Therefore, the traffic impacts for the new project program will be less during peak periods. Because the

¹ #541 Massachusetts Avenue is already constructed and permitted for occupancy and parking. However, because it was not occupied at the time of the traffic counts conducted for this study it was included for trip generation purposes.

impacts of the new program will be less than the previous program, the traffic analysis was not recalculated.

Table 2 summarizes the differences in project parking demand between the previous program and the new program.

Table 2 – Difference in Project Parking Demand

Peak Period	Previous Project Program	Current Project Program	Change
Friday 1 pm (no event)	98	106	+8
Friday 6 pm (no event)	58	66	+8
Friday 6 pm (with event)	120	84	-36
Friday 7 pm (with event)	218	156	-62
Saturday MIDDAY (with event)	216	156	-60

Table 2 shows the new project program would generate 8 more parked vehicles during the Friday peak hour (without an event) than the previous project program. The additional parking demand will continue to be met by available on-street spaces. With an event, the new project will generate between 36 and 62 fewer parked vehicles than the previous project. The preliminary parking plan documented in the August Traffic Impact Study will continue to be adequate to accommodate parking demand for all project conditions.

Analysis results show that the new project program will result in lower overall traffic and parking generation than the previous program. Consequently, project-related impacts are less than those documented in the August Traffic Impact Study. The intersection capacity analyses were not re-calculated since the new peak hour project trip generation is less than the previous calculations.

The transportation mitigation measures identified in the August Traffic Impact Study have not been changed for the new project (includes off-site traffic, parking, and pedestrian, mobility and safety improvements).

The revised Executive Summary and Project Generated Traffic (1.1) and Parking (1.2) sections have been revised and are included in their entirety below to present a comprehensive assessment. The remainder of the August Traffic Impact Study is still relevant for the new project and has not been revised. The revised trip generation and parking calculations are included in the Appendix of this Addendum.

EXECUTIVE SUMMARY

This Traffic Impact Study has been prepared by AECOM Technical Services, Inc. to evaluate the proposed West Acton Village Ecology (WAVE) project. 537 Mass Avenue LLC's applicant proposes to develop a mixed-use project along the north side of Massachusetts Avenue (Route 111) in West Acton, Massachusetts. The project site is bounded by Spruce Street to the west, an intermittent brook to the east, and Massachusetts Avenue (Route 111) to the south. Figure 1 shows the project site location. The proposed project will total approximately 46,000 square feet consisting of the following components:

- Retail – 14,000 SF
- Restaurant – 67 seats
- Office – 15,000 SF
- Existing #541² – 3,275 SF
- Cultural Space weekday - 20 seats (off-site occupants)
- Cultural Space nights/weekends – 200 seats
- 71 on-site parking spaces
- 20 new on-street parking spaces

The following summarizes the findings of the study:

- It is understood that there are currently mobility and safety issues for all users (motorists, pedestrians, and bicyclists) in the West Acton area, particularly along Massachusetts Avenue. The proposed project recognizes these issues and has addressed these by identifying improvement measures and including them as part of the overall project (see next bullet).
- The section of Massachusetts Avenue east of Spruce Street fronting the project site would be redesigned as part of the proposed project. The roadway would be redesigned to be consistent with the village operating environment currently in place near Spruce Street. This section would include on-street parking on the north side of Massachusetts Avenue, new parking for Gardner Field playground on the south side, and pedestrian/traffic calming facilities which would slow traffic and provide a safer environment for both pedestrians and motorists. The improvements to Massachusetts Avenue would include the following benefits:
 - Provide new sidewalks, a new crosswalk, and handicap ramps that will improve pedestrian circulation, safety and access to Gardner Field playground;
 - Provide new on-street parking that will increase parking supply in the area and improve safety for vehicles parked at the playground;
 - Extend village characteristics eastward by providing on-street parking, narrowing lanes, and pedestrian amenities that will calm traffic, reduce speeds, improve pedestrian visibility and safety, and eliminate the passing zone east of the project site;
 - Provide safety improvements at the intersection of Spruce Street/Kinsley Road;
 - Improve access management by eliminating four existing driveways; and
 - Provide access to existing parking that previously had no direct access to Massachusetts Avenue.

To implement these mobility and safety measures on Massachusetts Avenue the Town of Acton will need to acquire jurisdiction over this section of roadway from MassHighway. The Town will

² #541 Massachusetts Avenue is already constructed and permitted for occupancy and parking. However, because it was not occupied at the time of the traffic counts conducted for this study it was included for trip generation purposes.

need to request a state highway layout Discontinuance³ from MassHighway. Once the town accepts jurisdiction, it can request a reduction of the posted speed limit on Massachusetts Avenue in the project vicinity.

- Traffic volume data collected shows that Massachusetts Avenue currently carries approximately 13,000 vehicles per day with over 800 vehicles in the AM peak hour (8-9 AM) and over 1,000 vehicles in the PM peak hour (5-6 PM).
- A review of accident data (2004-2007) reveals that the intersection of Massachusetts Avenue/Central Street has a crash rate (1.11) that exceeds the MassHighway average. The crash rates at the other three intersections are below the MassHighway average. Mitigation measures for Massachusetts Avenue/Central Street are noted below.
- Parking surveys (on-street and off-street) show that there is excess parking available in the study area at peak weekday (Friday) and Saturday periods. At least 24 on-street parking spaces are currently available at any time in the study area. Off-street parking spaces are abundantly available.
- Currently all study intersections operate acceptably overall (Level of Service D or better) in both the AM and PM peak hours. However, some intersection movements experience delay and queuing. Traffic volumes were increased by 0.5% for 10 years to develop a 2018 No-Build condition. All study intersections will continue to operate acceptably overall in both peak hours, but the Central Street southbound left-turn movement will deteriorate to Level of Service F as a result of background traffic volume increases.
- Without an event, the proposed project is expected to generate just under 600 vehicles (1,188 trips) daily with 89 vehicles occurring during the weekday AM peak hour and 116 vehicles occurring during the PM peak hour. With a weeknight event, the project would generate roughly 700 vehicles (1,416 trips) daily with 144 vehicles occurring the PM peak hour. Events will usually occur only on weekday evenings and weekends. It is important to note that trip generation estimates are maximums assuming full occupancy of all project components and does not assume any walk trips from the surrounding neighborhood. As a result, the vehicle trip generation estimates are considered conservatively high and are expected to be lower during typical operations.
- The addition of project-generated vehicles to the roadway network will not change Level of Service at any study intersection.
- The project site driveways on Massachusetts Avenue and Spruce Street will serve all traffic movements. The driveways will operate at acceptable Levels of Service (D or better) during all peak hours. Adequate minimum stopping sight distance is provided at both driveways.
- The site driveways and roadways meet the town's dimensional requirements and will provide adequate turning radii to accommodate single-unit trucks.
- The proposed project parking supply will generally be adequate to accommodate project parking demand without an event or a below capacity event. With a sold-out event, the project will require additional parking spaces to meet demand. This demand will be met by sharing off-street parking spaces with nearby town and privately-owned facilities. The project proponent has begun

³ Massachusetts General Laws – State Highways – Chapter 81, Section 12.

discussions with private owners to reach agreements to secure overflow parking for larger events. The use of shared-parking is consistent with the state's Smart Growth initiatives which encourage use of existing infrastructure facilities, and is desirable for an economically sustainable and aesthetically appealing village environment.

- In addition to the changes to Massachusetts Avenue proposed as part of the project, the proponent has proposed the following measures to improve transportation conditions in the study area:
 - Provide two connected access driveways on Massachusetts Avenue and Spruce Street that will prevent overloading of any one access driveway;
 - Work with Town of Acton to accept the portion of Massachusetts Avenue under MassHighway jurisdiction as a town roadway and begin the Discontinuance process with MassHighway. Request a speed study by MassHighway to lower the posted speed limit on Massachusetts Avenue when the project is completed;
 - Eliminate one parking space on the north side of Massachusetts Avenue east of Spruce Street to improve sight distance for motorists;
 - Provide a curb extension on the northwest corner of Massachusetts Avenue and Spruce Street to improve sight lines for vehicles exiting Spruce Street, make pedestrians more visible and reduce the crosswalk distance across Massachusetts Avenue. In addition, thermoplastic material will be installed at the crosswalks to improve visibility;
 - Adjust signal timings at the intersection of Massachusetts Avenue/Central Street to reduce delay for the southbound Central Street left-turn movement and improve safety for turning vehicles;
 - Develop and implement a Traffic and Parking Management Plan to control parking and traffic during events. The plan should include the distribution of parking information and maps, agreements made with others to share parking for events, and provide parking and traffic personnel if necessary to direct motorists.

In summary, the transportation system in the study area can accommodate the proposed project. The recommended measures would improve existing deficiencies and mitigate potential impacts from the proposed project.

1 Future Build Conditions

In order to assess the potential impact of the project on traffic conditions in the study area, vehicle trips associated with the proposed project were estimated and distributed onto the roadway network. These vehicle trips were then added to the Future No-Build traffic volumes to form the Future Build traffic volumes for the weekday morning and afternoon peak hours. Peak parking conditions were evaluated for weekday afternoon, evening, and Saturday midday conditions.

For the No-Build condition, the current configuration of Massachusetts Avenue in the study area was assumed. For the Build condition, the following improvements on Massachusetts Avenue were assumed as part of the proposed project:

- 9 90-degree parking spaces on the south side of Massachusetts Avenue;
- 11 parallel parking spaces on the north side of Massachusetts Avenue; and
- New pedestrian crosswalk connecting the project site with the Gardner Field playground.

Figure 1 shows the project site plan.

1.1 Project Generated Traffic

The Institute of Transportation Engineers (ITE) Trip Generation manual (8th ed., 2008) was used to estimate trip generation characteristics for specific components of the proposed project. Vehicle trips associated with the office, retail, and restaurant components were estimated using ITE trip rates for daily and weekday AM and PM peak hours. The weekday AM and PM peak hours are the most critical periods for trip generation for the proposed land uses and also represent the highest hourly vehicular volume on the surrounding roadway network. The weekend trip generation characteristics are significantly lower for the office use and therefore, were not evaluated. Events would mostly occur at night when traffic volumes are low.

The ITE Land Use Codes #710—General Office Building, #814—Specialty Retail, and #932—High-Turnover (Sit-Down) Restaurant were used. The following units were used for trip generation calculations:

- Retail - 14,000 square feet (SF) of gross leasable area
- Office – 15,000 SF of gross floor area
- Restaurant – 67 seats

It is important to note that much of the unrented areas of the project serve as lobby and circulation for the 200-seat cultural space and are included in the trip generation for this component as is discussed below. It is also noted that the office space trip generation estimate includes the existing/permitted 541 Massachusetts Avenue building (3,275 SF). This building was included in the trip generation calculations because it was not occupied when the traffic counts were conducted for this study (March and June 2008 and February 2009).

The ITE trip rates provide a baseline for the vehicular trip generation. However, adjustments were made to account for internal capture and pass-by trips. In this case, internal capture accounts for trips made to the retail stores by persons who are already on-site for other uses (office and restaurant). These trips are considered “internal trips” and will not generate additional vehicular traffic on the surrounding roadway network. The Trip Generation Handbook, An ITE Recommended Practice (Institute of Transportation Engineers, March 2001) contains data and guidelines for the assessment of internal site trips. The “Internal Capture Rate” contained in the Trip Generation Handbook ranges from 28% to 41%, which is

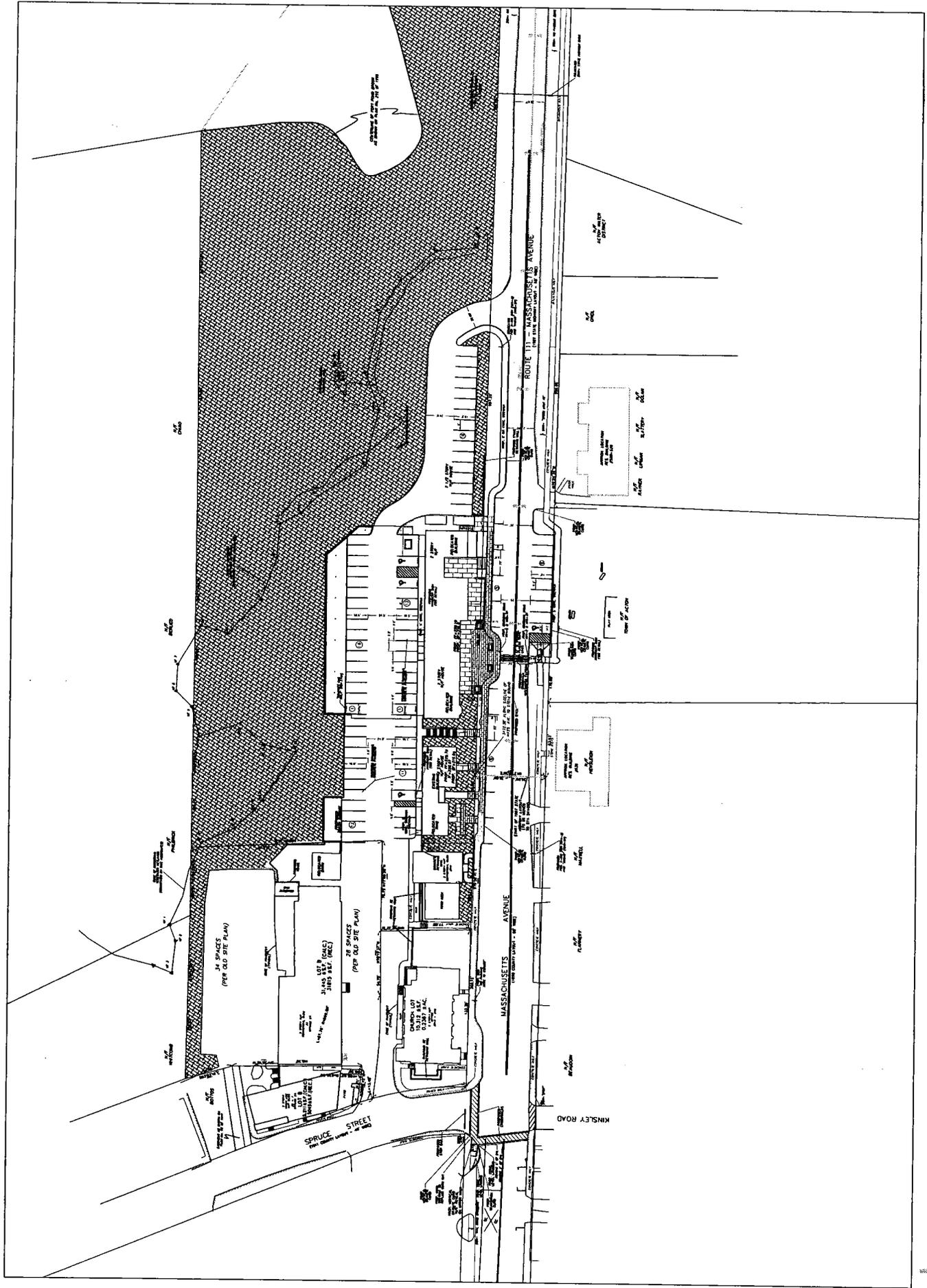


Figure 1
 Project Site Plan
 West Acton Village Ecology - Acton, MA

likely too high for a relatively small project. For this analysis, 10% was used as the internal capture rate to account for the internal trips of the retail component.

Pass-by trips are vehicles that are already on the roadway network and divert from their final destination to stop at a store, etc. Pass-by trips make up a large component of vehicle trips for uses such as gas stations, fast-food restaurants, and retail. A pass-by capture rate of 20% was used for the retail component of this project, which is typical for a development project of this scale. The pass-by adjustment does not reduce the number of vehicle trips entering and exiting the project driveways.

Trip generation estimates for the cultural space components of the project were based on proposed programs and schedules for these uses. Information for these uses was provided by the project proponent. The following program assumptions were used to estimate the vehicle trips generated by the proposed 200-seat cultural space:

Weekday:

- Activities/events start at 7 PM
- 200 visitors per event (100% seats occupied)
- 2 visitors per vehicle
- 20 cast/crew/workers
- 2 cast/crew/workers per vehicle
- 4 delivery vehicles per day (8 trips)

Traffic Peak Hours:

- 8-9 AM and 5-6 PM on a weekday
- No/few vehicle trips enter/exit the cultural space in the AM peak hour
- 25% of visitor vehicles arrive at the cultural space in PM peak hour
- All the 20 cast/crew/workers arrive at the cultural space in PM peak hour
- No delivery vehicles enter/exit the cultural space in the PM peak hour

The weekday cultural space component of the project would be used for a variety of uses that may include senior citizens classes, art/theater classes, yoga classes, gallery/display, and other small group activities. The daytime schedule would begin no earlier than 9:00 AM, so it would not generate any/few trips in the AM peak hour. The on-site office tenants would use the community space for meetings, classes, etc. Four daily delivery trips are assumed for the cultural space.

Project trip generation is summarized in Table 3. With no event, the proposed project is estimated to generate roughly 1,100 daily vehicle trips with 89 occurring during the AM peak hour and 116 during the PM peak hour. With an event, the project would generate roughly 1,400 daily vehicle trips with 89 in the AM peak hour and 144 in the PM peak hour. It is important to note that the trip generation estimates are maximums assuming full occupancy of all project components and a sold-out event. In reality, many non-vehicular trips are expected to be generated from the neighborhood (walk, bike, etc.). As a result, the vehicle trip generation estimates are considered conservatively high and are expected to be lower during typical operations. The complete trip generation calculations are contained in the attached Appendix.

Table 3 Project Trip Generation Summary

	Weekday Morning Peak Hour (vehicle trips)			Weekday Afternoon Peak Hour (vehicle trips)			Daily Trips
	Entering	Exiting	Total	Entering	Exiting	Total	Total
15,000 SF of General Office Building ¹	42	6	48	8	40	48	360
14,000 SF of Specialty Retail ²	8	8	16	24	31	55	636
Internal Trips (10% of Specialty Retail Trips)	-1	-1	-2	-2	-3	-5	-64
Pass by Trips (20% of Specialty Retail Trips)	-2	-2	-4	-5	-5	-10	-128
Specialty Retail-New Vehicle Trips	5	5	10	17	23	40	444
67 Seats High-Turnover (Sit-Down) Restaurant Vehicle Trips ³	16	15	31	16 ⁵	12	28	324
20 Seats of Cultural Space (weekday off-site)	0 ⁶	0 ⁶	0 ⁶	0 ⁶	0 ⁶	0 ⁶	60 ⁶
New Site-Generated Vehicle Trips (without Event)	63	26	89	41	75	116	1,188
200 Seats of Cultural Space (nights/weekends) Vehicle Trips ⁴	0	0	0	35	0	35	228
New Site-Generated Vehicle Trips (with Event)	63	26	89	69	75	144	1,416

¹ Based on ITE LUC 710 – General Office Building (trips include the Existing 541 space which is 3,275 SF)

² Based on ITE LUC 814 – Specialty Retail

³ Based on ITE LUC 932 – High-Turnover (Sit-Down) Restaurant

⁴ Based on assumptions (see Appendix for details)

⁵ 7 of the trips are assumed to arrive before the event, thereby reducing entering restaurant trips to 9 (16-7)

⁶ Weekday use would not occur during peak hours

1.2 Parking

The proposed project parking supply meets the Town of Acton parking requirements. Analysis was conducted to evaluate the project parking supply and demand and the impact of project parking on the existing public supply in the study area. Parking supply data collected for the Existing Conditions section was used for this analysis.

Parking was evaluated for the following future project conditions:

- Friday 1PM without event
- Friday 6 PM without event
- Friday 6 PM with event
- Friday 7 PM with event
- Saturday midday with event

A total of 91 new parking spaces, which include 71 off-street parking spaces and 20 on-street parking spaces (along Massachusetts Avenue), will be provided as part of the project. Considering the 3 existing parking spaces in the project area (near the playground), the net new parking supply is 88 spaces. Parking demand calculations did not include the existing 541 Massachusetts Avenue building on-site because it already includes permitted parking spaces in existing lots.

Parking demand was estimated based on rates published in the Institute of Transportation Engineers, Parking Generation, 3rd Edition, 2004. Parking rates are provided by land use code for specific uses including Shopping Center (Land use Code #820); Office Building (#701); and High-Turnover (Sit-Down) Restaurant. Peak parking demand estimates were made for these project components using the rates for weekdays and Saturday. Adjustments to the peak parking rates were made to account for persons making multi-purpose trips within the project facility (internal capture) and for variation in parking demand by time of day. Data published in the Institute of Transportation Engineers, Transportation Planning Handbook, 2nd Edition, 1999 was used to adjust for time of day variation. Parking demand calculations are provided in the Appendix.

Table 4 summarizes the peak parking demand for the project compared with the proposed project parking supply. For analysis purposes it is assumed that the 17 net new on-street parking spaces would be used by project tenants and visitors, as well as playground users. During the week, the highest project parking demand without an event (106 vehicles) will occur at 1 PM on Friday. This assumes that the office, retail, restaurant, and daytime cultural space components are all fully occupied, which represents a conservative condition. Under this assumption there would be a project parking deficit of 18 parking spaces. This small deficit will be accommodated by available existing on-street spaces in the area (24 available at 1 PM on Friday). At 6 PM without an event the project will experience a surplus of 22 on-site spaces.

With an event, the project would generate a parking demand of 84 vehicles at 6 PM on a weekday, assuming a 7 PM start. This would result in a project parking surplus of 4 on-site spaces.

On Friday at 7 PM and Saturday midday with a capacity event the project would generate a demand for 156 vehicles. This results in a project parking deficit of 68 spaces, which will be accommodated as described below.

Table 5 shows the project parking demand compared with available parking spaces in a two-block radius from the project. The table shows that even with project parking demand, parking utilization will remain below capacity overall (41% to 77% utilized on Friday and 83% utilized on Saturday). It is understood that overall parking demand on a Saturday evening even with an event will be well below capacity. While

parking demand is below capacity in the overall area, not all of the private off-street spaces will be available to accommodate project parking. Agreements will need to be reached with the town and/or private property owners to use parking spaces for events. These spaces would function as shared-parking spaces in that they would be available for event parking and would not coincide with the normal parking demand of the facility.

The project proponent has begun discussions with the town and several private property owners in the area as to the potential availability of shared-parking considerations. This information has been used to develop a preliminary parking plan to accommodate vehicles for events. Table 6 summarizes the components of the preliminary parking plan.

Table 6 shows that the project peak parking demand assuming a capacity event can be accommodated within the study area. In addition to the proposed new on-site (71) and on-street parking spaces (17 net new), the following facilities within a two-block radius are identified to accommodate event parking:

- General on-street parking;
- Parking lot for Office of Michael Rosenfeld;
- Acton Municipal parking lot (west of Central St., south of Mass Ave.);
- West Acton Baptist Church (west of Central St., south of Mass Ave.);
- Office parking lot (west of central St., north of Mass Ave.); and
- Other facilities (ongoing discussions).

Agreements will be made with these and other facilities as needed to share use of their parking facility (or portion of) to satisfy parking demand. There is also a possibility of providing a shuttle service between elementary school parking lots when the schools are not in session. The parking calculations do not assume a shuttle service.

As part of the project, a Traffic and Parking Management Plan will be developed to manage traffic for large events. Elements of a plan are discussed in the Recommendations section of this report.

The changes to Massachusetts Avenue proposed as part of the project would improve parking conditions in the area. Currently there are three undesignated off-street parking spaces for the Gardner Field playground on the south side of Massachusetts Avenue. Often motorists park on-street in this area with one tire on the road and the other tire on the curb/sidewalk. This creates an unsafe condition for with vehicles traveling on Massachusetts Avenue. As part of the project, 9 off-street 90-degree spaces are proposed on the south side of Massachusetts Avenue in the vicinity of the playground within the public right of way. These spaces will improve the operation and safety for vehicles parking for the playground and for the village in general.

Table 4 Summary of Project Peak Hour Parking Demand

Peak Period	Project Generated Peak Parking Demand							Project Site Net New Parking Supply	On Site Peak Parking Surplus/Deficiency
	Retail	Office	Restaurant	Event Cast/Crew	Event Visitors	Cultural Space	Total		
Friday 1pm (no event)	38	38	20	0	0	10	106	88	-18
Friday 6pm (no event)	30	11	15	0	0	10	66	88	+22
Friday 6pm (with event)	30	11	8	10	25	0	84	88	+4
Friday 7pm (with event)	34	4	8	10	100	0	156	88	-68
Saturday Midday (with event)	37	0	9	10	100	0	156	88	-68

Table 5 Summary of Future Study Area Peak Hour Parking

Peak Period	Existing Parking Supply w/o schools			Project Site Net New Parking	Total Parking Supply w/o schools	Peak Parking Demand			Peak Parking Utilization (%)
	On-Street	Off-Street	Total			Study Area	Project	Total	
Friday at 1pm (no event)	65	260	325	88	413	210	106	316	77%
Friday at 6m (no event)	65	260	325	88	413	104	66	170	41%
Friday at 6pm (with event)	65	260	325	88	413	104	84	188	46%
Friday at 7pm (with event)	65	260	325	88	413	80	156	236	57%
Saturday Mid-day (with event)	65	260	325	88	413	185	156	341	83%

Table 6 Preliminary Parking Plan with Event¹

Peak Period	Project Parking Demand	General On-Street Availability Office	Project On-Street Supply ²	Project On-Site Supply	OMR Spaces ³	Municipal Lot ⁴	Central St. Office ⁵	West Acton Baptist Church ⁵	Others ⁷	Total Parking Supply	% Full
Friday 6pm (with event)	84	49	17	71	26	23	15	26	16	243	35%
Friday 7pm (with event)	156	53	17	71	26	23	15	26	16	247	63%
Saturday Midday (with event)	156	27	17	71	26	23	15	26	16	221	71%

¹ Assumes 100% occupancy of 200 seats.

² 20 parking spaces – 3 existing at playground = 17 net new spaces.

³ Private lot, Office of Michael Rosenfeld, parking off of Spruce Street. Includes 5 spaces for Building Trade Shop.

⁴ Acton lot west of Central St. and south of Mass Ave.

⁵ Private lot west of Central St. and north of Mass Ave.

⁶ Lot west of Central St. and south of Mass Ave.

⁷ Ongoing discussions with other business owners.

Hypothetical Traffic Flow Scenario for Community Space and Auditorium											
Weekday	Activity*	Occupants in Auditorium				Occupants in Community Space***				# Vehs in	# Vehs out
		In	Out	# Vehs in	# Vehs out	In	Out	# Vehs in	# Vehs out		
9am		0	0	0	0	0	0	0	0	0	0
10am	Misc. Classes	0	0	0	0	20	0	10	0	0	0
11am		0	0	0	0	0	20	0	0	10	0
12pm	Misc. Classes	0	0	0	0	20	0	10	0	0	0
1pm	Deliveries	4	4	4	4	0	20	0	10	0	0
2pm	Misc. Classes	0	0	0	0	20	0	10	0	0	0
3pm		0	0	0	0	0	20	0	0	10	0
4pm		0	0	0	0	0	0	0	0	0	0
5pm		0	0	0	0	0	0	0	0	0	0
Nights											
6pm	Cast/Crew	20	0	10	0	0	0	0	0	0	0
6pm	Audience (early)	50	25	25	0	0	0	0	0	0	0
7pm	Audience Full House**	150	0	75	0	0	0	0	0	0	0
8pm		0	0	0	0	0	0	0	0	0	0
9pm		0	200	0	100	0	0	0	0	0	0
10pm		0	20	10	10	0	0	0	0	0	0
Totals		224	224	114	114	60	60	30	30	30	30
Weekends:	Matinee model represents rare maximum impact										
Notes:											
	* Number of drivers is reduced by car-poolers, walkers and bikers, non-driving age occupants, and senior shuttle.										
	** Full house model depicts scenario developed for Traffic Study representing rare maximum impact.										
	*** Community Space use will not occur with a theater event.										

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 710 - General Office Building

18,275 = 15,000 + 3,275 for # 541	18.275 x 1000 SF
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Equation Calcs

	Equation	Volume
Weekday 2-Way Volume	$\ln(T) = 0.77\ln(x) + 3.65, R^2 = 0.80$	360
7-9 AM Peak Hour (Entering)		42
7-9 AM Peak Hour (Exiting)		6
7-9 AM Peak Hour (Total)	$\ln(T) = 0.80\ln(x) + 1.55, R^2 = 0.83$	48
4-6 PM Peak Hour (Entering)		17
4-6 PM Peak Hour (Exiting)		82
4-6 PM Peak Hour (Total)	$(T) = 1.12(x) + 78.81, R^2 = 0.82$	99
REVISION		
4-6 PM Peak Hour (Entering)		8
4-6 PM Peak Hour (Exiting)		40
4-6 PM Peak Hour (Total)		48

This estimate is too high given that it is double AM peak hour estimate

This estimate assumes the same number of PM peak hour trips as AM

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 814 - Specialty Retail Center

14,000 x 1000 SF

Ave. Rate Calcs	
Ave. Rate	Volume
Weekday 2-Way Volume	620
7-9 AM Peak Hour (Entering)	
7-9 AM Peak Hour (Exiting)	
7-9 AM Peak Hour (Total)	
4-6 PM Peak Hour (Entering)	21
4-6 PM Peak Hour (Exiting)	17
4-6 PM Peak Hour (Total)	38

Equation Calcs	
Equation	Volume
$T = 42.78(x) + 37.66$	636
	$R^2 = 0.69$
	8
	8
	16
	24
	31
	55
	$T = 2.40(x) + 21.48$
	$R^2 = 0.98$

This is an estimate, based on the ratio of AM Peak Hour Trips / Daily Trips from Shopping Center (LUC 820)

Shopping Center (LUC 820):
 ratio of AM Peak Hour to Daily: $1.03 / 42.94 = 2.40\%$

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 932 - High-Turnover (Sit-Down) Restaurant

67 Seats

Ave. Rate Calcs	
Ave. Rate	Volume
Weekday 2-Way Volume	4.83
	324
7-9 AM Peak Hour (Entering)	0.244
	16
7-9 AM Peak Hour (Exiting)	0.226
	15
7-9 AM Peak Hour (Total)	0.47
	31
4-6 PM Peak Hour (Entering)	0.244
	16
4-6 PM Peak Hour (Exiting)	0.176
	12
4-6 PM Peak Hour (Total)	0.42
	28

Project Site Parking Utilization
Friday at 1pm (No Theater Event)

Project Generated Peak Parking Demand

Retail (14,000 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 14,000 \text{ SF} \times 90\%^b = \underline{38 \text{ Parked Vehicles}}$$

Office (15,000 SF):

$$2.84^c \text{ (Parked Vehicles/1,000 SF)} \times 15,000 \text{ SF} \times 90\%^d = \underline{38 \text{ Parked Vehicles}}$$

Restaurant (67 Seats):

$$0.33^e \text{ (Parked Vehicles/Seat)} \times 67 \text{ Seats} \times 90\%^f = \underline{20 \text{ Parked Vehicles}}$$

Community Space (20 to 40 seats)

$$= \underline{10 \text{ Parked Vehicles}}$$

$$\text{Total Peak Parking Demand} = 38 + 38 + 20 + 10 = \underline{106 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 71 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 71 + 20 - 3 = \underline{88 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

= Project Site Net New Parking Supply – Project Generated Peak Parking

$$\text{Demand} = 88 \text{ Space Supply} - 106 \text{ Parked Vehicles} = \underline{-18 \text{ Space Deficit}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Assume 10% parked vehicles are "internal vehicles" (already on site).

^c Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^d Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^e Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^f Assume 10% parked vehicles are "internal vehicles" (already on site).

Project Site Parking Utilization

Friday at 6pm WITHOUT Theater Event

Project Generated Peak Parking Demand

Retail (14,000 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 14,000 \text{ SF} \times 80\%^b \times 90\%^c = \underline{30 \text{ Parked Vehicles}}$$

Office (15,000 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 15,000 \text{ SF} \times 25\%^e = \underline{11 \text{ Parked Vehicles}}$$

Restaurant (67 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 67 \text{ Seats} \times 70\%^g = \underline{15 \text{ Parked Vehicles}}$$

Community Space (20 to 40 seats)

10 Parked Vehicles

$$\text{Total Peak Parking Demand} = 30 + 11 + 15 + 10 = \underline{66 \text{ (Parking Spaces)}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 71 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 71 + 20 - 3 = \underline{88 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

= Project Site Net New Parking Supply – Project Generated Peak Parking

$$\text{Demand} = 88 \text{ Space Supply} - 66 \text{ Parked Vehicles} = \underline{+22 \text{ Space Surplus}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

^d Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

Project Site Parking Utilization
Friday at 6pm with Theater Event

Project Generated Peak Parking Demand

Retail (14,000 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 14,000 \text{ SF} \times 80\%^b \times 90\%^c = \underline{30 \text{ Parked Vehicles}}$$

Office (15,000 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 15,000 \text{ SF} \times 25\%^e = \underline{11 \text{ Parked Vehicles}}$$

Restaurant (67 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 67 \text{ Seats} \times 70\%^g \times 50\%^h = \underline{8 \text{ Parked Vehicles}}$$

Theater (200 Seats):

20 cast/crew over driving age, 2 cast/crew per vehicle, so parking demand = 10 Parked Vehicles

25% visitor vehicles arrive at the theater in PM peak hour (2 visitors per vehicle), so parking demand = $(200 \div 2) \times 25\% = \underline{25 \text{ Parked Vehicles}}$

$$\text{Total Peak Parking Demand} = 30 + 11 + 8 + 10 + 25 = \underline{84 \text{ (Parking Spaces)}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 71 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 71 + 20 - 3 = \underline{88 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking Demand} = 88 \text{ Space Supply} - 84 \text{ Parked Vehicles} = \underline{+4 \text{ Space Surplus}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

^d Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^h Assume 50% of patrons will be theater show patrons.

Project Site Parking Utilization
Friday at 7pm with Theater Event

Project Generated Peak Parking Demand

Retail (14,000 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 14,000 \text{ SF} \times 90\%^b \times 90\%^c = \underline{34 \text{ Parked Vehicles}}$$

Office (15,000 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 15,000 \text{ SF} \times 10\%^e = \underline{4 \text{ Parked Vehicles}}$$

Restaurant (67 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 67 \text{ Seats} \times 75\%^g \times 50\%^h = \underline{8 \text{ Parked Vehicles}}$$

Theater (200 Seats):

$$20 \text{ cast/crew over driving age, 2 cast/crew per vehicle, so parking demand} = \underline{10 \text{ Parked Vehicles}}$$

$$200 \text{ visitors per show (2 visitors per vehicle), so parking demand} = (200 \div 2) = \underline{100 \text{ Parked Vehicles}}$$

$$\text{Total Peak Parking Demand} = 34 + 4 + 8 + 10 + 100 = \underline{156 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 71 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 71 + 20 - 3 = \underline{88 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking Demand} = 88 - 156 = \underline{-68 \text{ Space Deficiency}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

^d Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^h Assume 50% of patrons will be theater show patrons.

Project Site Parking Utilization
Mid-day on Saturday with Theater Event

Project Generated Peak Parking Demand

Retail (14,000 SF):

$$2.97^a \text{ (Parked Vehicles/1,000 SF)} \times 14,000 \text{ SF} \times 90\%^b = \underline{37 \text{ Parked Vehicles}}$$

Office (15,000 SF):

$$\text{No parking demand} = \underline{0 \text{ Parked Vehicles}}$$

Restaurant (67 Seats):

$$0.35^c \text{ (Parked Vehicles/Seat)} \times 67 \text{ Seats} \times 80\%^d \times 50\%^e = \underline{9 \text{ Parked Vehicles}}$$

Theater (200 Seats):

$$20 \text{ cast/crew over driving age, 2 cast/crew per vehicle, so parking demand} = \underline{10 \text{ Parked Vehicles}}$$

$$200 \text{ visitors per show (2 visitors per vehicle), so parking demand} = (200 \div 2) = \underline{100 \text{ Parked Vehicles}}$$

$$\text{Total Parking Demand: } 37 + 0 + 9 + 10 + 100 = \underline{156 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

$$\text{New off-street parking spaces in the project site} = \underline{71 \text{ Parking Spaces}}$$

$$\text{New on-street parking spaces} = \underline{20 \text{ Parking Spaces}}$$

$$\text{Existing off-street parking spaces in the project site (Playground)} = \underline{3 \text{ Parking Spaces}}$$

$$\text{Project site net new parking supply} = 71 + 20 - 3 = \underline{88 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$\text{= Project Site Net New Parking Supply} - \text{Project Generated Peak Parking Demand} = 88 - 156 = \underline{-68 \text{ Space Deficiency}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p201.

^b Assume 10% parked vehicles are "internal vehicles" (already on site).

^c Average peak period parking demand. "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p278.

^d Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^e Assume 50% of patrons will be theater show patrons.

West Acton Village Ecology Project

Traffic Impact Study

Prepared for:
537 Mass Avenue LLC
543 Massachusetts Avenue
West Acton, MA 01270

Prepared by:
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August 2009

AECOM Project No. 104310

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EXECUTIVE SUMMARY

This Traffic Impact Study has been prepared by AECOM Technical Services, Inc. to evaluate the proposed West Acton Village Ecology (WAVE) project. 537 Mass Avenue LLC's applicant proposes to develop a mixed-use project along the north side of Massachusetts Avenue (Route 111) in West Acton, Massachusetts. The project site is bounded by Spruce Street to the west, an intermittent brook to the east, and Massachusetts Avenue (Route 111) to the south. Figure 1 shows the project site location. The proposed project will total approximately 46,000 square feet consisting of the following components:

- Retail – 8,576 SF
- Restaurant – 57 seats
- Office – 17,761 SF
- Existing Office #541¹ – 3,275 SF
- Community Space²
- Theater/Auditorium – 300 seats
- 72 on-site parking spaces
- 20 on-street parking spaces

The following summarizes the findings of the study:

- It is understood that there are currently mobility and safety issues for all users (motorists, pedestrians, and bicyclists) in the West Acton area, particularly along Massachusetts Avenue. The proposed project recognizes these issues and has addressed these by identifying improvement measures and including them as part of the overall project (see next bullet).
- The section of Massachusetts Avenue east of Spruce Street fronting the project site would be redesigned as part of the proposed project. The roadway would be redesigned to be consistent with the village operating environment currently in place near Spruce Street. This section would include on-street parking on the north side of Massachusetts Avenue, new parking for Gardner Field playground on the south side, and pedestrian/traffic calming facilities which would slow traffic and provide a safer environment for both pedestrians and motorists. The improvements to Massachusetts Avenue would include the following benefits:
 - Provide new sidewalks, a new crosswalk, and handicap ramps that will improve pedestrian circulation, safety and access to Gardner Field playground;
 - Provide new on-street parking that will increase parking supply in the area and improve safety for vehicles parked at the playground;
 - Extend village characteristics eastward by providing on-street parking, narrowing lanes, and pedestrian amenities that will calm traffic, reduce speeds, improve pedestrian visibility and safety, and eliminate the passing zone east of the project site;
 - Provide safety improvements at the intersection of Spruce Street/Kinsley Road;
 - Improve access management by eliminating four existing driveways; and
 - Provide access to existing parking that previously had no direct access to Massachusetts Avenue.

¹ #541 Massachusetts Avenue is already constructed and permitted for occupancy and parking. However, because it was not occupied at the time of the traffic counts conducted for this study it was included for trip generation purposes.

² The number of occupants will vary depending on use and schedule. While there will be a range of uses, this study assumes a maximum use scenario that is discussed in the Section 3.2.

To implement these mobility and safety measures on Massachusetts Avenue the Town of Acton will need to acquire jurisdiction over this section of roadway from MassHighway. The Town will need to request a state highway layout Discontinuance³ from MassHighway. Once the town accepts jurisdiction, it can request a reduction of the posted speed limit on Massachusetts Avenue in the project vicinity.

- Traffic volume data collected shows that Massachusetts Avenue currently carries approximately 13,000 vehicles per day with over 800 vehicles in the AM peak hour (8-9 AM) and over 1,000 vehicles in the PM peak hour (5-6 PM).
- A review of accident data (2004-2007) reveals that the intersection of Massachusetts Avenue/Central Street has a crash rate (1.11) that exceeds the MassHighway average. The crash rates at the other three intersections are below the MassHighway average. Mitigation measures for Massachusetts Avenue/Central Street are noted below.
- Parking surveys (on-street and off-street) show that there is excess parking available in the study area at peak weekday (Friday) and Saturday periods. At least 24 on-street parking spaces are currently available at any time in the study area. Off-street parking spaces are abundantly available.
- Currently all study intersections operate acceptably overall (Level of Service D or better) in both the AM and PM peak hours. However, some intersection movements experience delay and queuing. Traffic volumes were increased by 0.5% for 10 years to develop a 2018 No-Build condition. All study intersections will continue to operate acceptably overall in both peak hours, but the Central Street southbound left-turn movement will deteriorate to Level of Service F as a result of background traffic volume increases.
- Without a theater event, the proposed project is expected to generate over 500 vehicles (1,100 trips) daily with 97 vehicles occurring during the weekday AM peak hour and 130 vehicles occurring during the PM peak hour. With a weeknight theater event, the project would generate over 750 vehicles (1,500 trips) daily with 198 vehicles occurring the PM peak hour. Theater events will usually occur only on weekday evenings and weekends. It is important to note that trip generation estimates are maximums assuming full occupancy of all project components and does not assume any walk trips from the surrounding neighborhood. As a result, the vehicle trip generation estimates are considered conservatively high and are expected to be lower during typical operations.
- The addition of project-generated vehicles to the roadway network will not change Level of Service at any study intersection.
- The project site driveways on Massachusetts Avenue and Spruce Street will serve all traffic movements. The driveways will operate at acceptable Levels of Service (D or better) during all peak hours. Adequate minimum stopping sight distance is provided at both driveways.
- The site driveways and roadways meet the town's dimensional requirements and will provide adequate turning radii to accommodate single-unit trucks.

³ Massachusetts General Laws – State Highways – Chapter 81, Section 12.

- The proposed project parking supply will generally be adequate to accommodate project parking demand without a theater event. With a sold-out theater event, the project will require additional parking spaces to meet demand. This demand will be met by sharing off-street parking spaces with nearby town and privately-owned facilities. The project proponent has begun discussions with private owners to reach agreements to secure parking for theater events. The use of shared-parking is consistent with the state's Smart Growth initiatives which encourage use of existing infrastructure facilities, and is desirable for an economically sustainable and aesthetically appealing village environment.
- In addition to the changes to Massachusetts Avenue proposed as part of the project, the proponent has proposed the following measures to improve transportation conditions in the study area:
 - Provide two connected access driveways on Massachusetts Avenue and Spruce Street that will prevent overloading of any one access driveway;
 - Work with Town of Acton to accept the portion of Massachusetts Avenue under MassHighway jurisdiction as a town roadway and begin the Discontinuance process with MassHighway. Request a speed study by MassHighway to lower the posted speed limit on Massachusetts Avenue when the project is completed;
 - Eliminate one parking space on the north side of Massachusetts Avenue east of Spruce Street to improve sight distance for motorists;
 - Provide a curb extension on the northwest corner of Massachusetts Avenue and Spruce Street to improve sight lines for vehicles exiting Spruce Street, make pedestrians more visible and reduce the crosswalk distance across Massachusetts Avenue. In addition, thermoplastic material will be installed at the crosswalks to improve visibility;
 - Adjust signal timings at the intersection of Massachusetts Avenue/Central Street to reduce delay for the southbound Central Street left-turn movement and improve safety for turning vehicles;
 - Develop and implement a Traffic and Parking Management Plan to control parking and traffic during events. The plan should include the distribution of parking information and maps, agreements made with others to share parking for events, and provide parking and traffic personnel if necessary to direct motorists.

In summary, the transportation system in the study area can accommodate the proposed project. The recommended measures would improve existing deficiencies and mitigate potential impacts from the proposed project.

1.0 INTRODUCTION

537 Mass Avenue LLC proposes to develop a mixed-use project along the north side of Massachusetts Avenue (Route 111) in West Acton, Massachusetts. The proposed West Acton Village Ecology (WAVE) project site is bounded by Spruce Street to the west, and intermittent brook to the east, and Massachusetts Avenue (Route 111) to the south. Figure 1 shows the project site location. The proposed project will total approximately 46,000 square feet consisting of the following components:

- Retail – 8,576 SF
- Restaurant – 57 seats
- Office – 17,761 SF
- Existing Office #541⁴ – 3,275 SF
- Community Space⁵
- Theater/Auditorium – 300 seats

The section of Massachusetts Avenue east of Spruce Street fronting the project site would be redesigned as part of the proposed project (see Figure 6). The roadway would be redesigned to be consistent with the village operating environment currently in place west of Spruce Street. This section would include on-street parking on the north side of Massachusetts Avenue, new parking for Gardner Field playground on the south side, and pedestrian/traffic calming facilities which would slow traffic and provide a safer environment for both pedestrians and motorists. The proposed 90-degree on-street parking on the south side at the Gardner Field playground would increase parking supply in this area and improve safety for vehicles parked at the Gardner Field playground.

This report includes a review of the existing traffic and roadway conditions, forecasts background traffic growth within the study area, estimates the additional traffic and parking generated by the proposed development project, and estimates the potential impact of the project on the local transportation network. This report was conducted in accordance with local, state and industry standards.

⁴ #541 Massachusetts Avenue is already constructed and permitted for occupancy and parking. However, because it was not occupied at the time of the traffic counts conducted for this study it was included for trip generation purposes.

⁵ The number of occupants will vary depending on use and schedule. While there will be range of uses, this study assumes a maximum use scenario that is discussed in the Section 3.2.



SITE

Figure 1
Project Location Map
West Acton Village Ecology - Acton, MA

2.0 EXISTING CONDITIONS

This section summarizes the existing transportation operating conditions in the project study area. The following were evaluated:

- Study roadways and intersections;
- Traffic Volume;
- Accident history;
- Pedestrian facilities;
- Parking conditions; and
- Intersection capacity analysis.

AECOM staff conducted inventories in the study area to record existing roadway geometry, traffic control devices, parking, and general observations of roadway operating characteristics. The study area intersections include:

- Massachusetts Avenue (Route 111) at Spruce Street and Kinsley Road;
- Massachusetts Avenue (Route 111) at Central Street;
- Massachusetts Avenue (Route 111) at Windsor Avenue; and
- Arlington Street at Spruce Street.

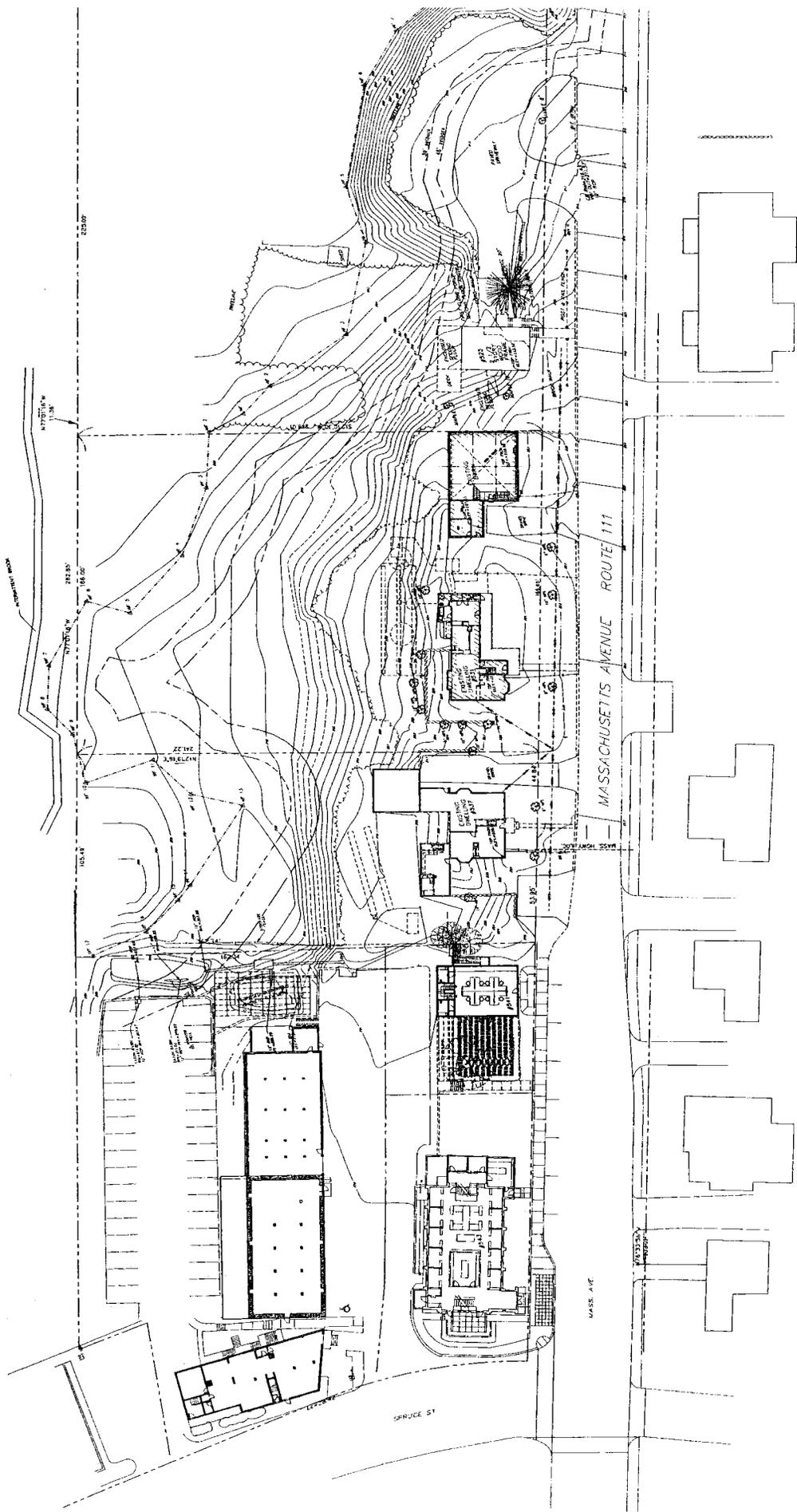
2.1 Study Roadways

Massachusetts Avenue (Route 111) is an urban arterial roadway that runs in an east-west direction through the Town of Acton. The MBTA Fitchburg Commuter Rail line intersects Massachusetts Avenue between Spruce Street and Central Street. In the vicinity of the project site, Massachusetts Avenue provides one travel lane in each direction, and sidewalks are provided along the north side of Massachusetts Avenue to the east of Arlington Street, and along the south side of Massachusetts Avenue. The roadway width varies from 47 feet to 26 feet (depending on on-street parking) within the project study area. Figure 2 shows the existing layout of Massachusetts Avenue in the study area.

The project parcels have been rezoned by the Town of Acton as a village business zone. Most of Massachusetts Avenue (Route 111) fronting the WAVE project is under MassHighway jurisdiction. The jurisdictional line is located near the west end of the project; therefore a short section of Massachusetts Avenue within the project area is under Town of Acton jurisdiction. The posted speed limits on Massachusetts Avenue in the project vicinity are 40 MPH eastbound and 30 MPH westbound. On-street parking is currently prohibited along the MassHighway section of Massachusetts Avenue. Parking is allowed on the south side of Massachusetts Avenue between Spruce Street and Central Street, and along the north side of the roadway between Spruce Street and the MassHighway jurisdictional line. There are three off-street parking spaces for the Gardner Field playground on the south side of Massachusetts Avenue. In the vicinity of the project site, passing is allowed for westbound traffic only in the section under MassHighway's jurisdiction.

Central Street is a local roadway that runs in a north-south direction between Route 2 and Main Street (Route 27). It generally provides one travel lane in each direction. The posted speed limit on Central Street is 30 MPH in both directions. In the vicinity of the project site, sidewalks are provided along both sides of the roadway, and on-street parking is prohibited on both sides.

Arlington Street is a local roadway that runs in a northeast-southwest direction between Newtown Road and Marian Road. The MBTA Fitchburg commuter rail line runs across Arlington Street between Spruce Street and Central Street. Arlington Street provides one travel lane in each direction. Sidewalks are located on both sides of Arlington Street to the west of Spruce Street, and along the south side of the



West Acton Village

Acton, Massachusetts

MASSACHUSETTS AVENUE
EXISTING CONDITIONS

SCALE: 1"=20'-0"

Figure 2



The Office of Michael Rosenfeld, Inc., Architects
West Acton, MA

roadway to the east of Spruce Street. The posted speed limits are 20 MPH eastbound and 25 MPH westbound. On-street parking is prohibited on both sides of the roadway.

Spruce Street is a local roadway that runs in a north-south direction north of Massachusetts Avenue, paralleling the MBTA line to the west. Spruce Street provides one travel lane in each direction. In the vicinity of the project site, the posted speed limit on Spruce Street is 20 MPH in both directions. On-street parking is allowed on the east side of the roadway between Arlington Street and Massachusetts Avenue. In the project site area, a sidewalk is provided along the west side of Spruce Street.

Kinsley Road is a local roadway that runs in a north-south direction between Massachusetts Avenue and its terminus to the south. Kinsley Road provides one travel lane in each direction, and there is no posted speed limit. No sidewalk is provided along either side of the street, and on-street parking is prohibited along both sides.

Windsor Avenue is a local roadway that runs in a north-south direction between Massachusetts Avenue and Central Street to the south. Windsor Avenue provides one travel lane in each direction, and the posted speed limit is 30 MPH in the southbound direction. There is no posted speed limit for the northbound direction. In the vicinity of the project site, sidewalks are provided along both sides of the street. On-street parking is allowed on the west side of the street between Massachusetts Avenue and Pearl Street.

2.2 Intersection Characteristics

Massachusetts Avenue at Central Street. Central Street intersects Massachusetts Avenue to form a signalized four-way intersection. The intersection is located approximately 400 feet west of the MBTA railroad crossing on Massachusetts Avenue. The Massachusetts Avenue eastbound approach provides two travel lanes; an exclusive left-turn lane and a shared through/right turn lane. The storage length for the exclusive left turn lane is approximately 100 feet. A No-Turn-On-Red sign is posted to control the eastbound right turn movement. The Massachusetts Avenue westbound approach also provides two westbound travel lanes; an exclusive left-turn lane and a shared through/right-turn lane. The exclusive left-turn lane is provided for approximately 160 feet. The Central Street southbound approach to this intersection consists of one 17-foot wide general purpose travel lane. This lane width is provided from the intersection at Massachusetts Avenue to Arlington Street, approximately 50 feet. The Central Street northbound approach provides one 18-foot wide general purpose travel lane. The northbound and southbound approaches are wide enough to allow through vehicles to pass by turning vehicles.

The signal consists of three phases:

- Massachusetts Avenue eastbound and westbound approaches;
- Central Street northbound and southbound approaches; and
- An exclusive pedestrian phase (push button actuated).

Painted crosswalks are provided across each leg of this intersection to accommodate the pedestrian movements during the exclusive phase.

Massachusetts Avenue at Spruce Street and Kinsley Road. Spruce Street and Kinsley Road intersect Massachusetts Avenue to form an unsignalized four-way intersection. The intersection is located approximately 210 feet east of the MBTA railroad crossing on Massachusetts Avenue. The Massachusetts Avenue eastbound approach provides one 12-foot wide general purpose travel lane, and the westbound approach provides one 20-foot wide general purpose travel lane. The Spruce Street southbound approach provides one 15-foot wide general purpose travel lane, while the Kinsley Road northbound approach provides one 10-foot general purpose travel lane. Vehicular traffic on southbound

Spruce Street and northbound Kinsley Road is under STOP sign control. Striped crosswalks are provided across Spruce Street, Kinsley Road, and the west leg of Massachusetts Avenue.

Arlington Street at Spruce Street. Spruce Street intersects Arlington Street to form an unsignalized four-way intersection under All-Way STOP sign control. This intersection is located approximately 200 feet east of the MBTA railroad crossing on Arlington Street. Both the Arlington Street eastbound and westbound approaches provide one 12-foot wide general purpose travel lane. The Spruce Street southbound approach provides one 11-foot general purpose travel lane, and the northbound approach provides one 14-foot general purpose travel lane. Striped crosswalks are provided across the west leg of Arlington Street and the north leg of Spruce Street.

Massachusetts Avenue at Windsor Avenue. Windsor Avenue intersects Massachusetts Avenue on the south to form an unsignalized T-intersection. The Massachusetts Avenue eastbound approach provides one 17-foot wide general purpose travel lane, and the westbound approach provides one 15-foot wide general purpose travel lane. The Windsor Avenue northbound approach provides one 13-foot general purpose travel lane. The northbound vehicular traffic is under STOP sign control. Striped crosswalks are provided across the east leg of Massachusetts Avenue and the north leg of Windsor Avenue.

MBTA Commuter Rail At-Grade Crossings (Fitchburg Line). As previously mentioned, the MBTA Fitchburg Commuter Rail line intersects both Massachusetts Avenue and Arlington Street. Both locations are controlled with gates and flashers for the vehicular traffic when a train travels through. During the AM peak commuting hours, the inbound trains arrive around every 20 minutes, and the outbound trains arrive every 30 to 50 minutes. The reverse is the case during the PM peak commuting hours.

2.3 Existing Traffic Volume Data

Traffic volume data were collected to assess the operational characteristics within the study area. The existing daily two-way traffic volumes on Massachusetts Avenue (Route 111), east of the proposed site driveway (525 Massachusetts Avenue) were recorded by an Automatic Traffic Recorder (ATR) machine. ATR counts were conducted over a 48-hour period between Wednesday, March 26 and Thursday, March, 2008, and between Wednesday, February 25 and Thursday, February 26, 2009. The ATR data are summarized in Table 1.

Table 1 Average Weekday Daily Traffic Volumes – Massachusetts Avenue (Route 111) East of Proposed Site Driveway

	Average Daily Traffic Volume	AM Peak Hour				PM Peak Hour			
		Peak Hour	Traffic Volume	K-Factor ¹	Dir. Dist. ²	Peak Hour	Traffic Volume	K-Factor ¹	Dir. Dist. ²
February 2009	12,780	8:00 – 9:00 AM	868	6.8	63% EB	5:15 - 6:15 PM	1,052	8.2	53% WB
March 2008	13,255	8:00-9:00 AM	897	6.8	62% EB	5:00-6:00 PM	1,105	8.3	53% WB
Difference	-475 (-3.6%)		-29 (-3.2%)				-53 (-4.8%)		

¹ Percentage of daily traffic during the peak hour
² Directional Distribution

As indicated in Table 1, during the weekday AM peak hour traffic volumes on Massachusetts Avenue were heavier in the eastbound direction. During the PM peak hour, the westbound directional distribution was slightly higher. The counts also show that the daily and peak hour traffic volumes along Massachusetts Avenue has decreased by 3 to 5 percent in the last year. The decrease in traffic volume is consistent with others areas in the state and is most likely in response to the economic downturn.

Manual Turning Movement Counts (TMC's) were conducted at the four study area intersections during the peak weekday commuting hours. The TMC's at the intersection of Massachusetts Avenue/Windsor Avenue were conducted on Tuesday June 3, 2008 between the hours of 7:00-9:00 AM and 4:00-6:00 PM, and the TMC's at the other three intersections were conducted on Thursday March 27, 2008 also between the hours of 7:00-9:00 AM and 4:00-6:00 PM. Based on the ATR and TMC's, it was determined that the morning peak hour generally occurs from 8:00-9:00 AM and the afternoon peak hour generally occurs from 5:00-6:00 PM. Turning movement estimates were made for the driveway of the Office of Michael Rosenfeld at Spruce Street for the AM and PM peak hours. Estimates were made based on the number of parking spaces and land use.

To determine if any of the data needed to be adjusted to account for seasonal fluctuation within the area, MassHighway seasonal data were researched. The MassHighway seasonal data revealed that traffic volume data collected during the months of March and June are three and ten percent higher, respectively than average month conditions. Based on this, the observed volumes were not adjusted. This provides a conservative (or above average) 2008 analysis condition.

Due to data collection on different days, traffic volumes were balanced between intersections where necessary. The 2008 existing weekday morning and afternoon peak hour traffic volumes are shown on Figure 3. The complete traffic count data are contained in Appendix A.

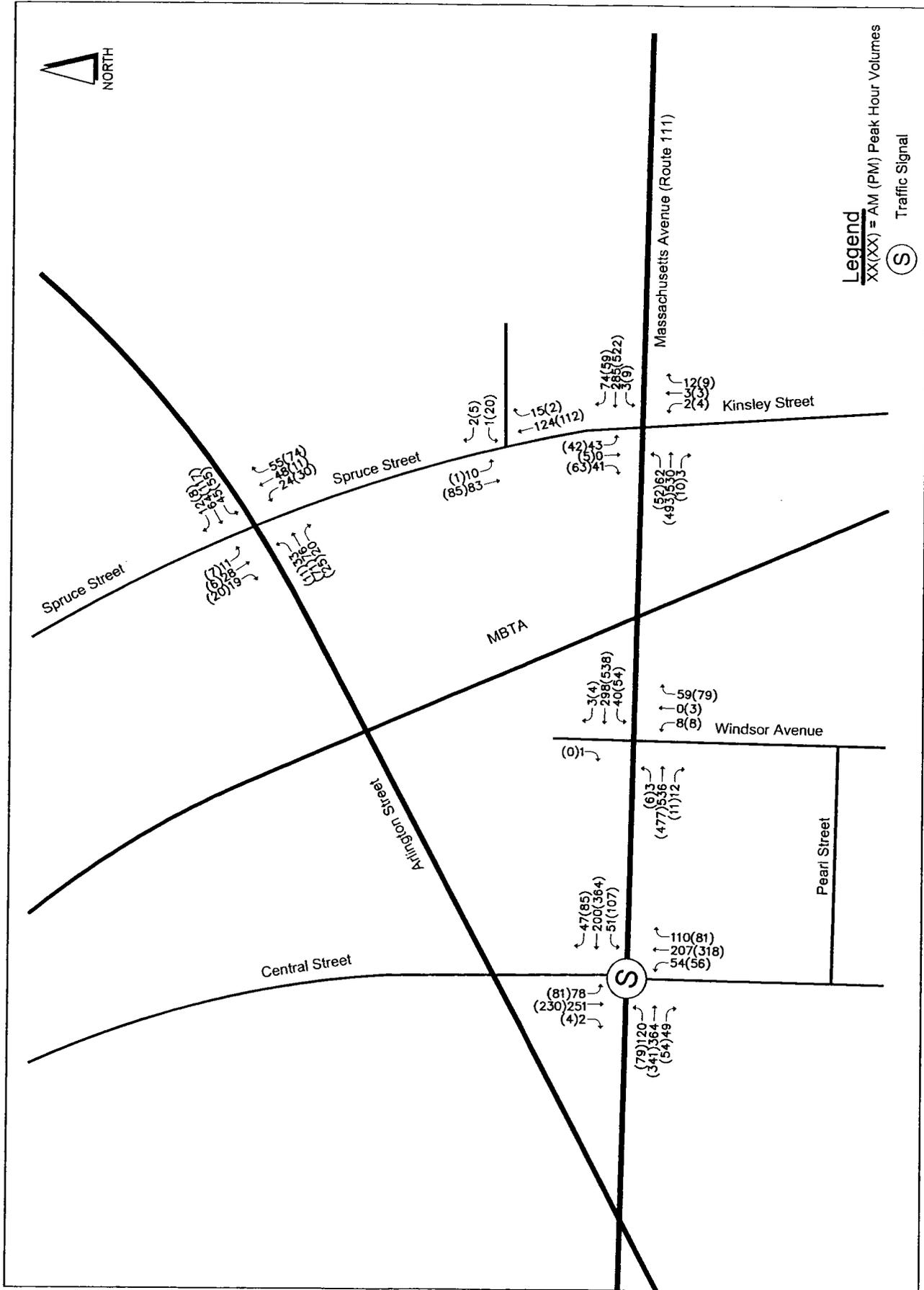


Figure 3
 2008 Existing Peak Hour Traffic Volumes
 West Acton Village Ecology - Acton, MA

2.4 Accident Data

Accident records were obtained from MassHighway for all study intersections for the four most recent years on record (2004-2007). Table 2 summarizes the crash history at each study area intersection over the four-year period. Crash rates were calculated per MassHighway methodology at each study intersection. The crash rates consider the number of accidents at each location, as well as the number of vehicles traveling through each intersection. The crash rate worksheets are contained in Appendix B. The most recent rates published by MassHighway indicate that the statewide average crash rate is 0.66 for unsignalized intersections and 0.87 for signalized intersections. The District 3 (which includes the Town of Acton) average crash rates are 0.79 for unsignalized intersections and 0.84 for signalized intersections.

As shown in Table 2, the crash rate (1.11) at the signalized intersection of Massachusetts Avenue (Route 111)/Central Street is higher than the average value for the state and District 3. At this location, the majorities of crashes were angle-type crashes, and occurred during the midday period. It is likely that these are due to the number of conflicting turning movements at this signalized intersection. The crash rate at other intersections is below the statewide and District 3 averages.

Table 2 Accident Summary (2004 – 2007)

	Arlington Street at Spruce Street				Massachusetts Avenue at Central Street				Massachusetts Avenue at Spruce Street/Kinsley Road				Massachusetts Avenue at Windsor Avenue			
	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
Severity																
Property Damage	1			1	6	2	11	4	4				1	2	1	
Injury					1				1						1	
Hit and Run																
Fatality																
Unknown					1	1	3									
Crash Type																
Rear End						1	1	1	1							
Angle	1			1	5	2	10	2	3					1		2
Head-On					1	1	1		1							
Other/Unknown					2	2	2	1	1				1	1		
Time of Day																
6 AM – 10 AM					1		2	1	1						1	
10 AM – 4 PM	1				5		7	1	4						1	
4 PM – 7 PM				1	1	3	2	1	1					2		
7 PM – 6 AM					1	1	3	1	1				1			
Roadway Condition																
Dry	1			1	6	1	13	4	3					1	1	
Wet					1	1			2				1	1	1	
Snow/Ice					1											
Other/Unknown																
Season																
Dec – Feb	1				4	2	6						1			
Mar – May					1	1	6		2					1		
Jun – Aug				1	1	1	1	2	1							
Sep – Nov					2	1	1	2	2				1	1	2	
Light Conditions																
Daylight	1			1	7	2	10	3	4					1	2	
Dawn/Dusk						1										
Dark (unlit)							1									
Dark (lit)					1		3	1	1					1		
Unknown																
Total	1	0	0	1	8	3	14	4	5	1	0	0	1	2	2	0
Average Per Year		0.50				7.25				1.50				1.25		
MHD Crash Rate		0.30				1.11				0.33				0.28		

Source: MassHighway

2.5 Parking Conditions

AECOM assessed the existing on-street and off-street public and private parking supply and demand within a two-block radius of the project site. The existing number of available parking spaces were identified and recorded within the study area. The areas included the parking lots at the Gates School and Douglas School. Figures 4 and 5 show the locations and type of the parking spaces inventoried.

Tables 3 and 4 show the number of available parking spaces in the study area by facility. There are a total of 446 parking spaces (65 on-street and 381 off-street) in the two-block study area surveyed.

Parking accumulation surveys were performed by AECOM staff on Saturday, June 28, 2008 (12:00 Noon to 4:00 PM) and Friday, July 11, 2008 (1:00 to 2:00 PM and 6:00 to 8:00 PM) in the project area. Tables 3 and 4 show the number of parked vehicles in each area by time and the percent utilized for each area, for Friday and Saturday, respectively.

On Friday, the highest level of overall parking demand was experienced at 1 PM with 65 percent of all spaces occupied (not including schools). A total of 91 off-street spaces (not including schools) and 24 on-street spaces were available (unoccupied) at this time. On Saturday, the highest parking utilization occurred between 1 and 2 PM with 57 percent of the overall spaces occupied (not including schools). A total of 113 off-street spaces (not including schools) and 27 on-street spaces were available at this time. The parking survey results show that there is an abundance of parking available in the study area at any time.

LEGEND

-  PARKING CODE *
-  OFF STREET PARKING
-  ON STREET PARKING



Figure 4
 Parking Survey Coverage Area (South)
 West Acton Village Ecology - Acton, MA

LEGEND

-  PARKING CODE *
-  OFF STREET PARKING
-  ON STREET PARKING



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Figure 5
 Parking Survey Coverage Area (North)
 West Acton Village Ecology - Acton, MA

Table 3 Summary of Parking Survey Conducted on Friday, July 11, 2008

Property Name	Parking Code†	Available Parking Spaces	Number of Parked Vehicles			Parking Utilization (%)		
			1pm - 2pm	6pm - 7pm	7pm - 8pm	1pm - 2pm	6pm - 7pm	7pm - 8pm
Douglas School	1	70	9	0	1	13	0	1
Gates School	2	38	2	0	0	5	0	0
Savory Lane (Deli Food Shop)	3	22	8	11	13	36	50	59
Margo's	4	10	9	6	3	90	60	30
Auto Parts	5	11	9	4	4	82	36	36
Table to Teapots	6	18	9	2	0	50	11	0
New London Style Pizza, Law Office, West Acton Car Wash, Hopscotch	7	24	20	19	11	83	79	46
New London Style Pizza	8	7	3	4	3	43	57	43
Northside of Massachusetts Avenue (Route 111)	9	1*	1	0	0	100	0	0
Eastside of Spruce Street	10	9*	8	7	6	89	78	67
Ernie's Auto Body, Golf Fitness Center, Ballet School	11	39	23	9	7	59	23	18
Golf Fitness Center, Ballet School, OMR Architects	12	28	25	3	2	89	11	7
Northside of Massachusetts Avenue (Route 111)	13	9*	7	3	2	78	33	22
Southside of Massachusetts Avenue (Route 111)	14	3	0	1	2	0	33	67
Southside of Massachusetts Avenue (Route 111)	15	7*	0	0	0	0	0	0
Southside of Massachusetts Avenue (Route 111)	16	9*	3	0	0	33	0	0
Northside of Massachusetts Avenue (Route 111)	17	9*	6	1	2	67	11	22
Southside of Massachusetts Avenue (Route 111)	18	11*	9	5	2	82	45	18
Middlesex Savings Bank	19	16	7	3	0	44	19	0
Acton Pharmacy	20	26	20	8	8	77	31	31
Driving School and Christian Science Church	21	18	0	0	0	0	0	0
Shops (Moodz, Barber Shop, etc)	22	28	26	14	13	93	50	46
Westside of Windsor Avenue	23	10*	7	0	0	70	0	0
Skin & Nails, Railroad Center	24	23	10	4	2	43	17	9
On Street Parking Total		65	41	16	12	63	25	18
Off Street Parking Total		381	180	88	69	47	23	18
Total		446	221	104	81	50	23	18
Total without Schools		325	210	104	80	65	32	25

† Parking codes correspond to parking areas shown in Figures 4 and 5.
* On street parking.

Table 4 Summary of Parking Survey Conducted on Saturday, June 28, 2008

Property Name	Parking Code†	Available Parking Spaces	Number of Parked Vehicles				Parking Utilization (%)			
			12pm - 1pm	1pm - 2pm	2pm - 3pm	3pm - 4pm	12pm - 1pm	1pm - 2pm	2pm - 3pm	3pm - 4pm
Douglas School	1	70	1	0	0	0	1	0	0	0
Gates School	2	38	7	1	1	0	18	3	3	0
Savory Lane (Deli Food Shop)	3	22	9	10	11	6	41	45	50	27
Margo's	4	10	10	10	7	6	100	100	70	60
Auto Parts	5	11	6	6	6	5	55	55	55	45
Table to Teapots	6	18	8	8	16	9	44	44	89	50
New London Style Pizza, Law Office, West Acton Car Wash, Hopscotch	7	24	17	18	15	12	71	75	63	50
New London Style Pizza	8	7	4	6	0	2	57	86	0	29
Northside of Massachusetts Avenue (Route 111)	9	1*	1*	1*	1*	0*	100*	100*	100*	0*
Eastside of Spruce Street	10	9*	4*	3*	3*	3*	44*	33*	33*	33*
Ernie's Auto Body, Golf Fitness Center, Ballet School	11	39	13	32	19	4	33	82	49	10
Golf Fitness Center, Ballet School, OMR Architects	12	28	5	6	5	1	18	21	18	4
Northside of Massachusetts Avenue (Route 111)	13	9*	5*	5*	5*	4*	56*	56*	56*	44*
Southside of Massachusetts Avenue (Route 111)	14	3	1	0	0	0	33	0	0	0
Southside of Massachusetts Avenue (Route 111)	15	7*	2*	0*	0*	0*	29*	0*	0*	0*
Southside of Massachusetts Avenue (Route 111)	16	9*	3*	6*	6*	5*	33*	67*	67*	56*
Northside of Massachusetts Avenue (Route 111)	17	9*	5*	7*	4*	5*	56*	78*	44*	56*
Southside of Massachusetts Avenue (Route 111)	18	11*	9*	9*	9*	5*	82*	82*	82*	45*
Middlesex Savings Bank	19	16	8	5	1	0	50	31	6	0
Acton Pharmacy	20	26	9	12	8	4	35	46	31	15
Driving School and Christian Science Church	21	18	8	5	5	1	44	28	28	6
Shops (Moodz, Barber Shop, etc)	22	28	17	17	18	15	61	61	64	54
Westside of Windsor Avenue	23	10*	6*	7*	7*	5*	60*	70*	70*	50*
Skin & Nails, Railroad Center	24	23	13	12	14	12	57	52	61	52
On Street Parking Total		65	35	38	35	27	54	58	54	42
Off Street Parking Total		381	136	148	126	77	36	39	33	20
Total		446	171	186	161	104	38	42	36	23
Total without Schools		325	163	185	160	104	50	57	49	32

† Parking codes correspond to parking areas shown in Figures 4 and 5.

* On street parking.

3.0 FUTURE CONDITIONS

This section evaluates future transportation operations in the study area both without and with the proposed project. Two future scenarios were analyzed, a Future No-Build and a Future Build condition. The No-Build scenario provides a baseline condition for which to compare the potential impacts of the project. Future conditions were evaluated for a year 2018 condition, 10 years from 2008. The following are evaluated below in this section:

- Future traffic volumes;
- Intersection capacity analysis;
- Site access and circulation;
- Parking impacts; and
- Pedestrian impacts.

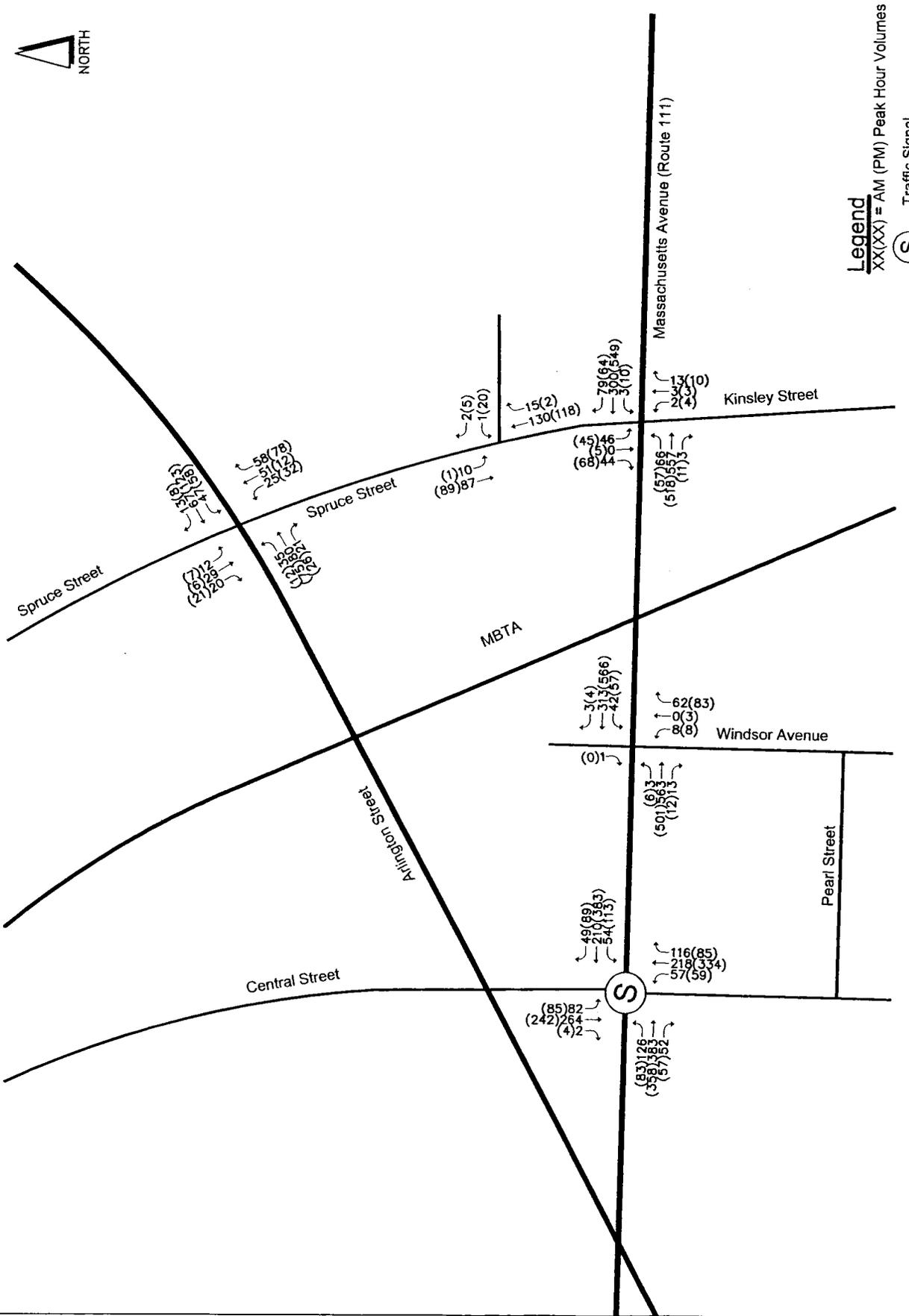
3.1 2018 No-Build Conditions

Future No-Build traffic volume projections typically consist of a general background growth factor and traffic generated from other known specific development projects within the study area. Background growth is typically a function of unspecified development projects, increased economic activity, and population growth.

A comparison of historical traffic data on Massachusetts Avenue (Route 111) between the years 2001 and 2009 indicates that traffic volumes decreased an average of 6% per year for the past seven years. The recent counts taken in 2008 and 2009 on Massachusetts Avenue for this study show that daily and peak hour volumes have decreased between three and five percent. Based on discussions with the Acton Planning Department, it was decided that an annual traffic growth of 0.5% would be appropriate for this study between 2008 and 2018. It is recognized that this growth rate is conservatively high given the steady reduction in traffic volumes on Massachusetts Avenue. The exiting AM and PM peak hour traffic volumes at the study intersections were increased by a factor of 5% to account for potential growth between 2008 and 2018.

The Acton Planning Department indicated that there is a proposal to develop the parcel on the southeast corner of Spruce Street and Arlington Street. For analysis purposes six townhouse and 1,500 square feet of retail were assumed. Peak hour vehicle trips were estimated for this background project based on the Institute of Transportation Engineers, Trip Generation, 8th Edition. The background project is estimated to generate 4 new trips in the AM peak hour and 7 new trips in the PM peak hour. Peak hour vehicle trips were assigned to the roadway network based on recent traffic volume counts and circulation patterns. The vehicle trips from this background project were added to the adjusted 2018 traffic volumes to create the 2018 No-Build peak hour traffic volumes.

Figure 6 displays the AM and PM peak hour 2018 No-Build traffic volumes.



Legend
XX(XX) = AM (PM) Peak Hour Volumes
(S) Traffic Signal

Figure 6
2018 Future No-Build Peak Hour Traffic Volumes
West Acton Village Ecology - Acton, MA



3.2 Future Build Conditions

In order to assess the potential impact of the project on traffic conditions in the study area, vehicle trips associated with the proposed project were estimated and distributed onto the roadway network. These vehicle trips were then added to the Future No-Build traffic volumes to form the Future Build traffic volumes for the weekday morning and afternoon peak hours. Peak parking conditions were evaluated for weekday afternoon, evening, and Saturday midday conditions.

For the No-Build condition, the current configuration of Massachusetts Avenue in the study area was assumed. For the Build condition, the following improvements on Massachusetts Avenue were assumed as part of the proposed project:

- 9 90-degree parking spaces on the south side of Massachusetts Avenue;
- 11 parallel parking spaces on the north side of Massachusetts Avenue; and
- New pedestrian crosswalk connecting the project site with the Gardner Field playground.

Figure 7 shows the project site plan.

3.2.1 Project Generated Traffic

The Institute of Transportation Engineers (ITE) Trip Generation manual (8th ed., 2008) was used to estimate trip generation characteristics for specific components of the proposed project. Vehicle trips associated with the office, retail, and restaurant components were estimated using ITE trip rates for daily and weekday AM and PM peak hours. The weekday AM and PM peak hours are the most critical periods for trip generation for the proposed land uses and also represent the highest hourly vehicular volume on the surrounding roadway network. The weekend trip generation characteristics are significantly lower for the office use and therefore, were not evaluated. Weekend theater events would mostly occur at night when traffic volumes are low. Weekend matinee events would be rare, but are discussed in the Parking section.

The ITE Land Use Codes #710–General Office Building, #814–Specialty Retail, and #932–High-Turnover (Sit-Down) Restaurant were used. The following units were used for trip generation calculations:

- Retail - 8,576 square feet (SF) of gross leasable area
- Office – 17,610 SF of gross floor area
- Restaurant – 57 seats

It is important to note that most of the unrented portions (common areas) of the project are associated with the 300-seat theater and community space and are included in the trip generation for those components as is discussed below. It is also noted that the office space trip generation estimate includes the existing/permitted 541 Massachusetts Avenue office Building (3,275 SF). This building was included in the trip generation calculations because it was not occupied when the traffic counts were conducted for this study (March and June 2008 and February 2009).

The ITE trip rates provide a baseline for the vehicular trip generation. However, adjustments were made to account for internal capture and pass-by trips. In this case, internal capture accounts for trips made to the retail stores by persons who are already on-site for other uses (office and restaurant). These trips are considered “internal trips” and will not generate additional vehicular traffic on the surrounding roadway network. The Trip Generation Handbook, An ITE Recommended Practice (Institute of Transportation Engineers, March 2001) contains data and guidelines for the assessment of internal site trips. The “Internal Capture Rate” contained in the Trip Generation Handbook ranges from 28% to 41%, which is

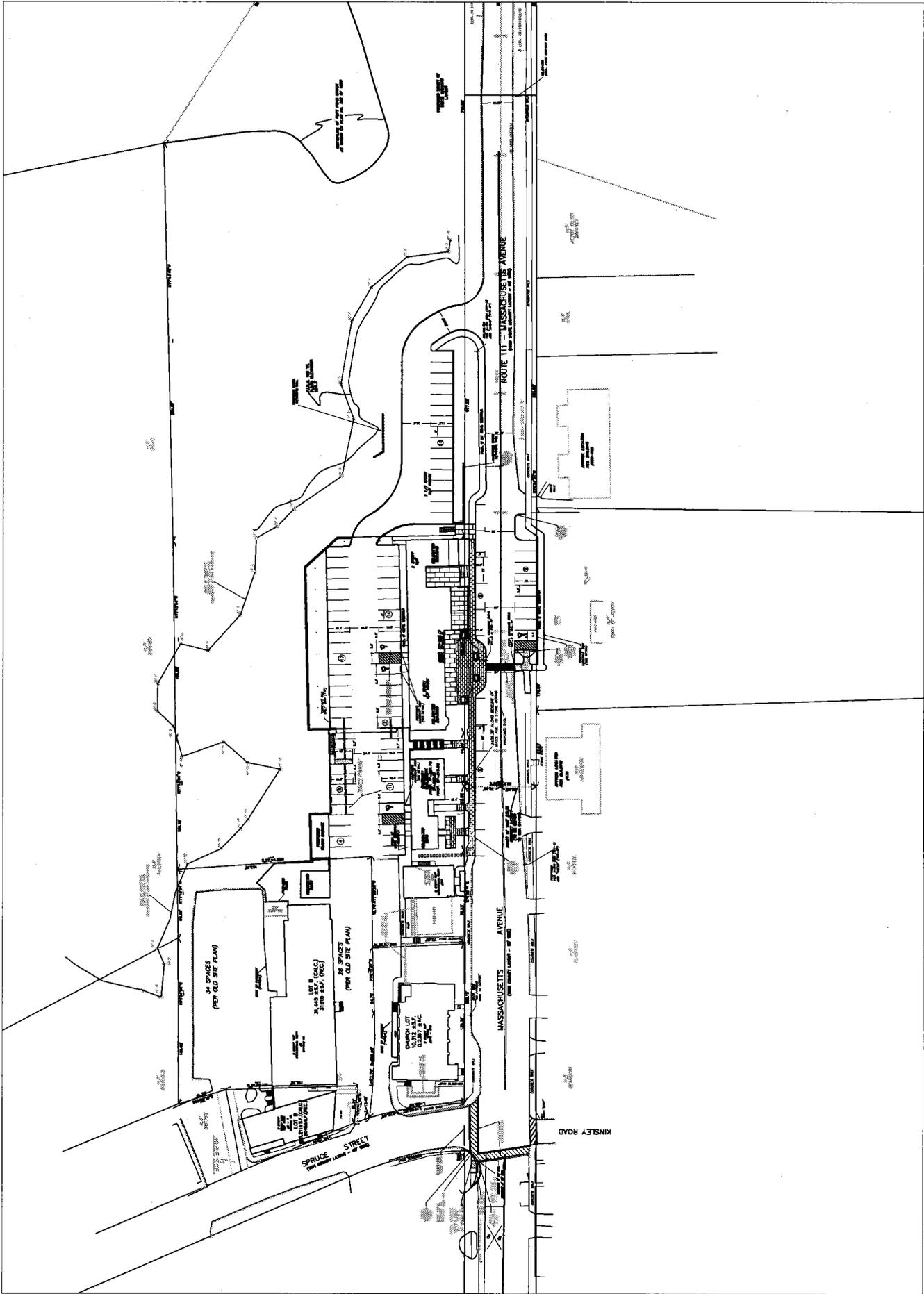


Figure 7
 Project Site Plan
 West Acton Village Ecology - Acton, MA

likely too high for a relatively small project. For this analysis, 10% was used as the internal capture rate to account for the internal trips of the retail component.

Pass-by trips are vehicles that are already on the roadway network and divert from their final destination to stop at a store, etc. Pass-by trips make up a large component of vehicle trips for uses such as gas stations, fast-food restaurants, and retail. A pass-by capture rate of 20% was used for the retail component of this project, which is typical for a development project of this scale. The pass-by adjustment does not reduce the number of vehicle trips entering and exiting the project driveways.

Trip generation estimates for the theater and community space components of the project were based on proposed programs and schedules for these uses. Information for these uses was provided by the project proponent and from the Dragon Fly Theater. The following program assumptions were used to estimate the vehicle trips generated by the proposed 300-seat theater:

Weekday:

- Theater shows start at 7 PM
- 300 visitors per show (100% seats occupied)
- 2 visitors per vehicle
- 70 cast/crew over driving age
- 2 cast/crew members per vehicle
- 25 child actors/crew who are driven or dropped off
- 1.5 children per vehicle + 1 adult driver
- 50% of the vehicles carrying children park for the show
- 4 delivery vehicles per day (8 trips)

Traffic Peak Hours:

- 8-9 AM and 5-6 PM on a weekday
- No vehicle trips enter/exit the theater in the AM peak hour
- 25% of visitor vehicles arrive at the theater in PM peak hour
- All the 70 cast/crew arrive at the theater in PM peak hour
- All vehicles carrying children arrive at the theater in the PM peak hour
- No delivery vehicles enter/exit the theater in the PM peak hour

The community space component of the project would be used for senior citizens classes, art/theater classes, and other small group activities. The community space schedule would begin at 9:00 AM, so it would generate only minimal trips in the AM peak hour. There would be no community space classes during a capacity auditorium event. For a less than capacity event, classes may be held, but the traffic impacts would be less than the maximum proposed scenario. The four daily delivery trips assumed for the theater will also serve the community space use.

Project trip generation is summarized in Table 5. With no theater event, the proposed project is estimated to generate over 1,100 daily vehicle trips with 97 occurring during the AM peak hour and 130 during the PM peak hour. With a theater event, the project would generate over 1,500 daily vehicle trips with 97 in the AM peak hour and 198 in the PM peak hour. It is important to note that the trip generation estimates are maximums assuming full occupancy of all project components, a sold-out theater event, and does not assume any walk trips from the surrounding neighborhood. As a result, the vehicle trip generation estimates are considered conservatively high and are expected to be lower during typical operations. The complete trip generation calculations are contained in the attached Appendix C.

Table 5 Project Trip Generation Summary

	Weekday Morning Peak Hour (vehicle-trips)			Weekday Afternoon Peak Hour (vehicle-trips)			Daily Trips
	Entering	Exiting	Total	Entering	Exiting	Total	Total
17,610 SF of General Office Building ¹	47	7	54	9	45	54	402
8,576 SF of Specialty Retail ²	6	6	12	18	24	42	404
Internal Trips (10% of Specialty Retail Trips)	1	1	2	2	2	4	40
Pass by Trips (20% of Specialty Retail Trips)	1	1	2	4	4	8	80
Specialty Retail-New Vehicle Trips	4	4	8	12	18	30	284
57 Seats High-Turnover (Sit-Down) Restaurant-Vehicle Trips ³	14	13	27	13 ⁵	10	23	274
50 Seats of Community Space	8	0	8	13 ⁶	10 ⁶	23 ⁶	206 ⁶
New Site-Generated Vehicle Trips (without Theater Event)	73	24	97	47	83	130	1,166
300 Seats Theater-Vehicle Trips ⁴	0	0	0	90	8	98	412
New Site-Generated Vehicle Trips (with Theater Event)	73	24	97	117	81	198	1,526

¹ Based on ITE LUC 710 – General Office Building
² Based on ITE LUC 814 – Specialty Retail
³ Based on ITE LUC 932 – High-Turnover (Sit-Down) Restaurant
⁴ Based on assumptions (see Appendix C for details)
⁵ 7 of the trips are assumed to arrive before the theater event, thereby reducing entering restaurant trips to 6 (13-7)
⁶ Community space classes would not occur after 5 PM with a theater event

3.2.2 Trip Distribution and Assignment

In order to evaluate the potential impacts related to the incremental traffic volumes associated with the development project, the new vehicle-trips were distributed onto the local roadway network. U.S. Census 2000 Journey-to-Work data were used to develop the trip distribution patterns for the office component. Journey-to-Work data are developed from the latest U.S. Census data, and indicate where the residents of Acton work and where workers in Acton live. It was assumed that the employees and visitors to the proposed office portion of the project would exhibit similar travel patterns. The peak hour traffic count data were used to develop the trip distribution for the retail, restaurant, community space, and theater components.

The trip distribution used for analysis is summarized in Table 6. The new project-generated trips were distributed and assigned to the roadway network based on the proposed project driveways, circulation patterns, and available off-street and on-street parking. Project trips were assigned for the AM peak hour, PM peak hour without theater event, and PM peak hour with theater event. The PM peak hour between 5:00 and 6:00 PM was used for both the without and with theater event conditions because it represents the highest combination of project-generated traffic plus traffic on adjacent roadways. It is noted that the traffic volumes at the project site driveways are slightly higher than the estimate of net new project trips

due to pass-by trips, which are diverted from the main stream traffic to the site. Project trips in the peak hours are shown in Figures 8 through 10.

The project vehicle trips were added to the Future No-Build peak hour traffic volume networks to create the 2018 Build traffic volumes. Build traffic volumes are shown in Figures 11 through 13.

Table 6 Project Trip Distribution

Use	Mass Ave (to/from west)	Mass Ave (to/from east)	Spruce St (to/from north)	Windsor Ave (to/from south)	Central St (to/from north)	Central St (to/from south)	Arlington St (to/from east)
Office ¹	10%	50%	2%	4%	23%	7%	4%
Restaurant, Retail Community Space & Theater ²	30%	50%	0%	5%	5%	5%	5%

¹ Based on U.S. Census 2000 Journey-to-work data

² Based on Traffic Data and Patterns

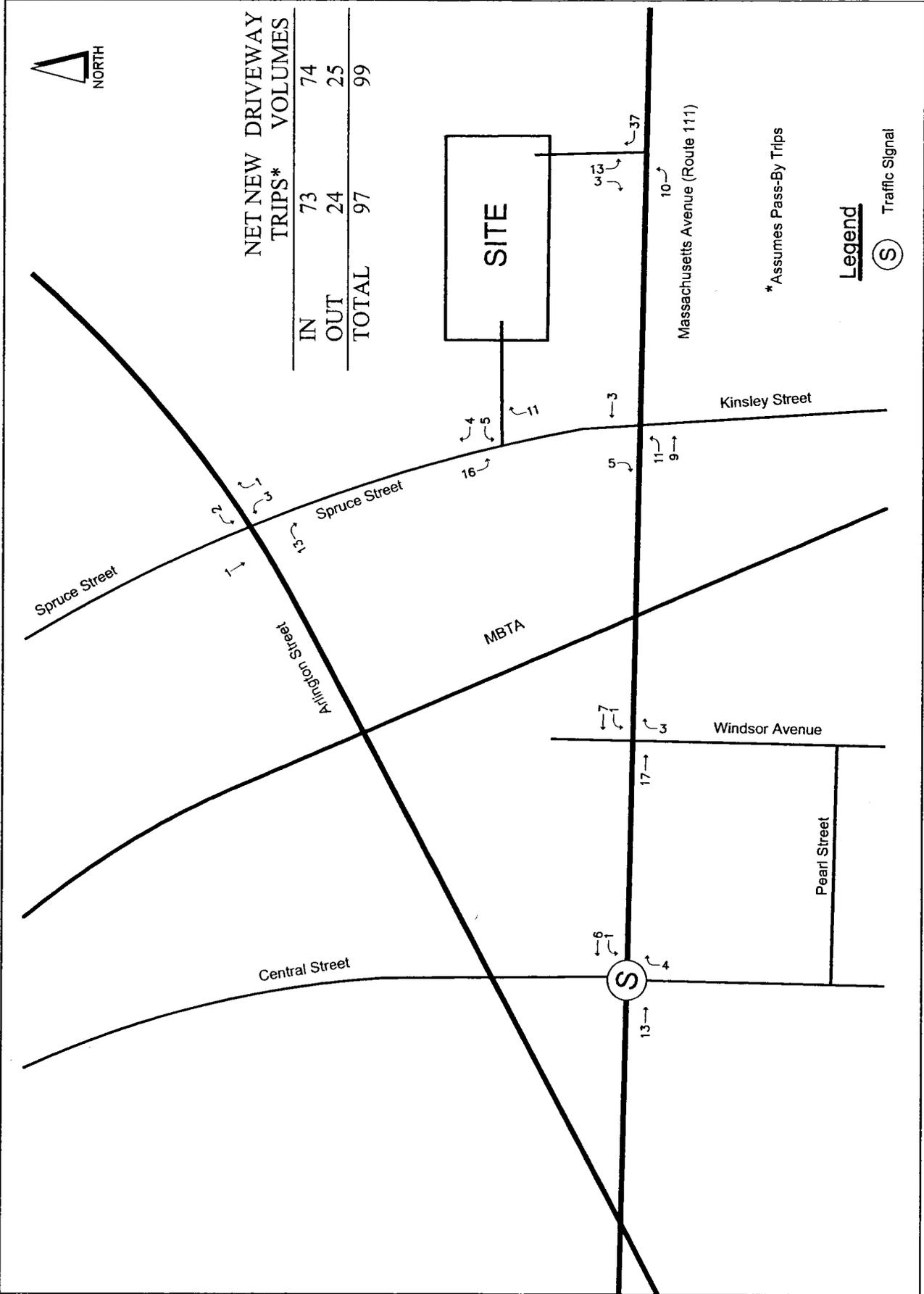
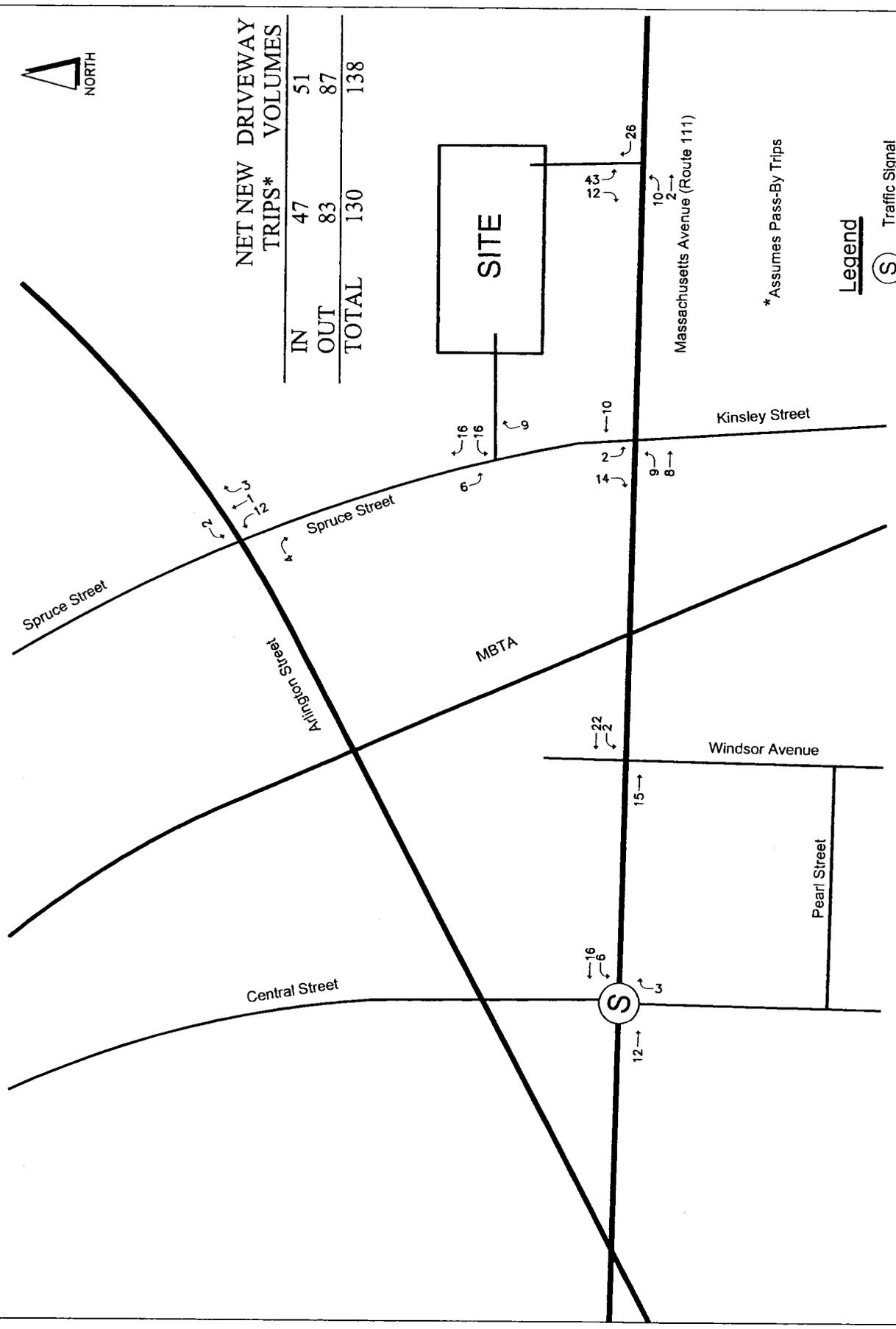
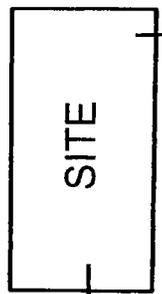


Figure 8
Generated Vehicle Trips-AM Peak Hour
West Acton Village Ecology - Acton, MA



NET NEW DRIVEWAY TRIPS* VOLUMES	
IN	47
OUT	51
TOTAL	83
	138



* Assumes Pass-By Trips

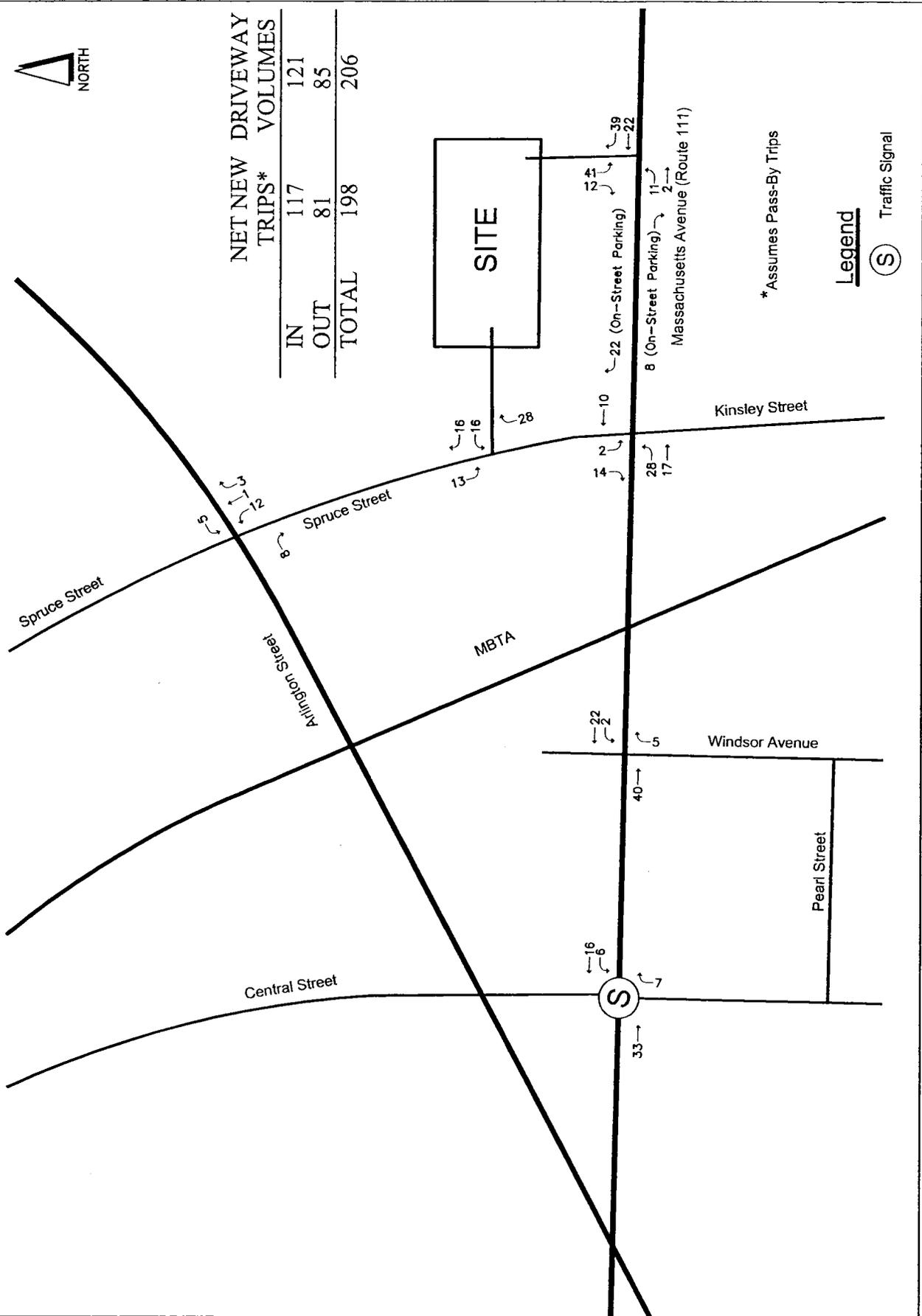
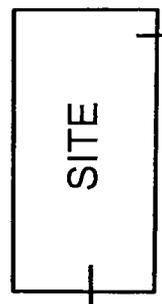
Legend

(S) Traffic Signal

Figure 9
Generated Vehicle Trips - PM Peak Hour No Event
West Acton Village Ecology - Acton, MA



NET NEW DRIVEWAY		
TRIPS*	VOLUMES	
IN	117	121
OUT	81	85
TOTAL	198	206



* Assumes Pass-By Trips

Legend

(S) Traffic Signal

Figure 10
Generated Vehicle Trips-PM Peak Hour w/ Event
West Acton Village Ecology - Acton, MA

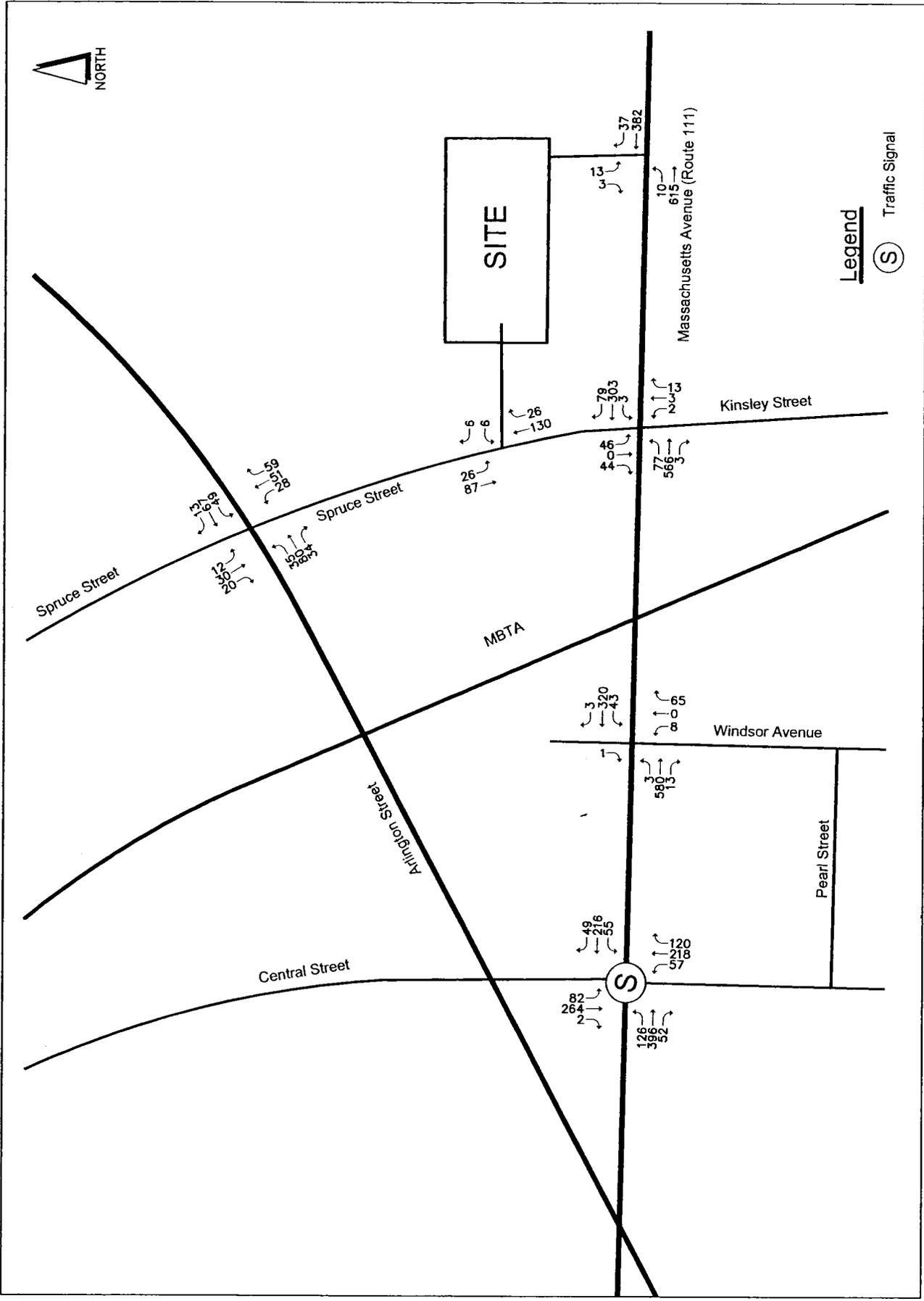
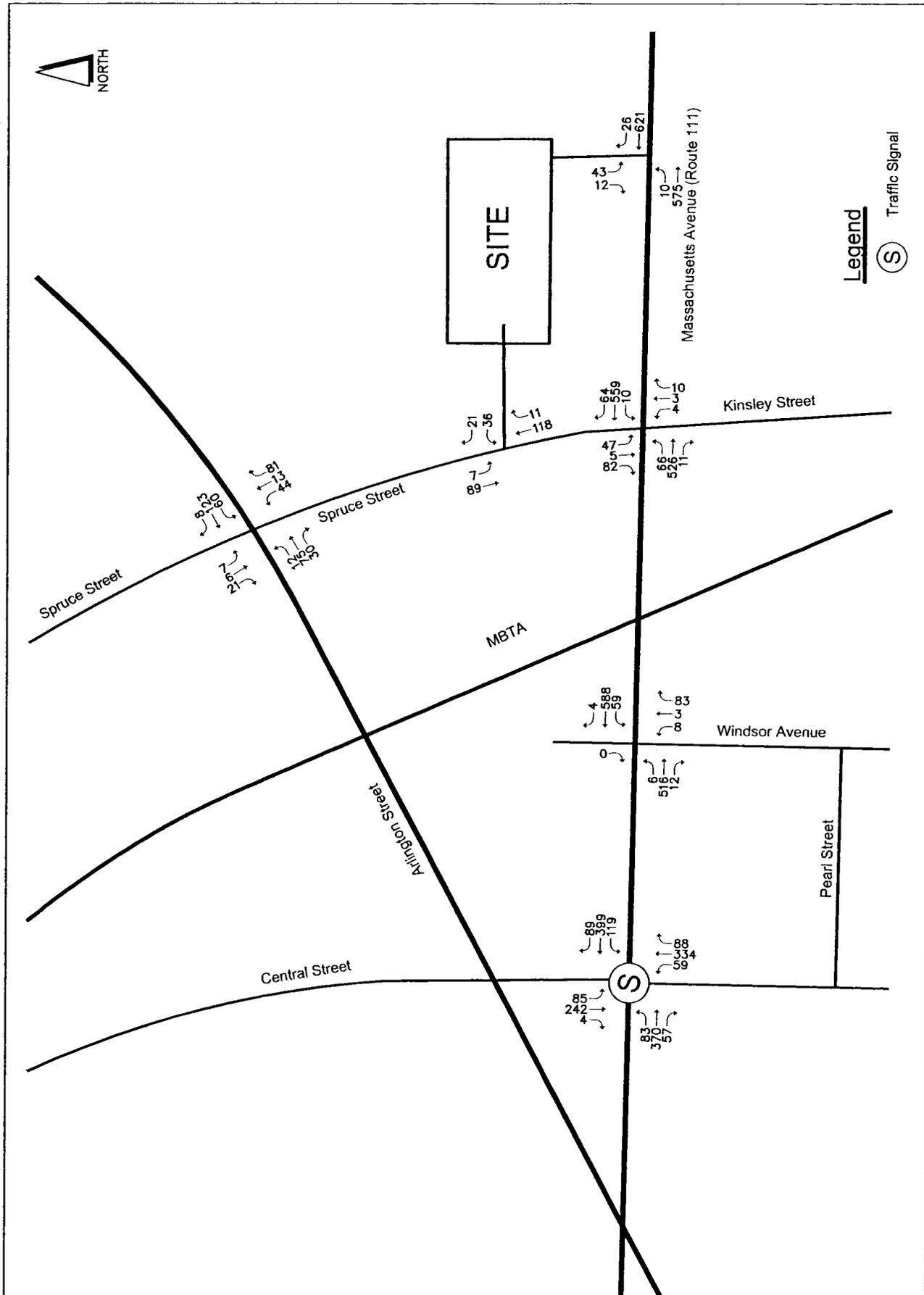


Figure 11
 2018 Future Build AM Peak Hour Traffic Volumes
 West Acton Village Ecology - Acton, MA



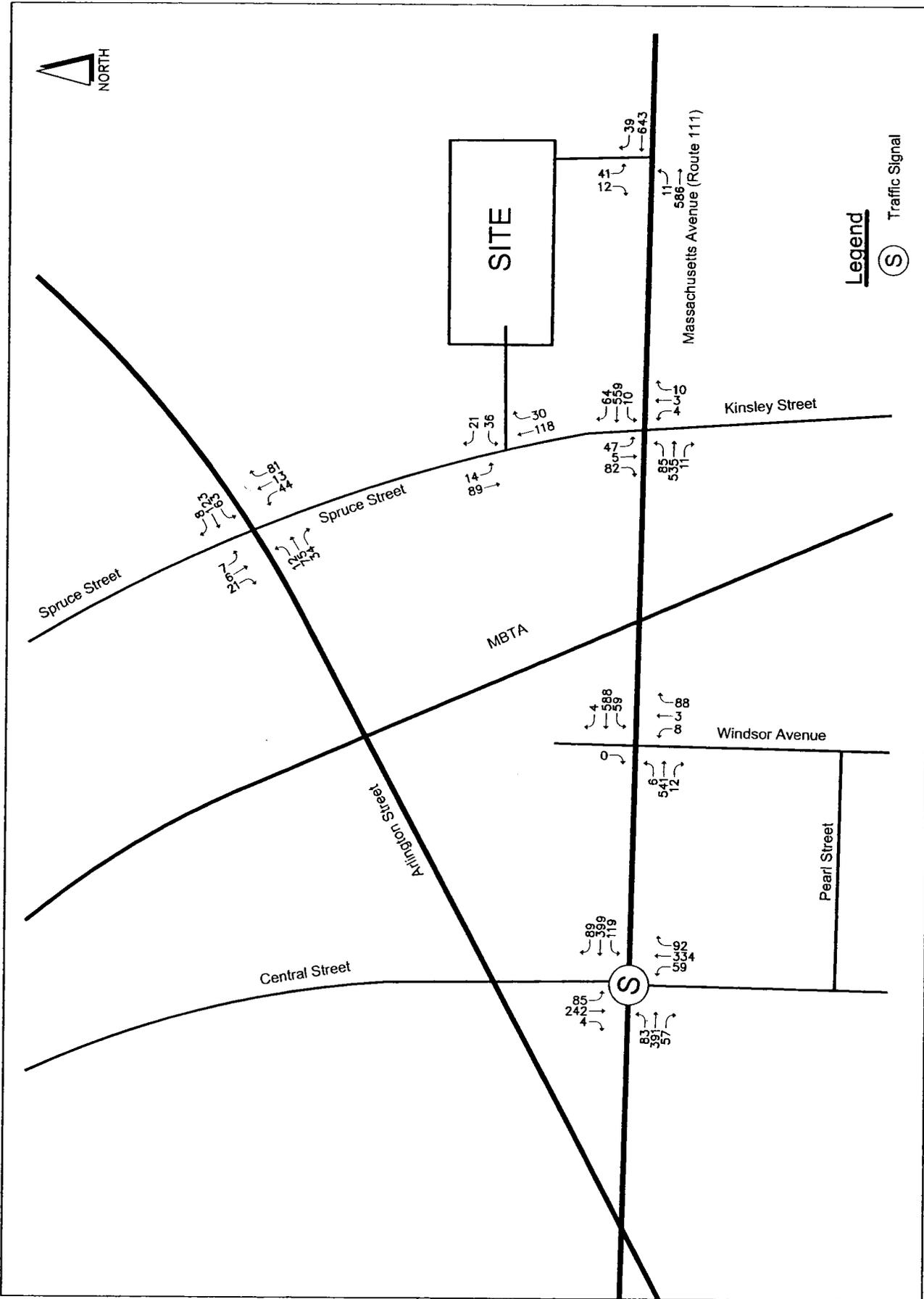


Figure 13
 2018 Future Build PM Peak Hour Traffic Volumes
 With Event
 West Acton Village Ecology - Acton, MA

3.2.3 Traffic Capacity Analysis

Capacity analyses were conducted to assess the quality of traffic flow at each of the study intersections. This was performed for 2008 Existing, the 2018 No-Build, and 2018 Build conditions for the weekday AM and PM peak hours. Scenarios without and with a theater event were evaluated for the Build condition.

The capacity analysis was conducted following the procedures described in *2000 Highway Capacity Manual (HCM)* using the Synchro/SimTraffic (version 7) software package. The capacity analysis utilizes traffic volumes, geometrics, and traffic controls at an intersection to determine a Level of Service (LOS) rating from A through F indicating how the intersection is expected to operate, or the quality of the driving conditions. LOS A represents the best operating conditions or little to no delay, while LOS F represents the worst operating conditions or very high delay. LOS E represents an intersection operating at capacity or at the limit of acceptable delay.

Level of Service for signalized intersections is based on the average control delay in seconds per vehicle approaching the intersection. The methodology takes into consideration the effects of signal type, timing and phasing, and geometrics when determining the delay for the intersection approaches and the intersection as a whole. Level of Service at an unsignalized intersection is defined as the delay experienced by each minor movement, since the major movements are considered to be uninterrupted. The LOS for unsignalized intersections is not defined for the intersection as a whole.

Table 7 provides the Level of Service and the delay threshold criteria for both signalized and unsignalized intersections.

Table 7 Level of Service Criteria – Intersections

Category	Delay (seconds per vehicle)	
	Unsignalized Intersections	Signalized Intersections
A	0.0 – 10.0	0.0 – 10.0
B	10.1 – 15.0	10.1 – 20.0
C	15.1 – 25.0	20.1 – 35.0
D	25.1 – 35.0	35.1 – 55.0
E	35.1 – 50.0	55.1 – 80.0
F	> 50	> 80

Source: Highway Capacity Manual, Transportation Research Board, Washington DC, 2000

3.2.4 Capacity Analysis Results

The traffic capacity results are shown in Tables 8, 9 and 10 and the complete analyses are contained in the Appendix D. The results also provide the queue lengths for each approach movement.

Table 8 Summary of Intersection Capacity Analysis – Weekday Morning Peak Hour Without Theater Event

	2008 Existing			2018 Future No-Build			2018 Future Build		
	LOS	Delay ¹	Queue Length ²	LOS	Delay ¹	Queue Length ²	LOS	Delay ¹	Queue Length ²
Signalized Intersection									
<i>Massachusetts Avenue at Central Street</i>									
Mass Avenue EB L	B	16.5	98	B	19.7	104	B	19.4	105
Mass Avenue EB TR	C	22.4	301	C	26.9	319	C	27.3	331
Mass Avenue WB L	B	15.6	53	B	17.9	59	B	18.0	61
Mass Avenue WB TR	B	17.2	186	B	19.3	196	B	19.2	201
Central Street SB L	B	12.9	81	B	13.2	88	B	13.6	88
Central Street SB TR	B	12.9	212	B	12.9	228	B	13.2	228
Central Street NB L	B	11.5	56	B	11.6	59	B	11.8	59
Central Street NB TR	B	14.8	269	B	15.0	312	B	15.5	318
Overall Intersection	B	16.7		B	18.6		B	18.9	
Unsignalized Intersections									
<i>Mass Avenue at Spruce Street and Kinsley Road</i>									
Mass Avenue EB LTR	A	1.5	5	A	1.6	5	A	1.9	6
Mass Avenue WB LTR	A	0.1	<5	A	0.1	<5	A	0.1	<5
Spruce Street SB LTR	C	25.0	36	D	29.3	46	D	32.3	50
Kinsley Road NB LTR	C	16.5	<5	C	17.3	5	C	18.0	5
<i>Arlington Street at Spruce Street</i>									
Arlington Street EB LTR	A	9.9	<5	B	10.3	<5	B	10.5	<5
Arlington Street WB LTR	A	9.7	<5	B	10.0	<5	B	10.2	<5
Spruce Street SB LTR	A	9.9	<5	A	9.3	<5	A	9.5	<5
Spruce Street NB LTR	A	9.1	<5	B	10.3	<5	B	10.6	<5
<i>Mass Avenue at Windsor Avenue</i>									
Mass Avenue EB TR	A	0.0	<5	A	0.0	<5	A	0.0	<5
Mass Avenue WB LT	A	1.6	<5	A	1.7	<5	A	1.7	<5
Windsor Avenue NB LR	B	14.3	17	C	15.0	19	C	15.4	20
<i>Spruce Street at Site Driveway</i>									
Spruce Street NB TR	A	0.0	<5	A	0.0	<5	A	0.0	<5
Spruce Street SB LT	A	0.9	<5	A	0.8	<5	A	1.9	<5
Site Driveway WB LR	A	9.3	<5	A	9.4	<5	A	9.8	<5
<i>Mass Avenue at Site Driveway</i>									
Mass Avenue EB LT							A	0.3	<5
Mass Avenue WB TR		NA			NA		A	0.0	<5
Site Driveway SB LR							C	20.1	5

¹ Measured in (seconds per vehicle)

² 95th percentile queue measured in (feet)

Table 9 Summary of Intersection Capacity Analysis – Weekday Afternoon Peak Hour Without Theater Event

	2008 Existing			2018 Future No-Build			2018 Future Build		
	LOS	Delay ¹	Queue Length ²	LOS	Delay ¹	Queue Length ²	LOS	Delay ¹	Queue Length ²
Signalized Intersection									
<i>Massachusetts Avenue at Central Street</i>									
Mass Avenue EB L	B	16.1	74	B	16.6	79	B	16.7	81
Mass Avenue EB TR	B	15.7	256	B	15.3	272	B	15.1	281
Mass Avenue WB L	B	14.7	91	B	14.6	99	B	15.1	106
Mass Avenue WB TR	C	28.7	364	C	28.0	410	C	28.2	457
Central Street SB L	C	34.7	137	F	106.8	156	F	119.5	157
Central Street SB TR	B	16.2	216	B	17.7	244	B	18.4	244
Central Street NB L	B	14.8	64	B	16.3	67	B	16.9	67
Central Street NB TR	C	29.5	473	D	41.1	501	D	46.8	505
Overall Intersection	C	23.1		C	29.3		C	31.2	
Unsignalized Intersections									
<i>Mass Avenue at Spruce Street and Kinsley Road</i>									
Mass Avenue EB LTR	A	1.6	5	A	1.7	5	A	2.0	6
Mass Avenue WB LTR	A	0.3	<5	A	0.3	<5	A	0.3	<5
Spruce Street SB LTR	E	40.6	75	F	53.3	98	F	66.7	127
Kinsley Road NB LTR	C	24.8	7	D	26.8	8	D	29.7	9
<i>Arlington Street at Spruce Street</i>									
Arlington Street EB LTR	A	9.1	<5	A	9.3	<5	A	9.5	<5
Arlington Street WB LTR	B	10.2	<5	B	10.5	<5	B	10.8	<5
Spruce Street SB LTR	A	8.4	<5	A	8.5	<5	A	8.6	<5
Spruce Street NB LTR	A	9.1	<5	A	9.3	<5	A	9.8	<5
<i>Mass Avenue at Windsor Avenue</i>									
Mass Avenue EB TR	A	0.0	<5	A	0.0	<5	A	0.0	<5
Mass Avenue WB LT	A	1.6	5	A	1.7	5	A	1.8	6
Windsor Avenue NB LR	C	15.2	23	C	16.1	26	C	17.3	29
<i>Spruce Street at Site Driveway</i>									
Spruce Street NB TR	A	0.0	<5	A	0.0	<5	A	0.0	<5
Spruce Street SB LT	A	0.1	<5	A	0.1	<5	A	0.6	<5
Site Driveway WB LR	A	9.7	<5	A	9.7	<5	A	9.9	6
<i>Mass Avenue at Site Driveway</i>									
Mass Avenue EB LT							A	0.3	<5
Mass Avenue WB TR		NA			NA		A	0.0	<5
Site Driveway SB LR							D	31.7	31

¹ Measured in (seconds per vehicle)
² 95th percentile queue measured in (feet)

Table 10 Summary of Intersection Capacity Analysis – Weekday Afternoon Peak Hour With Theater Event

	2018 Future Build		
	LOS	Delay ¹	Queue Length ²
Signalized Intersection			
<i>Massachusetts Avenue at Central Street</i>			
Mass Avenue EB L	B	16.7	81
Mass Avenue EB TR	B	15.6	299
Mass Avenue WB L	B	16.2	110
Mass Avenue WB TR	C	28.2	457
Central Street SB L	F	119.5	157
Central Street SB TR	B	18.4	244
Central Street NB L	B	16.9	67
Central Street NB TR	D	46.8	505
Overall Intersection	C	31.2	
Unsignalized Intersections			
<i>Mass Avenue at Spruce Street and Kinsley Road</i>			
Mass Avenue EB LTR	A	2.5	8
Mass Avenue WB LTR	A	0.3	<5
Spruce Street SB LTR	F	86.7	148
Kinsley Road NB LTR	D	33.1	11
<i>Arlington Street at Spruce Street</i>			
Arlington Street EB LTR	A	9.5	<5
Arlington Street WB LTR	B	10.9	<5
Spruce Street SB LTR	A	8.7	<5
Spruce Street NB LTR	A	9.8	<5
<i>Mass Avenue at Windsor Avenue</i>			
Mass Avenue EB TR	A	0.0	<5
Mass Avenue WB LT	A	1.9	6
Windsor Avenue NB LR	C	17.5	31
<i>Spruce Street at Site Driveway</i>			
Spruce Street NB TR	A	0.0	<5
Spruce Street SB LT	A	1.1	<5
Site Driveway WB LR	B	10.1	7
<i>Mass Avenue at Site Driveway</i>			
Mass Avenue EB LT	A	0.4	<5
Mass Avenue WB TR	A	0.0	<5
Site Driveway SB LR	D	33.5	32
¹ Measured in (seconds per vehicle)			
² 95 th percentile queue measured in (feet)			

During the AM peak hour, the operating conditions under the 2018 Build condition will remain relatively unchanged compared to the 2018 No-Build scenario. All intersections will operate at LOS D or better in the AM peak hour Build condition. As shown in Table 9 (without theater event), during the PM peak hour the increase in traffic from the 2008 Existing to the 2018 No-Build condition creates LOS F operations at two different intersections. At the signalized intersection of Massachusetts Avenue/Central Street, the southbound left turn movement is expected to operate at LOS F. The southbound approach at Massachusetts Avenue/Spruce Street/Kinsley Road is expected to deteriorate from LOS E to LOS F as a

result of background traffic and not the proposed project. As indicated in Tables 9 and 10, the addition of project traffic during the PM peak hour (both with and without a theatre event) will not change the LOS for any study intersection approach movement. Any increase in delay is expected to be minor. Also, the project driveway approaches at both Massachusetts Avenue and Spruce Street will operate at acceptable levels of service (LOS D or better) during all three build conditions (AM, PM without event, PM with event).

3.2.5 Site Access and Circulation

3.2.5.1 Site Access

This section evaluates the proposed site access for the project. Two site driveways are proposed for the project as shown in the site plan on Figure 7. One project driveway will be located on the north side of Massachusetts Avenue approximately 650 feet east of Spruce Street. It will form an unsignalized T-intersection on the north side of Massachusetts Avenue. It is located in approximately the same location as the existing horseshoe-shaped driveway for 525 Massachusetts Avenue. There are currently five driveway curb cuts along the north side of Massachusetts Avenue along the project frontage. The project will eliminate four of the existing driveways which improves access management along Massachusetts Avenue by reducing the number of conflicting vehicular movements. The project site driveway on Massachusetts Avenue will serve all vehicle movements and will be 20 feet wide.

The second project access will be provided through the existing parking lot of the Office of Michael Rosenfeld which intersects Spruce Street on the east side as an unsignalized T-intersection north of Massachusetts Avenue. Both driveways will serve all vehicle movements. This will allow motorists to use the most convenient driveway when entering and exiting the site, which will prevent vehicles from overloading any one driveway, thereby reducing delay and queuing.

The existing available sight distance at the primary site driveway (525 Massachusetts Avenue) was measured to determine whether vehicles would be able to safely exit the project site onto Massachusetts Avenue. The available sight distance was measured based on the procedures in the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets (5th ed., 2004). The measured available sight distance was compared to the minimum requirements for two sight distance criteria: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD). SSD is the required distance for vehicles traveling on the major roadway (Massachusetts Avenue) to stop in time to avoid a collision with a stationary object. ISD is the distance needed for motorists on the minor roadway (driveway) to enter the major roadway without interfering with traffic operations on the major roadway. ISD is desirable to improve traffic operations for vehicles entering the major roadway, but it is not required. As detailed in the AASHTO A Policy on Geometric Design of Highways and Streets, ISD was recorded 15 feet back from the edge of the travel way on Massachusetts Avenue. This point is one corner of the "clear sight triangle" that must be clear from obstructions to provide sufficient ISD.

For the sight distance evaluations, the prevailing 85th percentile speed (as determined by the ATR counts) was used. The 85th percentile speed is the speed at or below which 85 percent of the vehicles are traveling. Speeds were measured on Massachusetts Avenue in March 2008 by ATR Machine at the same time the traffic counts were recorded. The measured 85th percentile speeds on Massachusetts Avenue are 44 MPH eastbound and 43 MPH westbound. Table 11 compares the available sight distance to the minimum requirements for SSD and ISD.

Table 11 Sight Distance Summary

Massachusetts Avenue at Site Driveway			
<i>Stopping Sight Distance</i>	<u>Measured</u>	<u>Minimum Required</u>	<u>Meets Standard</u>
Vehicles on Mass Avenue, traveling eastbound	400 +/- ft	349 ft ¹	Yes
Vehicles on Mass Avenue, traveling westbound	2,000 + ft	338 ft ²	Yes
<i>Intersection Sight Distance</i>	<u>Measured</u>	<u>Desirable</u>	
Vehicles exiting the project site, looking to the east	2,000 + ft ³	478 ft ¹	Yes
Vehicles exiting the project site, looking to the west	400 +/- ft ³	489 ft ²	No ⁴
¹ Based on speed of 44 MPH in the vicinity of the site driveway. ² Based on speed of 43 MPH in the vicinity of the site driveway. ³ Assumes existing vegetation is cleared. ⁴ Sight distance is adequate up to 36 MPH.			

At the site driveway, the available SSD exceeds the minimum required distances specified by AASHTO in both directions. For vehicles exiting the project site, the ISD looking to the east exceeds the desirable value, but the ISD looking to the west does not meet the minimum desired value for vehicles traveling at 44 MPH. With the proposed change of roadway jurisdiction from MassHighway to Town of Acton in the near future, it is expected that the speed limit on Massachusetts Avenue will be reduced, and consequently the prevailing travel speeds will decrease. It is recommended that the posted speed limit be changed to 30 MPH for the section of Massachusetts Avenue proposed to be accepted by the Town of Acton (see Improvements section). Massachusetts Avenue is currently posted for 30 MPH in West Acton Village. The ISD at the site driveway on Massachusetts Avenue looking west is appropriate for up to 36 MPH. Therefore, the ISD would be adequate with a posted speed limit of 30 MPH. It is noted that a change in posted speed limit can only be made by MassHighway after completion of a speed study.

3.2.5.2 Site Circulation

The site design (see Figure 7) provides an internal connection between the two site access points so motorists can enter and exit each driveway as needed. Each driveway will provide two-way circulation. The Massachusetts Avenue driveway will be 20 feet wide and will provide adequate turning radius to accommodate entering and exiting vehicles. The internal roadway aisle width is 20 feet. Full size on-site parking spaces are 9 x 18.5' and compact spaces use 8.5' x 18.5' and 8.5' x 15'. The site plan should be reviewed by the Acton Fire Department to ensure safe and efficient operations of emergency vehicles on the project site. Truck single-unit turning radius for Massachusetts Avenue movements is provided in Appendix E.

3.2.6 Parking

The proposed project parking supply meets the Town of Acton parking requirements. Analysis was conducted to evaluate the project parking supply and demand and the impact of project parking on the existing public supply in the study area. Parking supply data collected for the Existing Conditions section was used for this analysis.

Parking was evaluated for the following future project conditions:

- Friday 1PM without Theater event
- Friday 6 PM without Theater event
- Friday 6 PM with Theater event
- Friday 7 PM with Theater event
- Saturday midday with Theater event

A total of 92 new parking spaces, which include 72 off-street parking spaces and 20 on-street parking spaces (along Massachusetts Avenue), will be provided as part of the project. Considering the 3 existing parking spaces in the project area (near the playground), the net new parking supply is 89 spaces. Parking demand calculations did not include the existing 541 Massachusetts Avenue office building on-site because it already includes 5 permitted parking spaces.

Parking demand was estimated based on rates published in the Institute of Transportation Engineers, Parking Generation, 3rd Edition, 2004. Parking rates are provided by land use code for specific uses including Shopping Center (Land use Code #820); Office Building (#701); and High-Turnover (Sit-Down) Restaurant. Peak parking demand estimates were made for these project components using the rates for weekdays and Saturday. Adjustments to the peak parking rates were made to account for persons making multi-purpose trips within the project facility (internal capture) and for variation in parking demand by time of day. Data published in the Institute of Transportation Engineers, Transportation Planning Handbook, 2nd Edition, 1999 was used to adjust for time of day variation. Parking demand calculations are provided in Appendix F.

Table 12 summarizes the peak parking demand for the project compared with the proposed project parking supply. For analysis purposes it is assumed that the 17 net new on-street parking spaces would be used by project tenants and visitors, as well as playground users. During the week, the highest project parking demand without a theater event (98 vehicles) will occur at 1 PM on Friday. This assumes that the office, retail, restaurant, and community space components are all fully occupied, which represents a conservative condition. Under this assumption there would be a project parking deficit of 9 parking spaces. This small deficit will be easily accommodated by available on-street spaces in the area (24 available at 1 PM on Friday). At 6 PM without a theater event the project will experience a surplus of 31 spaces.

With a theater event, the project would generate a parking demand of 120 vehicles at 6 PM on a weekday, assuming a 7 PM show start. This would result in a project parking deficit of 31 spaces, which can easily be accommodated by available on-street parking (49 available at 6 PM on Friday) and the adjacent parking lot for the Office of Michael Rosenfeld (see below).

On Friday at 7 PM and Saturday midday with a capacity theater event the project would generate a demand for approximately 218 vehicles. This results in a parking deficit for the project of approximately 130 vehicles.

Table 13 shows the project parking demand compared with available parking spaces in a two-block radius from the project. The table shows that even with project parking demand, parking utilization will remain below capacity overall (39% to 74% utilized on Friday and 97% utilized on Saturday). It is understood that overall parking demand on a Saturday evening even with a theater event will be well below capacity. While parking demand is below capacity in the overall area, not all of the private off-street spaces will be available to accommodate project parking. Agreements will need to be reached with the town and/or private property owners to use parking spaces for theater events. These spaces would function as shared-parking spaces in that they would be available for theater event parking and would not coincide with the normal parking demand of the facility.

The project proponent has begun discussions with the town and several private property owners in the area as to the potential availability of shared-parking considerations. This information has been used to develop a preliminary parking plan to accommodate vehicles for theater events. Table 14 summarizes the components of the preliminary parking plan.

Table 14 shows that the project peak parking demand assuming a capacity theater event can be accommodated within the study area. In addition to the proposed new on-site (72) and on-street parking spaces (17 net new), the following facilities within a two-block radius are identified to accommodate theater parking:

- General on-street parking;
- Parking lot for Office of Michael Rosenfeld;
- Acton Municipal parking lot (west of Central St., south of Mass Ave.);
- West Acton Baptist Church (west of Central St., south of Mass Ave.);
- Office parking lot (west of central St., north of Mass Ave.); and
- Other facilities (ongoing discussions).

Agreements will be made with these and other facilities as needed to share use of their parking facility (or portion of) to satisfy the parking demand for the theater. It is noted that the calculations do not include the possibility of providing a shuttle service between elementary school parking lots when the schools are not in session.

As part of the project, a Traffic and Parking Management Plan will be developed to manage traffic for theater events. Elements of a plan are discussed in the Recommendations section of this report.

The changes to Massachusetts Avenue proposed as part of the project would improve parking conditions in the area. Currently there are three undesignated off-street parking spaces for the Gardner Field playground on the south side of Massachusetts Avenue. Often motorists park on-street in this area with one tire on the road and the other tire on the curb/sidewalk. This creates an unsafe condition for with vehicles traveling on Massachusetts Avenue. As part of the project, 9 off-street 90-degree spaces are proposed on the south side of Massachusetts Avenue in the vicinity of the playground within the public right of way. These spaces will improve the operation and safety for vehicles parking for the playground and for the village in general.

Table 12 Summary of Project Peak Hour Parking Demand

Peak Period	Project Generated Peak Parking Demand								Project Site Net New Parking Supply	On Site Peak Parking Surplus/ Deficiency
	Retail	Office	Restaurant	Theater Cast/Crew	Theater Children Cast Drop Off	Visitor/ Audience	Community Space	Total		
Friday 1pm (no theater event)	23	45	17	0	0	0	13	98	89	-9
Friday 6pm (no theater event)	19	13	13	0	0	0	13	58	89	+31
Friday 6pm (with theater event)	19	13	7	35	8	38	0	120	89	-31
Friday 7pm (with theater event)	21	5	7	35	8	142	0	218	89	-129
Saturday Midday (with theater event)	23	0	8	35	8	142	0	216	89	-127

Table 13 Summary of Future Study Area Peak Hour Parking

Peak Period	Existing Parking Supply w/o schools			Project Site Net New Parking	Total Parking Supply w/o schools	Peak Parking Demand			Peak Parking Utilization (%)
	On-Street	Off-Street	Total			Study Area	Project	Total	
Friday at 1pm (no theater event)	65	260	325	89	414	210	98	308	74%
Friday at 6m (no theater event)	65	260	325	89	414	104	58	162	39%
Friday at 6pm (with theater event)	65	260	325	89	414	104	120	224	54%
Friday at 7pm (with theater event)	65	260	325	89	414	80	218	298	72%
Saturday Mid-day (with theater event)	65	260	325	89	414	185	216	401	97%

Table 14 Preliminary Parking Plan with Theater Event¹

Peak Period	Project Generated Peak Parking Demand									Total Parking Supply	% Full
	Project Parking Demand	General On-Street Availability Office	Project On-Street Supply ²	Project On-Site Supply	OMR Spaces ³	Municipal Lot ⁴	Central St. Office ⁵	West Acton Baptist Church ⁶	Others ⁷		
Friday 6pm (with theater event)	120	49	17	72	26	23	15	26	16	244	49%
Friday 7pm (with theater event)	218	53	17	72	26	23	15	26	16	248	88%
Saturday Midday (with theater event)	216	27	17	72	26	23	15	26	16	222	97%

¹ Assumes 100% show occupancy of 300 seats.

² 20 parking spaces – 3 existing at playground = 17 net new spaces.

³ Private lot, Office of Michael Rosenfeld, parking off of Spruce Street. Includes 5 spaces for Building Trade Shop.

⁴ Acton lot west of Central St. and south of Mass Ave.

⁵ Private lot west of Central St. and north of Mass Ave.

⁶ Lot west of Central St. and south of Mass Ave.

⁷ Ongoing discussions with other business owners.

3.2.7 Pedestrians

Pedestrian circulation and safety in the area will be improved by the proposed project. New sidewalks, crosswalks, and handicap ramps will be provided on both sides of Massachusetts Avenue in the project area. This will include a new mid-block crosswalk across Massachusetts Avenue linking the front of the theater on the north side with the Gardner Field playground on the south side. The crosswalk will be constructed with curb extensions on each side to shorten the pedestrian crossing distance and heighten the visibility of pedestrians for motorists. The crosswalk is located near the crest of the hill in this area and will provide adequate stopping sight distance for vehicles in both directions. The planned roadway design will help to slow speeds in this area, improving the environment for pedestrians and be more appropriate

for a village setting. Sidewalks on the north side of Massachusetts Avenue will provide direct pedestrian connections to the project site. Seating areas will be provided along the project frontage along with landscape treatments. Figure 7 shows the proposed pedestrian facilities in the project area.

4.0 RECOMMENDATIONS

Potential transportation improvements have been identified within the study area. These improvements address existing deficiencies as well as diminish the impacts of the proposed development project on the roadway network. The project proponent has proposed to pursue the following transportation improvement measures:

Massachusetts Avenue Change of Functional Use and Jurisdiction. The section of Massachusetts Avenue east of Spruce Street fronting the project site would be redesigned as part of the proposed project. The roadway would be redesigned to be consistent with the village operating environment currently in place near Spruce Street. This section would include on-street parking on both sides and pedestrian/traffic calming facilities which would slow traffic and provide a safer environment for both pedestrians and motorists. The proposed 90-degree on-street parking on the south side at the playground would increase parking supply in this area and improve safety for vehicles parked at the playground.

To implement these mobility and safety measures on Massachusetts Avenue, the Town of Acton will need to acquire jurisdiction over this section of roadway from MassHighway. The Town will need to request a state highway layout Discontinuance⁶ from MassHighway. The proponent has held preliminary meetings with MassHighway District 3 staff where they have indicated that this is an appropriate process for requesting a jurisdictional change for a state highway. It is recommended that the Town of Acton agree to accept this section of Massachusetts Avenue as a town roadway and begin the Discontinuance process with MassHighway.

Changing the posted speed limit on the redesigned section of Massachusetts Avenue will be appropriate. Currently, the posted speed limit for Massachusetts Avenue in this area is 30 MPH westbound and 40 MPH eastbound. It appears that a 30 MPH posted speed limit would be appropriate for both directions. MassHighway has indicated that they could perform a speed study after the project is completed in order to change the posted speed limit. MassHighway has jurisdiction for speed limits for all roadways in the state, regardless of jurisdiction. It is recommended that the Town of Acton request a speed study through MassHighway at completion of project⁷.

Massachusetts Avenue/Spruce Street/Kinsley Road Intersection. The southbound Spruce Street approach to this intersection is under Stop control and experiences vehicle delay during peak periods. Sight distance for motorists looking east from the southbound approach is restricted by vehicles parked on-street east of Spruce Street. As part of the project, the northwest corner at this intersection will be extended to improve motorist sight lines, pedestrian visibility, and shorten the crossing length across Massachusetts Avenue. It is recommended that the first on-street parking on the north side of Mass Avenue, east of Spruce Street be removed to improve sight distance. In addition, it is recommended that the existing painted crosswalks at this intersection be replaced with new thermoplastic material.

Massachusetts Avenue/Central Street Intersection. This intersection currently experiences delay and queuing during peak periods and has an average crash rate that exceeds the MassHighway average. Signal timing adjustments are recommended at this intersection to improve operational efficiency and safety. These measures include:

⁶ Massachusetts General Laws – State Highways – Chapter 81, Section 12.

⁷ MassHighway is required to perform speed studies on all public roadways in the state.

- Optimizing the cycle splits by reallocating green time from the Massachusetts Avenue eastbound and westbound approach phase to the Central Street northbound and southbound approach phase; and
- Increasing the Yellow time for the Central Street northbound and southbound approach phase from 3 seconds to 4 seconds.

The signal timing optimization will improve southbound Central Street left turn operations from LOS F to LOS E during the PM peak hour for the 2018 Build condition. This would reduce vehicle delay at this location and should improve safety issues. The intersection will continue to operate at LOS C overall. Intersection capacity analyses results are provided in Appendix D.

Traffic and Parking Management Plan for Theater Events. It is recommended that a Traffic and Parking Management Plan be developed to implement for theater events. The plan should contain the following elements:

- Maps showing parking locations on a theater website and distributed with tickets that are mailed;
- Agreements made to secure arrangements to share parking with selected public and private facilities in the area;
- Provide parking personnel as needed to direct vehicles at Mass Ave and Spruce Street site driveways; and
- Provide personnel, if needed, to direct traffic at the intersection of Mass Ave/Spruce Street/Kinsley Road.

Appendices

Appendix A
Traffic Data

Accurate Counts

978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648

135100V1
 Site Code: 13510001

Start Time	26-Mar-08 Wed	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	100			8	90				
12:15		9	110			6	105				
12:30		7	78			6	98				
12:45		2	87			2	77				
01:00		1	101	22	375	1	99	22	370	44	745
01:15		1	86			1	94				
01:30		1	72			2	101				
01:45		0	88	3	347	2	95	6	389	9	736
02:00		2	84			0	89				
02:15		2	118			3	77				
02:30		3	136			0	102				
02:45		0	125	7	463	2	94	5	362	12	825
03:00		1	148			1	90				
03:15		1	138			0	75				
03:30		0	139			2	128				
03:45		0	151	2	576	2	134	5	427	7	1003
04:00		3	137			4	141				
04:15		2	136			8	129				
04:30		0	152			6	112				
04:45		2	151	7	576	7	135	25	517	32	1093
05:00		1	140			12	134				
05:15		3	131			16	117				
05:30		6	147			20	135				
05:45		9	187	19	605	36	153	84	539	103	1144
06:00		14	153			65	136				
06:15		11	153			74	100				
06:30		25	118			90	98				
06:45		47	158	97	582	156	129	385	463	482	1045
07:00		62	126			145	116				
07:15		81	119			112	88				
07:30		62	98			130	71				
07:45		68	126	273	469	146	56	533	331	806	800
08:00		65	115			169	47				
08:15		83	88			142	61				
08:30		95	76			123	52				
08:45		91	88	334	367	131	35	565	195	899	562
09:00		84	61			138	47				
09:15		74	61			125	43				
09:30		60	52			114	29				
09:45		67	54	285	228	107	22	484	141	769	369
10:00		70	41			79	16				
10:15		71	37			90	10				
10:30		66	27			86	14				
10:45		62	27	269	132	80	3	335	43	604	175
11:00		73	20			95	12				
11:15		81	19			82	5				
11:30		86	12			117	3				
11:45		116	16	356	67	73	3	367	23	723	90
Total		1674	4787			2816	3800			4490	8587
Percent		25.9%	74.1%			42.6%	57.4%			34.3%	65.7%

Accurate Counts

978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648

135100V1
 Site Code: 13510001

Start Time	27-Mar-08 Thu	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	119			2	129				
12:15		4	127			1	115				
12:30		5	144			1	99				
12:45		4	124	16	514	1	112	5	455	21	969
01:00		5	100			1	122				
01:15		2	122			2	110				
01:30		2	108			0	105				
01:45		2	88	11	418	0	130	3	467	14	885
02:00		1	87			0	104				
02:15		3	122			1	86				
02:30		1	131			0	124				
02:45		1	125	6	465	1	88	2	402	8	867
03:00		1	147			1	109				
03:15		0	113			1	139				
03:30		2	129			0	132				
03:45		0	186	3	575	1	132	3	512	6	1087
04:00		1	147			4	94				
04:15		1	111			7	109				
04:30		2	143			7	106				
04:45		5	152	9	553	10	119	28	428	37	981
05:00		7	137			5	126				
05:15		10	158			8	121				
05:30		4	141			20	126				
05:45		10	129	31	565	54	127	87	500	118	1065
06:00		12	157			71	128				
06:15		17	132			83	94				
06:30		37	155			91	103				
06:45		29	109	95	553	151	118	396	443	491	996
07:00		46	122			182	101				
07:15		117	119			115	88				
07:30		67	90			107	62				
07:45		72	100	302	431	155	68	559	319	861	750
08:00		83	97			140	42				
08:15		78	72			145	49				
08:30		89	71			119	40				
08:45		103	63	353	303	137	43	541	174	894	477
09:00		103	71			166	27				
09:15		79	58			133	28				
09:30		62	50			122	21				
09:45		81	66	325	245	95	19	516	95	841	340
10:00		76	38			89	22				
10:15		75	50			96	19				
10:30		62	25			114	8				
10:45		93	29	306	142	93	4	392	53	698	195
11:00		65	18			96	6				
11:15		80	22			96	5				
11:30		83	17			115	6				
11:45		88	12	316	69	123	2	430	19	746	88
Total		1773	4833			2962	3867			4735	8700
Percent		26.8%	73.2%			43.4%	56.6%			35.2%	64.8%
Grand Total		3447	9620			5778	7667			9225	17287
Percent		26.4%	73.6%			43.0%	57.0%			34.8%	65.2%

ADT ADT 13,256 AADT 13,256

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State : Acton, MA
 Counter : 13648

135100V1
 Site Code: 13510001

Start Time	24-Mar-08		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AM																
01:00	*	*	22	22	16	5	*	*	*	*	*	*	*	*	19	14
02:00	*	*	3	6	11	3	*	*	*	*	*	*	*	*	7	4
03:00	*	*	7	5	6	2	*	*	*	*	*	*	*	*	6	4
04:00	*	*	2	5	3	3	*	*	*	*	*	*	*	*	2	4
05:00	*	*	7	25	9	28	*	*	*	*	*	*	*	*	8	26
06:00	*	*	19	84	31	87	*	*	*	*	*	*	*	*	25	86
07:00	*	*	97	385	95	396	*	*	*	*	*	*	*	*	96	390
08:00	*	*	273	533	302	559	*	*	*	*	*	*	*	*	288	546
09:00	*	*	334	565	353	541	*	*	*	*	*	*	*	*	344	553
10:00	*	*	285	484	325	516	*	*	*	*	*	*	*	*	305	500
11:00	*	*	269	335	306	392	*	*	*	*	*	*	*	*	288	364
12:00	*	*	356	367	316	430	*	*	*	*	*	*	*	*	336	398
PM																
01:00	*	*	375	370	514	455	*	*	*	*	*	*	*	*	444	412
02:00	*	*	347	389	418	467	*	*	*	*	*	*	*	*	382	428
03:00	*	*	463	362	465	402	*	*	*	*	*	*	*	*	464	382
04:00	*	*	576	427	575	512	*	*	*	*	*	*	*	*	576	470
05:00	*	*	576	517	553	428	*	*	*	*	*	*	*	*	564	472
06:00	*	*	605	539	565	500	*	*	*	*	*	*	*	*	585	520
07:00	*	*	582	463	553	443	*	*	*	*	*	*	*	*	568	453
08:00	*	*	469	331	431	319	*	*	*	*	*	*	*	*	450	325
09:00	*	*	228	195	303	174	*	*	*	*	*	*	*	*	335	184
10:00	*	*	132	43	142	53	*	*	*	*	*	*	*	*	236	118
11:00	*	*	67	23	69	19	*	*	*	*	*	*	*	*	137	48
Lane	0	0	6461	6616	6606	6829	0	0	0	0	0	0	0	0	6533	6722
Day	0	0	13077		13435		0	0	0	0	0	0	0	0	13255	
AM Peak			11:00	08:00	08:00	07:00									08:00	08:00
Vol.			356	565	353	559									344	553
PM Peak			17:00	17:00	15:00	15:00									17:00	17:00
Vol.			605	539	575	512									585	520

Comb. Total 0 0 13077 13435 0 0 0 0 0 0 0 0 0 0 13255

ADT ADT 13,256 AADT 13,256 0 0 0 0 0 0 0 0 0 0 0 0 0 13255

11.5

217

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Westbound

135100C1
 Site Code: 13510001

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/26/08	0	18	4	0	0	0	0	0	0	0	0	0	0	22
01:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
02:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
03:00	0	1	0	0	0	1	0	0	0	0	0	0	0	2
04:00	0	4	1	0	2	0	0	0	0	0	0	0	0	7
05:00	0	12	6	0	0	0	0	0	1	0	0	0	0	19
06:00	0	47	32	8	8	0	0	0	0	1	0	0	0	96
07:00	0	183	65	8	14	1	0	0	0	0	0	0	0	271
08:00	3	228	79	7	10	5	0	0	0	0	0	0	0	332
09:00	0	180	84	3	16	1	0	0	0	0	0	0	0	284
10:00	0	193	67	0	7	1	0	1	0	0	0	0	0	269
11:00	2	219	99	12	19	1	1	2	0	0	0	0	0	355
12 PM	1	243	111	5	10	1	1	2	0	0	0	0	0	374
13:00	0	242	85	0	17	2	0	0	0	0	0	0	0	346
14:00	1	311	131	3	13	0	0	3	0	0	0	0	0	462
15:00	4	401	132	10	21	3	0	0	2	0	0	0	0	573
16:00	4	416	131	1	17	3	0	2	0	1	0	0	0	575
17:00	5	442	134	0	13	6	0	3	0	0	0	0	0	603
18:00	0	446	119	2	11	2	0	0	0	0	0	0	0	580
19:00	5	367	88	0	5	2	0	1	0	0	0	0	0	468
20:00	1	294	70	0	1	1	0	0	0	0	0	0	0	367
21:00	0	194	30	0	3	0	0	1	0	0	0	0	0	228
22:00	1	112	18	0	1	0	0	0	0	0	0	0	0	132
23:00	0	59	7	0	1	0	0	0	0	0	0	0	0	67
Day Total	27	4620	1495	59	189	30	2	15	3	2	0	0	0	6442
Percent	0.4%	71.7%	23.2%	0.9%	2.9%	0.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	11:00	11:00	11:00	08:00	11:00	11:00	05:00	06:00	0.0%	0.0%	0.0%	11:00
Vol.	3	228	99	12	19	5	1	2	1	1				355
PM Peak	17:00	18:00	17:00	15:00	15:00	17:00	12:00	14:00	15:00	16:00				17:00
Vol.	5	446	134	10	21	6	1	3	2	1				603

Handwritten: 71, 22, 41, 4544

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Westbound

135100C1
 Site Code: 13510001

Start Time	Bikes	Cats & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/27/08	0	13	3	0	0	0	0	0	0	0	0	0	0	16
01:00	0	9	2	0	0	0	0	0	0	0	0	0	0	11
02:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	2	5	1	1	0	0	0	0	0	0	0	0	0	9
05:00	4	21	5	0	1	0	0	0	0	0	0	0	0	31
06:00	1	50	26	6	10	2	0	0	0	0	0	0	0	95
07:00	2	208	68	10	11	2	0	0	0	0	0	0	0	301
08:00	1	240	84	11	11	3	0	1	1	0	0	0	0	352
09:00	2	208	94	3	11	2	0	5	0	0	0	0	0	325
10:00	3	208	81	3	8	0	0	2	0	0	0	0	0	305
11:00	1	215	76	1	20	1	0	2	0	0	0	0	0	316
12 PM	2	330	153	6	22	0	0	1	0	0	0	0	0	514
13:00	1	274	121	5	13	1	0	2	0	0	0	0	0	417
14:00	0	316	129	3	14	2	0	0	0	0	0	0	0	464
15:00	4	397	149	3	15	3	0	3	0	0	0	0	0	574
16:00	0	421	113	1	15	0	0	2	0	0	0	0	0	552
17:00	4	426	114	0	19	1	0	0	0	0	0	0	0	564
18:00	2	426	108	0	13	3	0	1	0	0	0	0	0	553
19:00	0	330	86	1	10	3	0	1	0	0	0	0	0	431
20:00	1	270	31	0	0	1	0	0	0	0	0	0	0	303
21:00	1	192	45	0	6	0	0	0	0	0	0	0	1	245
22:00	0	118	21	0	3	0	0	0	0	0	0	0	0	142
23:00	0	62	7	0	0	0	0	0	0	0	0	0	0	69
Day Total	31	4747	1518	54	202	24	0	20	1	0	0	0	1	6598
Percent	0.5%	71.9%	23.0%	0.8%	3.1%	0.4%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	05:00	08:00	09:00	08:00	11:00	08:00		09:00	08:00					08:00
Vol.	4	240	94	11	20	3		5	1					352
PM Peak	15:00	17:00	12:00	12:00	12:00	15:00		15:00					21:00	15:00
Vol.	4	426	153	6	22	3		3				1		574
Grand Total	58	9367	3013	113	391	54	2	35	4	2	0	0	1	13040
Percent	0.4%	71.8%	23.1%	0.9%	3.0%	0.4%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	

27 = 7.6

2.5 + 1)

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Eastbound

135100C1
 Site Code: 13510001

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/26/08	0	10	7	0	4	0	0	0	1	0	0	0	0	22
01:00	0	2	3	0	1	0	0	0	0	0	0	0	0	6
02:00	0	1	3	0	0	0	0	0	1	0	0	0	0	5
03:00	0	0	2	0	1	1	0	0	1	0	0	0	0	5
04:00	0	6	13	0	6	0	0	0	0	0	0	0	0	25
05:00	0	40	37	0	5	2	0	0	0	0	0	0	0	84
06:00	0	213	136	0	33	1	0	1	0	0	0	0	0	384
07:00	0	293	198	4	34	0	0	3	0	0	0	0	0	532
08:00	1	303	213	5	38	2	0	2	0	0	0	0	0	564
09:00	1	258	187	1	34	3	0	0	0	0	0	0	0	484
10:00	2	186	121	0	23	1	0	2	0	0	0	0	0	335
11:00	3	198	136	2	25	2	0	1	0	0	0	0	0	367
12 PM	0	213	126	4	25	1	0	1	0	0	0	0	0	370
13:00	0	196	157	7	28	0	0	0	0	0	0	0	0	388
14:00	0	233	107	5	12	2	0	1	0	0	0	0	0	360
15:00	1	253	132	11	24	2	0	1	0	0	0	0	0	424
16:00	1	312	173	3	21	2	0	0	2	0	0	0	0	514
17:00	3	324	185	0	22	4	0	0	0	0	0	0	0	538
18:00	3	306	141	0	12	0	0	0	0	0	0	0	0	462
19:00	0	204	115	0	11	0	0	0	0	0	0	0	0	330
20:00	0	127	60	0	7	1	0	0	0	0	0	0	0	195
21:00	0	91	47	0	3	0	0	0	0	0	0	0	0	141
22:00	0	28	15	0	0	0	0	0	0	0	0	0	0	43
23:00	0	14	8	0	1	0	0	0	0	0	0	0	0	23
Day Total	15	3811	2322	42	370	24	0	12	5	0	0	0	0	6601
Percent	0.2%	57.7%	35.2%	0.6%	5.6%	0.4%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak Vol.	3	303	213	5	38	3	0	3	1	0	0	0	0	564
PM Peak Vol.	3	324	185	11	28	4	0	1	2	0	0	0	0	538

47 = 27
 26 = 57



Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State : Acton, MA
 Counter : 13648
 Eastbound

135100C1
 Site Code: 13510001

Start Time	Cats & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/27/08	1	4	0	0	0	0	0	0	0	0	0	0	5
01:00	1	2	0	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	1	0	0	0	0	2
03:00	0	2	0	0	0	0	0	0	0	0	0	0	3
04:00	1	13	1	3	0	0	0	0	0	0	0	0	28
05:00	50	22	0	6	0	0	0	0	0	0	0	0	86
06:00	224	139	0	30	1	0	2	0	0	0	0	0	396
07:00	332	187	2	31	1	0	3	0	0	0	0	0	557
08:00	321	171	9	30	2	1	4	0	0	0	0	0	540
09:00	288	194	6	22	3	0	0	0	0	0	0	0	514
10:00	222	140	3	24	1	0	1	1	0	0	0	0	392
11:00	249	154	2	20	1	0	3	0	0	0	0	0	429
12 PM	267	157	1	24	3	0	1	0	0	0	0	0	455
13:00	259	157	25	22	1	0	2	0	0	0	0	0	466
14:00	240	131	5	21	2	0	1	0	0	0	0	0	401
15:00	282	188	4	31	2	0	0	0	0	0	0	0	510
16:00	258	134	1	27	1	0	2	1	0	0	0	0	426
17:00	310	173	0	11	2	0	1	0	0	0	0	0	497
18:00	290	136	0	12	2	0	0	0	0	0	0	0	442
19:00	211	101	0	7	0	0	0	0	0	0	0	0	319
20:00	126	43	0	4	0	0	0	0	0	0	0	0	174
21:00	66	27	0	2	0	0	0	0	0	0	0	0	95
22:00	36	14	0	2	0	0	0	1	0	0	0	0	53
23:00	13	5	0	1	0	0	0	0	0	0	0	0	19
Day Total	24	4058	59	330	22	1	20	4	0	0	0	0	6812
Percent	0.4%	59.6%	0.9%	4.8%	0.3%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	05:00	07:00	08:00	07:00	09:00	08:00	08:00	02:00	0.0%	0.0%	0.0%	0.0%	07:00
Vol.	8	332	9	31	3	1	4	1					557
PM Peak	15:00	17:00	13:00	15:00	12:00		13:00	16:00					15:00
Vol.	3	310	25	31	3		2	1					510
Grand Total	39	7869	101	700	46	1	32	9	0	0	0	0	13413
Percent	0.3%	58.7%	0.8%	5.2%	0.3%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	

46 41
 47 14= 31

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Westbound, Eastbound

135100C1
 Site Code: 13510001

Start Time	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/26/08	28	11	0	4	0	0	0	1	0	0	0	0	44
01:00	4	4	0	1	0	0	0	0	0	0	0	0	9
02:00	7	4	0	0	0	0	0	1	0	0	0	0	12
03:00	1	2	0	1	2	0	0	1	0	0	0	0	7
04:00	10	14	0	8	0	0	0	0	0	0	0	0	32
05:00	52	43	0	5	2	0	0	1	0	0	0	0	103
06:00	260	168	8	41	1	0	1	0	1	0	0	0	480
07:00	476	263	12	48	1	0	3	0	0	0	0	0	803
08:00	531	292	12	48	7	0	2	0	0	0	0	0	896
09:00	1	438	4	50	4	0	0	0	0	0	0	0	768
10:00	2	379	0	30	2	0	3	0	0	0	0	0	604
11:00	5	417	14	44	3	1	3	0	0	0	0	0	722
12 PM	1	456	9	35	2	1	3	0	0	0	0	0	744
13:00	0	438	7	45	2	0	0	0	0	0	0	0	734
14:00	1	544	8	25	2	0	4	0	0	0	0	0	822
15:00	5	654	21	45	5	0	1	2	0	0	0	0	997
16:00	5	728	4	38	5	0	2	2	1	0	0	0	1089
17:00	8	766	0	35	10	0	3	0	0	0	0	0	1141
18:00	3	752	2	23	2	0	0	0	0	0	0	0	1042
19:00	5	571	0	16	2	0	1	0	0	0	0	0	798
20:00	1	421	0	8	2	0	0	0	0	0	0	0	562
21:00	0	285	0	6	0	0	1	0	0	0	0	0	369
22:00	1	140	0	1	0	0	0	0	0	0	0	0	175
23:00	0	73	0	2	0	0	0	0	0	0	0	0	90
Day Total	42	8431	101	559	54	2	27	8	2	0	0	0	13043
Percent	0.3%	64.6%	0.8%	4.3%	0.4%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	11:00	08:00	11:00	09:00	08:00	11:00	07:00	00:00	06:00				08:00
Vol.	5	531	14	50	7	1	3	1	1				896
PM Peak	17:00	17:00	15:00	13:00	17:00	12:00	14:00	15:00	16:00				17:00
Vol.	8	766	21	45	10	1	4	2	1				1141

THE CITY OF ACTON, MASSACHUSETTS
 DEPARTMENT OF PUBLIC WORKS
 100 STATE STREET, ACTON, MA 01701
 TEL: 978-664-2565 FAX: 978-664-2566
 WWW.CITYOFACTON.COM

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Westbound, Eastbound

135100C1
 Site Code: 13510001

Start Time	Cars & Trailers	Bikes	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
03/27/08	14	0	7	0	0	0	0	0	0	0	0	0	0	21
01:00	10	0	4	0	0	0	0	0	0	0	0	0	0	14
02:00	6	0	1	0	0	0	0	0	1	0	0	0	0	8
03:00	4	0	2	0	0	0	0	0	0	0	0	0	0	6
04:00	15	3	14	2	3	0	0	0	0	0	0	0	0	37
05:00	71	12	27	0	7	0	0	0	0	0	0	0	0	117
06:00	274	1	165	6	40	3	0	2	0	0	0	0	0	491
07:00	540	3	255	12	42	3	0	3	0	0	0	0	0	858
08:00	561	3	255	20	41	5	1	5	1	0	0	0	0	892
09:00	496	3	288	9	33	5	0	5	0	0	0	0	0	839
10:00	430	3	221	6	32	1	0	3	1	0	0	0	0	697
11:00	464	1	230	3	40	2	0	5	0	0	0	0	0	745
12 PM	597	4	310	7	46	3	0	2	0	0	0	0	0	969
13:00	533	1	278	30	35	2	0	4	0	0	0	0	0	883
14:00	556	1	260	8	35	4	0	1	0	0	0	0	0	865
15:00	679	7	337	7	46	5	0	3	0	0	0	0	0	1084
16:00	679	2	247	2	42	1	0	4	1	0	0	0	0	978
17:00	736	4	287	0	30	3	0	1	0	0	0	0	0	1061
18:00	716	4	244	0	25	5	0	1	0	0	0	0	0	995
19:00	541	0	187	1	17	3	0	1	0	0	0	0	0	750
20:00	396	2	74	0	4	1	0	0	0	0	0	0	0	477
21:00	258	1	72	0	8	0	0	0	0	0	0	0	1	340
22:00	154	0	35	0	5	0	0	0	0	0	0	0	0	195
23:00	75	0	12	0	1	0	0	0	0	0	0	0	0	88
Day Total	55	8805	3812	113	532	46	1	40	5	0	0	0	1	13410
Percent	0.4%	65.7%	28.4%	0.8%	4.0%	0.3%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	05:00	08:00	09:00	08:00	07:00	08:00	08:00	08:00	02:00					08:00
Vol.	12	561	288	20	42	5	1	5	1					892
PM Peak	15:00	17:00	15:00	13:00	12:00	15:00	15:00	13:00	16:00				21:00	15:00
Vol.	7	736	337	30	46	5	1	4	1				1	1084
Grand Total	97	17236	7629	214	1091	100	3	67	13	2	0	0	1	26453
Percent	0.4%	65.2%	28.8%	0.8%	4.1%	0.4%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State : Acton, MA
 Counter : 13648
 Westbound

135100S1
 Site Code: 13510001

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Pace Number in Pace
03/26/08	0	0	0	0	6	10	5	0	1	0	0	0	0	0	22	31-40	16
01:00	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3	32-41	3
02:00	0	0	0	0	1	3	3	0	0	0	0	0	0	0	7	34-43	7
03:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	27-36	2
04:00	0	0	0	0	2	3	1	1	0	0	0	0	0	0	7	29-38	5
05:00	0	0	0	0	5	8	3	1	2	0	0	0	0	0	19	31-40	13
06:00	6	0	0	7	27	37	13	7	0	0	0	0	0	0	97	31-40	64
07:00	24	2	1	7	66	116	51	4	2	0	0	0	0	0	273	31-40	182
08:00	18	1	1	9	112	119	59	15	0	0	0	0	0	0	334	31-40	231
09:00	11	0	0	11	39	107	101	14	2	0	0	0	0	0	285	36-45	208
10:00	12	0	6	8	38	122	67	14	2	0	0	0	0	0	269	36-45	189
11:00	15	1	1	12	70	176	71	10	0	0	0	0	0	0	356	32-41	247
12 PM	16	0	0	4	85	148	105	13	4	0	0	0	0	0	375	36-45	253
13:00	13	1	6	14	79	151	72	8	2	1	0	0	0	0	347	31-40	230
14:00	12	0	0	13	118	225	88	6	0	0	1	0	0	0	463	31-40	343
15:00	28	0	1	26	163	245	98	14	2	0	0	0	0	0	576	31-40	408
16:00	23	0	0	14	131	289	103	14	2	0	0	0	0	0	576	31-40	420
17:00	30	0	1	4	122	307	131	9	1	0	0	0	0	0	605	36-45	438
18:00	23	2	9	31	154	225	129	6	3	0	0	0	0	0	582	31-40	379
19:00	14	0	10	13	100	245	77	10	0	0	0	0	0	0	469	31-40	345
20:00	2	0	0	15	91	190	66	2	1	0	0	0	0	0	367	31-40	281
21:00	1	0	2	6	85	86	40	6	2	0	0	0	0	0	228	31-40	171
22:00	1	0	0	3	18	57	46	5	0	2	0	0	0	0	132	36-45	103
23:00	0	0	0	0	3	32	28	3	1	0	0	0	0	0	67	36-45	60
Total	249	7	38	197	1517	2903	1358	162	26	3	1	0	0	0	6461		
Percent	3.9%	0.1%	0.6%	3.0%	23.5%	44.9%	21.0%	2.5%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.	24	2	6	12	112	176	101	15	2						11:00		356
PM Peak Vol.	30	2	10	31	163	307	131	14	4	2	1				17:00		605



Accurate Counts 978-664-2565

135100S1
Site Code: 13510001

Location : Route 111 East of
Location : Spruce Street
City/State: Acton, MA
Counter : 13648
Westbound

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace Speed	Number in Pace
03/27/08	15	20	25	30	35	40	45	50	55	60	65	70	75	80	34-43	12
01:00	0	0	0	0	2	7	4	3	0	0	0	0	0	0	16	11
02:00	0	0	0	1	0	4	4	2	0	0	0	0	0	0	11	9
03:00	0	0	0	1	0	1	3	1	0	0	0	0	0	0	6	5
04:00	3	1	0	0	3	1	1	0	0	0	0	0	0	3	32-41	2
05:00	9	2	1	0	7	8	3	1	0	0	0	0	0	9	31-40	4
06:00	1	0	1	1	7	8	3	1	0	0	0	0	0	31	31-40	15
07:00	17	0	6	28	99	109	35	7	1	0	0	0	0	95	31-40	66
08:00	17	0	2	20	104	131	70	8	1	0	0	0	0	302	31-40	208
09:00	17	0	6	7	65	134	83	11	2	0	0	0	0	353	31-40	235
10:00	9	0	5	15	76	128	57	14	2	0	0	0	0	325	36-45	217
11:00	8	0	3	13	85	123	74	9	1	0	0	0	0	306	31-40	204
12 PM	24	0	0	28	126	229	93	11	3	0	0	0	0	316	31-40	208
13:00	23	0	1	13	91	176	101	12	1	0	0	0	0	514	31-40	355
14:00	21	0	1	18	122	204	81	15	4	0	0	0	0	418	36-45	277
15:00	27	1	14	39	166	240	77	10	0	1	0	0	0	465	31-40	326
16:00	16	0	5	31	149	245	94	12	1	0	0	0	0	575	31-40	406
17:00	33	0	1	19	117	253	125	15	2	0	0	0	0	565	36-45	378
18:00	17	0	0	19	156	256	92	11	2	0	0	0	0	553	31-40	394
19:00	8	0	0	13	115	214	67	14	0	0	0	0	0	431	31-40	412
20:00	2	0	1	11	80	140	64	4	1	0	0	0	0	303	31-40	329
21:00	1	1	0	2	52	114	67	6	2	0	0	0	0	245	36-45	181
22:00	0	0	0	1	23	58	50	10	0	0	0	0	0	142	36-45	108
23:00	0	0	0	3	9	21	32	3	1	0	0	0	0	69	36-45	53
Total	253	5	46	283	1677	2834	1300	182	25	1	0	0	0	0	6606	
Percent	3.8%	0.1%	0.7%	4.3%	25.4%	42.9%	19.7%	2.8%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	07:00	05:00	07:00	07:00	08:00	09:00	09:00	10:00	09:00						08:00	
Vol.	17	2	6	28	104	134	83	14	2						353	
PM Peak	17:00	15:00	15:00	15:00	15:00	18:00	17:00	14:00	14:00	15:00					15:00	
Vol.	33	1	14	39	166	256	125	15	4	1					575	
Total	502	12	84	480	3194	5737	2658	344	51	4	1	0	0	0	13067	
Percent	3.8%	0.1%	0.6%	3.7%	24.4%	43.9%	20.3%	2.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%		

Stats

10 MPH Pace Speed : 31-40 MPH
 Number in Pace : 8931
 Percent in Pace : 68.3%
 Number of Vehicles > 40 MPH : 3058
 Percent of Vehicles > 40 MPH : 23.4%
 Mean Speed(Average) : 36 MPH

15th Percentile : 32 MPH
 50th Percentile : 37 MPH
 85th Percentile : 43 MPH
 95th Percentile : 45 MPH

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State: Acton, MA
 Counter : 13648
 Eastbound

135100S1
 Site Code: 13510001

Start Time	15	16	21	25	26	30	31	35	36	40	41	44	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
03/26/08	1	20	21	25	26	30	31	35	36	40	41	44	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	22	38-47	18
01:00	0	0	0	0	1	0	1	0	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6	29-38	4
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38-47	5	
03:00	0	0	0	0	1	0	0	0	0	0	3	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	5	34-43	3	
04:00	0	0	0	0	1	0	0	0	5	5	10	10	10	5	2	2	2	1	1	1	1	1	1	0	0	0	25	36-45	15	
05:00	1	0	0	0	0	0	4	4	12	12	41	41	41	22	3	3	3	1	0	0	0	0	0	0	0	0	84	41-50	63	
06:00	5	0	0	0	3	13	13	13	121	121	194	194	194	35	14	14	14	0	0	0	0	0	0	0	0	0	385	36-45	315	
07:00	19	0	0	0	2	189	53	53	189	189	213	213	48	9	9	9	0	0	0	0	0	0	0	0	0	0	533	36-45	402	
08:00	20	0	0	0	11	47	47	47	198	198	243	243	44	2	2	2	0	0	0	0	0	0	0	0	0	0	565	36-45	441	
09:00	14	0	0	0	3	49	49	49	180	180	190	190	44	4	4	4	0	0	0	0	0	0	0	0	0	0	484	36-45	370	
10:00	8	0	0	0	1	23	23	23	114	114	134	134	45	1	1	1	0	0	0	0	0	0	0	0	0	0	335	36-45	248	
11:00	15	2	1	1	5	25	25	25	144	144	145	145	27	3	3	3	0	0	0	0	0	0	0	0	0	0	367	36-45	289	
12 PM	19	0	0	0	1	37	37	37	141	141	136	136	31	4	4	4	1	1	1	1	1	1	0	0	0	0	370	36-45	277	
13:00	19	0	0	0	2	39	39	39	163	163	139	139	21	5	5	5	0	0	0	0	0	0	0	0	0	0	389	36-45	302	
14:00	15	0	0	0	4	35	35	35	157	157	118	118	31	2	2	2	0	0	0	0	0	0	0	0	0	0	362	36-45	275	
15:00	29	0	0	0	2	62	62	62	172	172	138	138	20	2	2	2	0	0	0	0	0	0	0	0	0	0	427	36-45	310	
16:00	33	1	1	1	3	72	72	72	206	206	150	150	47	4	4	4	0	0	0	0	0	0	0	0	0	0	517	36-45	356	
17:00	47	0	0	0	0	41	41	41	200	200	206	206	34	10	10	10	0	0	0	0	0	0	0	0	0	0	539	36-45	406	
18:00	31	0	0	0	0	36	36	36	193	193	171	171	32	0	0	0	0	0	0	0	0	0	0	0	0	0	463	36-45	364	
19:00	19	0	0	0	0	26	26	26	136	136	119	119	26	5	5	5	0	0	0	0	0	0	0	0	0	0	331	36-45	255	
20:00	8	0	0	0	0	28	28	28	83	83	59	59	13	2	2	2	0	0	0	0	0	0	0	0	0	0	195	36-45	142	
21:00	4	0	0	0	2	14	14	14	52	52	51	51	15	3	3	3	0	0	0	0	0	0	0	0	0	0	141	36-45	103	
22:00	1	0	0	0	0	2	2	2	14	14	20	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	43	36-45	34	
23:00	0	0	0	0	0	2	2	2	5	5	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	36-45	21	
Total	309	3	4	4	42	609	609	609	2491	2491	2513	2513	84	7	7	7	0	0	0	0	0	0	0	0	0	0	6616			
Percent	4.7%	0.0%	0.1%	0.1%	0.6%	9.2%	9.2%	9.2%	37.7%	37.7%	38.0%	38.0%	8.3%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	11:00	11:00	11:00	08:00	07:00	07:00	07:00	08:00	08:00	08:00	08:00	06:00	04:00	04:00	04:00	08:00	05:00	05:00	04:00	04:00	04:00	04:00	04:00	04:00	04:00	08:00			
Vol.	20	2	1	1	11	53	53	53	198	198	243	243	48	1	1	1	1	1	1	1	1	1	1	1	1	1	565			
PM Peak	17:00	16:00	13:00	14:00	14:00	16:00	16:00	16:00	16:00	16:00	17:00	17:00	17:00	15:00	15:00	15:00	17:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	17:00				
Vol.	47	1	1	4	4	72	72	72	206	206	206	206	47	2	2	2	10	2	2	2	2	2	2	2	2	2	539			

Accurate Counts 978-664-2565

135100S1
Site Code: 13510001

Location : Route 111 East of
Location : Spruce Street
City/State: Acton, MA
Counter : 13648
Eastbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace Speed	Number in Pace
03/27/08	15	20	25	30	35	40	45	50	55	60	65	70	75	80	37-46	4
01:00	0	0	0	0	0	1	2	0	0	1	0	0	0	0	5	3
02:00	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3	3
03:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	2
04:00	7	0	0	0	3	4	10	0	0	0	0	0	0	0	3	3
05:00	39	2	3	1	6	11	21	4	1	2	1	0	0	0	28	14
06:00	4	0	0	2	14	120	193	60	2	1	0	0	0	0	87	32
07:00	18	0	9	29	126	235	123	18	1	0	0	0	0	0	396	313
08:00	23	0	3	18	109	242	137	8	1	0	0	0	0	0	559	361
09:00	20	0	0	6	65	263	137	22	3	0	0	0	0	0	541	379
10:00	14	0	0	6	52	188	132	18	2	0	0	0	0	0	516	400
11:00	17	1	0	1	58	209	125	16	3	0	0	0	0	0	392	300
12 PM	23	0	1	3	56	210	136	23	3	0	0	0	0	0	430	334
13:00	27	1	2	14	80	209	116	15	3	0	0	0	0	0	455	346
14:00	16	0	0	7	51	191	119	16	2	0	0	0	0	0	467	325
15:00	29	0	5	5	52	236	162	21	2	0	0	0	0	0	402	310
16:00	18	0	2	0	39	172	164	29	3	1	0	0	0	0	512	398
17:00	43	0	0	2	39	179	198	38	1	0	0	0	0	0	428	336
18:00	25	0	0	3	38	168	180	27	2	0	0	0	0	0	500	377
19:00	11	0	0	0	35	146	102	22	3	0	0	0	0	0	443	348
20:00	4	0	0	0	15	59	76	16	4	0	0	0	0	0	319	248
21:00	6	0	0	1	3	40	36	6	2	1	0	0	0	0	174	135
22:00	0	0	0	1	5	18	21	7	1	0	0	0	0	0	95	76
23:00	0	0	0	1	0	8	9	1	0	0	0	0	0	0	53	39
Total	344	4	25	100	846	2891	2203	370	39	6	1	0	0	0	19	17
Percent	5.0%	0.1%	0.4%	1.5%	12.4%	42.3%	32.3%	5.4%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	68.29	
AM Peak	05:00	07:00	09:00	11:00	13:00	15:00	17:00	19:00	21:00	23:00						
Vol.	39	2	9	29	126	263	193	60	3	2	1				07:00	
PM Peak	17:00	19:00	21:00	23:00											15:00	
Vol.	43	1	5	14	80	236	198	38	4	1				559		
Total	653	7	29	142	1455	5382	4716	922	123	13	2	1	0	0	13445	
Percent	4.9%	0.1%	0.2%	1.1%	10.8%	40.0%	35.1%	6.9%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%		

15th Percentile : 35 MPH
 50th Percentile : 40 MPH
 85th Percentile : 44 MPH
 95th Percentile : 48 MPH

Stats

10 MPH Pace Speed : 36-45 MPH
 Number in Pace : 10098
 Percent in Pace : 75.1%
 Number of Vehicles > 40 MPH : 5777
 Percent of Vehicles > 40 MPH : 43.0%
 Mean Speed(Average) : 38 MPH

Accurate Counts 978-664-2565

135100S1
Site Code: 13510001

Location : Route 111 East of
Location : Spruce Street
City/State: Acton, MA
Counter : 13648
Westbound, Eastbound

Start Time	15	16	21	25	26	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	Total	Pace Speed	Number in Pace	
03/26/08	1	20	0	0	1	6	18	13	4	2	18	3	1	1	0	0	0	0	0	0	0	0	0	0	44	36-45	31	
01:00	0	0	0	0	0	2	4	4	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	9	33-42	8	
02:00	0	0	0	0	0	3	6	3	6	6	6	2	0	0	0	0	0	0	0	0	0	0	0	0	12	38-47	11	
03:00	0	0	0	0	1	1	3	1	3	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	7	34-43	5	
04:00	0	0	0	0	1	2	8	8	11	11	11	6	2	2	0	0	0	1	1	1	1	0	0	0	32	37-46	20	
05:00	1	0	0	0	0	9	20	20	44	44	44	23	5	5	0	0	0	0	0	0	0	0	0	0	103	39-48	67	
06:00	11	0	0	0	10	40	158	158	207	207	207	42	14	14	0	0	0	0	0	0	0	0	0	0	482	36-45	365	
07:00	43	2	1	9	9	119	305	305	264	264	264	52	11	11	0	0	0	0	0	0	0	0	0	0	806	36-45	569	
08:00	38	1	1	20	20	159	317	317	302	302	302	59	2	2	0	0	0	0	0	0	0	0	0	0	899	36-45	619	
09:00	25	0	0	14	14	88	287	287	291	291	291	58	6	6	0	0	0	0	0	0	0	0	0	0	769	36-45	578	
10:00	20	0	6	9	9	61	236	236	201	201	201	59	11	11	1	1	0	0	0	0	0	0	0	0	604	36-45	437	
11:00	30	3	2	17	17	95	320	320	216	216	216	37	3	3	0	0	0	0	0	0	0	0	0	0	723	36-45	536	
12 PM	35	0	0	5	5	122	289	289	241	241	241	44	8	8	1	1	0	0	0	0	0	0	0	0	745	36-45	530	
13:00	32	1	7	16	16	118	314	314	211	211	211	29	7	7	1	1	0	0	0	0	0	0	0	0	736	36-45	525	
14:00	27	0	0	17	17	153	382	382	206	206	206	37	2	2	0	0	0	0	0	0	0	0	0	0	825	36-45	588	
15:00	57	0	1	28	28	225	417	417	236	236	236	34	3	3	2	2	0	0	0	0	0	0	0	0	1003	36-45	653	
16:00	56	1	1	17	17	203	495	495	253	253	253	61	6	6	0	0	0	0	0	0	0	0	0	0	1093	36-45	748	
17:00	77	0	2	4	4	163	507	507	337	337	337	43	11	11	0	0	0	0	0	0	0	0	0	0	1144	36-45	844	
18:00	54	2	9	31	31	190	418	418	300	300	300	38	3	3	0	0	0	0	0	0	0	0	0	0	1045	36-45	718	
19:00	33	0	10	13	13	126	381	381	196	196	196	36	5	5	0	0	0	0	0	0	0	0	0	0	800	36-45	577	
20:00	10	0	0	15	15	119	273	273	125	125	125	15	3	3	2	2	0	0	0	0	0	0	0	0	562	36-45	398	
21:00	5	0	2	8	8	99	138	138	91	91	91	21	5	5	0	0	0	0	0	0	0	0	0	0	369	31-40	237	
22:00	2	0	0	3	3	20	71	71	66	66	66	11	0	0	2	2	0	0	0	0	0	0	0	0	175	36-45	137	
23:00	0	0	0	0	0	5	37	37	44	44	44	3	1	1	0	0	0	0	0	0	0	0	0	0	90	36-45	81	
Total	558	10	42	239	2126	5394	3871	714	110	110	10	2	2	0	13077													
Percent	4.3%	0.1%	0.3%	1.8%	16.3%	41.2%	29.6%	5.5%	0.8%	0.8%	0.1%	0.0%																
AM Peak	07:00	11:00	10:00	08:00	04:00	08:00																						
Vol.	43	3	6	20	159	320	302	59	14	14	1	899																
PM Peak	17:00	18:00	19:00	18:00	15:00	17:00	17:00	16:00	17:00	17:00	15:00	14:00	14:00	14:00	14:00	14:00	15:00	17:00										
Vol.	77	2	10	31	225	507	337	61	11	11	2	1	1	1	1	2	2	1	1144									

Accurate Counts 978-664-2565

Location : Route 111 East of
 Location : Spruce Street
 City/State : Acton, MA
 Counter : 13648
 Westbound_Eastbound

135100S1
 Site Code: 13510001

Start Time	1	15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
03/27/08	0	0	0	0	0	0	0	0	2	2	8	4	6	6	4	4	0	0	1	0	0	0	0	0	0	0	0	0	21	34-43	14
01:00	0	0	0	0	0	0	0	0	1	1	5	2	6	6	2	2	0	0	0	0	0	0	0	0	0	0	0	0	14	35-44	11
02:00	0	0	0	0	0	0	1	0	0	0	2	4	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	8	37-46	7	
03:00	0	0	0	0	0	0	1	0	0	0	1	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	6	38-47	5	
04:00	10	1	0	0	0	0	0	0	6	6	5	11	11	11	0	0	1	1	2	0	1	1	0	0	0	0	37	36-45	16		
05:00	48	4	4	1	13	19	19	24	24	24	24	24	24	24	5	5	0	0	0	0	0	0	0	0	0	0	118	36-45	43		
06:00	5	0	0	1	43	157	157	215	215	215	63	63	63	63	3	3	3	3	1	1	0	0	0	0	0	0	491	36-45	372		
07:00	35	0	0	15	57	225	344	158	207	207	25	25	25	25	2	2	2	2	0	0	0	0	0	0	0	0	861	31-40	569		
08:00	40	0	0	5	38	213	373	207	207	207	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	894	31-40	586		
09:00	37	0	0	6	13	130	397	220	220	220	33	33	33	33	5	5	5	5	0	0	0	0	0	0	0	0	841	36-45	617		
10:00	23	0	0	5	21	128	296	189	189	189	32	32	32	32	4	4	4	4	0	0	0	0	0	0	0	0	698	36-45	485		
11:00	25	1	1	3	14	143	332	199	199	199	25	25	25	25	4	4	4	4	0	0	0	0	0	0	0	0	746	36-45	531		
12 PM	47	0	0	1	31	182	439	229	229	229	34	34	34	34	6	6	6	6	0	0	0	0	0	0	0	0	969	36-45	668		
13:00	50	1	1	3	27	171	385	217	217	217	27	27	27	27	4	4	4	4	0	0	0	0	0	0	0	0	885	36-45	602		
14:00	37	0	0	0	25	173	395	200	200	200	31	31	31	31	6	6	6	6	0	0	0	0	0	0	0	0	867	36-45	595		
15:00	56	1	1	19	44	218	476	239	239	239	31	31	31	31	2	2	2	2	1	1	0	0	0	0	0	0	1087	36-45	715		
16:00	34	0	0	0	31	188	417	258	258	258	41	41	41	41	4	4	4	4	0	0	0	0	0	0	0	0	981	36-45	675		
17:00	76	0	0	1	21	156	432	323	323	323	53	53	53	53	3	3	3	3	0	0	0	0	0	0	0	0	1065	36-45	755		
18:00	42	0	0	0	22	194	424	272	272	272	38	38	38	38	4	4	4	4	0	0	0	0	0	0	0	0	998	36-45	696		
19:00	19	0	0	0	13	150	360	169	169	169	36	36	36	36	3	3	3	3	0	0	0	0	0	0	0	0	750	36-45	529		
20:00	6	0	0	0	11	95	199	140	140	140	20	20	20	20	5	5	5	5	0	0	0	0	0	0	0	0	477	36-45	339		
21:00	7	1	1	0	3	55	154	103	103	103	12	12	12	12	4	4	4	4	1	1	0	0	0	0	0	0	340	36-45	257		
22:00	0	0	0	0	2	28	76	71	71	71	17	17	17	17	1	1	1	1	0	0	0	0	0	0	0	0	195	36-45	147		
23:00	0	0	0	0	4	9	29	41	41	41	4	4	4	4	1	1	1	1	0	0	0	0	0	0	0	0	88	36-45	70		
Total	597	9	9	71	383	2523	5725	3503	3503	3503	64	64	64	64	7	7	7	7	0	0	0	0	0	0	0	0	13435				
Percent	4.4%	0.1%	0.1%	0.5%	2.9%	18.8%	42.6%	26.1%	26.1%	26.1%	4.1%	4.1%	4.1%	4.1%	0.5%	0.5%	0.5%	0.5%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	05:00	4	4	07:00	15	57	225	397	397	397	220	220	220	220	5	5	5	5	2	2	0	0	0	0	0	0	0	08:00			
Vol.	48	4	4	15	57	225	397	397	397	397	220	220	220	220	63	63	63	63	2	2	1	1	1	1	1	1	1	894			
PM Peak	17:00	1	1	19	44	218	476	323	323	323	53	53	53	53	6	6	6	6	1	1	0	0	0	0	0	0	0	15:00			
Vol.	76	1	1	19	44	218	476	323	323	323	53	53	53	53	6	6	6	6	1	1	0	0	0	0	0	0	0	1087			
Total	1155	19	19	113	622	4649	11119	7374	7374	7374	1266	1266	1266	1266	174	174	174	174	17	17	3	3	1	1	1	1	26512				
Percent	4.4%	0.1%	0.1%	0.4%	2.3%	17.5%	41.9%	27.8%	27.8%	27.8%	4.8%	4.8%	4.8%	4.8%	0.7%	0.7%	0.7%	0.7%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				

15th Percentile : 33 MPH
 50th Percentile : 39 MPH
 85th Percentile : 44 MPH
 95th Percentile : 46 MPH

Stats
 10 MPH Pace Speed : 36-45 MPH
 Number in Pace : 18493
 Percent in Pace : 69.8%
 Number of Vehicles > 40 MPH : 8835
 Percent of Vehicles > 40 MPH : 33.3%
 Mean Speed(Average) : 37 MPH

Accurate Counts
978-664-2565

Location : Route 111 East of
Location : Kinsley Road
City/State: Acton, MA
Counter : 18295

10431001
Site Code: 10431001

Start Time	25-Feb-09 Wed	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		18	102			3	80				
12:15		5	77			1	78				
12:30		7	79			6	91				
12:45		5	92	35	350	3	87	13	336	48	686
01:00		5	94			1	81				
01:15		4	89			0	102				
01:30		2	77			0	94				
01:45		2	99	13	359	2	94	3	371	16	730
02:00		3	97			2	87				
02:15		1	109			1	88				
02:30		1	153			1	100				
02:45		1	113	6	472	0	98	4	373	10	845
03:00		0	108			1	125				
03:15		3	112			1	124				
03:30		1	159			5	104				
03:45		2	150	6	529	2	120	9	473	15	1002
04:00		0	121			1	107				
04:15		2	140			3	101				
04:30		0	137			6	99				
04:45		2	124	4	522	4	114	14	421	18	943
05:00		0	109			10	119				
05:15		3	142			19	105				
05:30		5	130			16	133				
05:45		7	147	15	528	38	123	83	480	98	1008
06:00		33	162			44	149				
06:15		17	153			84	97				
06:30		29	144			84	97				
06:45		26	155	105	614	110	115	322	458	427	1072
07:00		47	151			153	113				
07:15		98	96			123	95				
07:30		61	101			126	61				
07:45		60	88	266	436	131	63	533	332	799	768
08:00		84	108			131	80				
08:15		81	68			126	53				
08:30		69	91			141	48				
08:45		68	84	302	351	150	47	548	228	850	579
09:00		91	77			137	33				
09:15		109	67			117	32				
09:30		67	51			115	13				
09:45		77	27	344	222	112	33	481	111	825	333
10:00		75	39			108	15				
10:15		59	29			85	19				
10:30		78	26			93	9				
10:45		74	23	286	117	92	11	378	54	664	171
11:00		84	24			97	6				
11:15		77	16			108	10				
11:30		72	16			102	1				
11:45		84	10	317	66	97	8	404	25	721	91
Total		1699	4566			2792	3662			4491	8228
Percent		27.1%	72.9%			43.3%	56.7%			35.3%	64.7%

Accurate Counts
978-664-2565

Location : Route 111 East of
Location : Kinsley Road
City/State: Acton, MA
Counter : 18295

10431001
Site Code: 10431001

Start Time	26-Feb-09 Thu	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		9	105			4	110				
12:15		3	72			1	109				
12:30		9	92			3	124				
12:45		3	73	24	342	4	133	12	476	36	818
01:00		3	108			1	91				
01:15		4	124			1	84				
01:30		4	92			0	90				
01:45		1	105	12	429	0	83	2	348	14	777
02:00		0	94			0	101				
02:15		3	119			2	100				
02:30		0	133			0	104				
02:45		1	118	4	464	0	102	2	407	6	871
03:00		1	125			0	108				
03:15		2	125			1	103				
03:30		1	113			1	119				
03:45		2	136	6	499	1	110	3	440	9	939
04:00		2	126			6	107				
04:15		1	140			7	89				
04:30		0	126			2	119				
04:45		2	141	5	533	9	124	24	439	29	972
05:00		3	140			16	98				
05:15		1	147			14	103				
05:30		8	117			23	133				
05:45		9	120	21	524	33	120	86	454	107	978
06:00		15	151			53	121				
06:15		16	132			82	96				
06:30		29	143			96	100				
06:45		36	114	96	540	134	127	365	444	461	984
07:00		31	144			156	119				
07:15		105	138			137	70				
07:30		64	84			128	57				
07:45		71	99	271	465	129	73	550	319	821	784
08:00		98	84			116	56				
08:15		83	86			135	41				
08:30		67	62			140	39				
08:45		85	62	333	294	162	55	553	191	886	485
09:00		88	74			150	32				
09:15		80	84			131	38				
09:30		84	87			99	24				
09:45		77	58	329	303	107	24	487	118	816	421
10:00		57	35			92	13				
10:15		59	48			71	19				
10:30		74	22			105	23				
10:45		90	31	280	136	81	10	349	65	629	201
11:00		61	32			104	15				
11:15		86	10			102	4				
11:30		88	10			106	3				
11:45		82	7	317	59	94	2	406	24	723	83
Total		1698	4588			2839	3725			4537	8313
Percent		27.0%	73.0%			43.3%	56.7%			35.3%	64.7%
Grand Total		3397	9154			5631	7387			9028	16541
Percent		27.1%	72.9%			43.3%	56.7%			35.3%	64.7%

ADT ADT 12,784 AADT 12,784

N/S Street : Windsor Avenue
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

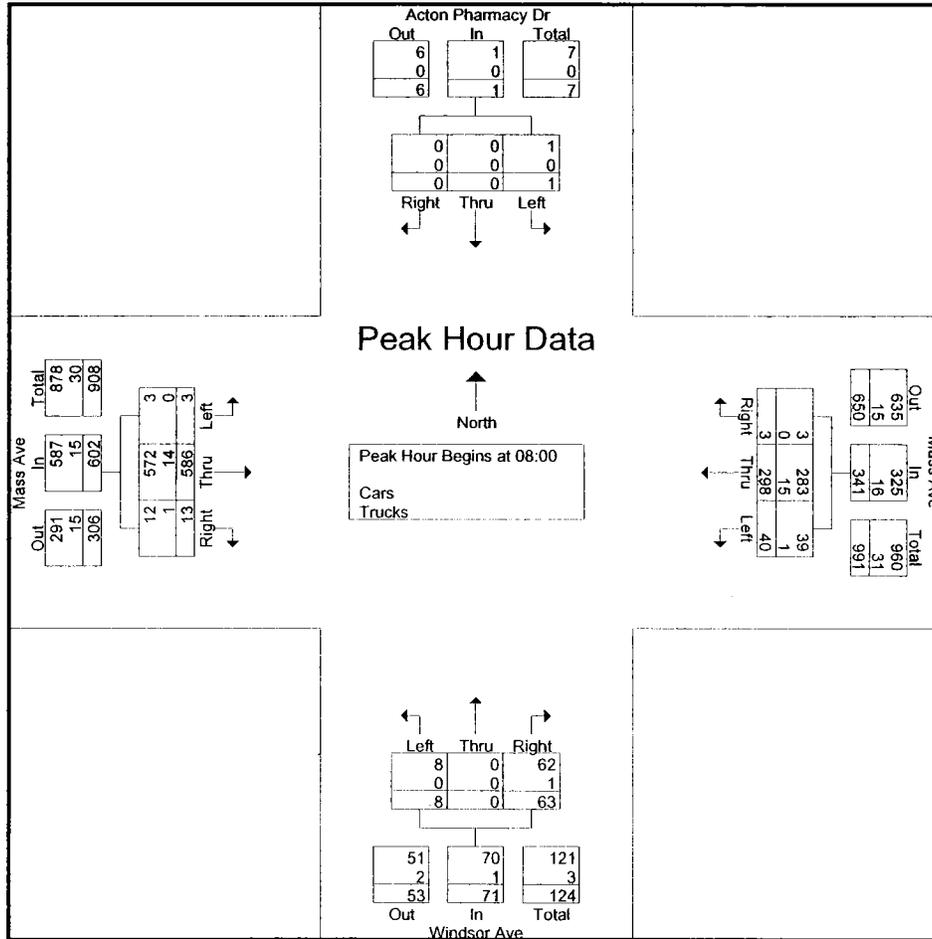
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Cars - Trucks

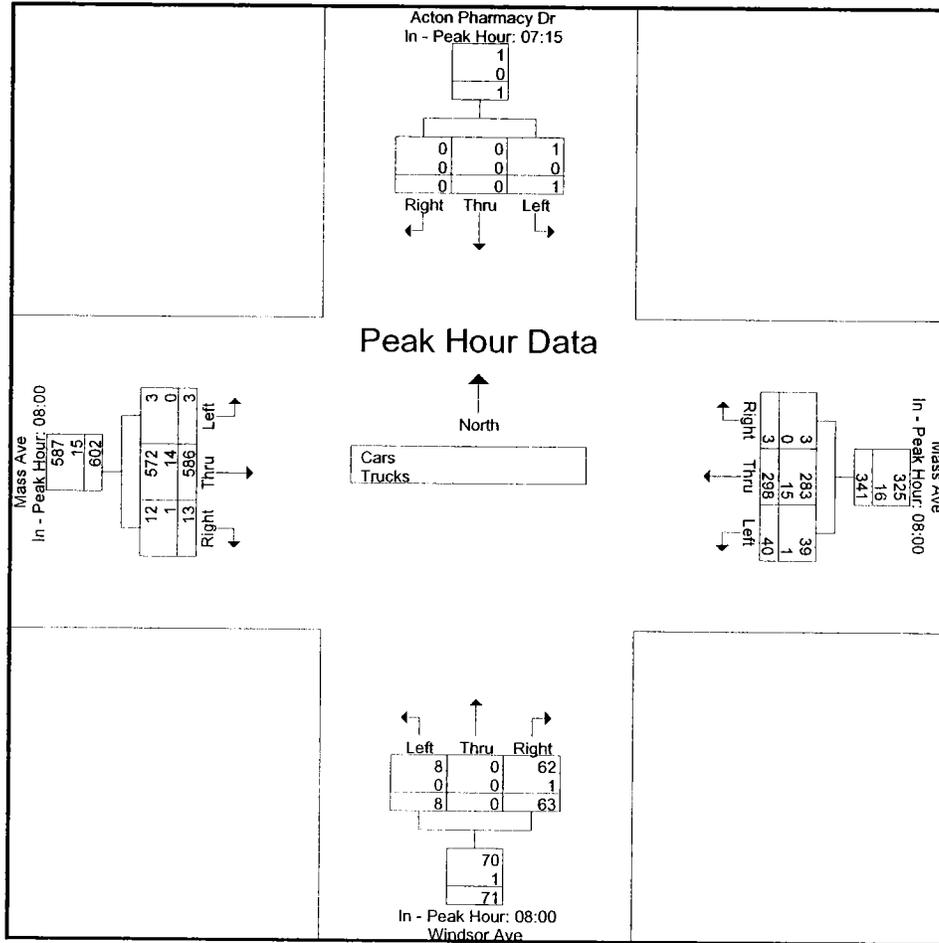
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	0	0	0	0	9	51	0	1	0	0	11	2	1	138	0	0	3	210	213
07:15	0	0	0	2	11	86	0	0	1	0	17	4	0	139	4	0	6	258	264
07:30	0	0	0	0	7	66	0	2	0	0	7	1	0	114	2	0	3	196	199
07:45	0	0	0	0	9	77	0	1	3	0	11	1	0	122	0	0	2	222	224
Total	0	0	0	2	36	280	0	4	4	0	46	8	1	513	6	0	14	886	900
08:00	1	0	0	0	8	53	1	0	3	0	12	0	0	147	4	0	0	229	229
08:15	0	0	0	0	12	87	1	0	2	0	17	0	1	149	2	0	0	271	271
08:30	0	0	0	8	8	83	0	2	2	0	20	4	1	136	3	1	15	253	268
08:45	0	0	0	0	12	75	1	0	1	0	14	16	1	154	4	0	16	262	278
Total	1	0	0	8	40	298	3	2	8	0	63	20	3	586	13	1	31	1015	1046
Grand Total	1	0	0	10	76	578	3	6	12	0	109	28	4	1099	19	1	45	1901	1946
Apprch %	100	0	0		11.6	88	0.5		9.9	0	90.1		0.4	98	1.7				
Total %	0.1	0	0		4	30.4	0.2		0.6	0	5.7		0.2	57.8	1		2.3	97.7	
Cars	1	0	0		75	548	3		12	0	106		4	1062	18		0	0	1874
% Cars	100	0	0	100	98.7	94.8	100	100	100	0	97.2	100	100	96.6	94.7	100	0	0	96.3
Trucks	0	0	0		1	30	0		0	0	3		0	37	1		0	0	72
% Trucks	0	0	0		1.3	5.2	0		0	0	2.8	0	0	3.4	5.3	0	0	0	3.7

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	1	0	0	1	8	53	1	62	3	0	12	15	0	147	4	151	229
08:15	0	0	0	0	12	87	1	100	2	0	17	19	1	149	2	152	271
08:30	0	0	0	0	8	83	0	91	2	0	20	22	1	136	3	140	253
08:45	0	0	0	0	12	75	1	88	1	0	14	15	1	154	4	159	262
Total Volume	1	0	0	1	40	298	3	341	8	0	63	71	3	586	13	602	1015
% App. Total	100	0	0		11.7	87.4	0.9		11.3	0	88.7		0.5	97.3	2.2		
PHF	.250	.000	.000	.250	.833	.856	.750	.853	.667	.000	.788	.807	.750	.951	.813	.947	.936
Cars	1	0	0	1	39	283	3	325	8	0	62	70	3	572	12	587	983
% Cars	100	0	0	100	97.5	95.0	100	95.3	100	0	98.4	98.6	100	97.6	92.3	97.5	96.8
Trucks	0	0	0	0	1	15	0	16	0	0	1	1	0	14	1	15	32
% Trucks	0	0	0	0	2.5	5.0	0	4.7	0	0	1.6	1.4	0	2.4	7.7	2.5	3.2



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

	07:15				08:00				08:00				08:00			
+0 mins.	0	0	0	0	8	53	1	62	3	0	12	15	0	147	4	151
+15 mins.	0	0	0	0	12	87	1	100	2	0	17	19	1	149	2	152
+30 mins.	0	0	0	0	8	83	0	91	2	0	20	22	1	136	3	140
+45 mins.	1	0	0	1	12	75	1	88	1	0	14	15	1	154	4	159
Total Volume	1	0	0	1	40	298	3	341	8	0	63	71	3	586	13	602
% App. Total	100	0	0	0	11.7	87.4	0.9	88.7	11.3	0	88.7	88.7	0.5	97.3	2.2	97.3
PHF	.250	.000	.000	.250	.833	.856	.750	.853	.667	.000	.788	.807	.750	.951	.813	.947
Cars	1	0	0	1	39	283	3	325	8	0	62	70	3	572	12	587
% Cars	100	0	0	100	97.5	95	100	95.3	100	0	98.4	98.6	100	97.6	92.3	97.5
Trucks	0	0	0	0	1	15	0	16	0	0	1	1	0	14	1	15
% Trucks	0	0	0	0	2.5	5	0	4.7	0	0	1.6	1.4	0	2.4	7.7	2.5



N/S Street : Windsor Avenue
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

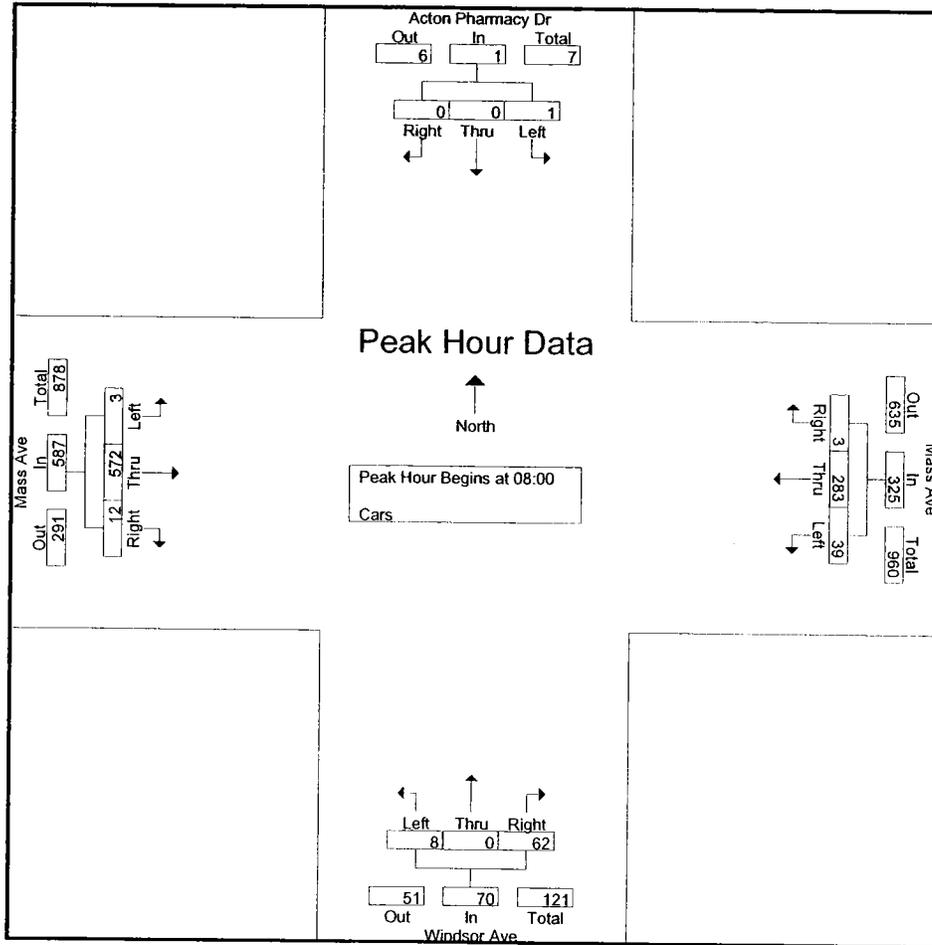
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Cars

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Exch. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	0	0	0	0	9	50	0	1	0	0	11	2	1	131	0	0	3	202	205
07:15	0	0	0	2	11	78	0	0	1	0	17	4	0	130	4	0	6	241	247
07:30	0	0	0	0	7	64	0	2	0	0	7	1	0	110	2	0	3	190	193
07:45	0	0	0	0	9	73	0	1	3	0	9	1	0	119	0	0	2	213	215
Total	0	0	0	2	36	265	0	4	4	0	44	8	1	490	6	0	14	846	860
08:00	1	0	0	0	7	52	1	0	3	0	12	0	0	140	4	0	0	220	220
08:15	0	0	0	0	12	86	1	0	2	0	17	0	1	147	2	0	0	268	268
08:30	0	0	0	8	8	75	0	2	2	0	20	4	1	134	3	1	15	243	258
08:45	0	0	0	0	12	70	1	0	1	0	13	16	1	151	3	0	16	252	268
Total	1	0	0	8	39	283	3	2	8	0	62	20	3	572	12	1	31	983	1014
Grand Total	1	0	0	10	75	548	3	6	12	0	106	28	4	1062	18	1	45	1829	1874
Apprch %	100	0	0		12	87.5	0.5		10.2	0	89.8		0.4	98	1.7				
Total %	0.1	0	0		4.1	30	0.2		0.7	0	5.8		0.2	58.1	1		2.4	97.6	

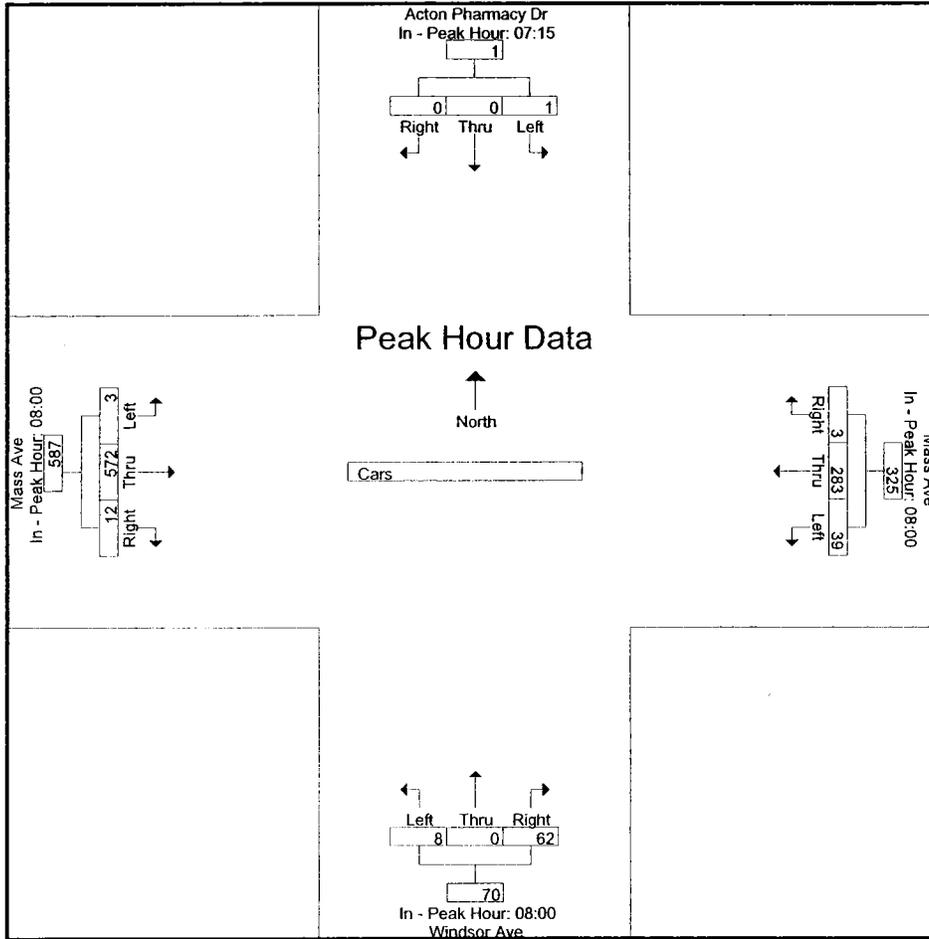
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	1	0	0	1	7	52	1	60	3	0	12	15	0	140	4	144	220
08:15	0	0	0	0	12	86	1	99	2	0	17	19	1	147	2	150	268
08:30	0	0	0	0	8	75	0	83	2	0	20	22	1	134	3	138	243
08:45	0	0	0	0	12	70	1	83	1	0	13	14	1	151	3	155	252
Total Volume	1	0	0	1	39	283	3	325	8	0	62	70	3	572	12	587	983
% App. Total	100	0	0		12	87.1	0.9		11.4	0	88.6		0.5	97.4	2		
PHF	.250	.000	.000	.250	.813	.823	.750	.821	.667	.000	.775	.795	.750	.947	.750	.947	.917



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15				08:00				08:00				08:00			
+0 mins.	0	0	0	0	7	52	1	60	3	0	12	15	0	140	4	144
+15 mins.	0	0	0	0	12	86	1	99	2	0	17	19	1	147	2	150
+30 mins.	0	0	0	0	8	75	0	83	2	0	20	22	1	134	3	138
+45 mins.	1	0	0	1	12	70	1	83	1	0	13	14	1	151	3	155
Total Volume	1	0	0	1	39	283	3	325	8	0	62	70	3	572	12	587
% App. Total	100	0	0	0	12	87.1	0.9	83	11.4	0	88.6	70	0.5	97.4	2	155
PHF	.250	.000	.000	.250	.813	.823	.750	.821	.667	.000	.775	.795	.750	.947	.750	.947



N/S Street : Windsor Avenue
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

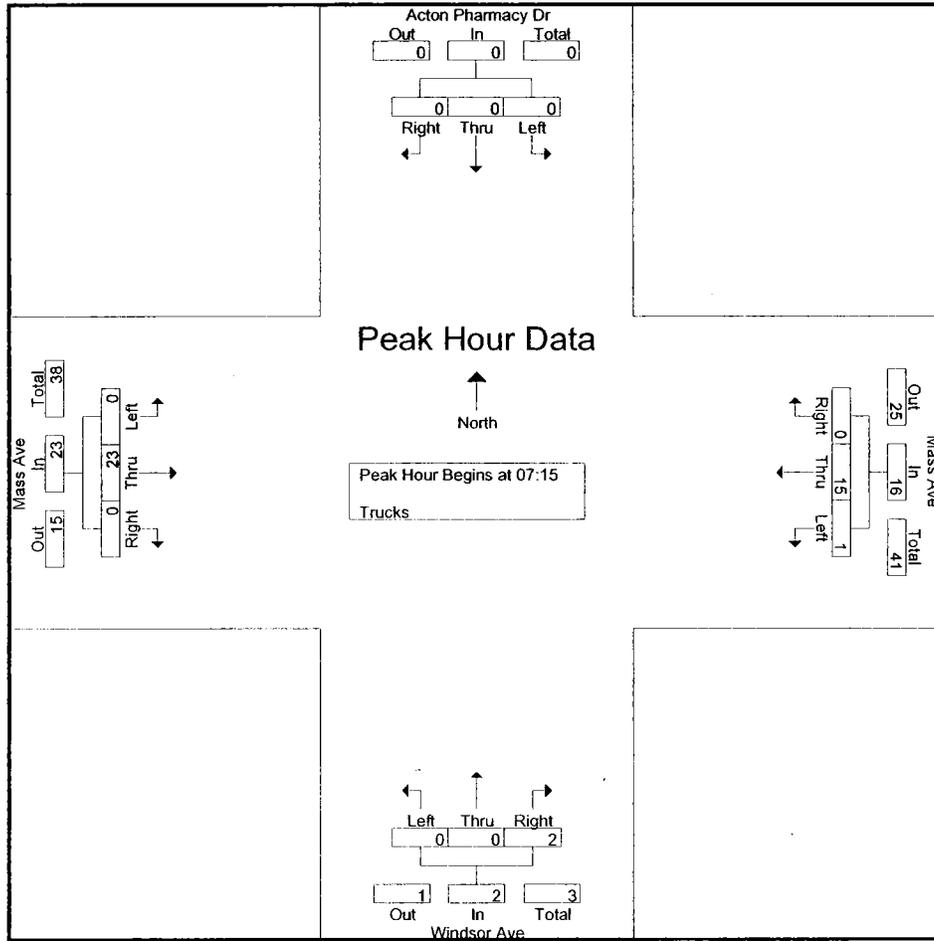
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Trucks

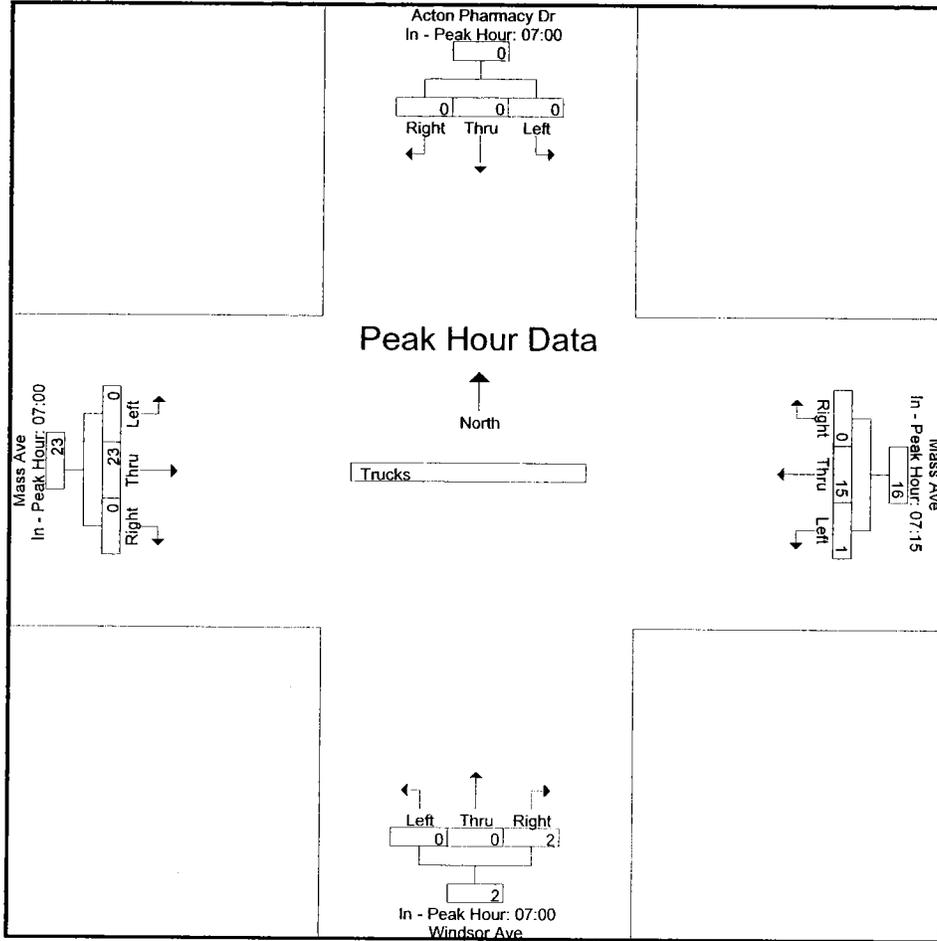
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Excl. Total	Incl. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	0	8	8
07:15	0	0	0	0	0	8	0	0	0	0	0	0	0	9	0	0	0	17	17
07:30	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	6	6
07:45	0	0	0	0	0	4	0	0	0	0	2	0	0	3	0	0	0	9	9
Total	0	0	0	0	0	15	0	0	0	0	2	0	0	23	0	0	0	40	40
08:00	0	0	0	0	1	1	0	0	0	0	0	0	0	7	0	0	0	9	9
08:15	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	3	3
08:30	0	0	0	0	0	8	0	0	0	0	0	0	0	2	0	0	0	10	10
08:45	0	0	0	0	0	5	0	0	0	0	1	0	0	3	1	0	0	10	10
Total	0	0	0	0	1	15	0	0	0	0	1	0	0	14	1	0	0	32	32
Grand Total	0	0	0	0	1	30	0	0	0	0	3	0	0	37	1	0	0	72	72
Apprch %	0	0	0		3.2	96.8	0		0	0	100		0	97.4	2.6				
Total %	0	0	0		1.4	41.7	0		0	0	4.2		0	51.4	1.4		0	100	

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15																	
07:15	0	0	0	0	0	8	0	8	0	0	0	0	0	9	0	9	17
07:30	0	0	0	0	0	2	0	2	0	0	0	0	0	4	0	4	6
07:45	0	0	0	0	0	4	0	4	0	0	2	2	0	3	0	3	9
08:00	0	0	0	0	1	1	0	2	0	0	0	0	0	7	0	7	9
Total Volume	0	0	0	0	1	15	0	16	0	0	2	2	0	23	0	23	41
% App. Total	0	0	0		6.2	93.8	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.250	.469	.000	.500	.000	.000	.250	.250	.000	.639	.000	.639	.603



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

	07:00				07:15				07:00				07:00			
+0 mins.	0	0	0	0	0	8	0	8	0	0	0	0	0	7	0	7
+15 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	9	0	9
+30 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	4
+45 mins.	0	0	0	0	1	1	0	2	0	0	2	2	0	3	0	3
Total Volume	0	0	0	0	1	15	0	16	0	0	2	2	0	23	0	23
% App. Total	0	0	0	0	6.2	93.8	0	0	0	0	100	0	0	100	0	0
PHF	.000	.000	.000	.000	.250	.469	.000	.500	.000	.000	.250	.250	.000	.639	.000	.639



N/S Street : Windsor Avenue
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

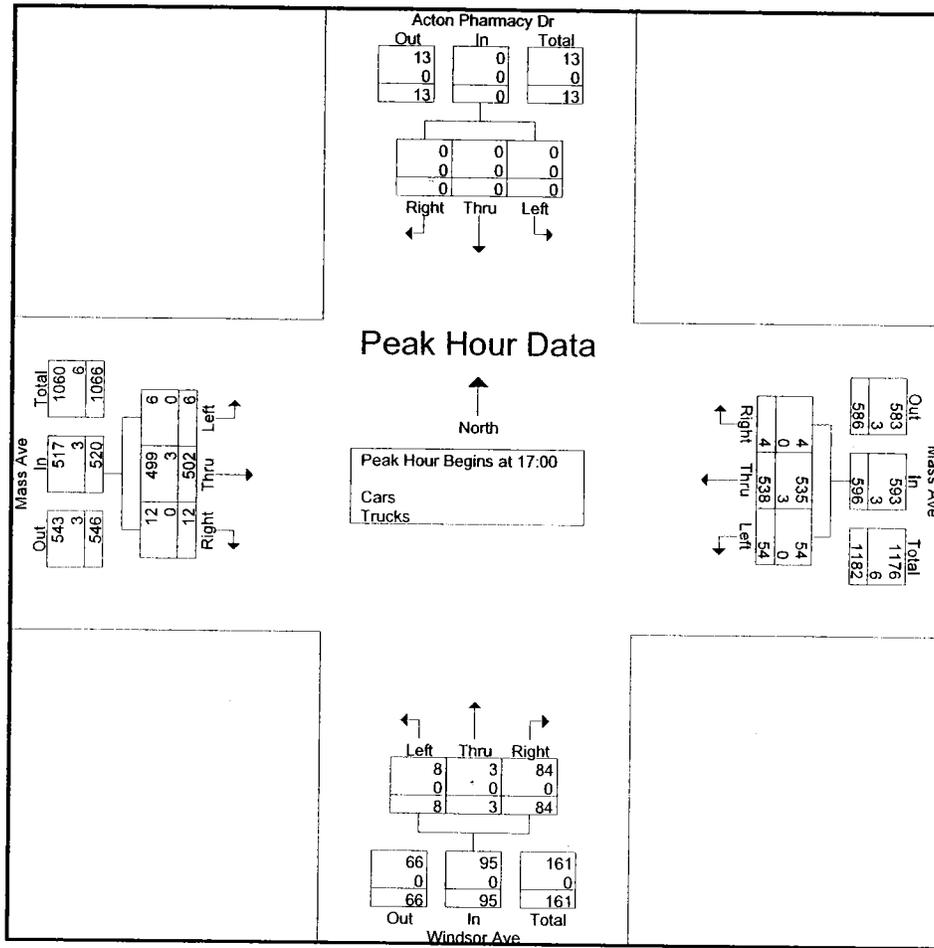
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Cars - Trucks

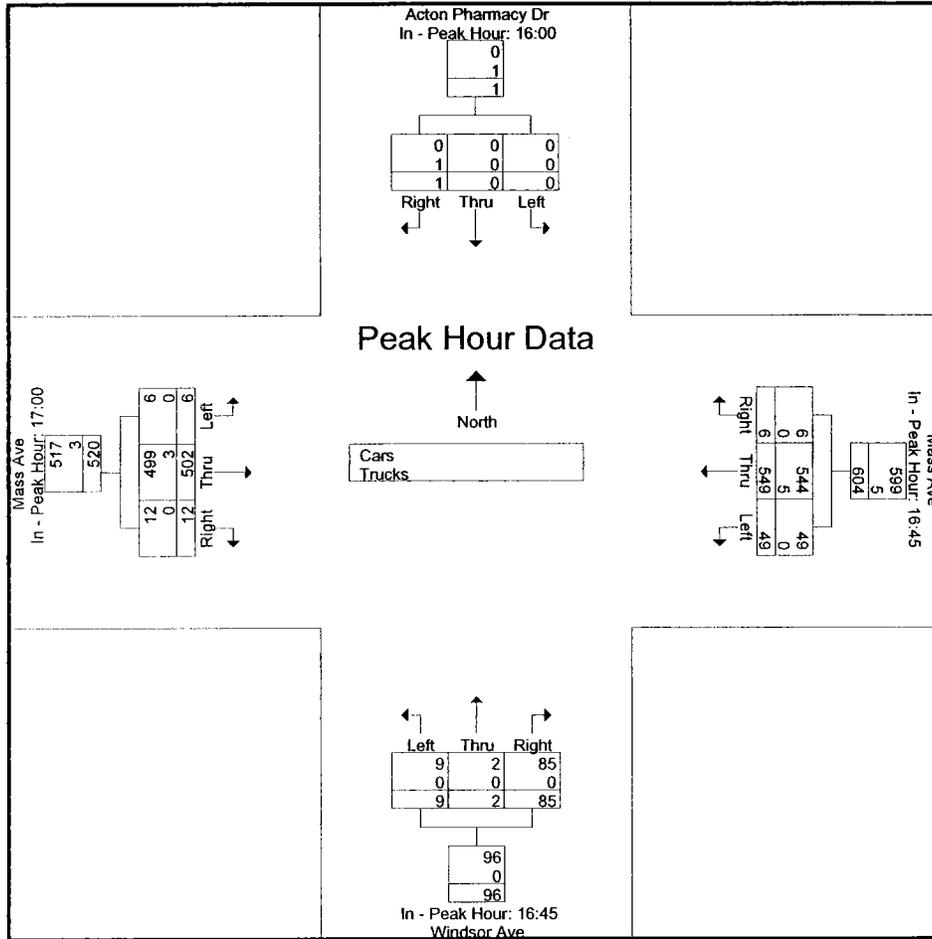
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	0	0	1	1	10	127	7	2	3	0	22	0	0	105	2	1	4	277	281
16:15	0	0	0	0	9	119	2	5	1	0	13	4	3	129	1	0	9	277	286
16:30	0	0	0	1	20	117	1	2	1	0	10	1	2	95	1	2	6	247	253
16:45	0	0	0	1	14	134	3	2	2	0	21	5	4	115	3	2	10	296	306
Total	0	0	1	3	53	497	13	11	7	0	66	10	9	444	7	5	29	1097	1126
17:00	0	0	0	0	16	150	0	1	4	1	21	3	1	123	6	2	6	322	328
17:15	0	0	0	0	8	133	1	2	3	1	18	3	2	109	5	0	5	280	285
17:30	0	0	0	0	11	132	2	1	0	0	25	2	1	136	1	0	3	308	311
17:45	0	0	0	0	19	123	1	0	1	1	20	0	2	134	0	0	0	301	301
Total	0	0	0	0	54	538	4	4	8	3	84	8	6	502	12	2	14	1211	1225
Grand Total	0	0	1	3	107	1035	17	15	15	3	150	18	15	946	19	7	43	2308	2351
Apprch %	0	0	100		9.2	89.3	1.5		8.9	1.8	89.3		1.5	96.5	1.9				
Total %	0	0	0		4.6	44.8	0.7		0.6	0.1	6.5		0.6	41	0.8		1.8	98.2	
Cars	0	0	0		107	1022	17		14	3	150		15	936	19		0	0	2326
% Cars	0	0	0	100	100	98.7	100	100	93.3	100	100	100	100	98.9	100	100	0	0	98.9
Trucks	0	0	1		0	13	0		1	0	0		0	10	0		0	0	25
% Trucks	0	0	100	0	0	1.3	0	0	6.7	0	0	0	0	1.1	0	0	0	0	1.1

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	0	0	0	16	150	0	166	4	1	21	26	1	123	6	130	322
17:15	0	0	0	0	8	133	1	142	3	1	18	22	2	109	5	116	280
17:30	0	0	0	0	11	132	2	145	0	0	25	25	1	136	1	138	308
17:45	0	0	0	0	19	123	1	143	1	1	20	22	2	134	0	136	301
Total Volume	0	0	0	0	54	538	4	596	8	3	84	95	6	502	12	520	1211
% App. Total	0	0	0		9.1	90.3	0.7		8.4	3.2	88.4		1.2	96.5	2.3		
PHF	.000	.000	.000	.000	.711	.897	.500	.898	.500	.750	.840	.913	.750	.923	.500	.942	.940
Cars	0	0	0	0	54	535	4	593	8	3	84	95	6	499	12	517	1205
% Cars	0	0	0	0	100	99.4	100	99.5	100	100	100	100	100	99.4	100	99.4	99.5
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	0	3	0	3	6
% Trucks	0	0	0	0	0	0.6	0	0.5	0	0	0	0	0	0.6	0	0.6	0.5



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	16:00				16:45				16:45				17:00			
+0 mins.	0	0	1	1	14	134	3	151	2	0	21	23	1	123	6	130
+15 mins.	0	0	0	0	16	150	0	166	4	1	21	26	2	109	5	116
+30 mins.	0	0	0	0	8	133	1	142	3	1	18	22	1	136	1	138
+45 mins.	0	0	0	0	11	132	2	145	0	0	25	25	2	134	0	136
Total Volume	0	0	1	1	49	549	6	604	9	2	85	96	6	502	12	520
% App. Total	0	0	100		8.1	90.9	1		9.4	2.1	88.5		1.2	96.5	2.3	
PHF	.000	.000	.250	.250	.766	.915	.500	.910	.563	.500	.850	.923	.750	.923	.500	.942
Cars	0	0	0	0	49	544	6	599	9	2	85	96	6	499	12	517
% Cars	0	0	0	0	100	99.1	100	99.2	100	100	100	100	100	99.4	100	99.4
Trucks	0	0	1	1	0	5	0	5	0	0	0	0	0	3	0	3
% Trucks	0	0	100	100	0	0.9	0	0.8	0	0	0	0	0	0.6	0	0.6



N/S Street : Windsor Avenue
 E/W Street : Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

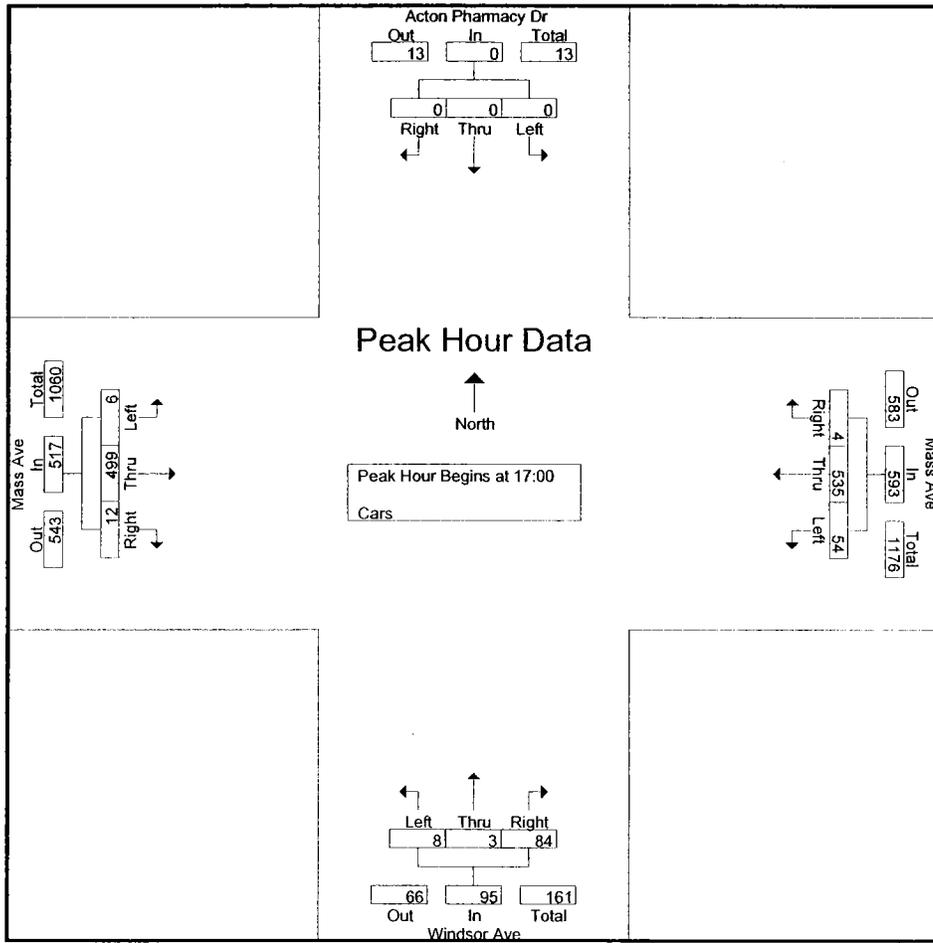
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Cars

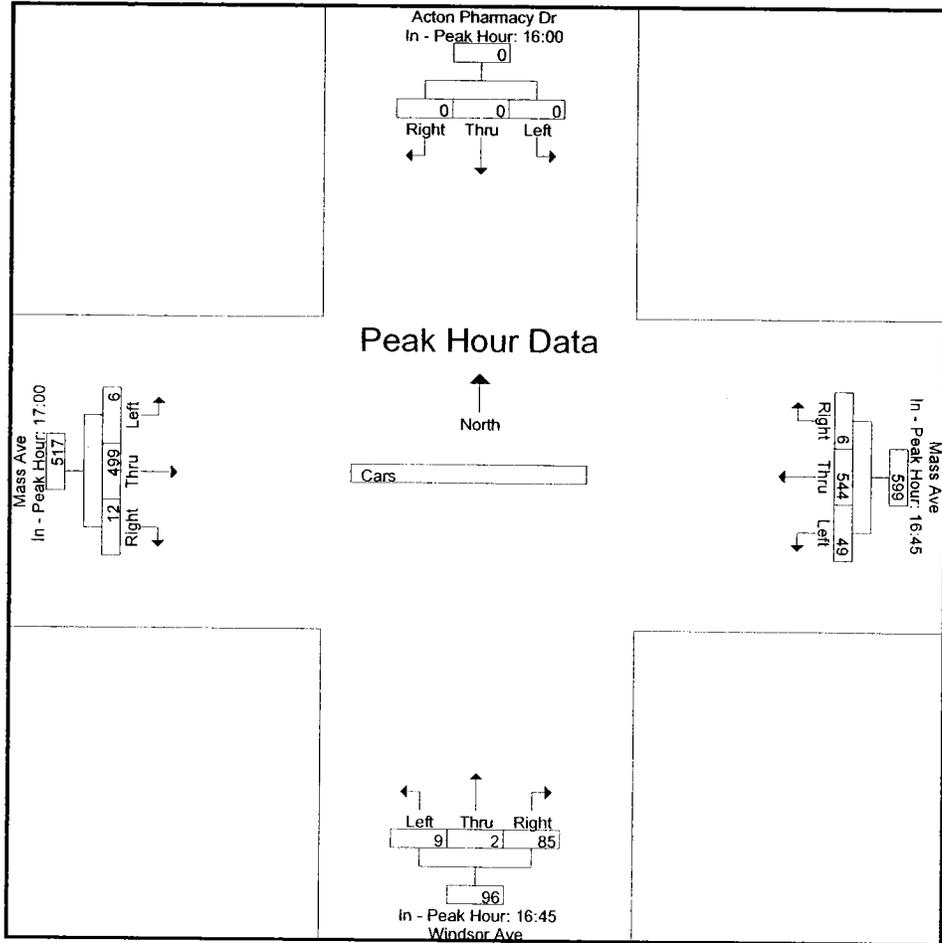
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	0	0	0	1	10	124	7	2	2	0	22	0	0	100	2	1	4	267	271
16:15	0	0	0	0	9	116	2	5	1	0	13	4	3	129	1	0	9	274	283
16:30	0	0	0	1	20	116	1	2	1	0	10	1	2	95	1	2	6	246	252
16:45	0	0	0	1	14	131	3	2	2	0	21	5	4	113	3	2	10	291	301
Total	0	0	0	3	53	487	13	11	6	0	66	10	9	437	7	5	29	1078	1107
17:00	0	0	0	0	16	150	0	1	4	1	21	3	1	123	6	2	6	322	328
17:15	0	0	0	0	8	132	1	2	3	1	18	3	2	108	5	0	5	278	283
17:30	0	0	0	0	11	131	2	1	0	0	25	2	1	135	1	0	3	306	309
17:45	0	0	0	0	19	122	1	0	1	1	20	0	2	133	0	0	0	299	299
Total	0	0	0	0	54	535	4	4	8	3	84	8	6	499	12	2	14	1205	1219
Grand Total	0	0	0	3	107	1022	17	15	14	3	150	18	15	936	19	7	43	2283	2326
Apprch %	0	0	0		9.3	89.2	1.5		8.4	1.8	89.8		1.5	96.5	2				
Total %	0	0	0		4.7	44.8	0.7		0.6	0.1	6.6		0.7	41	0.8		1.8	98.2	

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak I of I																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	0	0	0	16	150	0	166	4	1	21	26	1	123	6	130	322
17:15	0	0	0	0	8	132	1	141	3	1	18	22	2	108	5	115	278
17:30	0	0	0	0	11	131	2	144	0	0	25	25	1	135	1	137	306
17:45	0	0	0	0	19	122	1	142	1	1	20	22	2	133	0	135	299
Total Volume	0	0	0	0	54	535	4	593	8	3	84	95	6	499	12	517	1205
% App. Total	0	0	0		9.1	90.2	0.7		8.4	3.2	88.4		1.2	96.5	2.3		
PHF	.000	.000	.000	.000	.711	.892	.500	.893	.500	.750	.840	.913	.750	.924	.500	.943	.936



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	16:00				16:45				16:45				17:00			
+0 mins.	0	0	0	0	14	131	3	148	2	0	21	23	1	123	6	130
+15 mins.	0	0	0	0	16	150	0	166	4	1	21	26	2	108	5	115
+30 mins.	0	0	0	0	8	132	1	141	3	1	18	22	1	135	1	137
+45 mins.	0	0	0	0	11	131	2	144	0	0	25	25	2	133	0	135
Total Volume	0	0	0	0	49	544	6	599	9	2	85	96	6	499	12	517
% App. Total	0	0	0	0	8.2	90.8	1		9.4	2.1	88.5		1.2	96.5	2.3	
PHF	.000	.000	.000	.000	.766	.907	.500	.902	.563	.500	.850	.923	.750	.924	.500	.943



N/S Street : Windsor Avenue
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

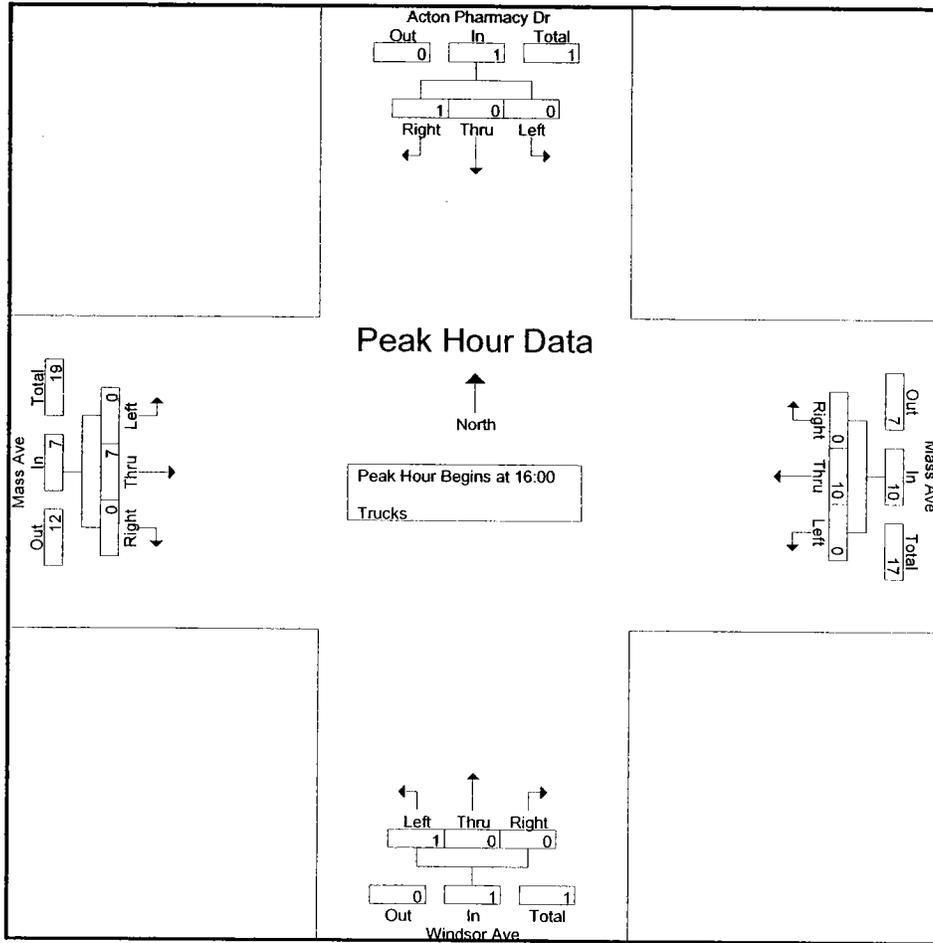
Accurate Counts
 978-664-2565

File Name : 10431001
 Site Code : 10431001
 Start Date : 6/3/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	0	0	1	0	0	3	0	0	1	0	0	0	0	5	0	0	0	10	10
16:15	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	3
16:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
16:45	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	5	5
Total	0	0	1	0	0	10	0	0	1	0	0	0	0	7	0	0	0	19	19
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
17:30	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
17:45	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
Total	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	6	6
Grand Total	0	0	1	0	0	13	0	0	1	0	0	0	0	10	0	0	0	25	25
Apprch %	0	0	100		0	100	0		100	0	0		0	100	0				
Total %	0	0	4		0	52	0		4	0	0		0	40	0		0	100	

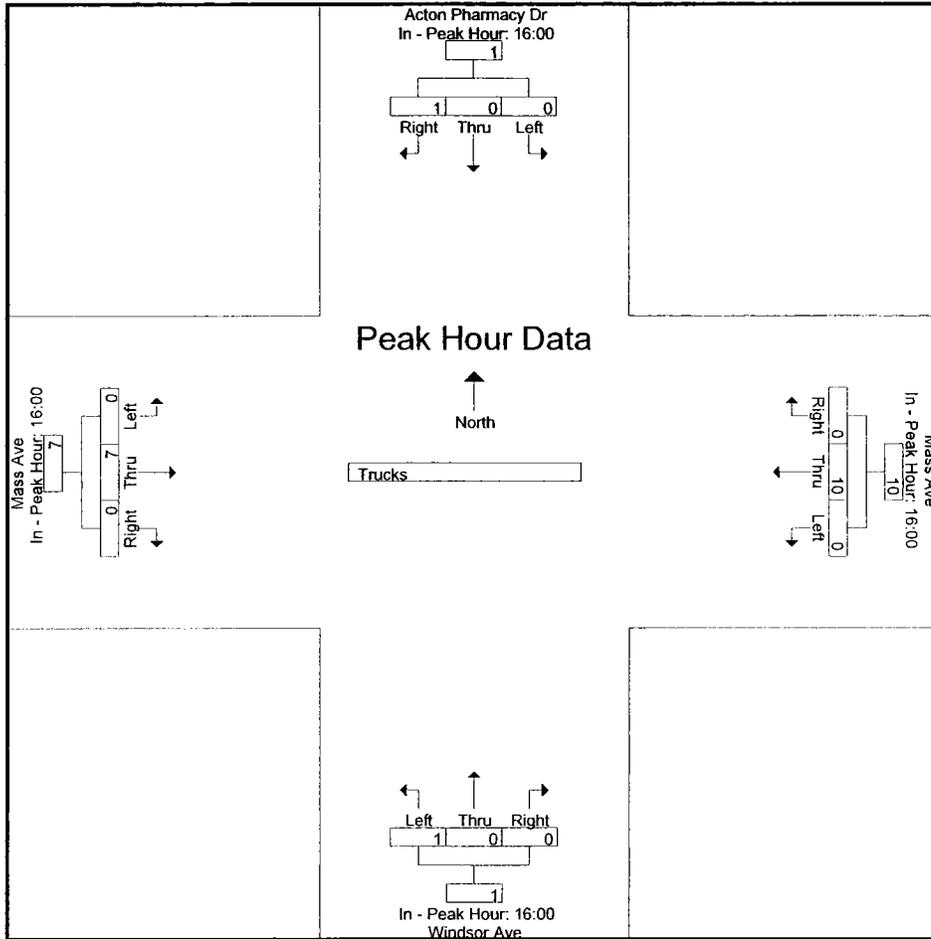
Start Time	Acton Pharmacy Dr From North				Mass Ave From East				Windsor Ave From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:00																	
16:00	0	0	1	1	0	3	0	3	1	0	0	1	0	5	0	5	10
16:15	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
16:30	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
16:45	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	2	5
Total Volume	0	0	1	1	0	10	0	10	1	0	0	1	0	7	0	7	19
% App. Total	0	0	100		0	100	0		100	0	0		0	100	0		
PHF	.000	.000	.250	.250	.000	.833	.000	.833	.250	.000	.000	.250	.000	.350	.000	.350	.475



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	16:00				16:00				16:00				16:00			
+0 mins.	0	0	1	1	0	3	0	3	1	0	0	1	0	5	0	5
+15 mins.	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	2
Total Volume	0	0	1	1	0	10	0	10	1	0	0	1	0	7	0	7
% App. Total	0	0	100	100	0	100	0	100	100	0	0	100	0	100	0	100
PHF	.000	.000	.250	.250	.000	.833	.000	.833	.250	.000	.000	.250	.000	.350	.000	.350



N/S Street : Spruce St / Kinsley St
 E/W Street : Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

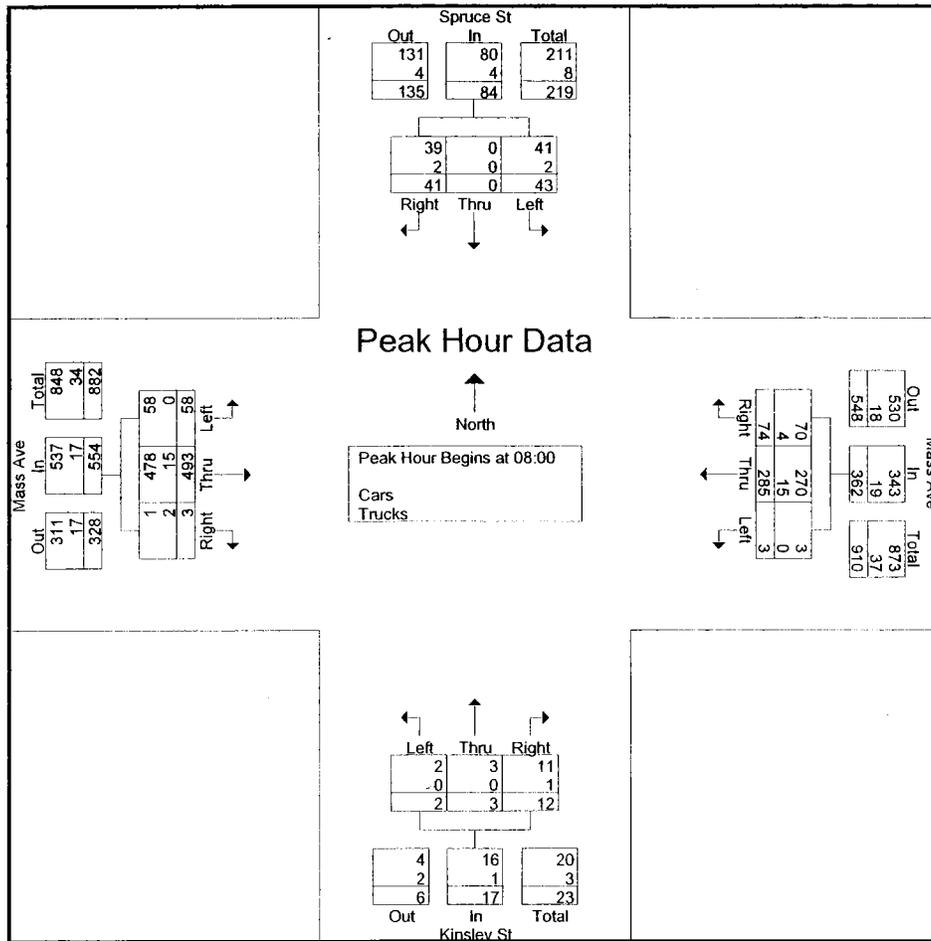
Accurate Counts
 978-664-2565

File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Excl. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	19	0	6	1	1	35	13	0	2	6	4	2	18	160	0	0	3	264	267
07:15	13	0	9	2	1	90	19	0	1	1	2	1	21	104	2	0	3	263	266
07:30	6	0	9	1	2	63	6	0	1	2	2	1	5	99	1	0	2	196	198
07:45	14	1	10	0	0	65	8	0	1	1	3	1	8	137	1	1	2	249	251
Total	52	1	34	4	4	253	46	0	5	10	11	5	52	500	4	1	10	972	982
08:00	10	0	11	0	0	66	17	0	1	1	2	1	13	131	1	0	1	253	254
08:15	11	0	11	0	0	73	14	0	0	0	4	2	17	130	0	0	2	260	262
08:30	8	0	12	1	3	70	14	0	1	1	5	1	13	111	1	3	5	239	244
08:45	14	0	7	2	0	76	29	0	0	1	1	2	15	121	1	14	18	265	283
Total	43	0	41	3	3	285	74	0	2	3	12	6	58	493	3	17	26	1017	1043
Grand Total	95	1	75	7	7	538	120	0	7	13	23	11	110	993	7	18	36	1989	2025
Apprch %	55.6	0.6	43.9		1.1	80.9	18		16.3	30.2	53.5		9.9	89.5	0.6				
Total %	4.8	0.1	3.8		0.4	27	6		0.4	0.7	1.2		5.5	49.9	0.4		1.8	98.2	
Cars	92	1	73		7	508	114		7	13	22		108	967	5		0	0	1953
% Cars	96.8	100	97.3	100	100	94.4	95	0	100	100	95.7	100	98.2	97.4	71.4	100	0	0	96.4
Trucks	3	0	2		0	30	6		0	0	1		2	26	2		0	0	72
% Trucks	3.2	0	2.7	0	0	5.6	5	0	0	0	4.3	0	1.8	2.6	28.6	0	0	0	3.6

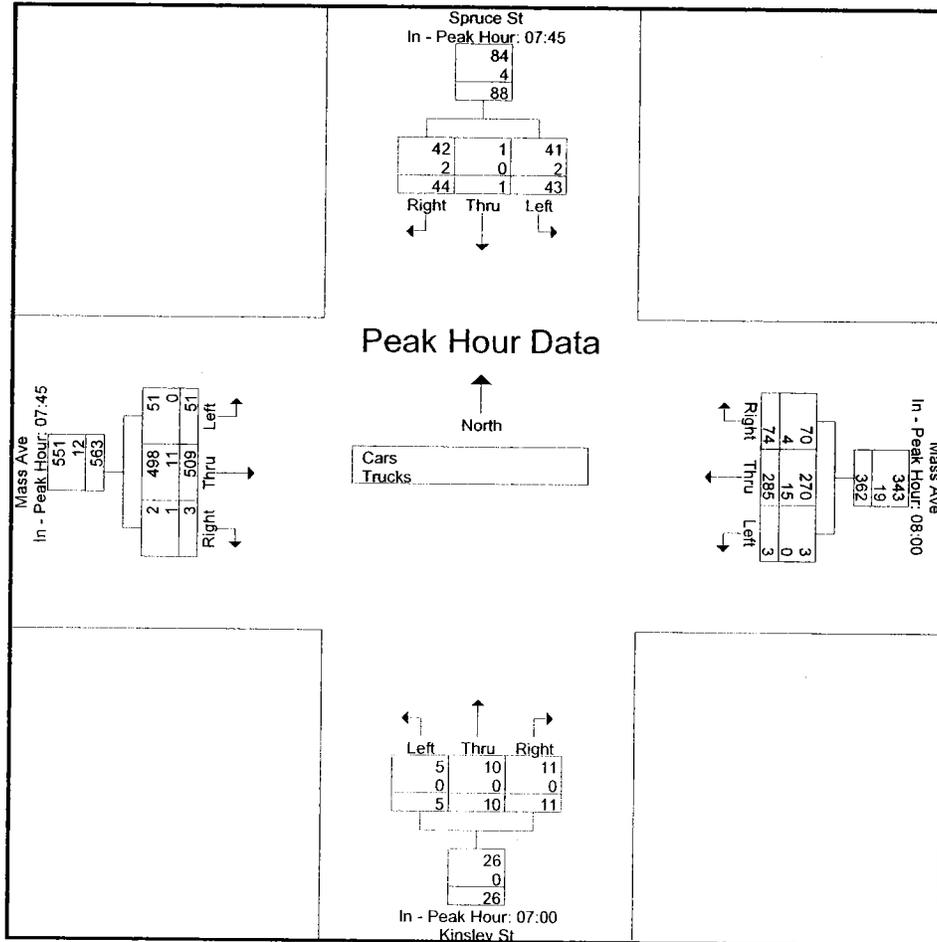
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	10	0	11	21	0	66	17	83	1	1	2	4	13	131	1	145	253
08:15	11	0	11	22	0	73	14	87	0	0	4	4	17	130	0	147	260
08:30	8	0	12	20	3	70	14	87	1	1	5	7	13	111	1	125	239
08:45	14	0	7	21	0	76	29	105	0	1	1	2	15	121	1	137	265
Total Volume	43	0	41	84	3	285	74	362	2	3	12	17	58	493	3	554	1017
% App. Total	51.2	0	48.8		0.8	78.7	20.4		11.8	17.6	70.6		10.5	89	0.5		
PHF	.768	.000	.854	.955	.250	.938	.638	.862	.500	.750	.600	.607	.853	.941	.750	.942	.959
Cars	41	0	39	80	3	270	70	343	2	3	11	16	58	478	1	537	976
% Cars	95.3	0	95.1	95.2	100	94.7	94.6	94.8	100	100	91.7	94.1	100	97.0	33.3	96.9	96.0
Trucks	2	0	2	4	0	15	4	19	0	0	1	1	0	15	2	17	41
% Trucks	4.7	0	4.9	4.8	0	5.3	5.4	5.2	0	0	8.3	5.9	0	3.0	66.7	3.1	4.0



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45				08:00				07:00				07:45			
+0 mins.	14	1	10	25	0	66	17	83	2	6	4	12	8	137	1	146
+15 mins.	10	0	11	21	0	73	14	87	1	1	2	4	13	131	1	145
+30 mins.	11	0	11	22	3	70	14	87	1	2	2	5	17	130	0	147
+45 mins.	8	0	12	20	0	76	29	105	1	1	3	5	13	111	1	125
Total Volume	43	1	44	88	3	285	74	362	5	10	11	26	51	509	3	563
% App. Total	48.9	1.1	50		0.8	78.7	20.4		19.2	38.5	42.3		9.1	90.4	0.5	
PHF	.768	.250	.917	.880	.250	.938	.638	.862	.625	.417	.688	.542	.750	.929	.750	.957
Cars	41	1	42	84	3	270	70	343	5	10	11	26	51	498	2	551
% Cars	95.3	100	95.5	95.5	100	94.7	94.6	94.8	100	100	100	100	100	97.8	66.7	97.9
Trucks	2	0	2	4	0	15	4	19	0	0	0	0	0	11	1	12
% Trucks	4.7	0	4.5	4.5	0	5.3	5.4	5.2	0	0	0	0	0	2.2	33.3	2.1



N/S Street : Spruce St / Kinsley St
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

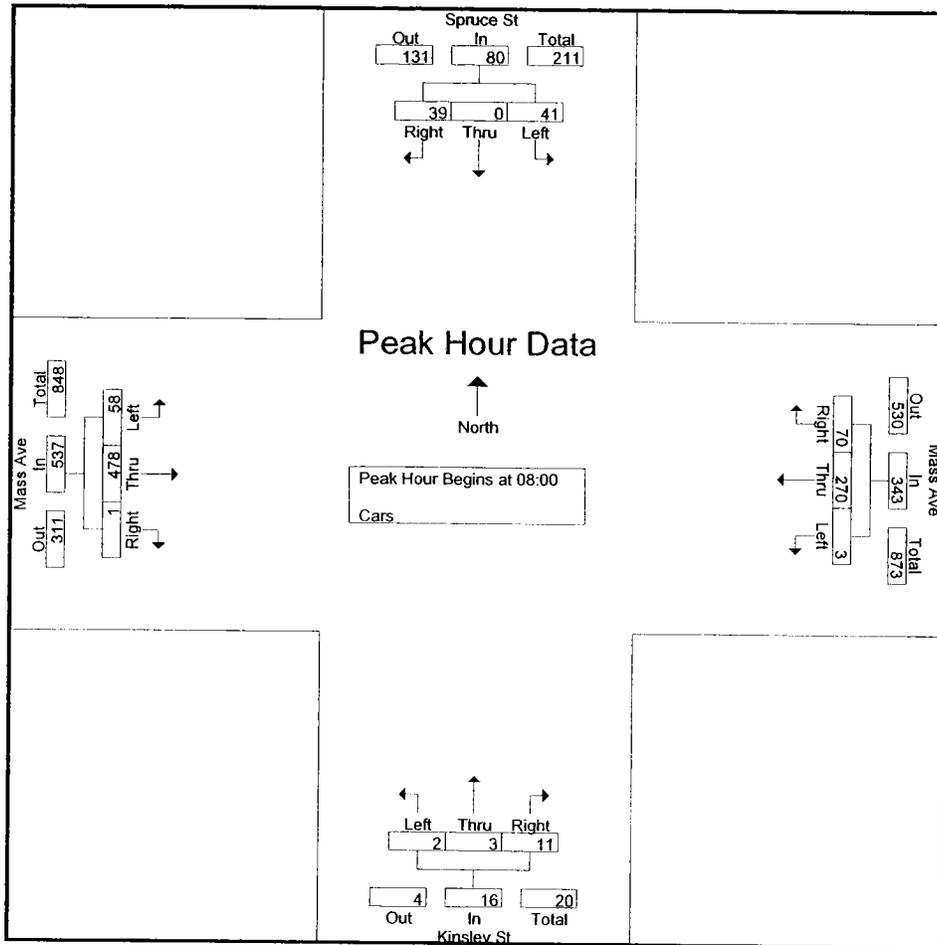
Accurate Counts
 978-664-2565

File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	18	0	6	1	1	35	12	0	2	6	4	2	16	158	0	0	3	258	261
07:15	13	0	9	2	1	83	19	0	1	1	2	1	21	101	2	0	3	253	256
07:30	6	0	9	1	2	59	5	0	1	2	2	1	5	94	1	0	2	186	188
07:45	14	1	10	0	0	61	8	0	1	1	3	1	8	136	1	1	2	244	246
Total	51	1	34	4	4	238	44	0	5	10	11	5	50	489	4	1	10	941	951
08:00	9	0	11	0	0	65	17	0	1	1	1	1	13	123	0	0	1	241	242
08:15	11	0	10	0	0	70	13	0	0	0	4	2	17	129	0	0	2	254	256
08:30	7	0	11	1	3	62	14	0	1	1	5	1	13	110	1	3	5	228	233
08:45	14	0	7	2	0	73	26	0	0	1	1	2	15	116	0	14	18	253	271
Total	41	0	39	3	3	270	70	0	2	3	11	6	58	478	1	17	26	976	1002
Grand Total	92	1	73	7	7	508	114	0	7	13	22	11	108	967	5	18	36	1917	1953
Apprch %	55.4	0.6	44		1.1	80.8	18.1		16.7	31	52.4		10	89.5	0.5				
Total %	4.8	0.1	3.8		0.4	26.5	5.9		0.4	0.7	1.1		5.6	50.4	0.3		1.8	98.2	

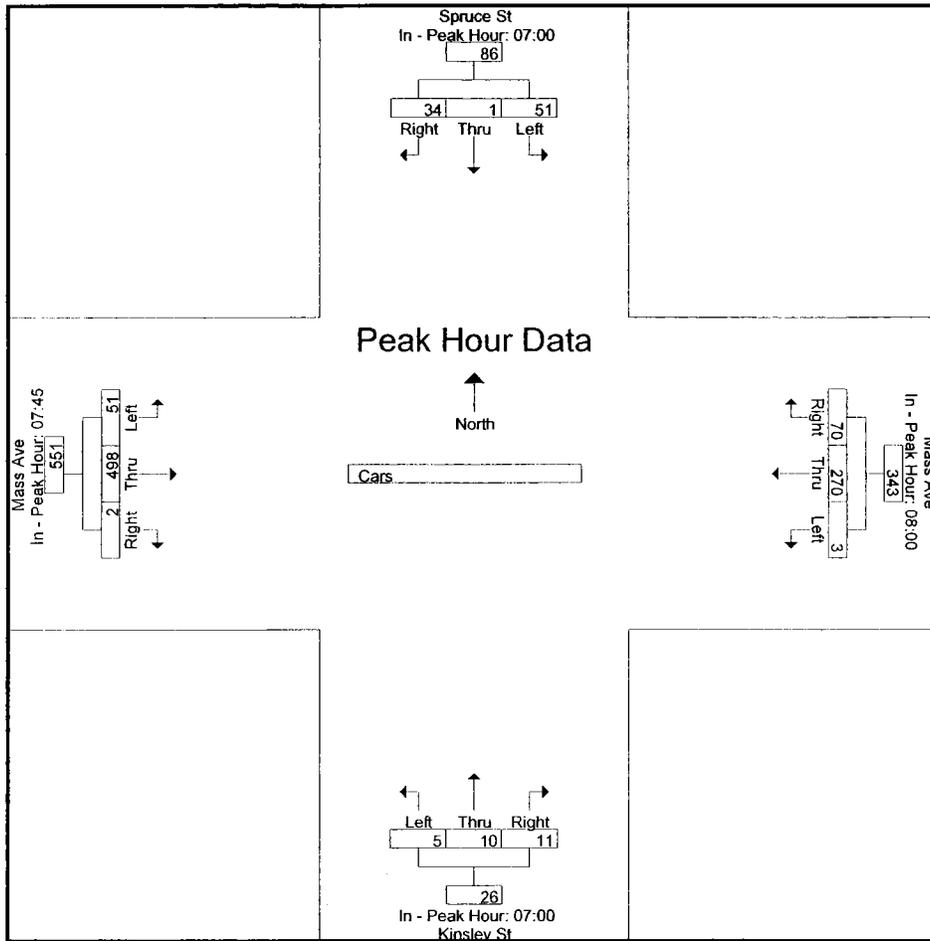
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	9	0	11	20	0	65	17	82	1	1	1	3	13	123	0	136	241
08:15	11	0	10	21	0	70	13	83	0	0	4	4	17	129	0	146	254
08:30	7	0	11	18	3	62	14	79	1	1	5	7	13	110	1	124	228
08:45	14	0	7	21	0	73	26	99	0	1	1	2	15	116	0	131	253
Total Volume	41	0	39	80	3	270	70	343	2	3	11	16	58	478	1	537	976
% App. Total	51.2	0	48.8		0.9	78.7	20.4		12.5	18.8	68.8		10.8	89	0.2		
PHF	.732	.000	.886	.952	.250	.925	.673	.866	.500	.750	.550	.571	.853	.926	.250	.920	.961



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00				08:00				07:00				07:45			
+0 mins.	18	0	6	24	0	65	17	82	2	6	4	12	8	136	1	145
+15 mins.	13	0	9	22	0	70	13	83	1	1	2	4	13	123	0	136
+30 mins.	6	0	9	15	3	62	14	79	1	2	2	5	17	129	0	146
+45 mins.	14	1	10	25	0	73	26	99	1	1	3	5	13	110	1	124
Total Volume	51	1	34	86	3	270	70	343	5	10	11	26	51	498	2	551
% App. Total	59.3	1.2	39.5		0.9	78.7	20.4		19.2	38.5	42.3		9.3	90.4	0.4	
PHF	.708	.250	.850	.860	.250	.925	.673	.866	.625	.417	.688	.542	.750	.915	.500	.943



N/S Street : Spruce St / Kinsley St
 E/W Street : Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

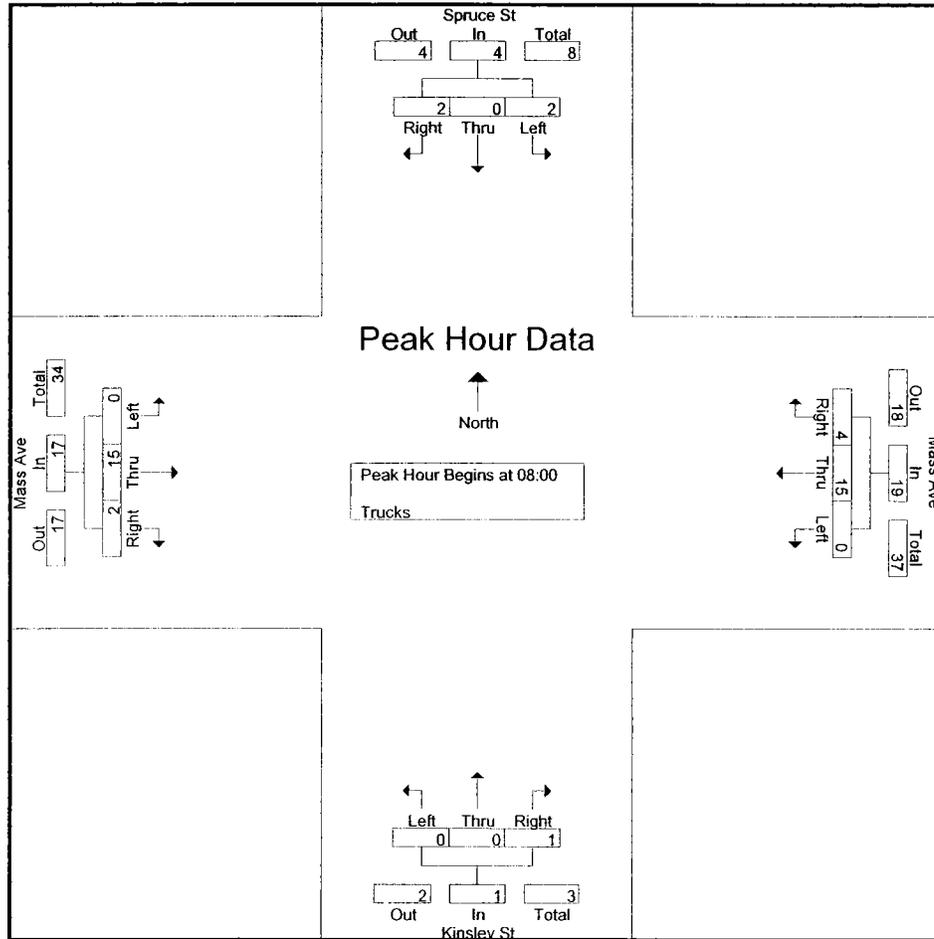
Accurate Counts
 978-664-2565

File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	1	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	0	6	6
07:15	0	0	0	0	0	7	0	0	0	0	0	0	0	3	0	0	0	10	10
07:30	0	0	0	0	0	4	1	0	0	0	0	0	0	5	0	0	0	10	10
07:45	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	5	5
Total	1	0	0	0	0	15	2	0	0	0	0	0	2	11	0	0	0	31	31
08:00	1	0	0	0	0	1	0	0	0	0	1	0	0	8	1	0	0	12	12
08:15	0	0	1	0	0	3	1	0	0	0	0	0	0	1	0	0	0	6	6
08:30	1	0	1	0	0	8	0	0	0	0	0	0	0	1	0	0	0	11	11
08:45	0	0	0	0	0	3	3	0	0	0	0	0	0	5	1	0	0	12	12
Total	2	0	2	0	0	15	4	0	0	0	1	0	0	15	2	0	0	41	41
Grand Total	3	0	2	0	0	30	6	0	0	0	1	0	2	26	2	0	0	72	72
Apprch %	60	0	40		0	83.3	16.7		0	0	100		6.7	86.7	6.7		0	72	72
Total %	4.2	0	2.8		0	41.7	8.3		0	0	1.4		2.8	36.1	2.8		0	100	

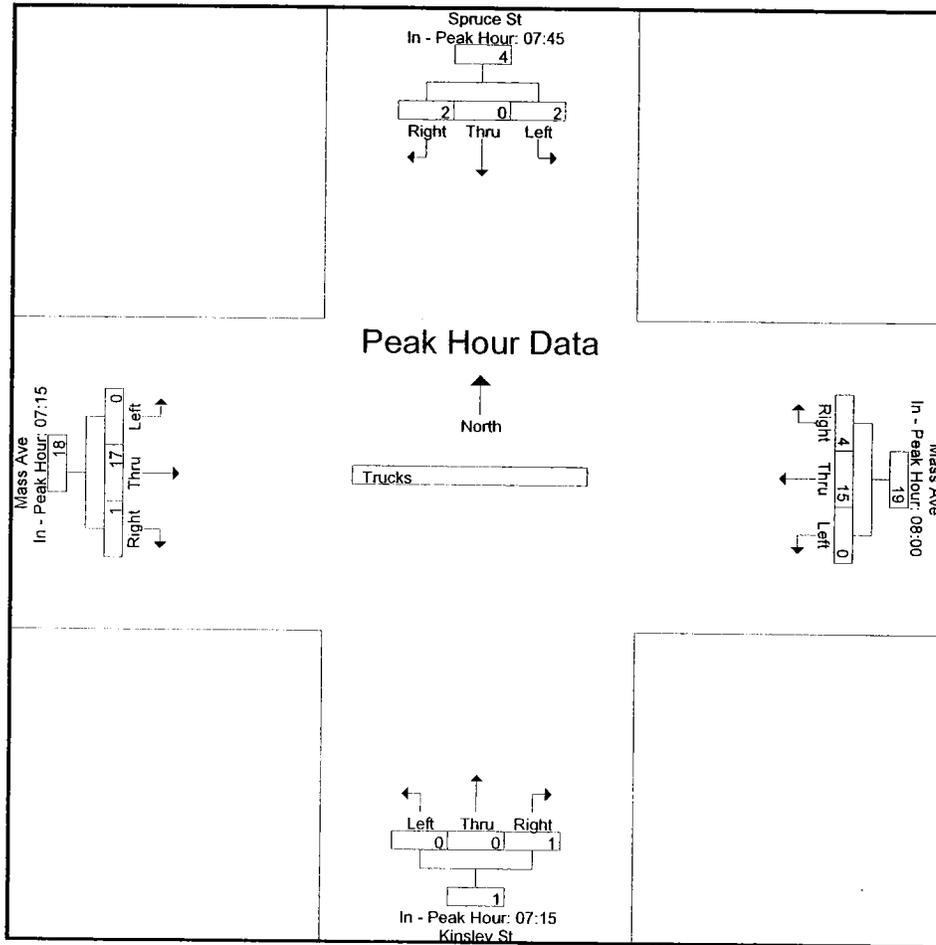
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	1	0	0	1	0	1	0	1	0	0	1	1	0	8	1	9	12
08:15	0	0	1	1	0	3	1	4	0	0	0	0	0	1	0	1	6
08:30	1	0	1	2	0	8	0	8	0	0	0	0	0	1	0	1	11
08:45	0	0	0	0	0	3	3	6	0	0	0	0	0	5	1	6	12
Total Volume	2	0	2	4	0	15	4	19	0	0	1	1	0	15	2	17	41
% App. Total	50	0	50		0	78.9	21.1		0	0	100		0	88.2	11.8		
PHF	.500	.000	.500	.500	.000	.469	.333	.594	.000	.000	.250	.250	.000	.469	.500	.472	.854



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45				08:00				07:15				07:15			
+0 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	3	0	3
+15 mins.	1	0	0	1	0	3	1	4	0	0	0	0	0	5	0	5
+30 mins.	0	0	1	1	0	8	0	8	0	0	0	0	0	1	0	1
+45 mins.	1	0	1	2	0	3	3	6	0	0	1	1	0	8	1	9
Total Volume	2	0	2	4	0	15	4	19	0	0	1	1	0	17	1	18
% App. Total	50	0	50		0	78.9	21.1		0	0	100		0	94.4	5.6	
PHF	.500	.000	.500	.500	.000	.469	.333	.594	.000	.000	.250	.250	.000	.531	.250	.500



N/S Street : Spruce St / Kinsley St
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

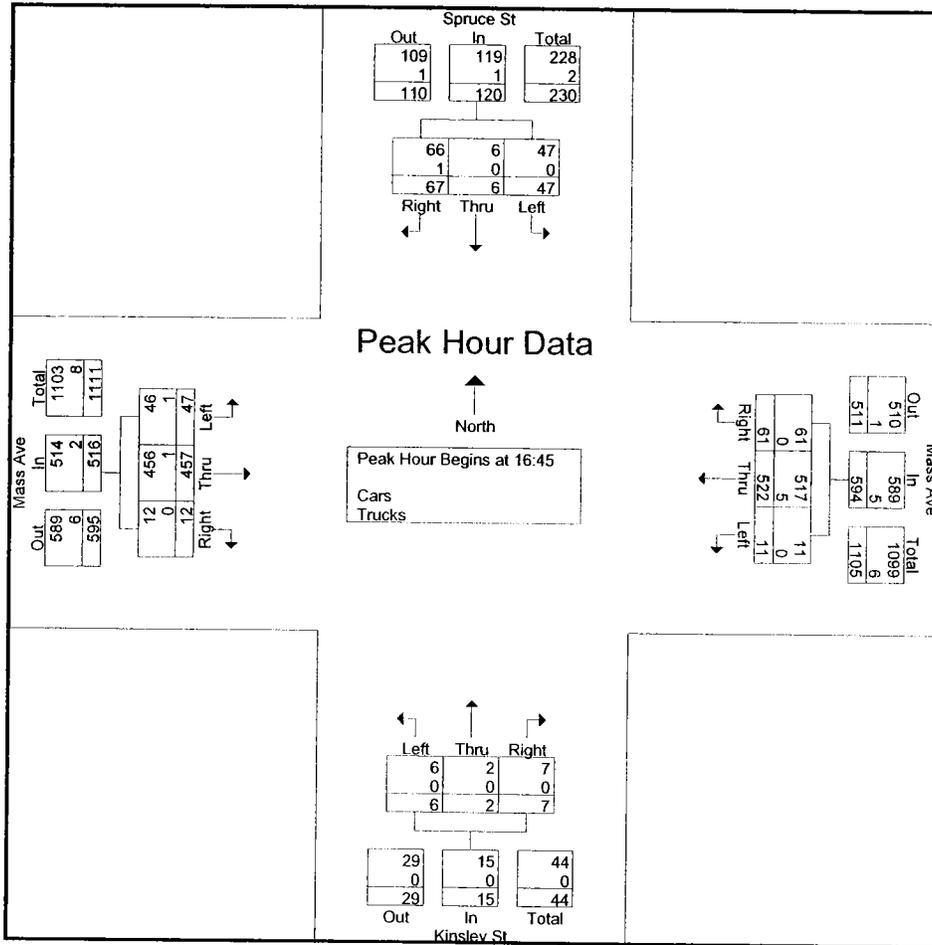
Accurate Counts
 978-664-2565

File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars - Trucks

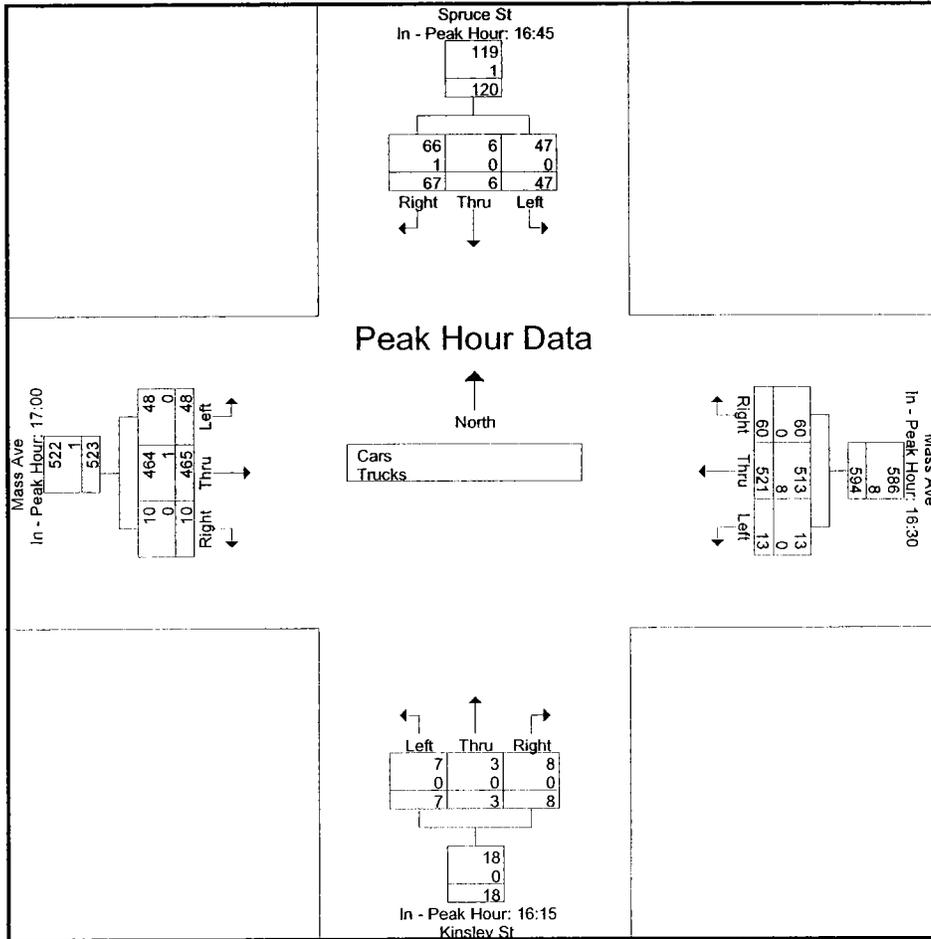
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	18	2	21	0	0	137	15	0	1	0	1	3	19	79	2	3	6	295	301
16:15	12	0	7	0	4	108	4	0	1	1	1	5	5	96	3	2	7	242	249
16:30	9	1	9	0	6	130	12	0	0	0	2	0	5	91	3	0	0	268	268
16:45	11	2	17	0	3	129	9	0	3	0	3	1	11	105	4	0	1	297	298
Total	50	5	54	0	13	504	40	0	5	1	7	9	40	371	12	5	14	1102	1116
17:00	4	4	18	0	2	127	19	0	3	2	2	2	8	126	4	0	2	319	321
17:15	12	0	20	0	2	135	20	0	0	0	1	2	18	109	0	0	2	317	319
17:30	20	0	12	0	4	131	13	0	0	0	1	0	10	117	4	0	0	312	312
17:45	6	1	13	0	1	129	7	0	1	1	5	1	12	113	2	0	1	291	292
Total	42	5	63	0	9	522	59	0	4	3	9	5	48	465	10	0	5	1239	1244
Grand Total	92	10	117	0	22	1026	99	0	9	4	16	14	88	836	22	5	19	2341	2360
Apprch %	42	4.6	53.4		1.9	89.5	8.6		31	13.8	55.2		9.3	88.4	2.3				
Total %	3.9	0.4	5		0.9	43.8	4.2		0.4	0.2	0.7		3.8	35.7	0.9		0.8	99.2	
Cars	92	10	115		22	1014	99		9	4	16		87	831	22		0	0	2340
% Cars	100	100	98.3	0	100	98.8	100	0	100	100	100	100	98.9	99.4	100	100	0	0	99.2
Trucks	0	0	2		0	12	0		0	0	0		1	5	0		0	0	20
% Trucks	0	0	1.7	0	0	1.2	0	0	0	0	0	0	1.1	0.6	0	0	0	0	0.8

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	11	2	17	30	3	129	9	141	3	0	3	6	11	105	4	120	297
17:00	4	4	18	26	2	127	19	148	3	2	2	7	8	126	4	138	319
17:15	12	0	20	32	2	135	20	157	0	0	1	1	18	109	0	127	317
17:30	20	0	12	32	4	131	13	148	0	0	1	1	10	117	4	131	312
Total Volume	47	6	67	120	11	522	61	594	6	2	7	15	47	457	12	516	1245
% App. Total	39.2	5	55.8		1.9	87.9	10.3		40	13.3	46.7		9.1	88.6	2.3		
PHF	.588	.375	.838	.938	.688	.967	.763	.946	.500	.250	.583	.536	.653	.907	.750	.935	.976
Cars	47	6	66	119	11	517	61	589	6	2	7	15	46	456	12	514	1237
% Cars	100	100	98.5	99.2	100	99.0	100	99.2	100	100	100	100	97.9	99.8	100	99.6	99.4
Trucks	0	0	1	1	0	5	0	5	0	0	0	0	1	1	0	2	8
% Trucks	0	0	1.5	0.8	0	1.0	0	0.8	0	0	0	0	2.1	0.2	0	0.4	0.6



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	16:45				16:30				16:15				17:00			
+0 mins.	11	2	17	30	6	130	12	148	1	1	1	3	8	126	4	138
+15 mins.	4	4	18	26	3	129	9	141	0	0	2	2	18	109	0	127
+30 mins.	12	0	20	32	2	127	19	148	3	0	3	6	10	117	4	131
+45 mins.	20	0	12	32	2	135	20	157	3	2	2	7	12	113	2	127
Total Volume	47	6	67	120	13	521	60	594	7	3	8	18	48	465	10	523
% App. Total	39.2	5	55.8		2.2	87.7	10.1		38.9	16.7	44.4		9.2	88.9	1.9	
PHF	.588	.375	.838	.938	.542	.965	.750	.946	.583	.375	.667	.643	.667	.923	.625	.947
Cars	47	6	66	119	13	513	60	586	7	3	8	18	48	464	10	522
% Cars	100	100	98.5	99.2	100	98.5	100	98.7	100	100	100	100	100	99.8	100	99.8
Trucks	0	0	1	1	0	8	0	8	0	0	0	0	0	1	0	1
% Trucks	0	0	1.5	0.8	0	1.5	0	1.3	0	0	0	0	0	0.2	0	0.2



N/S Street : Spruce St / Kinsley St
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

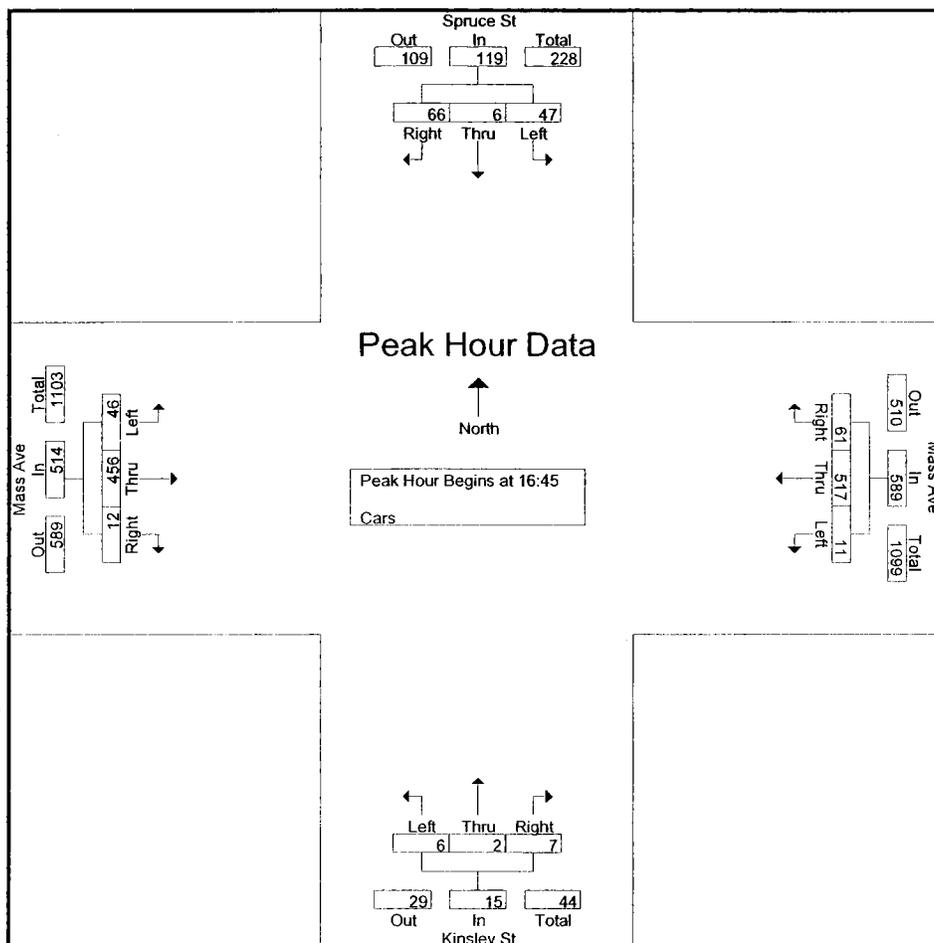
Accurate Counts
 978-664-2565

File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	18	2	21	0	0	135	15	0	1	0	1	3	19	78	2	3	6	292	298
16:15	12	0	7	0	4	107	4	0	1	1	1	5	5	95	3	2	7	240	247
16:30	9	1	8	0	6	127	12	0	0	0	2	0	5	89	3	0	0	262	262
16:45	11	2	17	0	3	127	9	0	3	0	3	1	10	105	4	0	1	294	295
Total	50	5	53	0	13	496	40	0	5	1	7	9	39	367	12	5	14	1088	1102
17:00	4	4	18	0	2	125	19	0	3	2	2	2	8	126	4	0	2	317	319
17:15	12	0	20	0	2	134	20	0	0	0	1	2	18	109	0	0	2	316	318
17:30	20	0	11	0	4	131	13	0	0	0	1	0	10	116	4	0	0	310	310
17:45	6	1	13	0	1	128	7	0	1	1	5	1	12	113	2	0	1	290	291
Total	42	5	62	0	9	518	59	0	4	3	9	5	48	464	10	0	5	1233	1238
Grand Total	92	10	115	0	22	1014	99	0	9	4	16	14	87	831	22	5	19	2321	2340
Apprch %	42.4	4.6	53		1.9	89.3	8.7		31	13.8	55.2		9.3	88.4	2.3				
Total %	4	0.4	5		0.9	43.7	4.3		0.4	0.2	0.7		3.7	35.8	0.9		0.8	99.2	

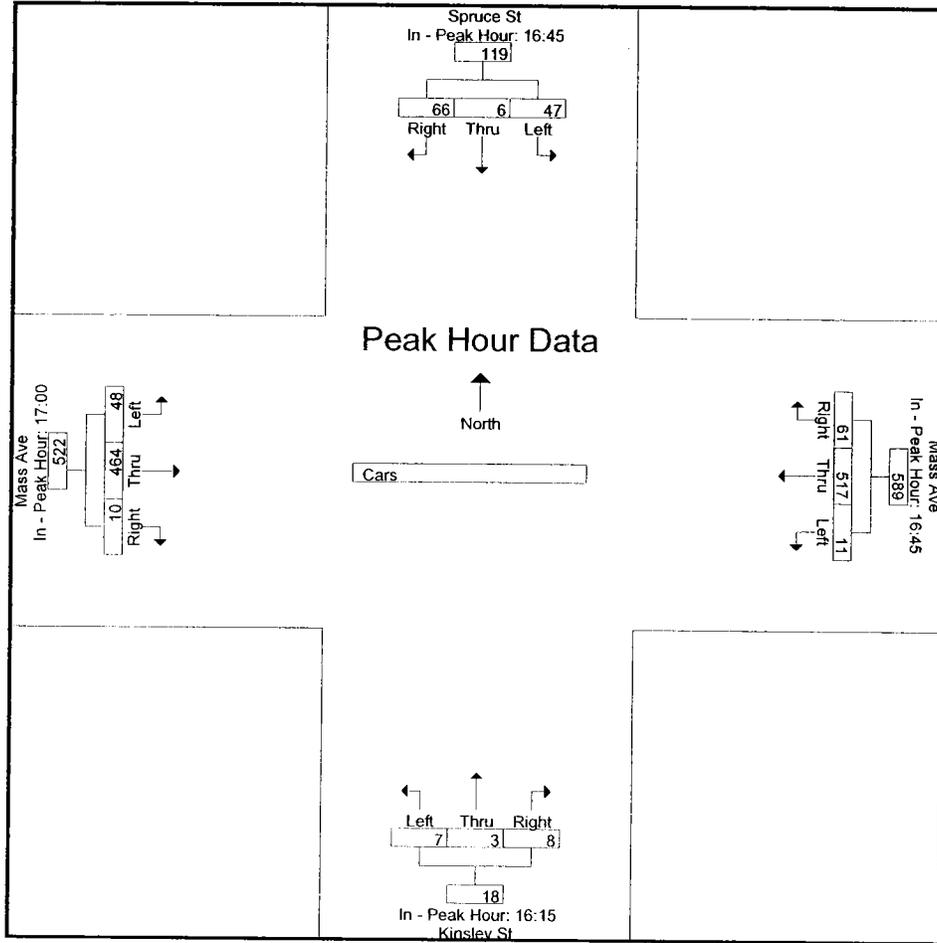
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	11	2	17	30	3	127	9	139	3	0	3	6	10	105	4	119	294
17:00	4	4	18	26	2	125	19	146	3	2	2	7	8	126	4	138	317
17:15	12	0	20	32	2	134	20	156	0	0	1	1	18	109	0	127	316
17:30	20	0	11	31	4	131	13	148	0	0	1	1	10	116	4	130	310
Total Volume	47	6	66	119	11	517	61	589	6	2	7	15	46	456	12	514	1237
% App. Total	39.5	5	55.5		1.9	87.8	10.4		40	13.3	46.7		8.9	88.7	2.3		
PHF	.588	.375	.825	.930	.688	.965	.763	.944	.500	.250	.583	.536	.639	.905	.750	.931	.976



Peak Hour Analysis From 16:00 to 17:45 - Peak I of 1

Peak Hour for Each Approach Begins at:

	16:45				16:45				16:15				17:00			
+0 mins.	11	2	17	30	3	127	9	139	1	1	1	3	8	126	4	138
+15 mins.	4	4	18	26	2	125	19	146	0	0	2	2	18	109	0	127
+30 mins.	12	0	20	32	2	134	20	156	3	0	3	6	10	116	4	130
+45 mins.	20	0	11	31	4	131	13	148	3	2	2	7	12	113	2	127
Total Volume	47	6	66	119	11	517	61	589	7	3	8	18	48	464	10	522
% App. Total	39.5	5	55.5	1.9	87.8	10.4	38.9	16.7	44.4	6.7	1.5	3.3	9.2	88.9	1.9	3.3
PHF	.588	.375	.825	.930	.688	.965	.763	.944	.583	.375	.667	.643	.667	.921	.625	.946



N/S Street : Spruce St / Kinsley St
 E/W Street : Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

Accurate Counts
 978-664-2565

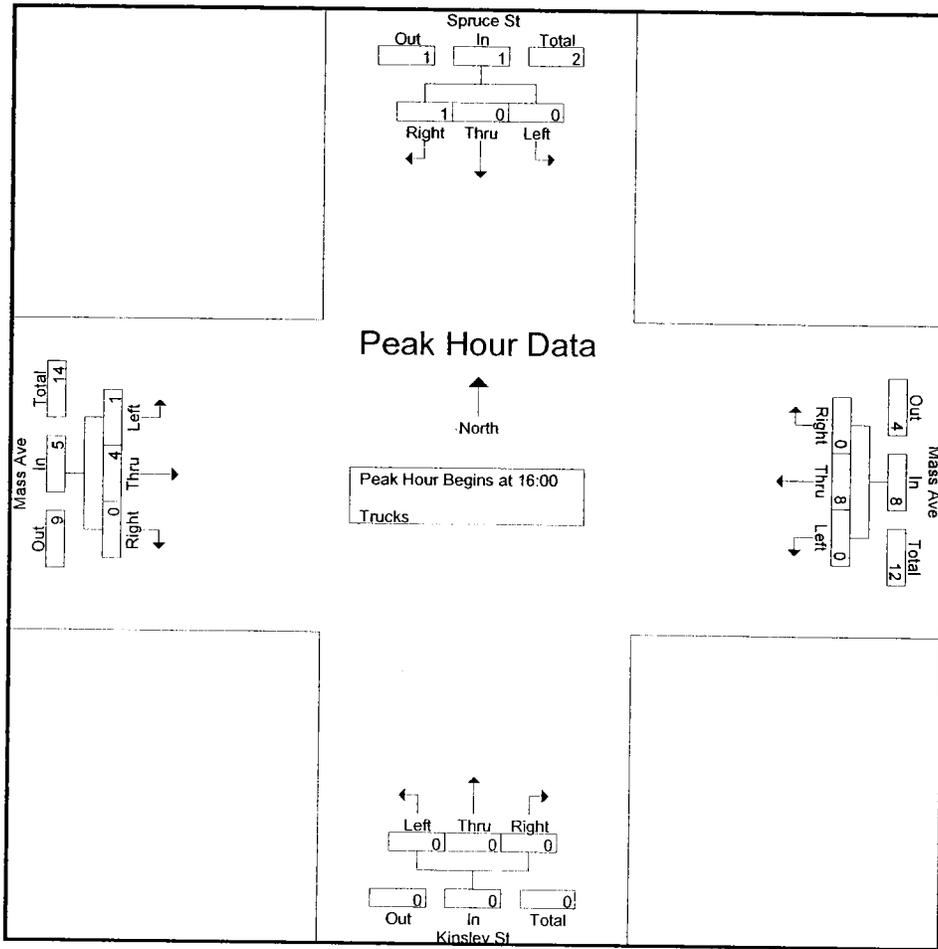
File Name : 13510001
 Site Code : 13510001
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3	3
16:15	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
16:30	0	0	1	0	0	3	0	0	0	0	0	0	0	2	0	0	0	6	6
16:45	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	3	3
Total	0	0	1	0	0	8	0	0	0	0	0	0	1	4	0	0	0	14	14
17:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
17:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
17:30	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2
17:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	1	0	0	4	0	0	0	0	0	0	0	1	0	0	0	6	6
Grand Total	0	0	2	0	0	12	0	0	0	0	0	0	1	5	0	0	0	20	20
Apprch %	0	0	100		0	100	0		0	0	0		16.7	83.3	0				
Total %	0	0	10		0	60	0		0	0	0		5	25	0		0	100	

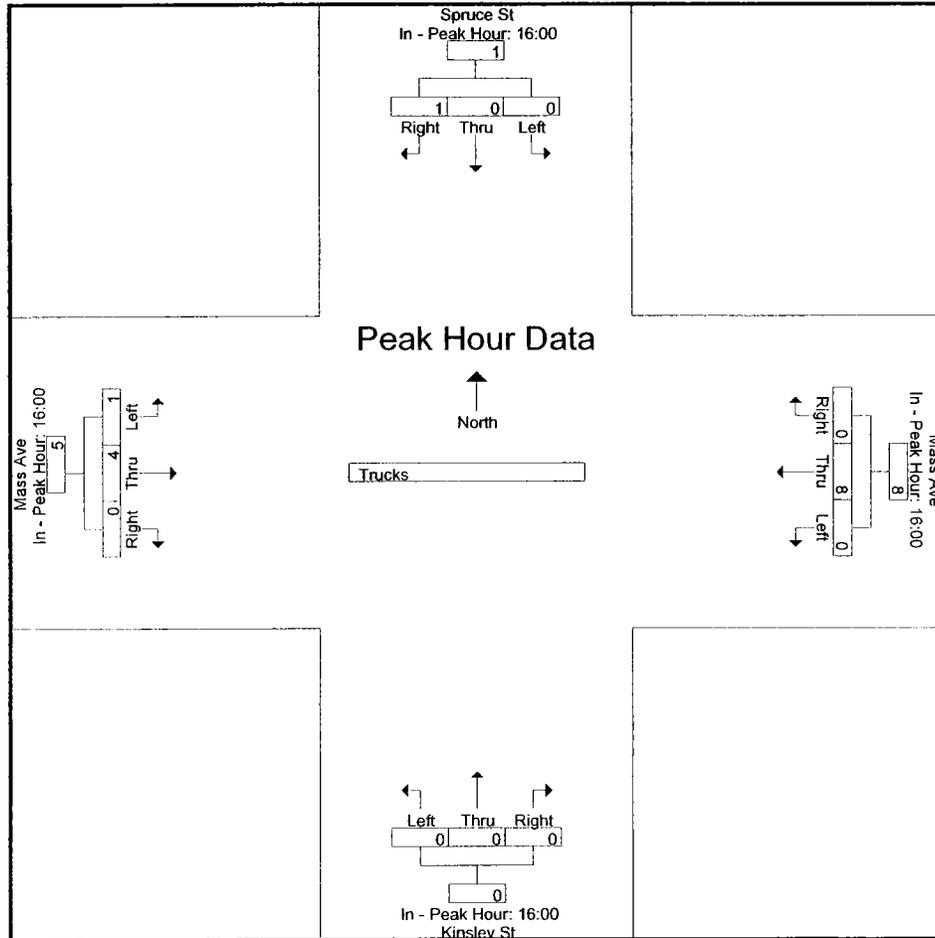
Start Time	Spruce St From North				Mass Ave From East				Kinsley St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
16:00	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
16:15	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
16:30	0	0	1	1	0	3	0	3	0	0	0	0	0	2	0	2	6
16:45	0	0	0	0	0	2	0	2	0	0	0	0	1	0	0	1	3
Total Volume	0	0	1	1	0	8	0	8	0	0	0	0	1	4	0	5	14
% App. Total	0	0	100		0	100	0		0	0	0		20	80	0		
PHF	.000	.000	.250	.250	.000	.667	.000	.667	.000	.000	.000	.000	.250	.500	.000	.625	.583

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 16:00



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	16:00				16:00				16:00				16:00			
+0 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
+30 mins.	0	0	1	1	0	3	0	3	0	0	0	0	0	2	0	2
+45 mins.	0	0	0	0	0	2	0	2	0	0	0	0	1	0	0	1
Total Volume	0	0	1	1	0	8	0	8	0	0	0	0	1	4	0	5
% App. Total	0	0	100		0	100	0		0	0	0	0	20	80	0	
PHF	.000	.000	.250	.250	.000	.667	.000	.667	.000	.000	.000	.000	.250	.500	.000	.625



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

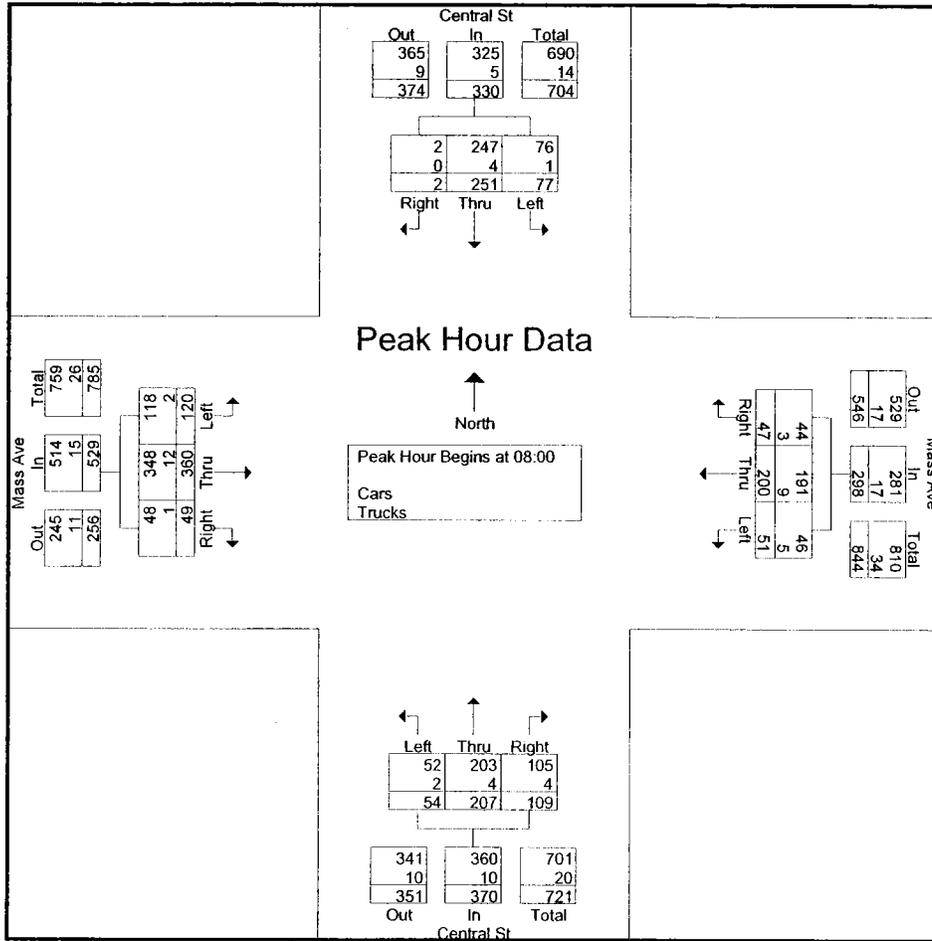
Groups Printed- Cars - Trucks

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	21	61	1	0	5	18	9	0	4	47	34	3	55	121	17	0	3	393	396
07:15	17	50	0	0	12	70	14	0	8	47	16	0	42	91	8	0	0	375	375
07:30	14	48	0	0	11	45	8	0	8	35	22	0	23	70	18	0	0	302	302
07:45	21	63	0	0	15	49	8	2	11	45	32	0	18	81	12	0	2	355	357
Total	73	222	1	0	43	182	39	2	31	174	104	3	138	363	55	0	5	1425	1430
08:00	18	60	0	0	10	56	4	0	8	45	28	0	38	95	9	0	0	371	371
08:15	13	59	1	0	12	52	13	0	12	64	36	6	30	94	13	0	6	399	405
08:30	21	73	0	0	15	47	19	0	18	48	24	0	26	76	10	0	0	377	377
08:45	25	59	1	1	14	45	11	0	16	50	21	3	26	95	17	1	5	380	385
Total	77	251	2	1	51	200	47	0	54	207	109	9	120	360	49	1	11	1527	1538
Grand Total	150	473	3	1	94	382	86	2	85	381	213	12	258	723	104	1	16	2952	2968
Apprch %	24	75.6	0.5		16.7	68	15.3		12.5	56.1	31.4		23.8	66.6	9.6				
Total %	5.1	16	0.1		3.2	12.9	2.9		2.9	12.9	7.2		8.7	24.5	3.5		0.5	99.5	
Cars	145	461	3		85	364	81		82	373	208		247	700	102		0	0	2867
% Cars	96.7	97.5	100	100	90.4	95.3	94.2	100	96.5	97.9	97.7	100	95.7	96.8	98.1	100	0	0	96.6
Trucks	5	12	0		9	18	5		3	8	5		11	23	2		0	0	101
% Trucks	3.3	2.5	0	0	9.6	4.7	5.8	0	3.5	2.1	2.3	0	4.3	3.2	1.9	0	0	0	3.4

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	18	60	0	78	10	56	4	70	8	45	28	81	38	95	9	142	371
08:15	13	59	1	73	12	52	13	77	12	64	36	112	30	94	13	137	399
08:30	21	73	0	94	15	47	19	81	18	48	24	90	26	76	10	112	377
08:45	25	59	1	85	14	45	11	70	16	50	21	87	26	95	17	138	380
Total Volume	77	251	2	330	51	200	47	298	54	207	109	370	120	360	49	529	1527
% App. Total	23.3	76.1	0.6		17.1	67.1	15.8		14.6	55.9	29.5		22.7	68.1	9.3		
PHF	.770	.860	.500	.878	.850	.893	.618	.920	.750	.809	.757	.826	.789	.947	.721	.931	.957
Cars	76	247	2	325	46	191	44	281	52	203	105	360	118	348	48	514	1480
% Cars	98.7	98.4	100	98.5	90.2	95.5	93.6	94.3	96.3	98.1	96.3	97.3	98.3	96.7	98.0	97.2	96.9
Trucks	1	4	0	5	5	9	3	17	2	4	4	10	2	12	1	15	47
% Trucks	1.3	1.6	0	1.5	9.8	4.5	6.4	5.7	3.7	1.9	3.7	2.7	1.7	3.3	2.0	2.8	3.1

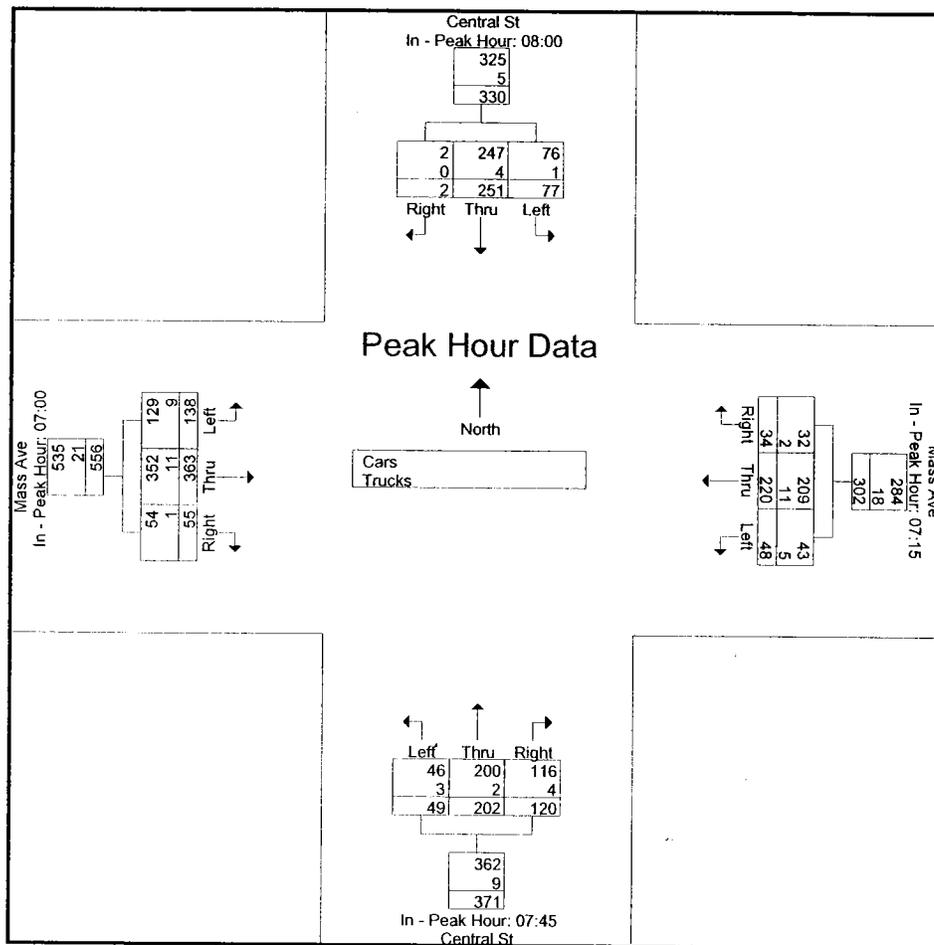
Accurate Counts
978-664-2565

File Name : 13510002
Site Code : 13510002
Start Date : 3/27/2008
Page No : 2



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

	08:00				07:15				07:45				07:00			
+0 mins.	18	60	0	78	12	70	14	96	11	45	32	88	55	121	17	193
+15 mins.	13	59	1	73	11	45	8	64	8	45	28	81	42	91	8	141
+30 mins.	21	73	0	94	15	49	8	72	12	64	36	112	23	70	18	111
+45 mins.	25	59	1	85	10	56	4	70	18	48	24	90	18	81	12	111
Total Volume	77	251	2	330	48	220	34	302	49	202	120	371	138	363	55	556
% App. Total	23.3	76.1	0.6		15.9	72.8	11.3		13.2	54.4	32.3		24.8	65.3	9.9	
PHF	.770	.860	.500	.878	.800	.786	.607	.786	.681	.789	.833	.828	.627	.750	.764	.720
Cars	76	247	2	325	43	209	32	284	46	200	116	362	129	352	54	535
% Cars	98.7	98.4	100	98.5	89.6	95	94.1	94	93.9	99	96.7	97.6	93.5	97	98.2	96.2
Trucks	1	4	0	5	5	11	2	18	3	2	4	9	9	11	1	21
% Trucks	1.3	1.6	0	1.5	10.4	5	5.9	6	6.1	1	3.3	2.4	6.5	3	1.8	3.8



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

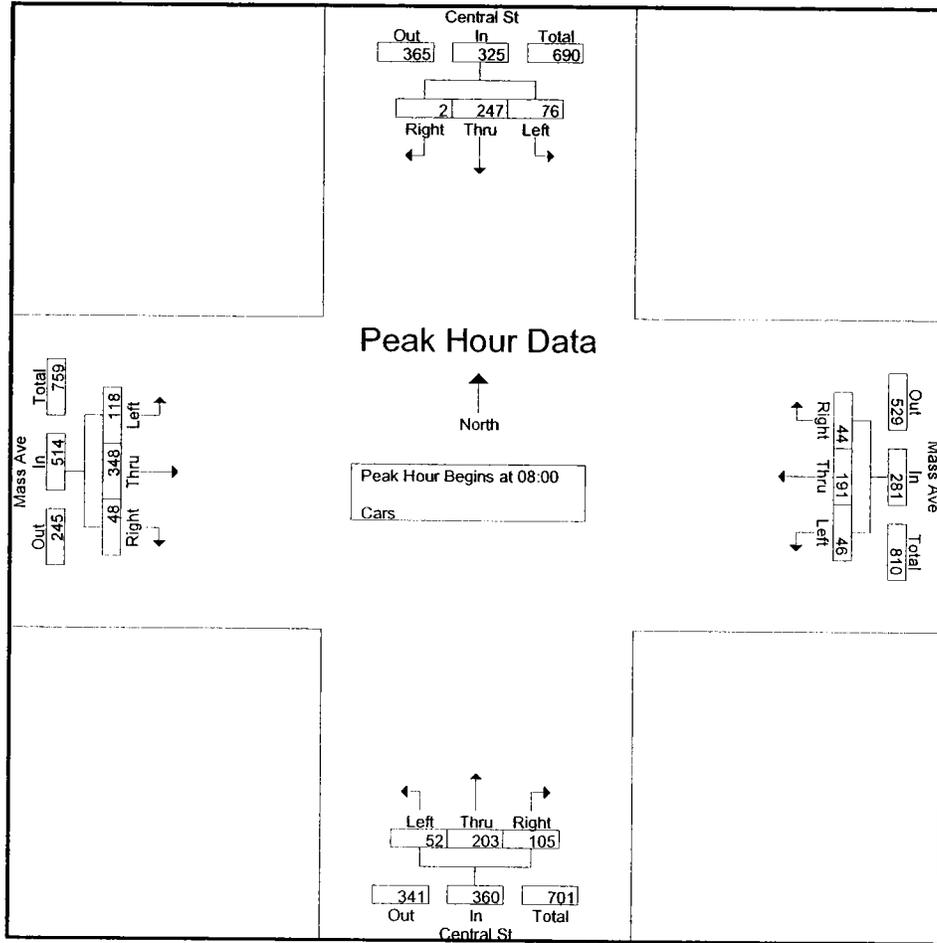
Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	20	58	1	0	5	18	9	0	4	45	34	3	49	118	17	0	3	378	381
07:15	17	49	0	0	11	67	12	0	8	45	16	0	41	89	7	0	0	362	362
07:30	12	47	0	0	11	42	8	0	8	35	21	0	21	67	18	0	0	290	290
07:45	20	60	0	0	12	46	8	2	10	45	32	0	18	78	12	0	2	341	343
Total	69	214	1	0	39	173	37	2	30	170	103	3	129	352	54	0	5	1371	1376
08:00	18	57	0	0	9	54	4	0	7	43	25	0	38	90	9	0	0	354	354
08:15	13	59	1	0	11	51	13	0	12	64	36	6	28	90	12	0	6	390	396
08:30	21	72	0	0	13	43	17	0	17	48	23	0	26	76	10	0	0	366	366
08:45	24	59	1	1	13	43	10	0	16	48	21	3	26	92	17	1	5	370	375
Total	76	247	2	1	46	191	44	0	52	203	105	9	118	348	48	1	11	1480	1491
Grand Total	145	461	3	1	85	364	81	2	82	373	208	12	247	700	102	1	16	2851	2867
Apprch %	23.8	75.7	0.5		16	68.7	15.3		12.4	56.3	31.4		23.5	66.7	9.7				
Total %	5.1	16.2	0.1		3	12.8	2.8		2.9	13.1	7.3		8.7	24.6	3.6		0.6	99.4	

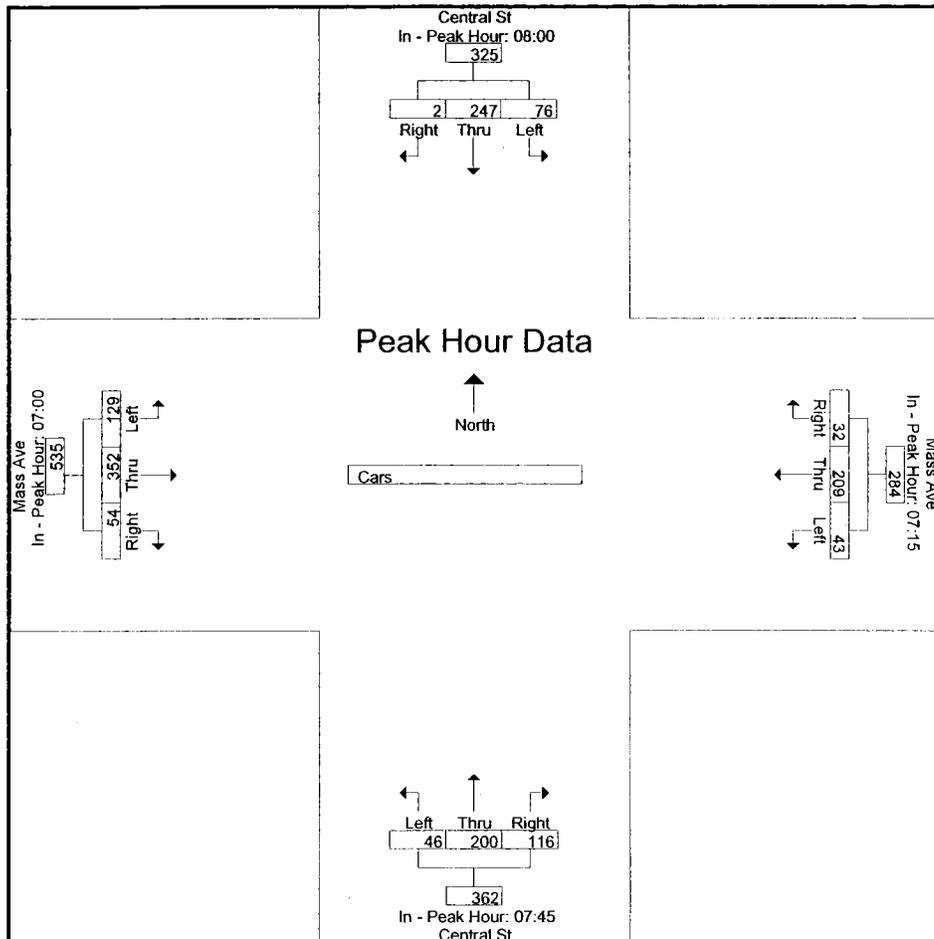
Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	18	57	0	75	9	54	4	67	7	43	25	75	38	90	9	137	354
08:15	13	59	1	73	11	51	13	75	12	64	36	112	28	90	12	130	390
08:30	21	72	0	93	13	43	17	73	17	48	23	88	26	76	10	112	366
08:45	24	59	1	84	13	43	10	66	16	48	21	85	26	92	17	135	370
Total Volume	76	247	2	325	46	191	44	281	52	203	105	360	118	348	48	514	1480
% App. Total	23.4	76	0.6		16.4	68	15.7		14.4	56.4	29.2		23	67.7	9.3		
PHF	.792	.858	.500	.874	.885	.884	.647	.937	.765	.793	.729	.804	.776	.946	.706	.938	.949



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	08:00				07:15				07:45				07:00			
+0 mins.	18	57	0	75	11	67	12	90	10	45	32	87	49	118	17	184
+15 mins.	13	59	1	73	11	42	8	61	7	43	25	75	41	89	7	137
+30 mins.	21	72	0	93	12	46	8	66	12	64	36	112	21	67	18	106
+45 mins.	24	59	1	84	9	54	4	67	17	48	23	88	18	78	12	108
Total Volume	76	247	2	325	43	209	32	284	46	200	116	362	129	352	54	535
% App. Total	23.4	76	0.6		15.1	73.6	11.3		12.7	55.2	32		24.1	65.8	10.1	
PHF	.792	.858	.500	.874	.896	.780	.667	.789	.676	.781	.806	.808	.658	.746	.750	.727



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

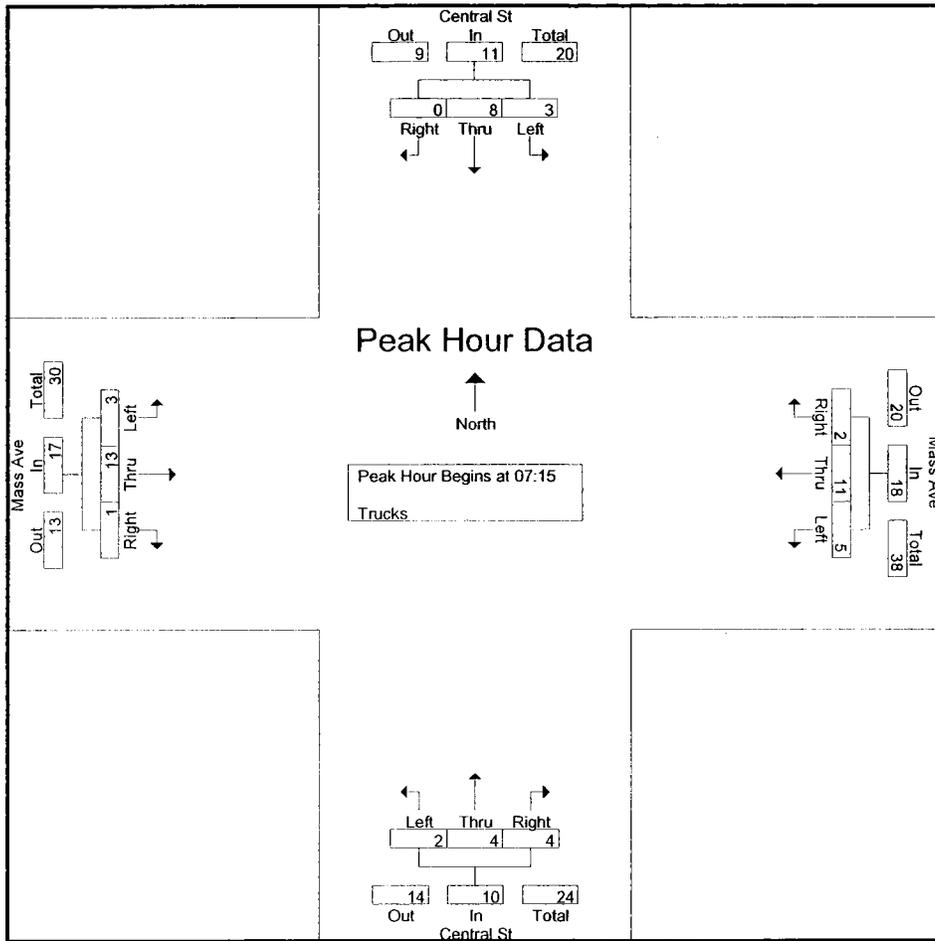
Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	1	3	0	0	0	0	0	0	0	2	0	0	6	3	0	0	0	15	15
07:15	0	1	0	0	1	3	2	0	0	2	0	0	1	2	1	0	0	13	13
07:30	2	1	0	0	0	3	0	0	0	0	1	0	2	3	0	0	0	12	12
07:45	1	3	0	0	3	3	0	0	1	0	0	0	0	3	0	0	0	14	14
Total	4	8	0	0	4	9	2	0	1	4	1	0	9	11	1	0	0	54	54
08:00	0	3	0	0	1	2	0	0	1	2	3	0	0	5	0	0	0	17	17
08:15	0	0	0	0	1	1	0	0	0	0	0	0	2	4	1	0	0	9	9
08:30	0	1	0	0	2	4	2	0	1	0	1	0	0	0	0	0	0	11	11
08:45	1	0	0	0	1	2	1	0	0	2	0	0	0	3	0	0	0	10	10
Total	1	4	0	0	5	9	3	0	2	4	4	0	2	12	1	0	0	47	47
Grand Total	5	12	0	0	9	18	5	0	3	8	5	0	11	23	2	0	0	101	101
Apprch %	29.4	70.6	0		28.1	56.2	15.6		18.8	50	31.2		30.6	63.9	5.6		0		
Total %	5	11.9	0		8.9	17.8	5		3	7.9	5		10.9	22.8	2		0	100	

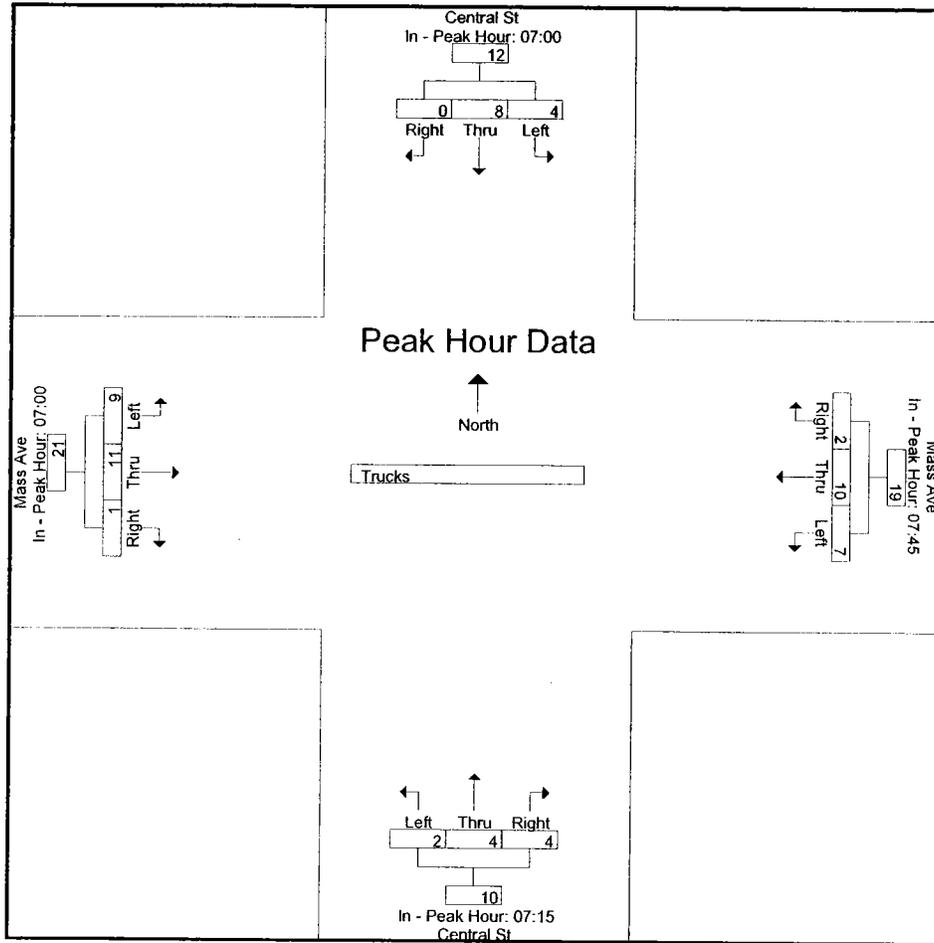
Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15																	
07:15	0	1	0	1	1	3	2	6	0	2	0	2	1	2	1	4	13
07:30	2	1	0	3	0	3	0	3	0	0	1	1	2	3	0	5	12
07:45	1	3	0	4	3	3	0	6	1	0	0	1	0	3	0	3	14
08:00	0	3	0	3	1	2	0	3	1	2	3	6	0	5	0	5	17
Total Volume	3	8	0	11	5	11	2	18	2	4	4	10	3	13	1	17	56
% App. Total	27.3	72.7	0		27.8	61.1	11.1		20	40	40		17.6	76.5	5.9		
PHF	.375	.667	.000	.688	.417	.917	.250	.750	.500	.500	.333	.417	.375	.650	.250	.850	.824



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00				07:45				07:15				07:00			
+0 mins.	1	3	0	4	3	3	0	6	0	2	0	2	6	3	0	9
+15 mins.	0	1	0	1	1	2	0	3	0	0	1	1	1	2	1	4
+30 mins.	2	1	0	3	1	1	0	2	1	0	0	1	2	3	0	5
+45 mins.	1	3	0	4	2	4	2	8	1	2	3	6	0	3	0	3
Total Volume	4	8	0	12	7	10	2	19	2	4	4	10	9	11	1	21
% App. Total	33.3	66.7	0		36.8	52.6	10.5		20	40	40		42.9	52.4	4.8	
PHF	.500	.667	.000	.750	.583	.625	.250	.594	.500	.500	.333	.417	.375	.917	.250	.583



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

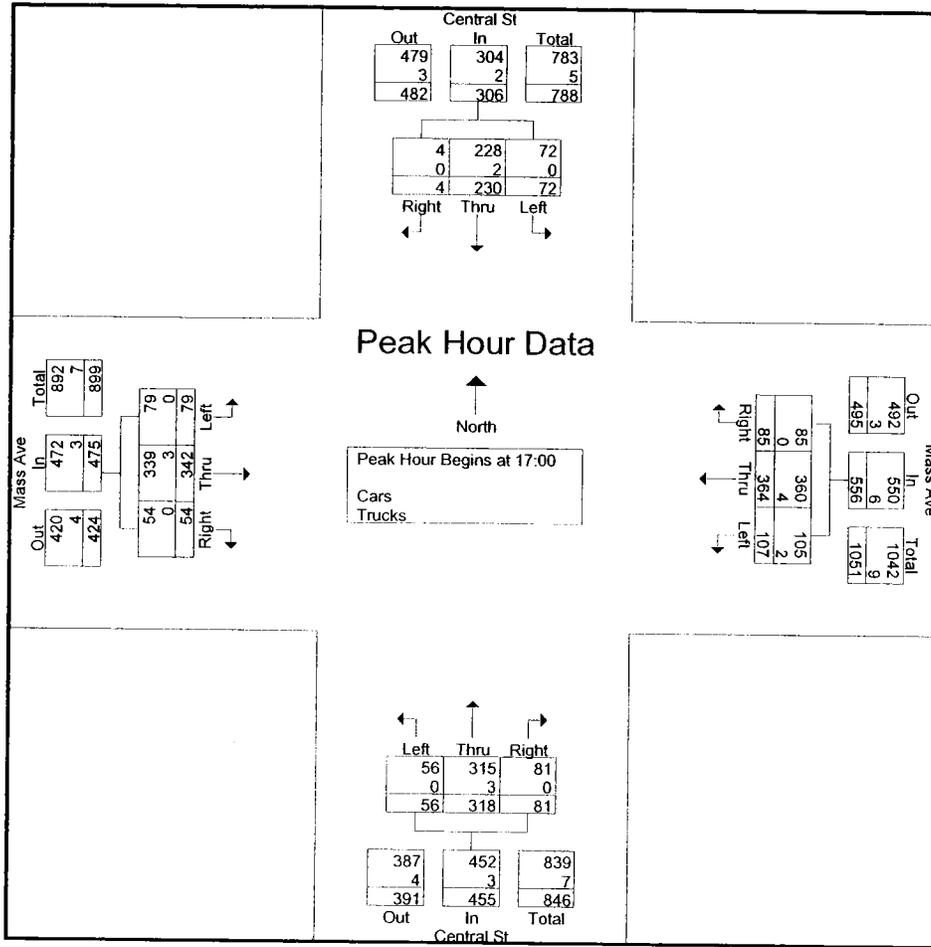
Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars - Trucks

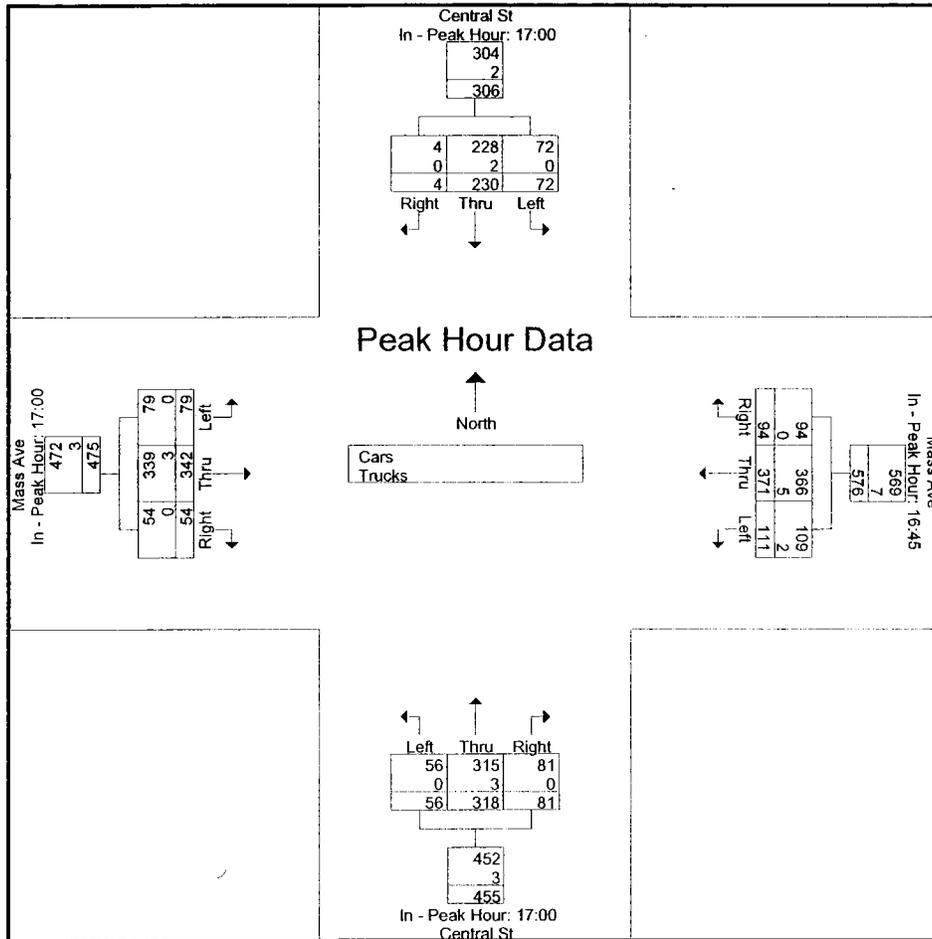
Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	15	41	0	0	29	107	19	15	12	53	24	1	27	53	10	0	16	390	406
16:15	13	58	0	0	25	67	23	0	14	59	28	2	18	54	8	0	2	367	369
16:30	8	50	0	0	16	79	19	2	11	54	26	7	29	74	8	0	9	374	383
16:45	16	47	0	0	22	103	24	0	14	60	18	0	25	79	6	0	0	414	414
Total	52	196	0	0	92	356	85	17	51	226	96	10	99	260	32	0	27	1545	1572
17:00	13	57	2	0	27	88	18	2	16	77	22	0	24	90	9	3	5	443	448
17:15	19	58	1	0	35	94	22	0	10	82	26	0	16	82	11	0	0	456	456
17:30	25	67	0	0	27	86	30	0	16	81	14	0	18	75	16	0	0	455	455
17:45	15	48	1	0	18	96	15	11	14	78	19	0	21	95	18	0	11	438	449
Total	72	230	4	0	107	364	85	13	56	318	81	0	79	342	54	3	16	1792	1808
Grand Total	124	426	4	0	199	720	170	30	107	544	177	10	178	602	86	3	43	3337	3380
Apprch %	22.4	76.9	0.7		18.3	66.1	15.6		12.9	65.7	21.4		20.6	69.5	9.9				
Total %	3.7	12.8	0.1		6	21.6	5.1		3.2	16.3	5.3		5.3	18	2.6		1.3	98.7	
Cars	123	422	4		197	710	169		104	538	177		175	593	86		0	0	3341
% Cars	99.2	99.1	100	0	99	98.6	99.4	100	97.2	98.9	100	100	98.3	98.5	100	100	0	0	98.8
Trucks	1	4	0		2	10	1		3	6	0		3	9	0		0	0	39
% Trucks	0.8	0.9	0	0	1	1.4	0.6	0	2.8	1.1	0	0	1.7	1.5	0	0	0	0	1.2

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	13	57	2	72	27	88	18	133	16	77	22	115	24	90	9	123	443
17:15	19	58	1	78	35	94	22	151	10	82	26	118	16	82	11	109	456
17:30	25	67	0	92	27	86	30	143	16	81	14	111	18	75	16	109	455
17:45	15	48	1	64	18	96	15	129	14	78	19	111	21	95	18	134	438
Total Volume	72	230	4	306	107	364	85	556	56	318	81	455	79	342	54	475	1792
% App. Total	23.5	75.2	1.3		19.2	65.5	15.3		12.3	69.9	17.8		16.6	72	11.4		
PHF	.720	.858	.500	.832	.764	.948	.708	.921	.875	.970	.779	.964	.823	.900	.750	.886	.982
Cars	72	228	4	304	105	360	85	550	56	315	81	452	79	339	54	472	1778
% Cars	100	99.1	100	99.3	98.1	98.9	100	98.9	100	99.1	100	99.3	100	99.1	100	99.4	99.2
Trucks	0	2	0	2	2	4	0	6	0	3	0	3	0	3	0	3	14
% Trucks	0	0.9	0	0.7	1.9	1.1	0	1.1	0	0.9	0	0.7	0	0.9	0	0.6	0.8



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	17:00				16:45				17:00				17:00			
+0 mins.	13	57	2	72	22	103	24	149	16	77	22	115	24	90	9	123
+15 mins.	19	58	1	78	27	88	18	133	10	82	26	118	16	82	11	109
+30 mins.	25	67	0	92	35	94	22	151	16	81	14	111	18	75	16	109
+45 mins.	15	48	1	64	27	86	30	143	14	78	19	111	21	95	18	134
Total Volume	72	230	4	306	111	371	94	576	56	318	81	455	79	342	54	475
% App. Total	23.5	75.2	1.3		19.3	64.4	16.3		12.3	69.9	17.8		16.6	72	11.4	
PHF	.720	.858	.500	.832	.793	.900	.783	.954	.875	.970	.779	.964	.823	.900	.750	.886
Cars	72	228	4	304	109	366	94	569	56	315	81	452	79	339	54	472
% Cars	100	99.1	100	99.3	98.2	98.7	100	98.8	100	99.1	100	99.3	100	99.1	100	99.4
Trucks	0	2	0	2	2	5	0	7	0	3	0	3	0	3	0	3
% Trucks	0	0.9	0	0.7	1.8	1.3	0	1.2	0	0.9	0	0.7	0	0.9	0	0.6



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

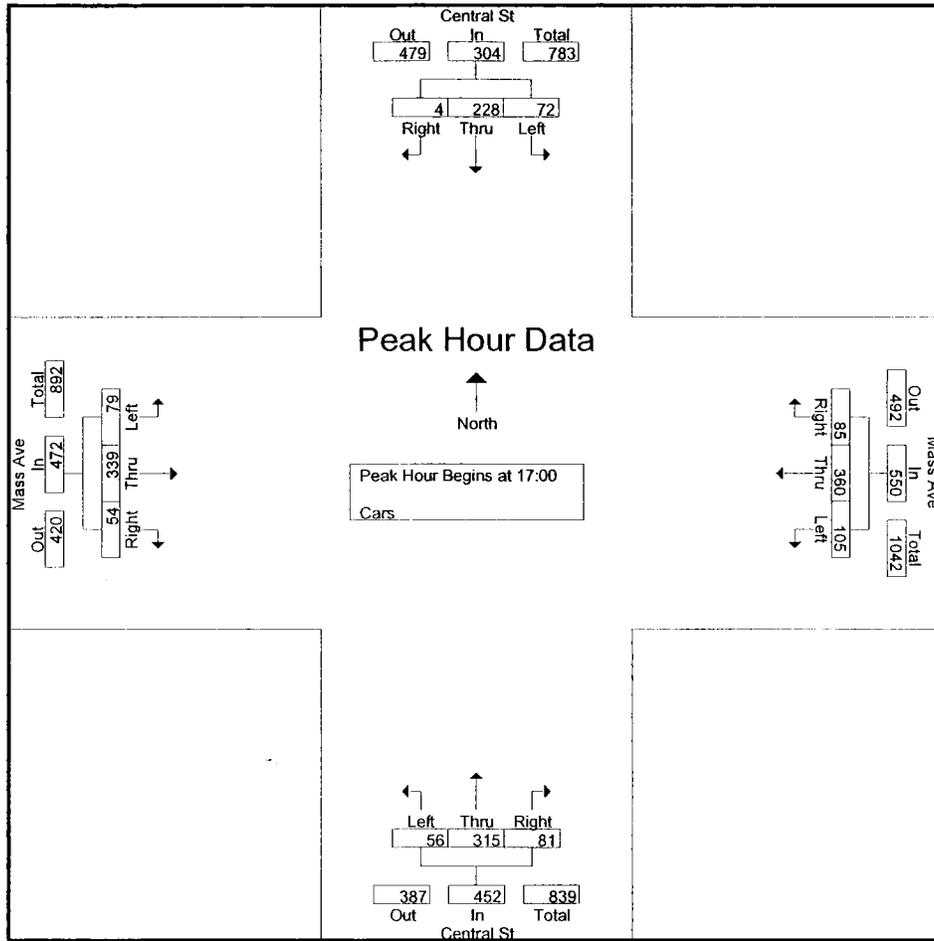
Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	15	41	0	0	29	106	19	15	11	53	24	1	27	51	10	0	16	386	402
16:15	13	57	0	0	25	67	23	0	12	58	28	2	17	53	8	0	2	361	363
16:30	7	49	0	0	16	76	18	2	11	52	26	7	29	72	8	0	9	364	373
16:45	16	47	0	0	22	101	24	0	14	60	18	0	23	78	6	0	0	409	409
Total	51	194	0	0	92	350	84	17	48	223	96	10	96	254	32	0	27	1520	1547
17:00	13	56	2	0	26	88	18	2	16	74	22	0	24	90	9	3	5	438	443
17:15	19	58	1	0	34	91	22	0	10	82	26	0	16	82	11	0	0	452	452
17:30	25	66	0	0	27	86	30	0	16	81	14	0	18	73	16	0	0	452	452
17:45	15	48	1	0	18	95	15	11	14	78	19	0	21	94	18	0	11	436	447
Total	72	228	4	0	105	360	85	13	56	315	81	0	79	339	54	3	16	1778	1794
Grand Total	123	422	4	0	197	710	169	30	104	538	177	10	175	593	86	3	43	3298	3341
Apprch %	22.4	76.9	0.7		18.3	66	15.7		12.7	65.7	21.6		20.5	69.4	10.1				
Total %	3.7	12.8	0.1		6	21.5	5.1		3.2	16.3	5.4		5.3	18	2.6		1.3	98.7	

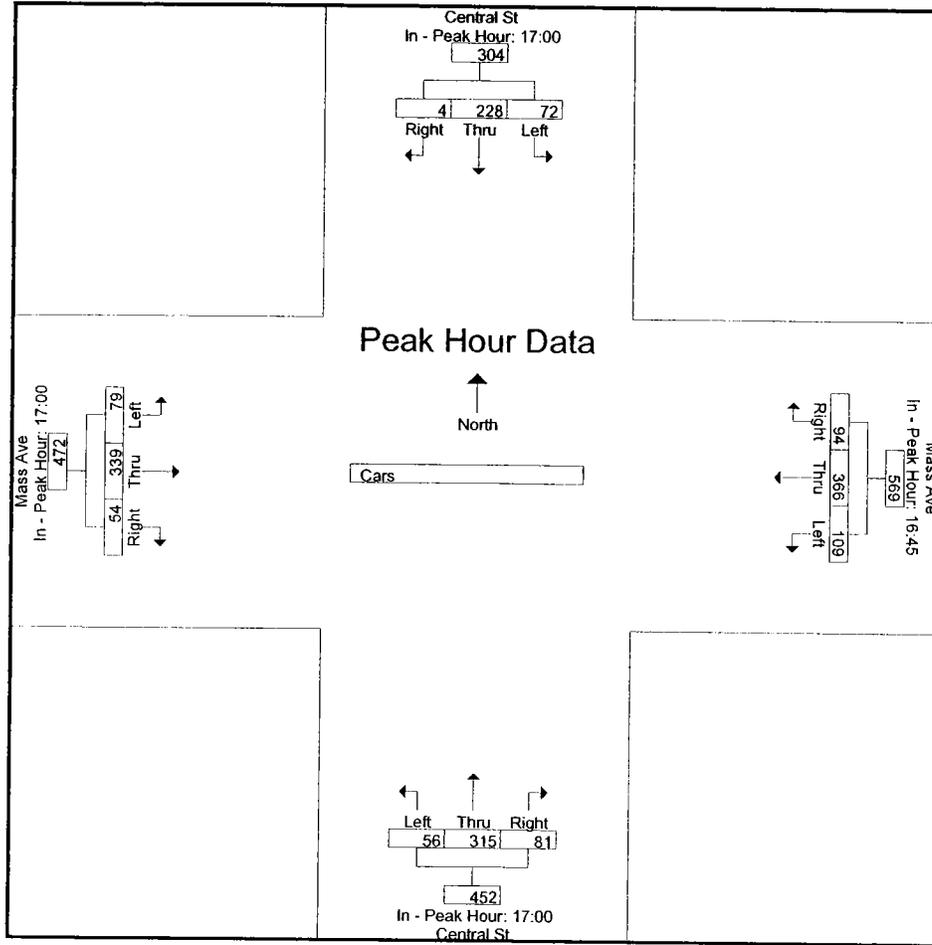
Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	13	56	2	71	26	88	18	132	16	74	22	112	24	90	9	123	438
17:15	19	58	1	78	34	91	22	147	10	82	26	118	16	82	11	109	452
17:30	25	66	0	91	27	86	30	143	16	81	14	111	18	73	16	107	452
17:45	15	48	1	64	18	95	15	128	14	78	19	111	21	94	18	133	436
Total Volume	72	228	4	304	105	360	85	550	56	315	81	452	79	339	54	472	1778
% App. Total	23.7	75	1.3		19.1	65.5	15.5		12.4	69.7	17.9		16.7	71.8	11.4		
PHF	.720	.864	.500	.835	.772	.947	.708	.935	.875	.960	.779	.958	.823	.902	.750	.887	.983



Peak Hour Analysis From 16:00 to 17:45 - Peak I of 1

Peak Hour for Each Approach Begins at:

	17:00				16:45				17:00				17:00			
+0 mins.	13	56	2	71	22	101	24	147	16	74	22	112	24	90	9	123
+15 mins.	19	58	1	78	26	88	18	132	10	82	26	118	16	82	11	109
+30 mins.	25	66	0	91	34	91	22	147	16	81	14	111	18	73	16	107
+45 mins.	15	48	1	64	27	86	30	143	14	78	19	111	21	94	18	133
Total Volume	72	228	4	304	109	366	94	569	56	315	81	452	79	339	54	472
% App. Total	23.7	75	1.3		19.2	64.3	16.5		12.4	69.7	17.9		16.7	71.8	11.4	
PHF	.720	.864	.500	.835	.801	.906	.783	.968	.875	.960	.779	.958	.823	.902	.750	.887



N/S Street : Central Street
 E/W Street: Massachusetts Avenue
 City/State : Acton, MA
 Weather : Clear

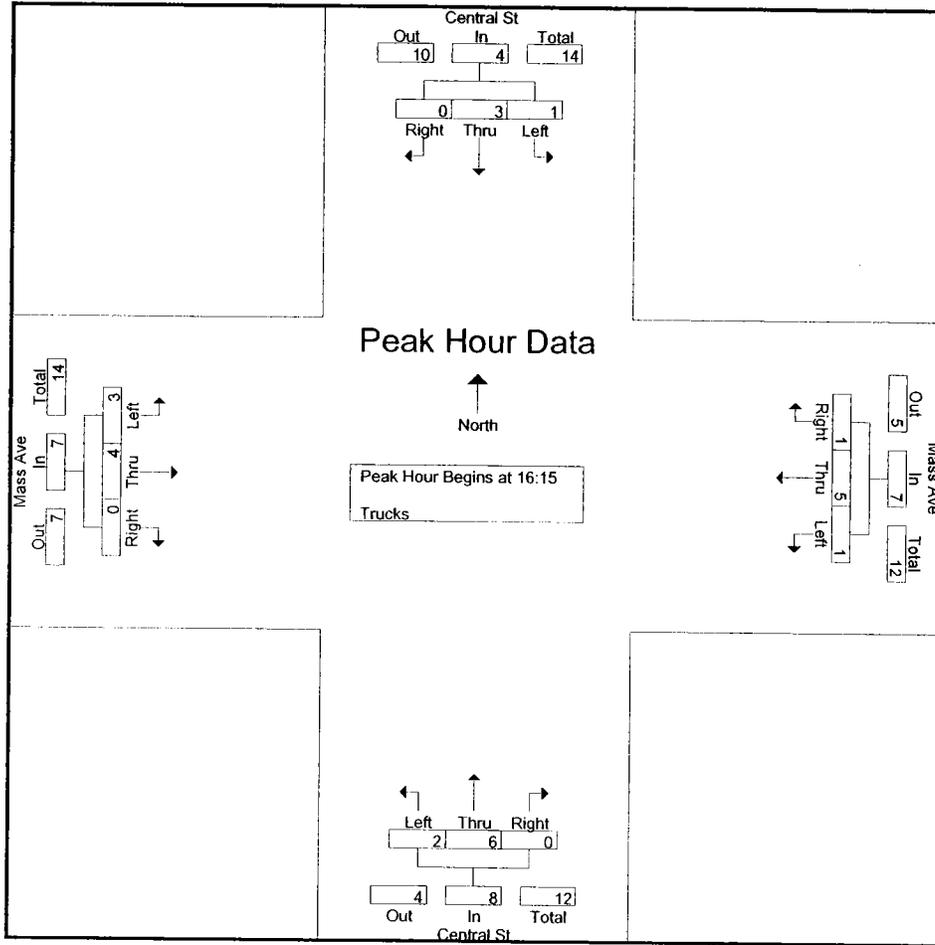
Accurate Counts
 978-664-2565

File Name : 13510002
 Site Code : 13510002
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	0	0	4	4
16:15	0	1	0	0	0	0	0	0	2	1	0	0	1	1	0	0	0	6	6
16:30	1	1	0	0	0	3	1	0	0	2	0	0	0	2	0	0	0	10	10
16:45	0	0	0	0	0	2	0	0	0	0	0	0	2	1	0	0	0	5	5
Total	1	2	0	0	0	6	1	0	3	3	0	0	3	6	0	0	0	25	25
17:00	0	1	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	5	5
17:15	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	4	4
17:30	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	3
17:45	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	2
Total	0	2	0	0	2	4	0	0	0	3	0	0	0	3	0	0	0	14	14
Grand Total	1	4	0	0	2	10	1	0	3	6	0	0	3	9	0	0	0	39	39
Apprch %	20	80	0		15.4	76.9	7.7		33.3	66.7	0		25	75	0				
Total %	2.6	10.3	0		5.1	25.6	2.6		7.7	15.4	0		7.7	23.1	0		0	100	

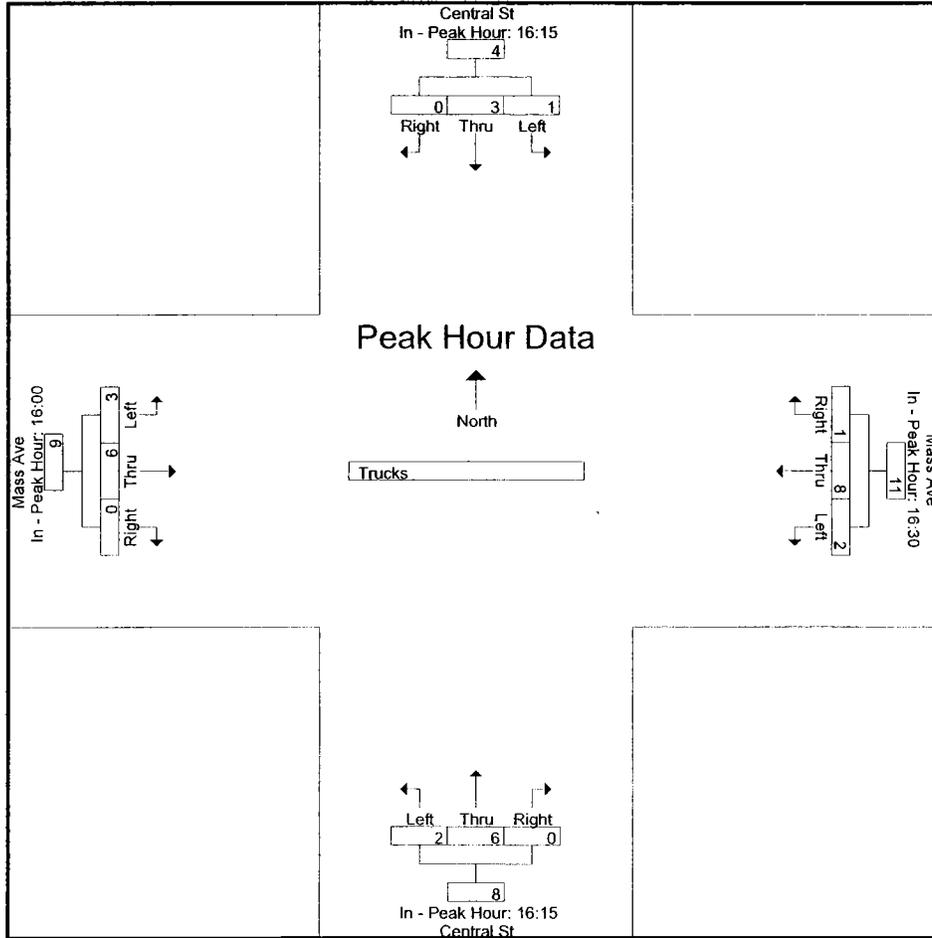
Start Time	Central St From North				Mass Ave From East				Central St From South				Mass Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:15																	
16:15	0	1	0	1	0	0	0	0	2	1	0	3	1	1	0	2	6
16:30	1	1	0	2	0	3	1	4	0	2	0	2	0	2	0	2	10
16:45	0	0	0	0	0	2	0	2	0	0	0	0	2	1	0	3	5
17:00	0	1	0	1	1	0	0	1	0	3	0	3	0	0	0	0	5
Total Volume	1	3	0	4	1	5	1	7	2	6	0	8	3	4	0	7	26
% App. Total	25	75	0		14.3	71.4	14.3		25	75	0		42.9	57.1	0		
PHF	.250	.750	.000	.500	.250	.417	.250	.438	.250	.500	.000	.667	.375	.500	.000	.583	.650



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	16:15				16:30				16:15				16:00			
+0 mins.	0	1	0	1	0	3	1	4	2	1	0	3	0	2	0	2
+15 mins.	1	1	0	2	0	2	0	2	0	2	0	2	1	1	0	2
+30 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	2
+45 mins.	0	1	0	1	1	3	0	4	0	3	0	3	2	1	0	3
Total Volume	1	3	0	4	2	8	1	11	2	6	0	8	3	6	0	9
% App. Total	25	75	0		18.2	72.7	9.1		25	75	0		33.3	66.7	0	
PHF	.250	.750	.000	.500	.500	.667	.250	.688	.250	.500	.000	.667	.375	.750	.000	.750



N/S Street : Spruce Street
 E/W Street: Arlington Street
 City/State : Acton, MA
 Weather : Clear

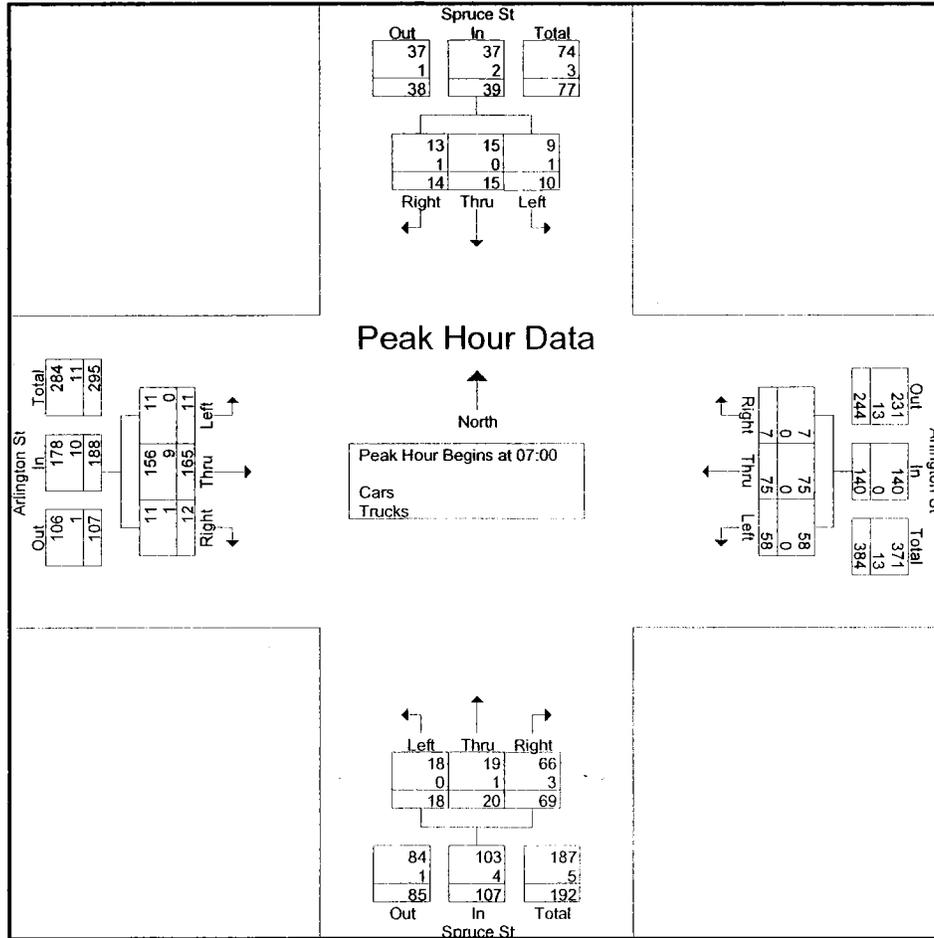
Accurate Counts
 978-664-2565

File Name : 13510003
 Site Code : 13510003
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars - Trucks

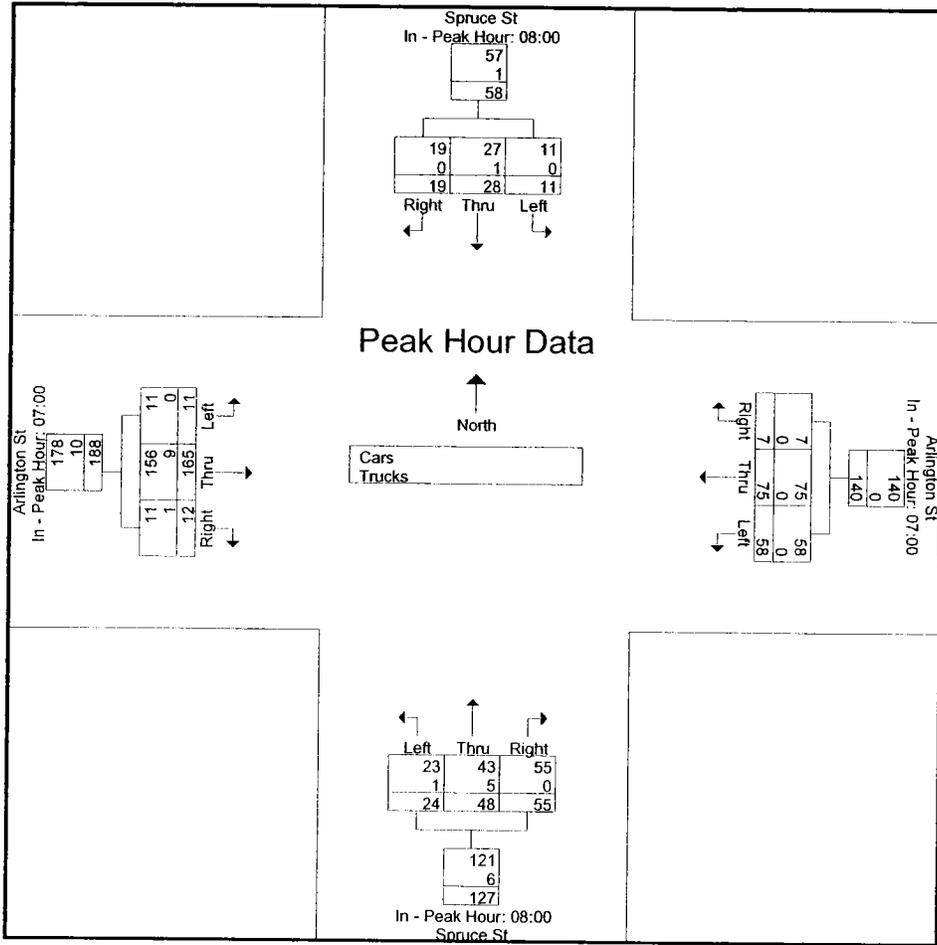
Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Excls. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	3	4	7	1	20	14	3	1	4	2	31	0	2	88	2	1	3	180	183
07:15	4	5	3	0	19	31	3	0	5	10	23	0	4	40	3	3	3	150	153
07:30	3	0	2	0	9	13	1	0	4	2	7	0	2	17	0	0	0	60	60
07:45	0	6	2	0	10	17	0	0	5	6	8	0	3	20	7	2	2	84	86
Total	10	15	14	1	58	75	7	1	18	20	69	0	11	165	12	6	8	474	482
08:00	2	5	5	0	10	15	2	0	9	5	15	0	6	29	4	1	1	107	108
08:15	1	4	2	0	18	14	2	0	6	8	10	0	8	18	4	1	1	95	96
08:30	2	6	1	3	9	14	2	0	4	10	12	0	6	15	7	6	9	88	97
08:45	6	13	11	14	8	21	6	0	5	25	18	0	13	14	5	14	28	145	173
Total	11	28	19	17	45	64	12	0	24	48	55	0	33	76	20	22	39	435	474
Grand Total	21	43	33	18	103	139	19	1	42	68	124	0	44	241	32	28	47	909	956
Apprch %	21.6	44.3	34		39.5	53.3	7.3		17.9	29.1	53		13.9	76	10.1				
Total %	2.3	4.7	3.6		11.3	15.3	2.1		4.6	7.5	13.6		4.8	26.5	3.5		4.9	95.1	
Cars	20	42	32		102	138	19		41	62	121		43	231	30		0	0	928
% Cars	95.2	97.7	97	100	99	99.3	100	100	97.6	91.2	97.6	0	97.7	95.9	93.8	100	0	0	97.1
Trucks	1	1	1		1	1	0		1	6	3		1	10	2		0	0	28
% Trucks	4.8	2.3	3	0	1	0.7	0	0	2.4	8.8	2.4	0	2.3	4.1	6.2	0	0	0	2.9

Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00																	
07:00	3	4	7	14	20	14	3	37	4	2	31	37	2	88	2	92	180
07:15	4	5	3	12	19	31	3	53	5	10	23	38	4	40	3	47	150
07:30	3	0	2	5	9	13	1	23	4	2	7	13	2	17	0	19	60
07:45	0	6	2	8	10	17	0	27	5	6	8	19	3	20	7	30	84
Total Volume	10	15	14	39	58	75	7	140	18	20	69	107	11	165	12	188	474
% App. Total	25.6	38.5	35.9		41.4	53.6	5		16.8	18.7	64.5		5.9	87.8	6.4		
PHF	.625	.625	.500	.696	.725	.605	.583	.660	.900	.500	.556	.704	.688	.469	.429	.511	.658
Cars	9	15	13	37	58	75	7	140	18	19	66	103	11	156	11	178	458
% Cars	90.0	100	92.9	94.9	100	100	100	100	100	95.0	95.7	96.3	100	94.5	91.7	94.7	96.6
Trucks	1	0	1	2	0	0	0	0	0	1	3	4	0	9	1	10	16
% Trucks	10.0	0	7.1	5.1	0	0	0	0	0	5.0	4.3	3.7	0	5.5	8.3	5.3	3.4



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

	08:00				07:00				08:00				07:00			
+0 mins.	2	5	5	12	20	14	3	37	9	5	15	29	2	88	2	92
+15 mins.	1	4	2	7	19	31	3	53	6	8	10	24	4	40	3	47
+30 mins.	2	6	1	9	9	13	1	23	4	10	12	26	2	17	0	19
+45 mins.	6	13	11	30	10	17	0	27	5	25	18	48	3	20	7	30
Total Volume	11	28	19	58	58	75	7	140	24	48	55	127	11	165	12	188
% App. Total	19	48.3	32.8		41.4	53.6	5		18.9	37.8	43.3		5.9	87.8	6.4	
PHF	.458	.538	.432	.483	.725	.605	.583	.660	.667	.480	.764	.661	.688	.469	.429	.511
Cars	11	27	19	57	58	75	7	140	23	43	55	121	11	156	11	178
% Cars	100	96.4	100	98.3	100	100	100	100	95.8	89.6	100	95.3	100	94.5	91.7	94.7
Trucks	0	1	0	1	0	0	0	0	1	5	0	6	0	9	1	10
% Trucks	0	3.6	0	1.7	0	0	0	0	4.2	10.4	0	4.7	0	5.5	8.3	5.3



N/S Street : Spruce Street
 E/W Street : Arlington Street
 City/State : Acton, MA
 Weather : Clear

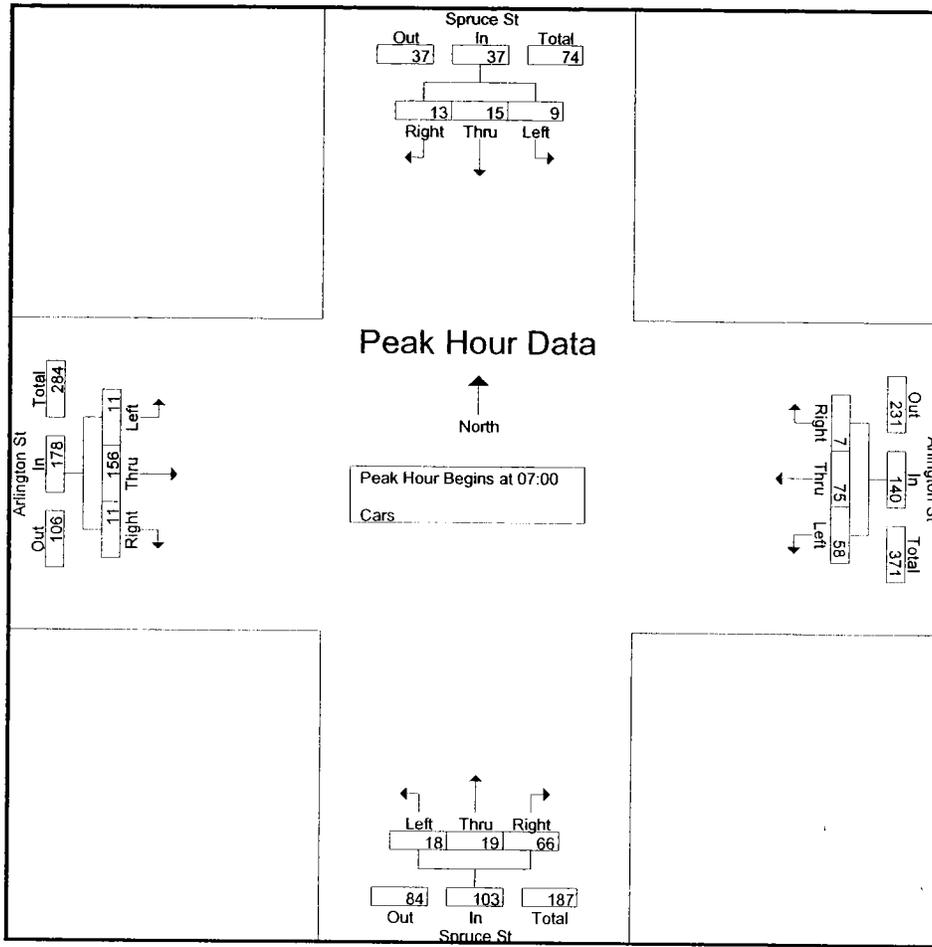
Accurate Counts
 978-664-2565

File Name : 13510003
 Site Code : 13510003
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

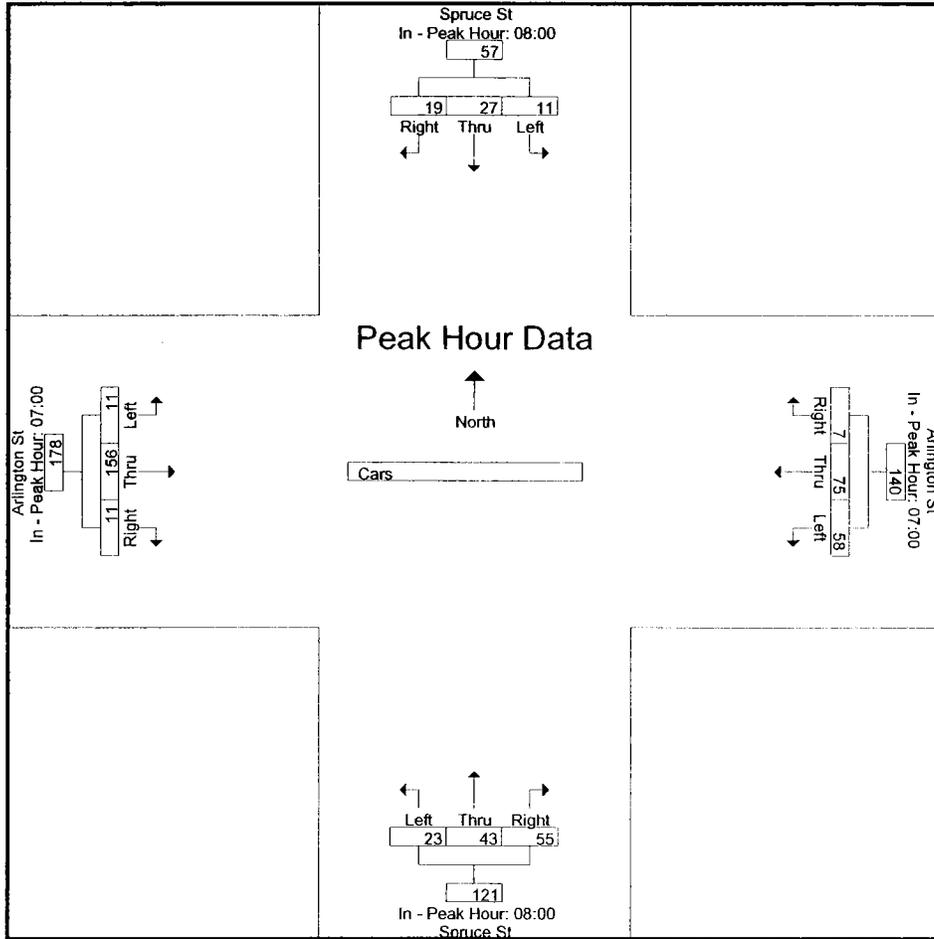
Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	2	4	7	1	20	14	3	1	4	2	28	0	2	80	1	1	3	167	170
07:15	4	5	3	0	19	31	3	0	5	9	23	0	4	39	3	3	3	148	151
07:30	3	0	1	0	9	13	1	0	4	2	7	0	2	17	0	0	0	59	59
07:45	0	6	2	0	10	17	0	0	5	6	8	0	3	20	7	2	2	84	86
Total	9	15	13	1	58	75	7	1	18	19	66	0	11	156	11	6	8	458	466
08:00	2	5	5	0	9	15	2	0	9	5	15	0	6	29	4	1	1	106	107
08:15	1	4	2	0	18	14	2	0	5	8	10	0	8	17	4	1	1	93	94
08:30	2	5	1	3	9	14	2	0	4	10	12	0	6	15	6	6	9	86	95
08:45	6	13	11	14	8	20	6	0	5	20	18	0	12	14	5	14	28	138	166
Total	11	27	19	17	44	63	12	0	23	43	55	0	32	75	19	22	39	423	462
Grand Total	20	42	32	18	102	138	19	1	41	62	121	0	43	231	30	28	47	881	928
Apprch %	21.3	44.7	34		39.4	53.3	7.3		18.3	27.7	54		14.1	76	9.9				
Total %	2.3	4.8	3.6		11.6	15.7	2.2		4.7	7	13.7		4.9	26.2	3.4		5.1	94.9	

Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:00																		
07:00	2	4	7	13	20	14	3	37	4	2	28	34	2	80	1	1	83	167
07:15	4	5	3	12	19	31	3	53	5	9	23	37	4	39	3	3	46	148
07:30	3	0	1	4	9	13	1	23	4	2	7	13	2	17	0	0	19	59
07:45	0	6	2	8	10	17	0	27	5	6	8	19	3	20	7	2	30	84
Total Volume	9	15	13	37	58	75	7	140	18	19	66	103	11	156	11	6	178	458
% App. Total	24.3	40.5	35.1		41.4	53.6	5		17.5	18.4	64.1		6.2	87.6	6.2			
PHF	.563	.625	.464	.712	.725	.605	.583	.660	.900	.528	.589	.696	.688	.488	.393		.536	.686



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

	08:00				07:00				08:00				07:00			
+0 mins.	2	5	5	12	20	14	3	37	9	5	15	29	2	80	1	83
+15 mins.	1	4	2	7	19	31	3	53	5	8	10	23	4	39	3	46
+30 mins.	2	5	1	8	9	13	1	23	4	10	12	26	2	17	0	19
+45 mins.	6	13	11	30	10	17	0	27	5	20	18	43	3	20	7	30
Total Volume	11	27	19	57	58	75	7	140	23	43	55	121	11	156	11	178
% App. Total	19.3	47.4	33.3		41.4	53.6	5		19	35.5	45.5		6.2	87.6	6.2	
PHF	.458	.519	.432	.475	.725	.605	.583	.660	.639	.538	.764	.703	.688	.488	.393	.536



N/S Street : Spruce Street
 E/W Street: Arlington Street
 City/State : Acton, MA
 Weather : Clear

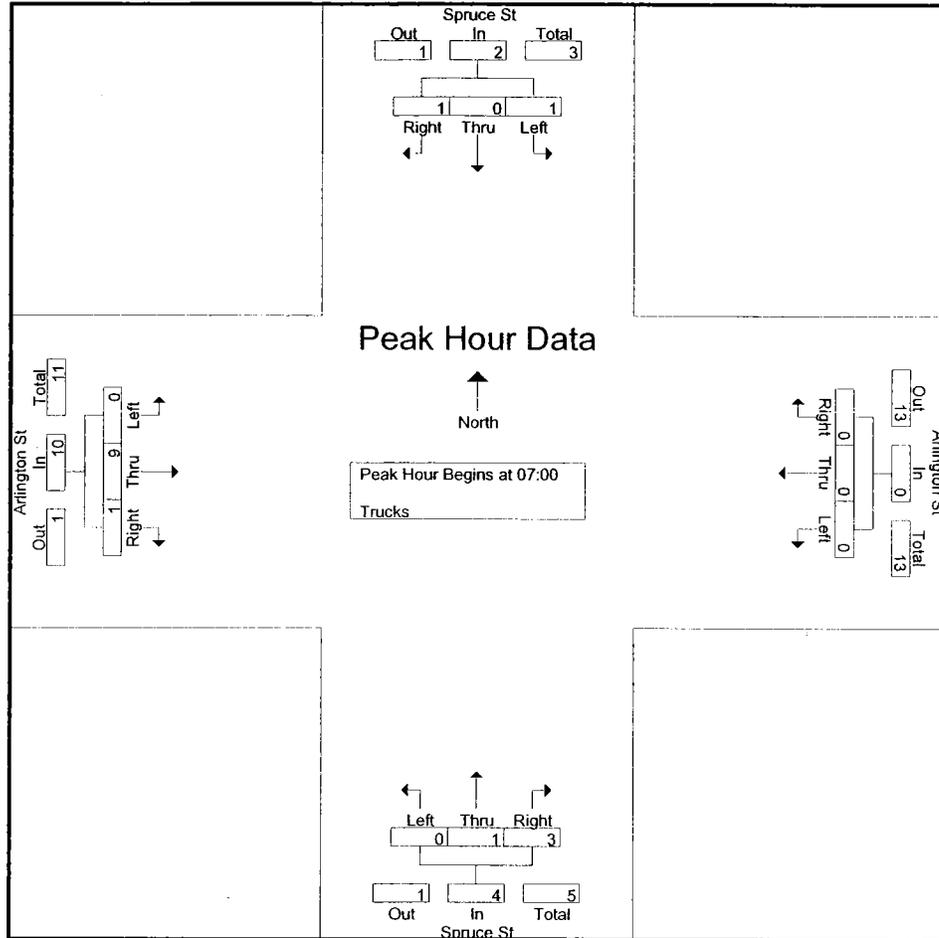
Accurate Counts
 978-664-2565

File Name : 13510003
 Site Code : 13510003
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Trucks

Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00	1	0	0	0	0	0	0	0	0	0	3	0	0	8	1	0	0	13	13
07:15	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	2
07:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	1	0	1	0	0	0	0	0	0	1	3	0	0	9	1	0	0	16	16
08:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
08:15	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2	2
08:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2
08:45	0	0	0	0	0	1	0	0	0	5	0	0	1	0	0	0	0	7	7
Total	0	1	0	0	1	1	0	0	1	5	0	0	1	1	1	0	0	12	12
Grand Total	1	1	1	0	1	1	0	0	1	6	3	0	1	10	2	0	0	28	28
Apprch %	33.3	33.3	33.3		50	50	0		10	60	30		7.7	76.9	15.4				
Total %	3.6	3.6	3.6		3.6	3.6	0		3.6	21.4	10.7		3.6	35.7	7.1		0	100	

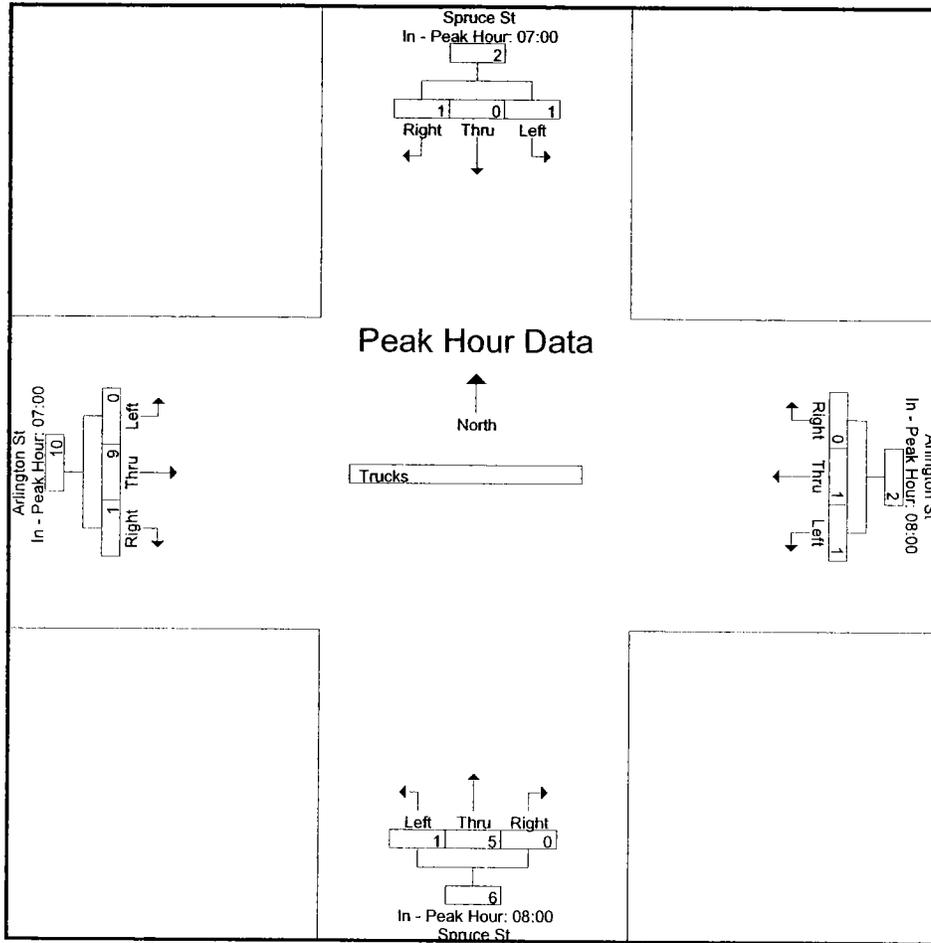
Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00																	
07:00	1	0	0	1	0	0	0	0	0	0	3	3	0	8	1	9	13
07:15	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
07:30	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	1	2	0	0	0	0	0	1	3	4	0	9	1	10	16
% App. Total	50	0	50		0	0	0		0	25	75		0	90	10		
PHF	.250	.000	.250	.500	.000	.000	.000	.000	.000	.250	.250	.333	.000	.281	.250	.278	.308



Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00				08:00				08:00				07:00			
+0 mins.	1	0	0	1	1	0	0	1	0	0	0	0	0	8	1	9
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1
+30 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	0	5	0	5	0	0	0	0
Total Volume	1	0	1	2	1	1	0	2	1	5	0	6	0	9	1	10
% App. Total	50	0	50		50	50	0		16.7	83.3	0		0	90	10	
PHF	.250	.000	.250	.500	.250	.250	.000	.500	.250	.250	.000	.300	.000	.281	.250	.278



N/S Street : Spruce Street
 E/W Street: Arlington Street
 City/State : Acton, MA
 Weather : Clear

Accurate Counts
 978-664-2565

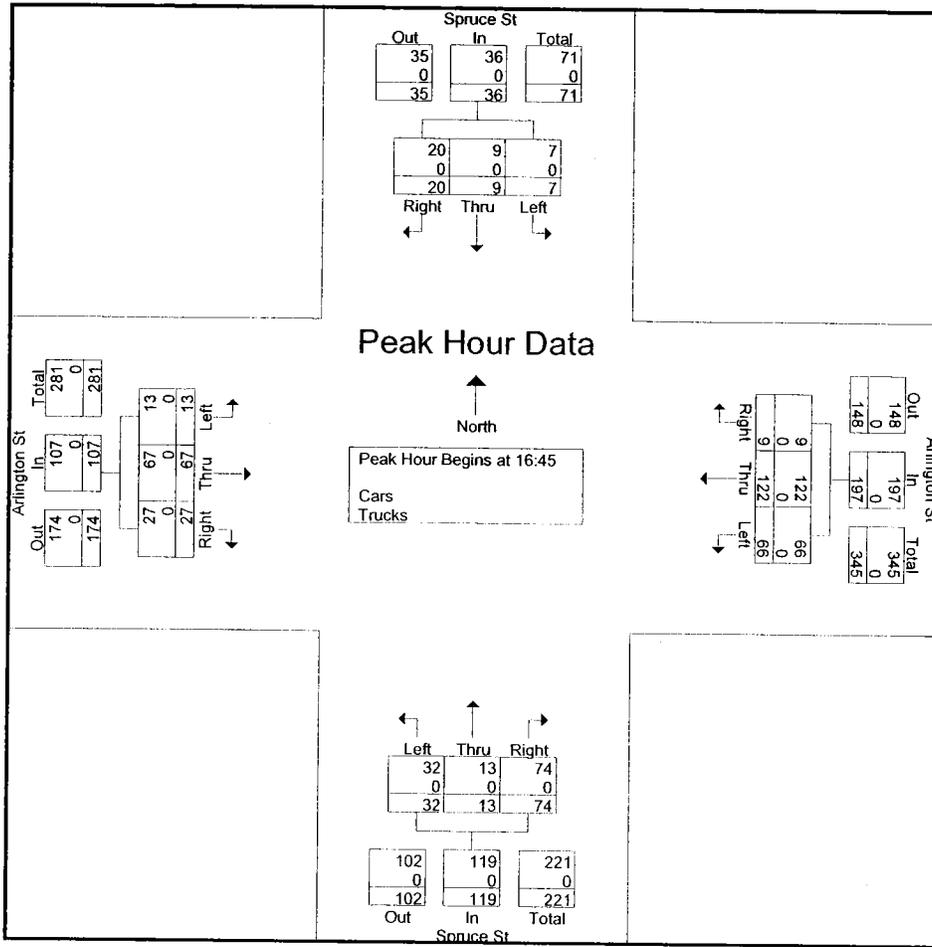
File Name : 13510003
 Site Code : 13510003
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	4	9	10	2	21	30	4	0	9	11	17	0	3	19	14	2	4	151	155
16:15	1	5	5	2	5	22	2	2	4	3	9	0	7	24	6	2	6	93	99
16:30	3	3	4	1	7	28	2	2	4	2	11	0	3	15	6	2	5	88	93
16:45	1	3	5	1	18	33	3	0	7	3	13	0	6	19	6	0	1	117	118
Total	9	20	24	6	51	113	11	4	24	19	50	0	19	77	32	6	16	449	465
17:00	1	1	6	3	18	32	0	0	8	3	21	0	2	13	7	3	6	112	118
17:15	3	2	6	0	13	34	6	0	10	6	20	0	4	21	6	0	0	131	131
17:30	2	3	3	1	17	23	0	0	7	1	20	0	1	14	8	0	1	99	100
17:45	1	0	5	0	7	28	2	0	5	1	13	0	4	23	4	0	0	93	93
Total	7	6	20	4	55	117	8	0	30	11	74	0	11	71	25	3	7	435	442
Grand Total	16	26	44	10	106	230	19	4	54	30	124	0	30	148	57	9	23	884	907
Apprch %	18.6	30.2	51.2		29.9	64.8	5.4		26	14.4	59.6		12.8	63	24.3				
Total %	1.8	2.9	5		12	26	2.1		6.1	3.4	14		3.4	16.7	6.4		2.5	97.5	
Cars	16	26	44		106	230	19		54	30	124		30	148	57		0	0	907
% Cars	100	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100	0	0	100
Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

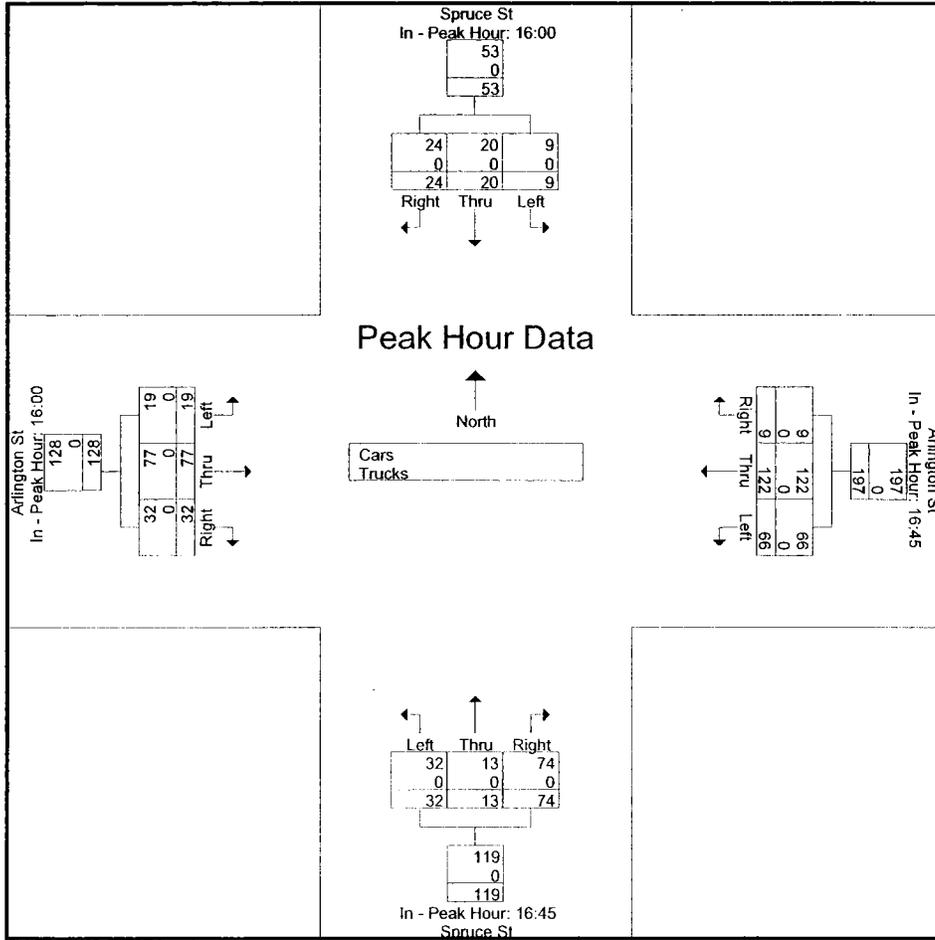
Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
16:45	1	3	5	9	18	33	3	54	7	3	13	23	6	19	6	31	117
17:00	1	1	6	8	18	32	0	50	8	3	21	32	2	13	7	22	112
17:15	3	2	6	11	13	34	6	53	10	6	20	36	4	21	6	31	131
17:30	2	3	3	8	17	23	0	40	7	1	20	28	1	14	8	23	99
Total Volume	7	9	20	36	66	122	9	197	32	13	74	119	13	67	27	107	459
% App. Total	19.4	25	55.6		33.5	61.9	4.6		26.9	10.9	62.2		12.1	62.6	25.2		
PHF	.583	.750	.833	.818	.917	.897	.375	.912	.800	.542	.881	.826	.542	.798	.844	.863	.876
Cars	7	9	20	36	66	122	9	197	32	13	74	119	13	67	27	107	459
% Cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 16:45



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	16:00				16:45				16:45				16:00			
+0 mins.	4	9	10	23	18	33	3	54	7	3	13	23	3	19	14	36
+15 mins.	1	5	5	11	18	32	0	50	8	3	21	32	7	24	6	37
+30 mins.	3	3	4	10	13	34	6	53	10	6	20	36	3	15	6	24
+45 mins.	1	3	5	9	17	23	0	40	7	1	20	28	6	19	6	31
Total Volume	9	20	24	53	66	122	9	197	32	13	74	119	19	77	32	128
% App. Total	17	37.7	45.3		33.5	61.9	4.6		26.9	10.9	62.2		14.8	60.2	25	
PHF	.563	.556	.600	.576	.917	.897	.375	.912	.800	.542	.881	.826	.679	.802	.571	.865
Cars	9	20	24	53	66	122	9	197	32	13	74	119	19	77	32	128
% Cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



N/S Street : Spruce Street
 E/W Street: Arlington Street
 City/State : Acton, MA
 Weather : Clear

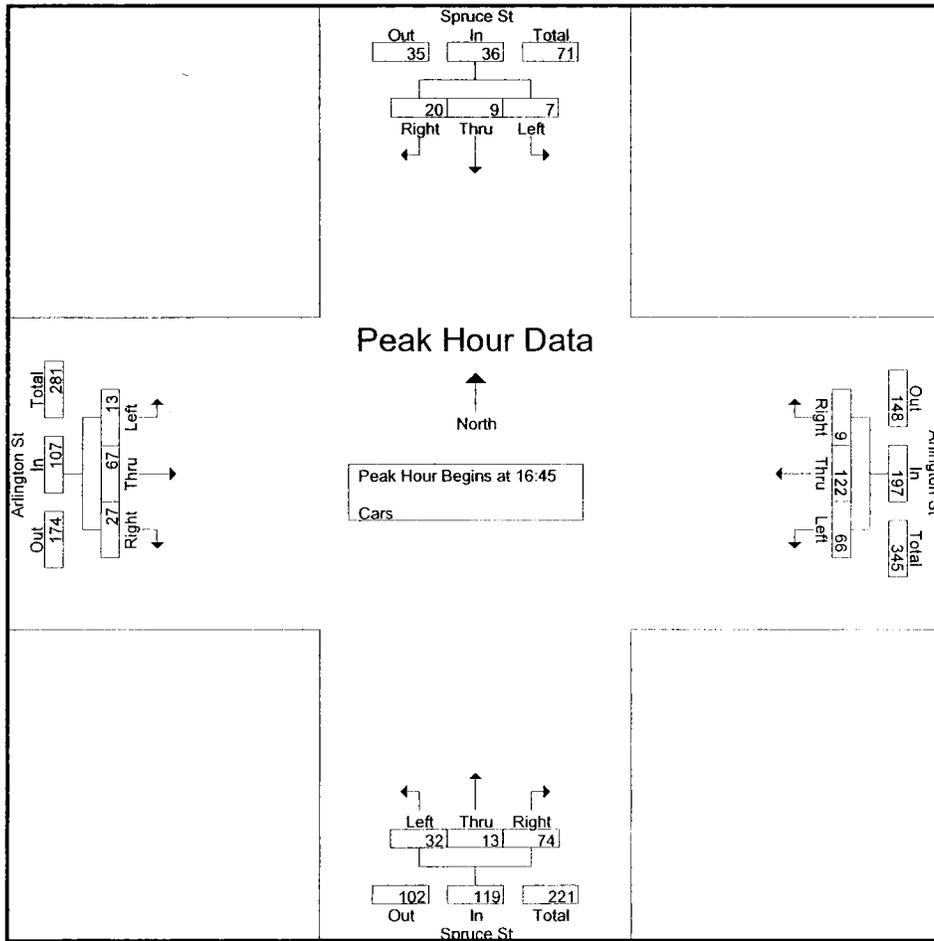
Accurate Counts
 978-664-2565

File Name : 13510003
 Site Code : 13510003
 Start Date : 3/27/2008
 Page No : 1

Groups Printed- Cars

Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
16:00	4	9	10	2	21	30	4	0	9	11	17	0	3	19	14	2	4	151	155
16:15	1	5	5	2	5	22	2	2	4	3	9	0	7	24	6	2	6	93	99
16:30	3	3	4	1	7	28	2	2	4	2	11	0	3	15	6	2	5	88	93
16:45	1	3	5	1	18	33	3	0	7	3	13	0	6	19	6	0	1	117	118
Total	9	20	24	6	51	113	11	4	24	19	50	0	19	77	32	6	16	449	465
17:00	1	1	6	3	18	32	0	0	8	3	21	0	2	13	7	3	6	112	118
17:15	3	2	6	0	13	34	6	0	10	6	20	0	4	21	6	0	0	131	131
17:30	2	3	3	1	17	23	0	0	7	1	20	0	1	14	8	0	1	99	100
17:45	1	0	5	0	7	28	2	0	5	1	13	0	4	23	4	0	0	93	93
Total	7	6	20	4	55	117	8	0	30	11	74	0	11	71	25	3	7	435	442
Grand Total	16	26	44	10	106	230	19	4	54	30	124	0	30	148	57	9	23	884	907
Apprch %	18.6	30.2	51.2		29.9	64.8	5.4		26	14.4	59.6		12.8	63	24.3				
Total %	1.8	2.9	5		12	26	2.1		6.1	3.4	14		3.4	16.7	6.4		2.5	97.5	

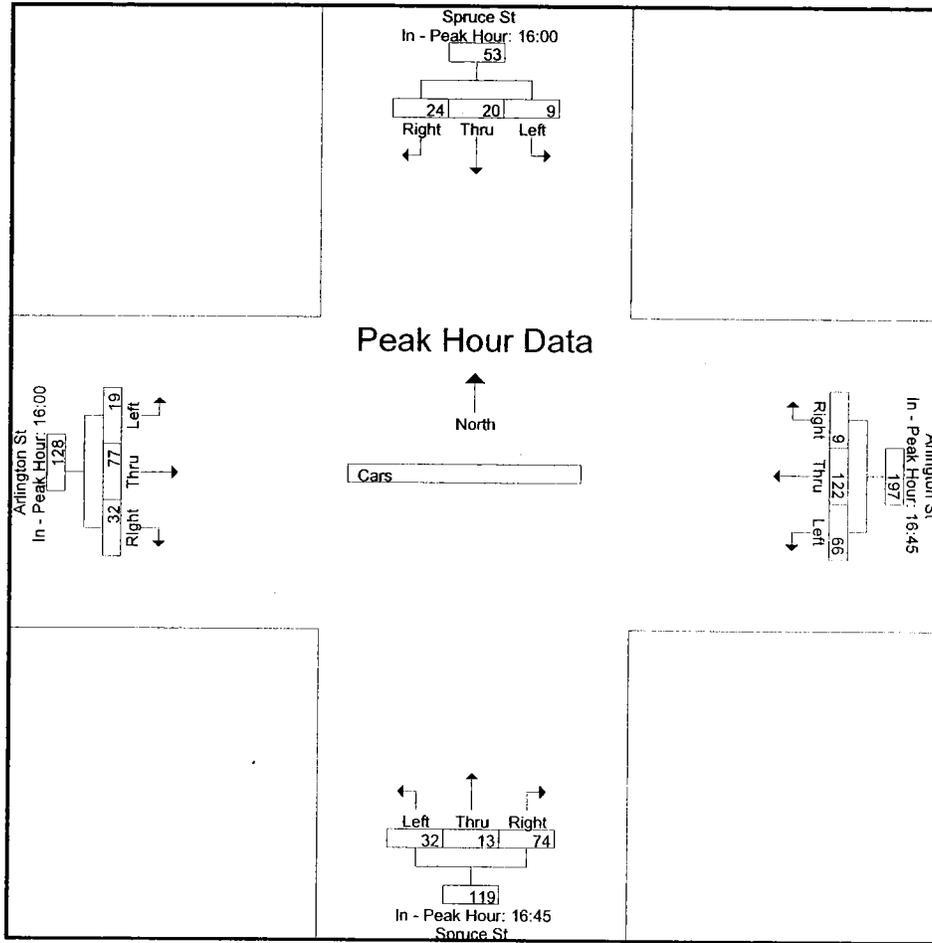
Start Time	Spruce St From North				Arlington St From East				Spruce St From South				Arlington St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	1	3	5	9	18	33	3	54	7	3	13	23	6	19	6	31	117
17:00	1	1	6	8	18	32	0	50	8	3	21	32	2	13	7	22	112
17:15	3	2	6	11	13	34	6	53	10	6	20	36	4	21	6	31	131
17:30	2	3	3	8	17	23	0	40	7	1	20	28	1	14	8	23	99
Total Volume	7	9	20	36	66	122	9	197	32	13	74	119	13	67	27	107	459
% App. Total	19.4	25	55.6		33.5	61.9	4.6		26.9	10.9	62.2		12.1	62.6	25.2		
PHF	.583	.750	.833	.818	.917	.897	.375	.912	.800	.542	.881	.826	.542	.798	.844	.863	.876



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	16:00				16:45				16:45				16:00			
+0 mins.	4	9	10	23	18	33	3	54	7	3	13	23	3	19	14	36
+15 mins.	1	5	5	11	18	32	0	50	8	3	21	32	7	24	6	37
+30 mins.	3	3	4	10	13	34	6	53	10	6	20	36	3	15	6	24
+45 mins.	1	3	5	9	17	23	0	40	7	1	20	28	6	19	6	31
Total Volume	9	20	24	53	66	122	9	197	32	13	74	119	19	77	32	128
% App. Total	17	37.7	45.3		33.5	61.9	4.6		26.9	10.9	62.2		14.8	60.2	25	
PHF	.563	.556	.600	.576	.917	.897	.375	.912	.800	.542	.881	.826	.679	.802	.571	.865



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Appendix B
Accident Crash Rates

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : West Acton, MA COUNT DATE : March 27, 2008

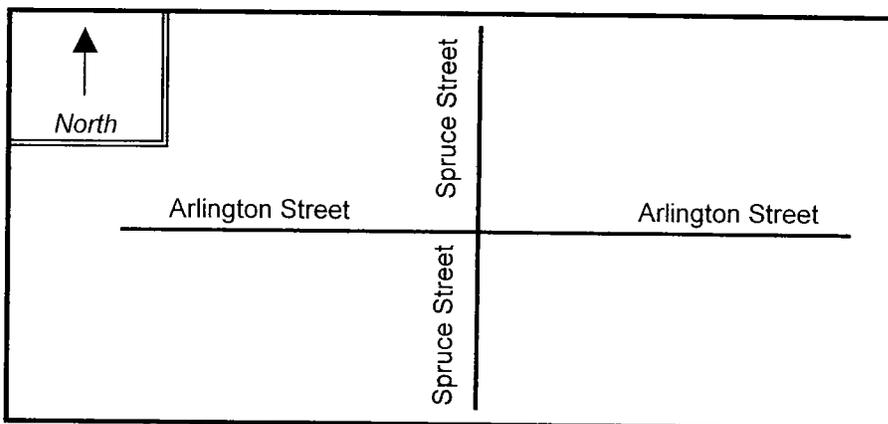
DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Arlington Street

MINOR STREET(S) : Spruce Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	SB	WB	NB	EB		
VOLUMES (PM) :	102	174	35	148		459

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

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

Comments :

Project Title & Date : West Acton Village Expansion, June 25, 2008

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : West Acton, MA COUNT DATE : March 27, 2008

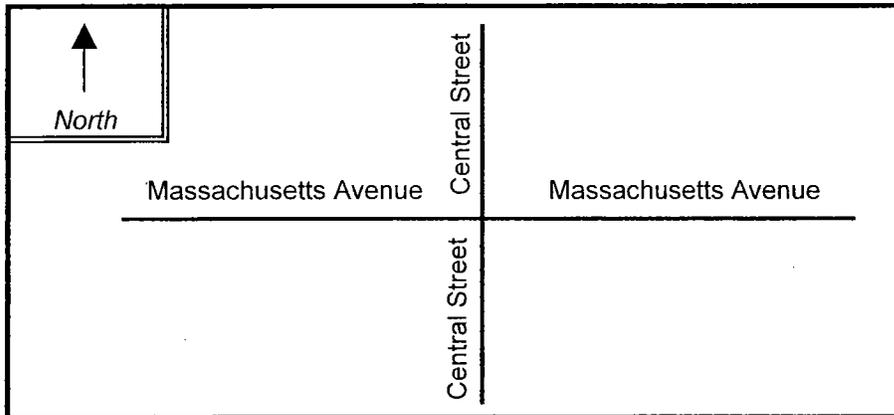
DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Massachusetts Avenue

MINOR STREET(S) : Central Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	SB	WB	NB	EB		
VOLUMES (PM) :	391	424	482	495		1,792

"K" FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

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

Comments : _____

Project Title & Date : West Acton Village Expansion, June 25, 2008

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : West Acton, MA COUNT DATE : March 27, 2008

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

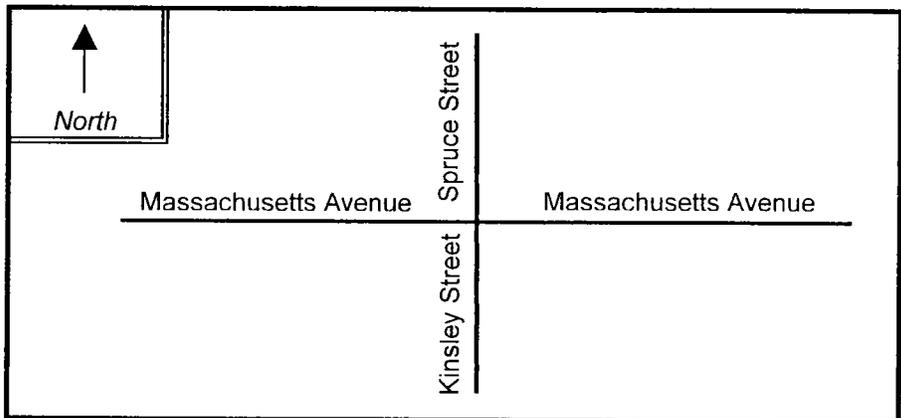
~ INTERSECTION DATA ~

MAJOR STREET : Massachusetts Avenue

MINOR STREET(S) : Spruce Street

Kinsley Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	SB	WB	NB	EB		
VOLUMES (PM) :	29	595	110	511		1,245

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

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

Comments : _____

Project Title & Date: West Acton Village Expansion, June 25, 2008

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : West Acton, MA COUNT DATE : June 3, 2008

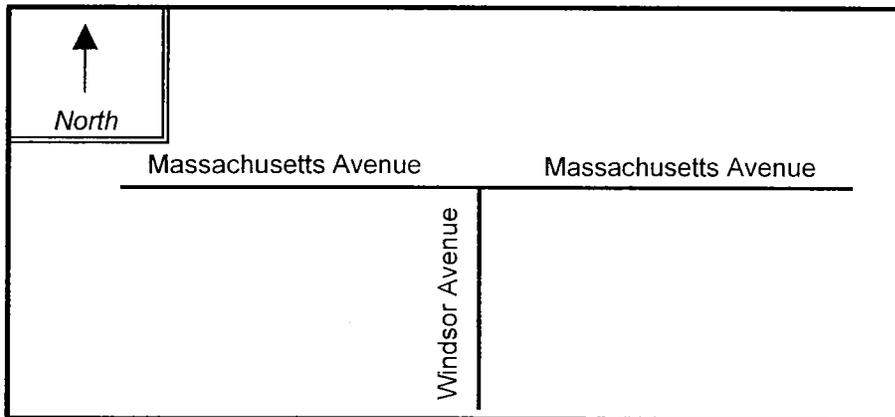
DISTRICT : 3 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Massachusetts Avenue

MINOR STREET(S) : Windsor Avenue

**INTERSECTION
DIAGRAM**
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	SB	WB	NB	EB		
VOLUMES (PM) :	66	546	13	586		1,211

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES (A) :

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

Comments : _____

Project Title & Date : West Acton Village Expansion, June 25, 2008

Appendix C
Trip Generation Calculations

Hypothetical Traffic Flow Scenario for Community Space and Auditorium

Weekday	Activity	Occupants in Auditorium		Occupants in Community Space****		# Vehs in	# Vehs out	# Vehs in	# Vehs out
		In	Out	In	Out				
9am	Senior Ctr**	0	0	15	0			8	0
10am	Classes	0	0	20	15			13	8
11am		0	0	20	20			13	13
12pm		0	0	20	20			13	13
1pm	Deliveries	4	4	4	0			0	13
2pm	After School**	0	0	20	0			8	0
3pm	Groups	0	0	35	10			12	8
4pm		0	0	0	25			10	12
5pm		0	0	0	20			0	10
Nights									
6pm	Cast/Crew	70	0	25	0			13	0
6pm	Children Cast**	33	17	8					
6pm	Audience (early)	75	38	0					
7pm	Audience Full House**	217	0	104	0			25	13
8pm		0	0	0	10			0	5
9pm		0	325	8	159			0	8
10pm		0	70	35	0			0	0
Totals		399	399	206	206			180	103
Weekends:	Matinee model represents rare maximum impact								
Notes:									
	* Number of drivers is reduced by car-poolers, walkers and bikers, non-driving age occupants, and senior shuttle.								
	** Represents both drop-offs/pick-ups and parkers. Includes one adult driver. Parent drivers may not enter theater until show time.								
	*** Full house model depicts scenario developed for Traffic Study representing rare maximum impact. Assume that 9 parents have arrive arrive early with Children. 7 PM show time.								
	**** Community Space use will not occur with a theater event.								

Assumption Based Calculation Details

104310
 West Acton Village Expansion
 Acton, MA
 Theater

300 Seats

Assumption Based Calcs

	Volume
Weekday 2-Way Volume	412
7-9 AM Peak Hour (Entering)	0
7-9 AM Peak Hour (Exiting)	0
7-9 AM Peak Hour (Total)	0
4-6 PM Peak Hour (Entering)	90
4-6 PM Peak Hour (Exiting)	8
4-6 PM Peak Hour (Total)	98

<p>Weekday: Visitors: 300 seats means 300 visitors per show Assume 2 visitors per vehicle, so 150 vehicles enter/exit the theater per weekday = $150 \times 2 = 300$ vehicle trips - 16 children staying = 284 Cast/Crew: Assume 70 cast/crew members over driving age. 2 cast/crew per vehicle. So 35 cast/crew vehicles enter/exit the theater per weekday = $35 \times 2 = 70$ vehicle trips Assume drop-offs/pick-ups for 25 children, 1.5 children per vehicle enter/exit, and 50% of the drop off vehicles park for the show = $[(25/1.5) + (25/1.5) \times 0.5] \times 2 = 50$ vehicle trips Delivery Vehicles: Assume 4 delivery vehicles enter/exit per weekday = 8 vehicle trips Total Trips for a Weekday: $284 + 70 + 50 + 8 = 412$ vehicle trips</p>
<p>AM Peak Hour: Assume no vehicles enter/exit the theater in AM</p>
<p>PM Peak Hour: Visitors: Assume 25% of the 300 visitors (150 vehicles) enter the theater in the PM peak hour = $150 \times 25\% = 38$ vehicle trips Cast/Crew: Assume the 70 over driving age cast/crew members enter the theater in the PM peak hour = 35 vehicle trips Assume drop-offs for 25 children, 1.5 children per vehicle, and 50% of vehicles park to watch the show = $(25/1.5) + (25/1.5) \times 0.5 = 25$ vehicle trips Delivery Vehicles: Assume no delivery vehicles enter/exit in the PM peak hour Total Trips in PM Peak Hour: $38 + 35 + 25 = 98$ vehicle trips</p>

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 710 - General Office Building

21,036 x 1000 SF

Equation Calcs

	Equation	Volume
Weekday 2-Way Volume	$\ln(T) = 0.77\ln(x) + 3.65, R^2 = 0.80$	402
7-9 AM Peak Hour (Entering)		47
7-9 AM Peak Hour (Exiting)		7
7-9 AM Peak Hour (Total)	$\ln(T) = 0.80\ln(x) + 1.55, R^2 = 0.83$	54
4-6 PM Peak Hour (Entering)		17
4-6 PM Peak Hour (Exiting)		85
4-6 PM Peak Hour (Total)	$(T) = 1.12(x) + 78.81, R^2 = 0.82$	102
REVISION		
4-6 PM Peak Hour (Entering)		9
4-6 PM Peak Hour (Exiting)		45
4-6 PM Peak Hour (Total)		54

This estimate is too high given that it is double AM peak hour estimate

This estimate assumes the same number of PM peak hour trips as AM

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 814 - Specialty Retail Center

8.576 x 1000 SF

Ave. Rate Calcs	
Ave. Rate	Volume
44.32	380
7-9 AM Peak Hour (Entering)	
7-9 AM Peak Hour (Exiting)	
7-9 AM Peak Hour (Total)	
4-6 PM Peak Hour (Entering)	10
4-6 PM Peak Hour (Exiting)	13
4-6 PM Peak Hour (Total)	23

Equation Calcs	
Volume	
404	
$T = 42.78(x) + 37.66, R^2 = 0.69$	
6	
6	
12	
18	
24	
42	
$T = 2.40(x) + 21.48, R^2 = 0.98$	

This is an estimate, based on the ratio of AM Peak Hour Trips / Daily Trips from Shopping Center (LUC 820)

Shopping Center (LUC 820):
 ratio of AM Peak Hour to Daily: 1.03 / 42.94 = 2.40%

104310
 West Acton Village Expansion
 Acton, MA
 ITE Land Use Code 932 - High-Turnover (Sit-Down) Restaurant

57 Seats

Ave. Rate Calcs		
	Ave. Rate	Volume
Weekday 2-Way Volume	4.83	275
7-9 AM Peak Hour (Entering)	0.244	14
7-9 AM Peak Hour (Exiting)	0.226	13
7-9 AM Peak Hour (Total)	0.47	27
4-6 PM Peak Hour (Entering)	0.244	13
4-6 PM Peak Hour (Exiting)	0.176	10
4-6 PM Peak Hour (Total)	0.42	23

Arlington St at Spruce St

6 townhomes	LUC 230 - Residential Condominium
1.5 kSF Retail	LUC 814 - Specialty Retail

LUC 230

Ave. Rate Calcs

	Ave. Rate	Volume
Weekday 2-Way Volume	5.81	35
7-9 AM Peak Hour (Entering)	0.07	1
7-9 AM Peak Hour (Exiting)	0.37	2
7-9 AM Peak Hour (Total)	0.44	3
4-6 PM Peak Hour (Entering)	0.35	2
4-6 PM Peak Hour (Exiting)	0.17	1
4-6 PM Peak Hour (Total)	0.52	3

Equation Calcs

Volume
56
$\text{Ln}(T) = 0.87 \text{Ln}(X) + 2.46, R^2 = 0.80$
1
4
5
$\text{Ln}(T) = 0.80 \text{Ln}(X) + 0.26, R^2 = 0.76$
4
2
6
$\text{Ln}(T) = 0.82 \text{Ln}(X) + 0.32, R^2 = 0.80$

LUC 814

Ave. Rate Calcs

	Ave. Rate	Volume
Weekday 2-Way Volume	44.32	66
7-9 AM Peak Hour (Entering)	0.47	1
7-9 AM Peak Hour (Exiting)	0.30	0
7-9 AM Peak Hour (Total)	0.77	1
4-6 PM Peak Hour (Entering)	1.518	2
4-6 PM Peak Hour (Exiting)	1.192	2
4-6 PM Peak Hour (Total)	2.71	4

Equation Calcs

Total Volume
102
$T = 42.78(x) + 37.66, R^2 = 0.69$
1
1
2
11
14
25
$T = 2.40(x) + 21.48, R^2 = 0.98$

This is an estimate, based on the ratio of AM Peak Hour Trips / Daily Trips from Shopping Center (LUC 820)

Shopping Center (LUC 820):
 ratio of AM Peak Hour to Daily: $1.03 / 42.94 = 2.40\%$
 ratio of AM Peak Hour to PM Peak Hour = 28.50%

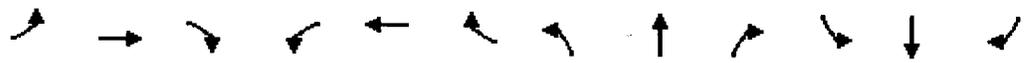
	Total Residential	Total Retail	Total New Trips
Weekday 2-Way Volume	35	66	101
7-9 AM Peak Hour (Entering)	1	1	2
7-9 AM Peak Hour (Exiting)	2	0	2
7-9 AM Peak Hour (Total)	3	1	4
4-6 PM Peak Hour (Entering)	2	2	4
4-6 PM Peak Hour (Exiting)	1	2	3
4-6 PM Peak Hour (Total)	3	4	7

Based on an estimate of the ratio of AM Peak Hour Trips/PM Peak Hour Trips from Shopping Center (LUC 820)

Appendix D
Level of Service Calculations

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2008 Existing AM
 3/17/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	120	364	49	51	200	47	54	207	110	78	251	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.98		1.00	0.96		1.00	0.95		1.00	1.00	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1866		1586	1574		1562	1633		1608	1735	
Fl _t Permitted	0.52	1.00		0.31	1.00		0.54	1.00		0.42	1.00	
Satd. Flow (perm)	933	1866		515	1574		881	1633		706	1735	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	152	383	68	60	225	76	72	256	145	101	292	4
RTOR Reduction (vph)	0	0	0	0	16	0	0	19	0	0	1	0
Lane Group Flow (vph)	152	451	0	60	285	0	72	382	0	101	295	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)	0											
Turn Type	Perm		Perm		Perm		Perm		Perm			
Protected Phases	2		6		8		8		4			
Permitted Phases	2		6		8		8		4			
Actuated Green, G (s)	18.4	18.4		18.4	18.4		23.3	23.3		23.3	23.3	
Effective Green, g (s)	18.4	18.4		18.4	18.4		23.3	23.3		23.3	23.3	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.40	0.40		0.40	0.40	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	298	596		165	503		356	661		286	702	
v/s Ratio Prot	c0.24		0.18		c0.23		0.17					
v/s Ratio Perm	0.16		0.12		0.08		0.14					
v/c Ratio	0.51	0.76		0.36	0.57		0.20	0.58		0.35	0.42	
Uniform Delay, d ₁	15.9	17.6		15.1	16.3		11.1	13.3		11.9	12.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.6	4.9		0.5	0.9		0.4	1.5		1.0	0.6	
Delay (s)	16.5	22.4		15.6	17.2		11.5	14.8		12.9	12.9	
Level of Service	B	C		B	B		B	B		B	B	
Approach Delay (s)	21.0		16.9		14.3		12.9					
Approach LOS	C		B		B		B					

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	15.9
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	152	451	60	301	72	401	101	296
v/c Ratio	0.50	0.74	0.36	0.56	0.20	0.57	0.34	0.41
Control Delay	22.9	25.5	22.8	19.8	17.2	19.6	20.6	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	25.5	22.8	19.8	17.2	19.6	20.6	17.4
Queue Length 50th (ft)	38	124	14	70	12	72	18	54
Queue Length 95th (ft)	98	301	53	186	56	#269	81	212
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	634	1267	349	1077	428	809	343	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.36	0.17	0.28	0.17	0.50	0.29	0.35

Intersection Summary

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



Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		↕			↕	↕	
Volume (veh/h)	3	536	12	40	298	8	59
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	564	15	48	347	12	75
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None			None		
Median storage (veh)							
Upstream signal (ft)		320					
pX, platoon unblocked	0.00			0.81		0.81	0.81
vC, conflicting volume	0			579		1015	572
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			361		899	351
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			95		95	87
cM capacity (veh/h)	0			968		240	559

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	579	395	87
Volume Left	0	48	12
Volume Right	15	0	75
cSH	1700	968	472
Volume to Capacity	0.34	0.05	0.18
Queue Length 95th (ft)	0	4	17
Control Delay (s)	0.0	1.6	14.3
Lane LOS		A	B
Approach Delay (s)	0.0	1.6	14.3
Approach LOS			B

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization		55.8%	ICU Level of Service B
Analysis Period (min)		15	



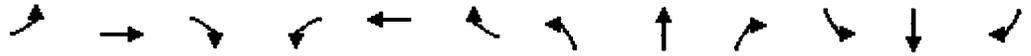
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	33	76	20	45	64	12	24	48	55	11	28	19
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	52	115	28	73	84	24	36	100	72	24	52	44

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	196	181	208	120
Volume Left (vph)	52	73	36	24
Volume Right (vph)	28	24	72	44
Hadj (s)	0.03	0.02	-0.08	-0.13
Departure Headway (s)	5.0	5.0	5.0	5.0
Degree Utilization, x	0.27	0.25	0.29	0.17
Capacity (veh/h)	660	659	663	644
Control Delay (s)	9.9	9.7	9.9	9.1
Approach Delay (s)	9.9	9.7	9.9	9.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay		9.7	
HCM Level of Service		A	
Intersection Capacity Utilization		26.6%	ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 7: Mass Ave (Route 111) & Spruce St

2008 Existing AM
 3/17/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	62	530	3	3	285	74	2	3	12	43	0	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	576	3	3	310	80	2	3	13	47	0	45
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		660										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	390			579			1114	1109	578	1084	1071	350
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	390			412			1043	1038	410	1008	992	350
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			99	98	98	73	100	94
cM capacity (veh/h)	1168			970			156	183	543	170	195	693

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	647	393	18	91
Volume Left	67	3	2	47
Volume Right	3	80	13	45
cSH	1168	970	332	269
Volume to Capacity	0.06	0.00	0.06	0.34
Queue Length 95th (ft)	5	0	4	36
Control Delay (s)	1.5	0.1	16.5	25.1
Lane LOS	A	A	C	D
Approach Delay (s)	1.5	0.1	16.5	25.1
Approach LOS			C	D

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		72.7%	ICU Level of Service C
Analysis Period (min)		15	



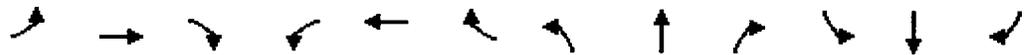
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑	↘	↙	↑
Volume (veh/h)	1	2	124	15	10	83
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	135	16	11	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	255	143			151	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	143			151	
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			99	
cM capacity (veh/h)	728	905			1430	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	151	101
Volume Left	1	0	11
Volume Right	2	16	0
cSH	837	1700	1430
Volume to Capacity	0.00	0.09	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	9.3	0.0	0.9
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.9
Approach LOS	A		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		22.7%	ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2008 Existing PM
 3/17/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	341	54	107	364	85	56	318	81	81	230	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1860		1586	1575		1562	1676		1608	1732	
Flt Permitted	0.26	1.00		0.39	1.00		0.53	1.00		0.25	1.00	
Satd. Flow (perm)	474	1860		644	1575		871	1676		418	1732	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	100	359	75	126	409	137	75	393	107	105	267	8
RTOR Reduction (vph)	0	0	0	0	15	0	0	9	0	0	1	0
Lane Group Flow (vph)	100	434	0	126	531	0	75	491	0	105	274	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)												0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	23.8	23.8		23.8	23.8		21.2	21.2		21.2	21.2	
Effective Green, g (s)	23.8	23.8		23.8	23.8		21.2	21.2		21.2	21.2	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	185	726		251	615		303	582		145	602	
v/s Ratio Prot		0.23			c0.34			c0.29			0.16	
v/s Ratio Perm	0.21			0.20			0.09			0.25		
v/c Ratio	0.54	0.60		0.50	0.86		0.25	0.84		0.72	0.45	
Uniform Delay, d1	14.4	14.8		14.1	17.1		14.2	18.4		17.4	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.9		0.6	11.6		0.6	11.2		17.4	0.7	
Delay (s)	16.1	15.7		14.7	28.7		14.8	29.5		34.7	16.2	
Level of Service	B	B		B	C		B	C		C	B	
Approach Delay (s)		15.8			26.1			27.6			21.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	434	126	546	75	500	105	275
v/c Ratio	0.52	0.58	0.48	0.84	0.24	0.82	0.70	0.44
Control Delay	25.3	17.3	20.9	28.5	22.1	34.5	51.7	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	17.3	20.9	28.5	22.1	34.5	51.7	21.9
Queue Length 50th (ft)	22	98	27	137	16	133	27	63
Queue Length 95th (ft)	74	256	91	364	64	#473	#137	216
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	340	1335	463	1137	313	611	150	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.33	0.27	0.48	0.24	0.82	0.70	0.44

Intersection Summary

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



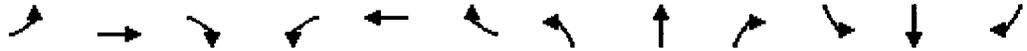
Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		↕			↕	↕	
Volume (veh/h)	6	477	11	54	538	8	79
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	502	14	65	626	12	100
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None			None		
Median storage veh							
Upstream signal (ft)		320					
pX, platoon unblocked	0.00			0.84		0.84	0.84
vC, conflicting volume	0			516		1265	509
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			333		1221	325
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			94		92	83
cM capacity (veh/h)	0			1034		159	604

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	516	691	112
Volume Left	0	65	12
Volume Right	14	0	100
cSH	1700	1034	465
Volume to Capacity	0.30	0.06	0.24
Queue Length 95th (ft)	0	5	23
Control Delay (s)	0.0	1.6	15.2
Lane LOS		A	C
Approach Delay (s)	0.0	1.6	15.2
Approach LOS			C

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		72.7%	ICU Level of Service C
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 5: Arlington St & Spruce St

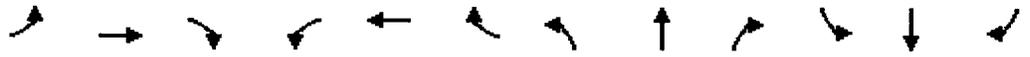
2008 Existing PM
 3/17/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	71	25	55	117	8	30	11	74	7	6	20
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	17	108	35	89	154	16	45	23	97	15	11	47

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	160	259	165	73
Volume Left (vph)	17	89	45	15
Volume Right (vph)	35	16	97	47
Hadj (s)	-0.04	0.05	-0.25	-0.29
Departure Headway (s)	4.8	4.7	4.8	4.9
Degree Utilization, x	0.21	0.34	0.22	0.10
Capacity (veh/h)	699	718	692	659
Control Delay (s)	9.1	10.2	9.1	8.4
Approach Delay (s)	9.1	10.2	9.1	8.4
Approach LOS	A	B	A	A

Intersection Summary			
Delay		9.4	
HCM Level of Service		A	
Intersection Capacity Utilization		32.8%	ICU Level of Service
Analysis Period (min)		15	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations		↕			↕			↕			↕				
Volume (veh/h)	52	493	10	9	522	59	4	3	9	42	5	63			
Sign Control		Free			Free			Stop			Stop				
Grade		0%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Hourly flow rate (vph)	57	536	11	10	567	64	4	3	10	46	5	68			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type	None					None									
Median storage veh															
Upstream signal (ft)	660														
pX, platoon unblocked				0.89			0.89			0.89			0.89		
vC, conflicting volume	632			547			1345			1305			541		
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	632			430			1326			1282			424		
tC, single (s)	4.1			4.1			7.1			6.5			6.2		
tC, 2 stage (s)															
tF (s)	2.2			2.2			3.5			4.0			3.3		
p0 queue free %	94			99			95			98			98		
cM capacity (veh/h)	951			1006			94			137			561		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	603	641	17	120
Volume Left	57	10	4	46
Volume Right	11	64	10	68
cSH	951	1006	199	216
Volume to Capacity	0.06	0.01	0.09	0.55
Queue Length 95th (ft)	5	1	7	75
Control Delay (s)	1.6	0.3	24.8	40.6
Lane LOS	A	A	C	E
Approach Delay (s)	1.6	0.3	24.8	40.6
Approach LOS			C	E

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↕		↘	↘
Volume (veh/h)	20	5	112	2	1	85
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)	22	5	122	2	1	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	217	123			124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217	123			124	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %						
cM capacity (veh/h)	770	928			1463	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	124	93
Volume Left	22	0	1
Volume Right	5	2	0
cSH	797	1700	1463
Volume to Capacity	0.03	0.07	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.7	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		16.0%	ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2018 No-Build AM

3/5/2009



	EB	EB	EB	WB	WB	WB	NE	NE	NE	SB	SB	SB
Lane Configurations												
Volume (vph)	126	383	52	54	210	49	57	218	116	82	264	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.95		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1866		1586	1575		1562	1632		1608	1736	
Flt Permitted	0.48	1.00		0.26	1.00		0.52	1.00		0.40	1.00	
Satd. Flow (perm)	869	1866		435	1575		853	1632		679	1736	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	159	403	72	64	236	79	76	269	153	106	307	4
RTOR Reduction (vph)	0	0	0	0	15	0	0	18	0	0	1	0
Lane Group Flow (vph)	159	475	0	64	300	0	76	404	0	106	310	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)	0											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	19.5	19.5		19.5	19.5		26.3	26.3		26.3	26.3	
Effective Green, g (s)	19.5	19.5		19.5	19.5		26.3	26.3		26.3	26.3	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.43	0.43		0.43	0.43	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	274	589		137	497		363	695		289	739	
v/s Ratio Prot	c0.25			0.19			c0.25			0.18		
v/s Ratio Perm	0.18			0.15			0.09			0.16		
v/c Ratio	0.58	0.81		0.47	0.60		0.21	0.58		0.37	0.42	
Uniform Delay, d1	17.7	19.4		17.0	17.9		11.2	13.5		12.1	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	7.5		0.9	1.4		0.4	1.5		1.1	0.5	
Delay (s)	19.7	26.9		17.9	19.3		11.6	15.0		13.2	12.9	
Level of Service	B C			B B			B B			B B		
Approach Delay (s)	25.1			19.1			14.5			13.0		
Approach LOS	C			B			B			B		

Intersection Summary

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	61.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	475	64	315	76	422	106	311
v/c Ratio	0.56	0.78	0.45	0.60	0.20	0.57	0.36	0.41
Control Delay	25.5	28.1	27.9	20.9	17.8	20.1	21.5	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	28.1	27.9	20.9	17.8	20.1	21.5	17.6
Queue Length 50th (ft)	41	133	16	75	13	81	20	59
Queue Length 95th (ft)	104	319	59	196	59	#312	88	228
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	534	1147	267	976	375	735	298	763
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.41	0.24	0.32	0.20	0.57	0.36	0.41

Intersection Summary

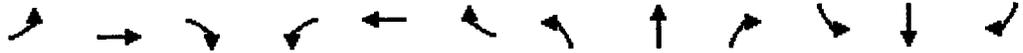
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



Direction	EB1	EB2	EB3	WB1	WB2	NB1	NB2
Lane Configurations	↕			↕		↕	
Volume (veh/h)	3	563	13	42	313	8	62
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	593	16	51	364	12	78
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage veh							
Upstream signal (ft)	320						
pX, platoon unblocked	0.00			0.80		0.80	0.80
vC, conflicting volume	0			609		1066	601
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			380		955	370
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			95		95	85
cM capacity (veh/h)	0			938		218	538
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	609	415	90				
Volume Left	0	51	12				
Volume Right	16	0	78				
cSH	1700	938	450				
Volume to Capacity	0.36	0.05	0.20				
Queue Length 95th (ft)	0	4	19				
Control Delay (s)	0.0	1.7	15.0				
Lane LOS		A	B				
Approach Delay (s)	0.0	1.7	15.0				
Approach LOS			B				
Intersection Summary							
Average Delay			1.8				
Intersection Capacity Utilization			58.4%	ICU Level of Service	B		
Analysis Period (min)			15				

West Acton Village Expansion - Acton, MA
 5: Arlington St & Spruce St

2018 No-Build AM
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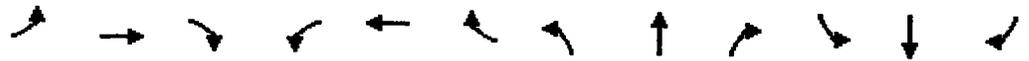
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	35	80	21	47	67	13	25	51	58	12	29	20
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	56	121	30	76	88	26	37	106	76	26	54	47

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	206	190	220	126
Volume Left (vph)	56	76	37	26
Volume Right (vph)	30	26	76	47
Hadj (s)	0.03	0.01	-0.08	-0.13
Departure Headway (s)	5.1	5.1	5.1	5.2
Degree Utilization, x	0.29	0.27	0.31	0.18
Capacity (veh/h)	648	647	660	630
Control Delay (s)	10.3	10.0	10.3	9.3
Approach Delay (s)	10.3	10.0	10.3	9.3
Approach LOS	B	B	B	A

Intersection Summary			
Delay	10.1		
HCM Level of Service	B		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

West Acton Village Expansion - Acton, MA
 7: Mass Ave (Route 111) & Spruce St

2018 No-Build AM
 3/5/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB	
Lane Configurations	↕			↕			↕			↕			
Volume (veh/h)	66	557	3	3	300	79	2	3	13	46	0	44	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	72	605	3	3	326	86	2	3	14	50	0	48	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (ft)	660												
pX, platoon unblocked				0.84			0.84			0.84			
vC, conflicting volume	412				609	1174			1169	607	1142	1128	369
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	412				445	1114			1108	443	1076	1059	369
tC, single (s)	4.1				4.1	7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2				2.2	3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	94				100	98			98	97	67	100	93
cM capacity (veh/h)	1147				942	138			166	519	151	177	677
Direction Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	680	415	20	98									
Volume Left	72	3	2	50									
Volume Right	3	86	14	48									
cSH	1147	942	312	244									
Volume to Capacity	0.06	0.00	0.06	0.40									
Queue Length 95th (ft)	5	0	5	46									
Control Delay (s)	1.6	0.1	17.3	29.3									
Lane LOS	A	A	C	D									
Approach Delay (s)	1.6	0.1	17.3	29.3									
Approach LOS				C	D								
Intersection Summary													
Average Delay				3.6									
Intersection Capacity Utilization				75.8%	ICU Level of Service	D							
Analysis Period (min)				15									



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P			4
Volume (veh/h)	1	2	130	15	10	87
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)	1	2	141	16	11	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	266	149			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266	149			158	
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			99	
cM capacity (veh/h)	718	897			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	158	105
Volume Left	1	0	11
Volume Right	2	16	0
cSH	828	1700	1422
Volume to Capacity	0.00	0.09	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	9.4	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.8
Approach LOS	A		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		22.9%	ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2018 No-Build PM

3/5/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBE	SBL	SBT	SBE
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	83	358	57	113	383	89	59	334	85	85	242	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.97		1.00	0.96		1.00	0.97		1.00	1.00	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1860		1586	1575		1562	1676		1608	1732	
Fl _t Permitted	0.25	1.00		0.37	1.00		0.50	1.00		0.20	1.00	
Satd. Flow (perm)	453	1860		623	1575		820	1676		331	1732	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	105	377	79	133	430	144	79	412	112	110	281	8
RTOR Reduction (vph)	0	0	0	0	15	0	0	9	0	0	1	0
Lane Group Flow (vph)	105	456	0	133	559	0	79	515	0	110	288	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)	0											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	25.9	25.9		25.9	25.9		21.0	21.0		21.0	21.0	
Effective Green, g (s)	25.9	25.9		25.9	25.9		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	186	765		256	648		273	559		110	577	
v/s Ratio Prot		0.25			c0.36			0.31			0.17	
v/s Ratio Perm	0.23			0.21			0.10			c0.33		
v/c Ratio	0.56	0.60		0.52	0.86		0.29	0.92		1.00	0.50	
Uniform Delay, d1	14.2	14.5		13.9	16.9		15.5	20.2		21.0	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.8		0.7	11.1		0.8	20.9		85.8	0.9	
Delay (s)	16.6	15.3		14.6	28.0		16.3	41.1		106.8	17.7	
Level of Service	B	B		B	C		B	D		F	B	
Approach Delay (s)		15.5			25.5			37.9			42.3	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	16.1
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	456	133	574	79	524	110	289
v/c Ratio	0.54	0.58	0.50	0.84	0.28	0.89	0.96	0.48
Control Delay	26.3	17.0	21.3	28.1	23.8	43.3	107.2	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	17.0	21.3	28.1	23.8	43.3	107.2	23.8
Queue Length 50th (ft)	24	105	29	149	18	153	34	72
Queue Length 95th (ft)	79	272	99	#410	67	#501	#156	#244
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	313	1283	430	1093	283	587	115	598
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.36	0.31	0.53	0.28	0.89	0.96	0.48

Intersection Summary

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



Volume	EB	WB	NB	EB	WB	NB	NB
Lane Configurations	↕		↕		↕		↕
Volume (veh/h)	6	501	12	57	566	8	83
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	527	15	69	658	12	105
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)	320						
pX, platoon unblocked	0.00			0.85		0.85	0.85
vC, conflicting volume	0			542		1330	535
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			368		1299	359
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			93		92	82
cM capacity (veh/h)	0			1007		142	580

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	542	727	117
Volume Left	0	69	12
Volume Right	15	0	105
cSH	1700	1007	441
Volume to Capacity	0.32	0.07	0.27
Queue Length 95th (ft)	0	5	26
Control Delay (s)	0.0	1.7	16.1
Lane LOS		A	C
Approach Delay (s)	0.0	1.7	16.1
Approach LOS			C

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		75.9%	ICU Level of Service D
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 5: Arlington St & Spruce St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	12	75	26	58	123	8	32	12	78	7	6	21
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	19	114	37	94	162	16	48	25	103	15	11	49

Direction Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	169	271	175	75
Volume Left (vph)	19	94	48	15
Volume Right (vph)	37	16	103	49
Hadj (s)	-0.04	0.05	-0.25	-0.29
Departure Headway (s)	4.9	4.8	4.8	5.0
Degree Utilization, x	0.23	0.36	0.24	0.10
Capacity (veh/h)	688	708	680	645
Control Delay (s)	9.3	10.5	9.3	8.5
Approach Delay (s)	9.3	10.5	9.3	8.5
Approach LOS	A	B	A	A

Intersection Summary			
Delay	9.7		
HCM Level of Service	A		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

West Acton Village Expansion - Acton, MA
 7: Mass Ave (Route 111) & Spruce St

2018 No-Build PM
 3/5/2009



Movement	EBL	EB	EBR	WBL	WB	WBR	NBL	NB	NBR	SBL	SB	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	57	518	11	10	549	64	4	3	10	45	5	68
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	563	12	11	597	70	4	3	11	49	5	74
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)		660										
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	666			575			1423	1381	569	1359	1352	632
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	666			484			1415	1369	477	1345	1338	632
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			99			95	97	98	54	96	85
cM capacity (veh/h)	923			982			81	123	535	106	129	481

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	637	677	18	128
Volume Left	62	11	4	49
Volume Right	12	70	11	74
cSH	923	982	183	195
Volume to Capacity	0.07	0.01	0.10	0.66
Queue Length 95th (ft)	5	1	8	98
Control Delay (s)	1.7	0.3	26.8	53.3
Lane LOS	A	A	D	F
Approach Delay (s)	1.7	0.3	26.8	53.3
Approach LOS			D	F

Intersection Summary

Average Delay	5.9
Intersection Capacity Utilization	79.2%
ICU Level of Service	D
Analysis Period (min)	15



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	LT		TH	RT	LT	RT
Volume (veh/h)	20	5	118	2	1	89
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)	22	5	128	2	1	97
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	228	129			130	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	228	129			130	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	759	920			1455	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	130	98
Volume Left	22	0	1
Volume Right	5	2	0
cSH	787	1700	1455
Volume to Capacity	0.03	0.08	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.7	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		16.3%	ICU Level of Service
Analysis Period (min)		15	A

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2018 Build AM
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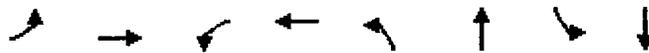


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	126	396	52	55	216	49	57	218	120	82	264	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1867		1586	1576		1562	1630		1608	1736	
Flt Permitted	0.48	1.00		0.25	1.00		0.52	1.00		0.39	1.00	
Satd. Flow (perm)	856	1867		415	1576		849	1630		664	1736	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	159	417	72	65	243	79	76	269	158	106	307	4
RTOR Reduction (vph)	0	0	0	0	15	0	0	19	0	0	1	0
Lane Group Flow (vph)	159	489	0	65	307	0	76	408	0	106	310	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)					0							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	20.0	20.0		20.0	20.0		26.2	26.2		26.2	26.2	
Effective Green, g (s)	20.0	20.0		20.0	20.0		26.2	26.2		26.2	26.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.42	0.42		0.42	0.42	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	275	600		133	507		358	687		280	731	
v/s Ratio Prot		c0.26			0.19			c0.25			0.18	
v/s Ratio Perm	0.19			0.16			0.09			0.16		
v/c Ratio	0.58	0.82		0.49	0.61		0.21	0.59		0.38	0.42	
Uniform Delay, d1	17.6	19.4		17.0	17.8		11.4	13.9		12.4	12.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	7.9		1.0	1.4		0.4	1.6		1.2	0.5	
Delay (s)	19.4	27.3		18.0	19.2		11.8	15.5		13.6	13.2	
Level of Service	B	C		B	B		B	B		B	B	
Approach Delay (s)		25.4			19.0			15.0			13.3	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	62.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	489	65	322	76	427	106	311
v/c Ratio	0.56	0.79	0.47	0.60	0.21	0.59	0.37	0.41
Control Delay	25.5	28.5	29.2	20.9	18.0	20.5	22.2	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	28.5	29.2	20.9	18.0	20.5	22.2	17.8
Queue Length 50th (ft)	41	138	16	78	13	84	20	61
Queue Length 95th (ft)	105	331	61	201	59	#318	88	228
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	521	1139	254	970	370	729	289	757
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.43	0.26	0.33	0.21	0.59	0.37	0.41

Intersection Summary

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



Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		↕			↕	↕	
Volume (veh/h)	3	580	13	43	320	8	65
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	611	16	52	372	12	82
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None			None		
Median storage (veh)							
Upstream signal (ft)		320					
pX, platoon unblocked	0.00			0.79		0.79	0.79
vC, conflicting volume	0			627		1094	619
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			391		985	380
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			94		94	84
cM capacity (veh/h)	0			919		206	525

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	627	424	94
Volume Left	0	52	12
Volume Right	16	0	82
cSH	1700	919	439
Volume to Capacity	0.37	0.06	0.21
Queue Length 95th (ft)	0	4	20
Control Delay (s)	0.0	1.7	15.4
Lane LOS		A	C
Approach Delay (s)	0.0	1.7	15.4
Approach LOS			C

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		59.8%	ICU Level of Service B
Analysis Period (min)		15	



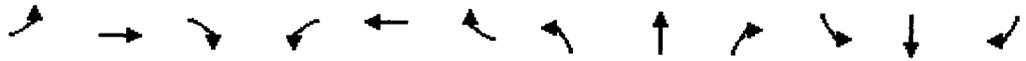
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	80	34	49	67	13	28	51	59	12	30	20
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	56	121	48	79	88	26	42	106	78	26	56	47

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	225	193	226	128
Volume Left (vph)	56	79	42	26
Volume Right (vph)	48	26	78	47
Hadj (s)	-0.01	0.02	-0.08	-0.13
Departure Headway (s)	5.1	5.2	5.1	5.2
Degree Utilization, x	0.32	0.28	0.32	0.19
Capacity (veh/h)	649	637	640	617
Control Delay (s)	10.5	10.2	10.6	9.5
Approach Delay (s)	10.5	10.2	10.6	9.5
Approach LOS	B	B	B	A

Intersection Summary			
Delay		10.3	
HCM Level of Service		B	
Intersection Capacity Utilization	28.9%		ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 7: Mass Ave (Route 111) & Spruce St

2018 Build AM
 3/17/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	77	566	3	3	303	79	2	3	13	46	0	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	615	3	3	329	86	2	3	14	50	0	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		660										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	415			618			1211	1206	617	1179	1165	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415			442			1153	1147	440	1114	1097	372
iC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
iC, 2 stage (s)												
iF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			98	98	97	64	100	93
cM capacity (veh/h)	1144			932			127	153	514	139	164	674

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	702	418	20	98
Volume Left	84	3	2	50
Volume Right	3	86	14	48
cSH	1144	932	297	227
Volume to Capacity	0.07	0.00	0.07	0.43
Queue Length 95th (ft)	6	0	5	50
Control Delay (s)	1.9	0.1	18.0	32.3
Lane LOS	A	A	C	D
Approach Delay (s)	1.9	0.1	18.0	32.3
Approach LOS			C	D

Intersection Summary

Average Delay	3.9
Intersection Capacity Utilization	77.1%
ICU Level of Service	D
Analysis Period (min)	15



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	10	615	382	37	13	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	668	415	40	14	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)						
pX, platoon unblocked						
vC, conflicting volume	455				1126	435
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455				1126	435
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	99
cM capacity (veh/h)	1105				224	621

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	679	455	17
Volume Left	11	0	14
Volume Right	0	40	3
cSH	1105	1700	255
Volume to Capacity	0.01	0.27	0.07
Queue Length 95th (ft)	1	0	5
Control Delay (s)	0.3	0.0	20.1
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	20.1
Approach LOS			C

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		50.4%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Volume (veh/h)	6	6	130	26	26	87
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)	7	7	141	28	28	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	307	155			170	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	307	155			170	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	672	890			1408	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	170	123
Volume Left	7	0	28
Volume Right	7	28	0
cSH	766	1700	1408
Volume to Capacity	0.02	0.10	0.02
Queue Length 95th (ft)	1	0	2
Control Delay (s)	9.8	0.0	1.9
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	1.9
Approach LOS	A		

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		27.8%	ICU Level of Service A
Analysis Period (min)		15	

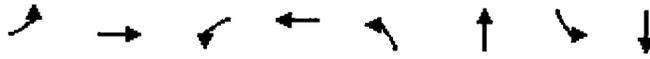


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	370	57	119	399	89	59	334	88	85	242	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	1.00	
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1861		1586	1577		1562	1674		1608	1732	
Fit Permitted	0.24	1.00		0.37	1.00		0.49	1.00		0.19	1.00	
Satd. Flow (perm)	437	1861		612	1577		810	1674		324	1732	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	105	389	79	140	448	144	79	412	116	110	281	8
RTOR Reduction (vph)	0	0	0	0	14	0	0	10	0	0	1	0
Lane Group Flow (vph)	105	468	0	140	578	0	79	518	0	110	288	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)					0							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.0	27.0		27.0	27.0		20.9	20.9		20.9	20.9	
Effective Green, g (s)	27.0	27.0		27.0	27.0		20.9	20.9		20.9	20.9	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	184	785		258	665		265	547		106	566	
v/s Ratio Prot		0.25			c0.37			0.31			0.17	
v/s Ratio Perm	0.24			0.23			0.10			c0.34		
v/c Ratio	0.57	0.60		0.54	0.87		0.30	0.95		1.04	0.51	
Uniform Delay, d1	14.1	14.3		13.9	16.9		16.1	21.0		21.6	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	0.8		1.3	11.3		0.9	25.8		97.9	1.0	
Delay (s)	16.7	15.1		15.1	28.2		16.9	46.8		119.5	18.4	
Level of Service	B	B		B	C		B	D		F	B	
Approach Delay (s)		15.4			25.7			42.9			46.3	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	16.1
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	468	140	592	79	528	110	289
v/c Ratio	0.55	0.58	0.53	0.84	0.29	0.92	1.01	0.49
Control Delay	26.8	16.8	22.1	28.3	24.5	47.4	122.2	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	16.8	22.1	28.3	24.5	47.4	122.2	24.4
Queue Length 50th (ft)	24	109	32	157	19	162	36	75
Queue Length 95th (ft)	81	281	106	#457	67	#505	#157	#244
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	296	1259	413	1075	273	576	109	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.37	0.34	0.55	0.29	0.92	1.01	0.49

Intersection Summary

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



Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		↕			↕	↕	
Volume (veh/h)	6	516	12	59	588	9	83
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	543	15	71	684	13	105
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None			None		
Median storage (veh)							
Upstream signal (ft)		320					
pX, platoon unblocked	0.00			0.84		0.84	0.84
vC, conflicting volume	0			558		1376	551
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			379		1353	371
tC, single (s)	0.0			4.1		6.4	6.2
tC, 2 stage (s)							
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			93		90	81
cM capacity (veh/h)	0			991		130	568

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	558	755	118
Volume Left	0	71	13
Volume Right	15	0	105
cSH	1700	991	411
Volume to Capacity	0.33	0.07	0.29
Queue Length 95th (ft)	0	6	29
Control Delay (s)	0.0	1.8	17.3
Lane LOS		A	C
Approach Delay (s)	0.0	1.8	17.3
Approach LOS			C

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		78.1%	ICU Level of Service D
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	12	75	30	60	123	8	44	13	81	7	6	21
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	19	114	42	97	162	16	66	27	107	15	11	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	175	275	199	75
Volume Left (vph)	19	97	66	15
Volume Right (vph)	42	16	107	49
Hadj (s)	-0.05	0.05	-0.20	-0.29
Departure Headway (s)	4.9	4.9	4.9	5.0
Degree Utilization, x	0.24	0.37	0.27	0.11
Capacity (veh/h)	674	694	671	631
Control Delay (s)	9.5	10.8	9.8	8.6
Approach Delay (s)	9.5	10.8	9.8	8.6
Approach LOS	A	B	A	A

Intersection Summary			
Delay		10.0	
HCM Level of Service		A	
Intersection Capacity Utilization	36.6%		ICU Level of Service A
Analysis Period (min)		15	

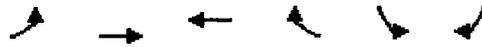
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	66	526	11	10	559	64	4	3	10	47	5	82
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	572	12	11	608	70	4	3	11	51	5	89
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		660										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	677			584			1477	1420	578	1398	1391	642
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	677			483			1475	1411	476	1387	1379	642
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			94	97	98	47	95	81
cM capacity (veh/h)	915			973			69	113	530	97	119	474
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	655	688	18	146								
Volume Left	72	11	4	51								
Volume Right	12	70	11	89								
cSH	915	973	164	191								
Volume to Capacity	0.08	0.01	0.11	0.76								
Queue Length 95th (ft)	6	1	9	127								
Control Delay (s)	2.0	0.3	29.7	66.7								
Lane LOS	A	A	D	F								
Approach Delay (s)	2.0	0.3	29.7	66.7								
Approach LOS			D	F								
Intersection Summary												
Average Delay			7.8									
Intersection Capacity Utilization			86.4%		ICU Level of Service					E		
Analysis Period (min)			15									



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑	↘	↙	↘
Volume (veh/h)	36	21	118	11	7	89
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)	39	23	128	12	8	97
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	246	134			140	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246	134			140	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			99	
cM capacity (veh/h)	738	915			1443	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	62	140	104
Volume Left	39	0	8
Volume Right	23	12	0
cSH	795	1700	1443
Volume to Capacity	0.08	0.08	0.01
Queue Length 95th (ft)	6	0	0
Control Delay (s)	9.9	0.0	0.6
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.6
Approach LOS	A		

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		20.5%	ICU Level of Service
Analysis Period (min)		15	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Volume (veh/h)	10	575	621	26	43	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	625	675	28	47	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	703				1336	689
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	703				1336	689
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				72	97
cM capacity (veh/h)	894				167	446

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	636	703	60
Volume Left	11	0	47
Volume Right	0	28	13
cSH	894	1700	194
Volume to Capacity	0.01	0.41	0.31
Queue Length 95th (ft)	1	0	31
Control Delay (s)	0.3	0.0	31.7
Lane LOS	A		D
Approach Delay (s)	0.3	0.0	31.7
Approach LOS			D

Intersection Summary		
Average Delay		1.5
Intersection Capacity Utilization	48.3%	ICU Level of Service
Analysis Period (min)	15	A

West Acton Village Expansion - Acton, MA
 10: Mass Ave (Route 111) & Central St

2018 Build PM w/ Event
 3/18/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	83	391	57	119	399	89	59	334	88	85	242	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1863		1586	1577		1562	1674		1608	1732	
Flt Permitted	0.24	1.00		0.34	1.00		0.49	1.00		0.19	1.00	
Satd. Flow (perm)	437	1863		573	1577		810	1674		324	1732	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	105	412	79	140	448	144	79	412	116	110	281	8
RTOR Reduction (vph)	0	0	0	0	14	0	0	10	0	0	1	0
Lane Group Flow (vph)	105	491	0	140	578	0	79	518	0	110	288	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)					0							
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	2		6		8		4		4			
Permitted Phases	2		6		8		4		4			
Actuated Green, G (s)	27.0	27.0		27.0	27.0		20.9	20.9		20.9	20.9	
Effective Green, g (s)	27.0	27.0		27.0	27.0		20.9	20.9		20.9	20.9	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	184	786		242	665		265	547		106	566	
v/s Ratio Prot		0.26			c0.37			0.31			0.17	
v/s Ratio Perm	0.24			0.24			0.10			c0.34		
v/c Ratio	0.57	0.62		0.58	0.87		0.30	0.95		1.04	0.51	
Uniform Delay, d1	14.1	14.5		14.1	16.9		16.1	21.0		21.6	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	1.1		2.1	11.3		0.9	25.8		97.9	1.0	
Delay (s)	16.7	15.6		16.2	28.2		16.9	46.8		119.5	18.4	
Level of Service	B	B		B	C		B	D		F	B	
Approach Delay (s)		15.8			25.9			42.9			46.3	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	16.1
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	491	140	592	79	528	110	289
v/c Ratio	0.55	0.61	0.56	0.84	0.29	0.92	1.01	0.49
Control Delay	26.8	17.4	24.1	28.3	24.5	47.4	122.2	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	17.4	24.1	28.3	24.5	47.4	122.2	24.4
Queue Length 50th (ft)	24	116	32	157	19	162	36	75
Queue Length 95th (ft)	81	299	110	#457	67	#505	#157	#244
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	296	1260	388	1075	273	576	109	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.39	0.36	0.55	0.29	0.92	1.01	0.49

Intersection Summary

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



Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		↕			↕	↕	
Volume (veh/h)	6	541	12	59	588	8	88
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.75	0.95	0.81	0.83	0.86	0.67	0.79
Hourly flow rate (vph)	0	569	15	71	684	12	111
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None			None		
Median storage (veh)							
Upstream signal (ft)		320					
pX, platoon unblocked	0.00			0.82		0.82	0.82
vC, conflicting volume	0			584		1403	577
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0			388		1382	379
iC, single (s)	0.0			4.1		6.4	6.2
iC, 2 stage (s)							
iF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			93		90	80
cM capacity (veh/h)	0			964		122	550

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	584	755	123
Volume Left	0	71	12
Volume Right	15	0	111
cSH	1700	964	411
Volume to Capacity	0.34	0.07	0.30
Queue Length 95th (ft)	0	6	31
Control Delay (s)	0.0	1.9	17.5
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	17.5
Approach LOS			C

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		79.6%	ICU Level of Service D
Analysis Period (min)		15	



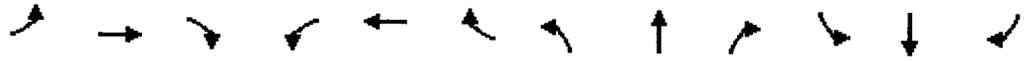
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	12	75	34	63	123	8	44	13	81	7	6	21
Peak Hour Factor	0.63	0.66	0.71	0.62	0.76	0.50	0.67	0.48	0.76	0.46	0.54	0.43
Hourly flow rate (vph)	19	114	48	102	162	16	66	27	107	15	11	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	181	279	199	75
Volume Left (vph)	19	102	66	15
Volume Right (vph)	48	16	107	49
Hadj (s)	-0.06	0.05	-0.20	-0.29
Departure Headway (s)	4.9	4.9	5.0	5.1
Degree Utilization, x	0.25	0.38	0.27	0.11
Capacity (veh/h)	674	692	667	626
Control Delay (s)	9.5	10.9	9.8	8.7
Approach Delay (s)	9.5	10.9	9.8	8.7
Approach LOS	A	B	A	A

Intersection Summary			
Delay		10.0	
HCM Level of Service		B	
Intersection Capacity Utilization	36.8%		ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 7: Mass Ave (Route 111) & Spruce St

2018 Build PM w/ Event
 3/18/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	85	535	11	10	559	64	4	3	10	47	5	82
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	582	12	11	608	70	4	3	11	51	5	89
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		660										
pX, platoon unblocked				0.88			0.88	0.88	0.88	0.88	0.88	
vC, conflicting volume	677			593			1528	1471	588	1449	1442	642
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	677			467			1532	1467	460	1442	1434	642
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			93	97	98	40	95	81
cM capacity (veh/h)	915			960			60	100	528	85	104	474

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	686	688	18	146
Volume Left	92	11	4	51
Volume Right	12	70	11	89
cSH	915	960	146	172
Volume to Capacity	0.10	0.01	0.13	0.84
Queue Length 95th (ft)	8	1	11	148
Control Delay (s)	2.5	0.3	33.1	86.6
Lane LOS	A	A	D	F
Approach Delay (s)	2.5	0.3	33.1	86.6
Approach LOS			D	F

Intersection Summary			
Average Delay		9.9	
Intersection Capacity Utilization		89.9%	ICU Level of Service E
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	3	1	1	1	1	1
Volume (veh/h)	36	21	118	30	14	89
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)	39	23	128	33	15	97
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	272	145			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272	145			161	
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	97			99	
cM capacity (veh/h)	710	903			1418	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	62	161	112
Volume Left	39	0	15
Volume Right	23	33	0
cSH	771	1700	1418
Volume to Capacity	0.08	0.09	0.01
Queue Length 95th (ft)	7	0	1
Control Delay (s)	10.1	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	10.1	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		26.5%	ICU Level of Service A
Analysis Period (min)		15	

West Acton Village Expansion - Acton, MA
 16: Mass Ave (Route 111) & Proposed Driveway

2018 Build PM w/ Event
 3/18/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	11	586	643	39	41	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	637	699	42	45	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	741				1381	720
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	741				1381	720
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				72	97
cM capacity (veh/h)	866				157	428

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	649	741	58
Volume Left	12	0	45
Volume Right	0	42	13
cSH	866	1700	183
Volume to Capacity	0.01	0.44	0.31
Queue Length 95th (ft)	1	0	32
Control Delay (s)	0.4	0.0	33.5
Lane LOS	A		D
Approach Delay (s)	0.4	0.0	33.5
Approach LOS			D

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		49.7%	ICU Level of Service A
Analysis Period (min)		15	

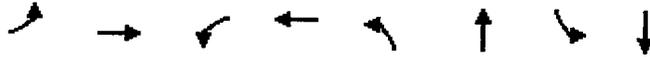


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	83	370	57	119	399	89	59	334	88	85	242	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.97		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1861		1586	1577		1562	1674		1608	1732	
Flt Permitted	0.22	1.00		0.34	1.00		0.51	1.00		0.22	1.00	
Satd. Flow (perm)	391	1861		569	1577		839	1674		380	1732	
Peak-hour factor, PHF	0.79	0.95	0.72	0.85	0.89	0.62	0.75	0.81	0.76	0.77	0.86	0.50
Adj. Flow (vph)	105	389	79	140	448	144	79	412	116	110	281	8
RTOR Reduction (vph)	0	0	0	0	12	0	0	10	0	0	1	0
Lane Group Flow (vph)	105	468	0	140	580	0	79	518	0	110	288	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)					0							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.3	32.3		32.3	32.3		28.2	28.2		28.2	28.2	
Effective Green, g (s)	32.3	32.3		32.3	32.3		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	162	771		236	653		303	605		137	626	
v/s Ratio Prot		0.25			c0.37			c0.31			0.17	
v/s Ratio Perm	0.27			0.25			0.09			0.29		
v/c Ratio	0.65	0.61		0.59	0.89		0.26	0.86		0.80	0.46	
Uniform Delay, d1	18.3	17.9		17.7	21.2		17.6	23.0		22.4	19.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	0.9		2.7	13.6		0.6	11.8		29.0	0.7	
Delay (s)	24.8	18.8		20.4	34.8		18.2	34.8		51.4	19.8	
Level of Service	C	B		C	C		B	C		D	B	
Approach Delay (s)		19.9			32.0			32.7			28.5	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	468	140	592	79	528	110	289
v/c Ratio	0.63	0.59	0.58	0.87	0.25	0.83	0.78	0.45
Control Delay	40.1	21.7	30.9	35.7	21.2	35.8	61.5	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	21.7	30.9	35.7	21.2	35.8	61.5	21.8
Queue Length 50th (ft)	34	148	44	215	23	197	41	91
Queue Length 95th (ft)	#117	339	#147	#553	59	#420	#132	202
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	167	795	243	684	313	635	141	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.59	0.58	0.87	0.25	0.83	0.78	0.45

Intersection Summary

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

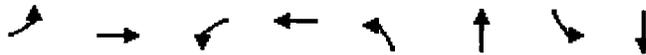


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	13	13	11	12	12	9	10	10	9	10	10
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frts	1.00	0.98		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1863		1586	1577		1562	1674		1608	1732	
Flt Permitted	0.22	1.00		0.32	1.00		0.51	1.00		0.22	1.00	
Satd. Flow (perm)	391	1863		530	1577		839	1674		380	1732	
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Adj. Flow (vph)	105	412	79	140	448	144	79	412	116	110	281	8
RTOR Reduction (vph)	0	0	0	0	12	0	0	10	0	0	1	0
Lane Group Flow (vph)	105	491	0	140	580	0	79	518	0	110	288	0
Heavy Vehicles (%)	2%	3%	2%	10%	4%	6%	4%	2%	4%	1%	2%	0%
Parking (#/hr)												0
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.3	32.3		32.3	32.3		28.2	28.2		28.2	28.2	
Effective Green, g (s)	32.3	32.3		32.3	32.3		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	162	771		219	653		303	605		137	626	
v/s Ratio Prot		0.26			c0.37			c0.31			0.17	
v/s Ratio Perm	0.27			0.26			0.09			0.29		
v/c Ratio	0.65	0.64		0.64	0.89		0.26	0.86		0.80	0.46	
Uniform Delay, d1	18.3	18.2		18.2	21.2		17.6	23.0		22.4	19.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	1.3		4.5	13.6		0.6	11.8		29.0	0.7	
Delay (s)	24.8	19.5		22.7	34.8		18.2	34.8		51.4	19.8	
Level of Service	C	B		C	C		B	C		D	B	
Approach Delay (s)		20.4			32.4			32.7			28.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	105	491	140	592	79	528	110	289
v/c Ratio	0.63	0.62	0.62	0.87	0.25	0.83	0.78	0.45
Control Delay	40.1	22.5	34.3	35.7	21.2	35.8	61.5	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	22.5	34.3	35.7	21.2	35.8	61.5	21.8
Queue Length 50th (ft)	34	158	45	215	23	197	41	91
Queue Length 95th (ft)	#117	360	#155	#553	59	#420	#132	202
Internal Link Dist (ft)		149		240		697		827
Turn Bay Length (ft)	100		160		60		60	
Base Capacity (vph)	167	795	226	684	313	635	141	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.62	0.62	0.87	0.25	0.83	0.78	0.45

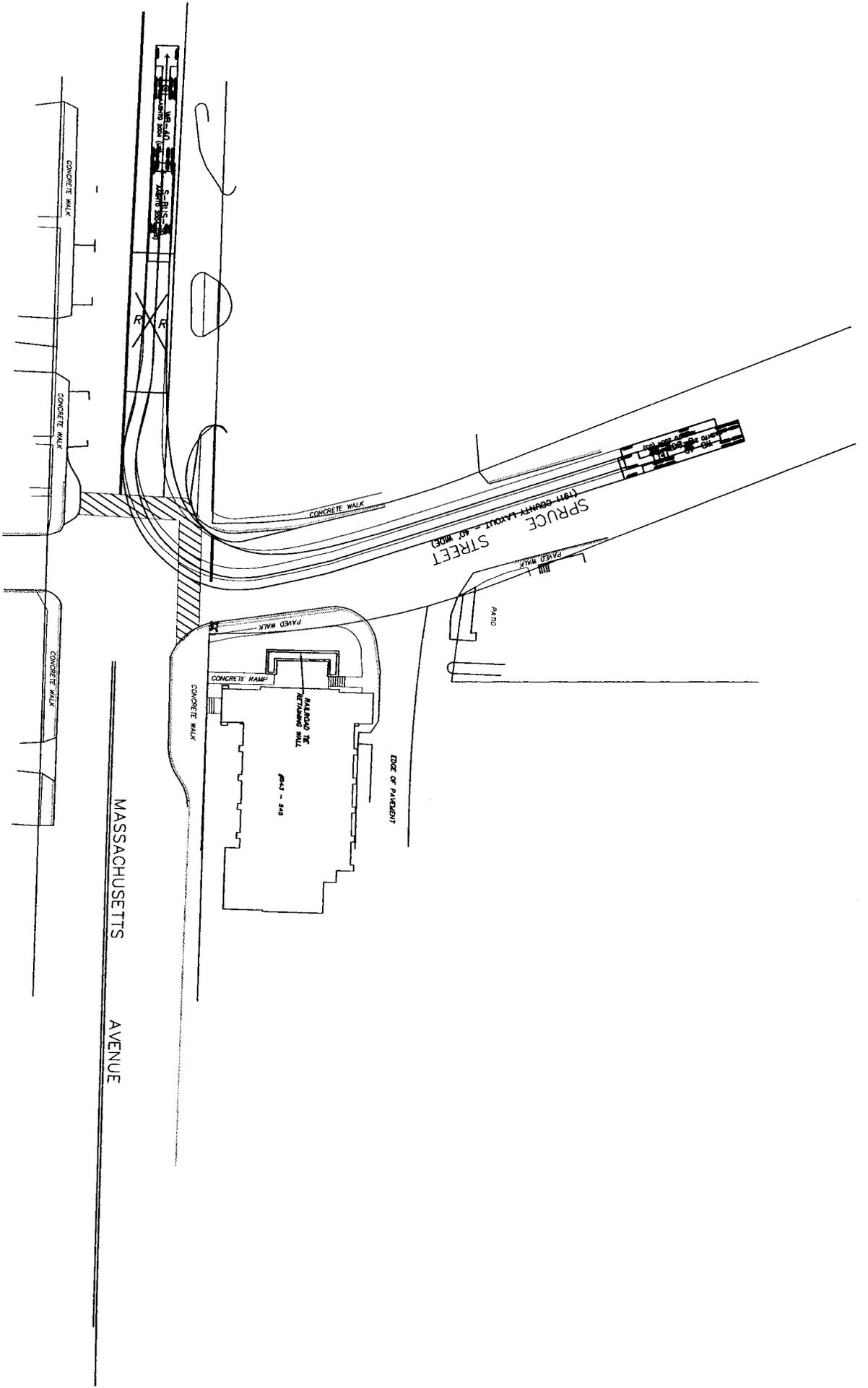
Intersection Summary

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

Appendix E
Truck Turning Radius

KINSLEY ROAD

N/F
BEALDWIN



SPRUCE STREET
(1911 CONCRETE LAYOUT - 40' WIDE)

MASSACHUSETTS AVENUE

RIALTO THEATRE
REPAIRING HALL

PAVED WALK

CONCRETE WALK

EDGE OF PARKING

PAVED

PAVED WALK

CONCRETE WALK

Appendix F
Parking Calculations

Project Site Parking Utilization

Friday at 1pm (No Theater Event)

Project Generated Peak Parking Demand

Retail (8,576 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 8,576 \text{ SF} \times 90\%^b = \underline{23 \text{ Parked Vehicles}}$$

Office (17,761 SF):

$$2.84^c \text{ (Parked Vehicles/1,000 SF)} \times 17,761 \text{ SF} \times 90\%^d = \underline{45 \text{ Parked Vehicles}}$$

Restaurant (57 Seats):

$$0.33^e \text{ (Parked Vehicles/Seat)} \times 57 \text{ Seats} \times 90\%^f = \underline{17 \text{ Parked Vehicles}}$$

Community Space (50 seats)

$$= \underline{13 \text{ Parked Vehicles}}$$

$$\text{Total Peak Parking Demand} = 23 + 45 + 17 + 13 = \underline{98 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 72 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 72 + 20 - 3 = \underline{89 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$\begin{aligned} &= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking} \\ &\text{Demand} = 92 \text{ Space Supply} - 98 \text{ Parked Vehicles} = \underline{-9 \text{ Space Deficit}} \end{aligned}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Assume 10% parked vehicles are "internal vehicles" (already on site).

^c Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^d Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^e Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^f Assume 10% parked vehicles are "internal vehicles" (already on site).

Project Site Parking Utilization
Friday at 6pm WITHOUT Theater Event

Project Generated Peak Parking Demand

Retail (8,576 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 8,576 \text{ SF} \times 80\%^b \times 90\%^c = \underline{19 \text{ Parked Vehicles}}$$

Office (17,761 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 17,761 \text{ SF} \times 25\%^e = \underline{13 \text{ Parked Vehicles}}$$

Restaurant (57 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 57 \text{ Seats} \times 70\%^g = \underline{13 \text{ Parked Vehicles}}$$

Community Space (50 seats)

13 Parked Vehicles

$$\text{Total Peak Parking Demand} = 19 + 13 + 13 + 13 = \underline{58 \text{ (Parking Spaces)}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 72 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

Project site net new parking supply = $72 + 20 - 3 = \underline{89 \text{ Parking Spaces}}$

On Site Peak Parking Utilization

= Project Site Net New Parking Supply – Project Generated Peak Parking
Demand = $92 \text{ Space Supply} - 58 \text{ Parked Vehicles} = \underline{+31 \text{ Space Surplus}}$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

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^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

Project Site Parking Utilization
Friday at 6pm with Theater Event

Project Generated Peak Parking Demand

Retail (8,576 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 8,576 \text{ SF} \times 80\%^b \times 90\%^c = \underline{19 \text{ Parked Vehicles}}$$

Office (17,761 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 17,761 \text{ SF} \times 25\%^e = \underline{13 \text{ Parked Vehicles}}$$

Restaurant (57 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 57 \text{ Seats} \times 70\%^g \times 50\%^h = \underline{7 \text{ Parked Vehicles}}$$

Theater (300 Seats):

70 cast/crew over driving age, 2 cast/crew per vehicle, so parking demand = 35 Parked Vehicles;

Drop-off vehicles for 25 children cast (1.5 children per vehicle) enter the theater in PM peak hour, 50% of the vehicles park for the show, so parking demand = 8 Parked Vehicles

25% visitor vehicles arrive at the theater in PM peak hour (2 visitors per vehicle), so parking demand = $(300 \div 2) \times 25\% = \underline{38 \text{ Parked Vehicles}}$

$$\text{Total Peak Parking Demand} = 19 + 13 + 7 + 35 + 8 + 38 = \underline{120 \text{ (Parking Spaces)}}$$

Project Site Net New Parking Supply

New off-street parking spaces in the project site = 72 Parking Spaces

New on-street parking spaces = 20 Parking Spaces

Existing off-street parking spaces in the project site = 3 Parking Spaces
(Playground)

$$\text{Project site net new parking supply} = 72 + 20 - 3 = \underline{89 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking Demand} = 92 \text{ Space Supply} - 120 \text{ Parked Vehicles} = \underline{-31 \text{ Space Deficiency}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

^d Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^h Assume 50% of patrons will be theater show patrons.

Project Site Parking Utilization
Friday at 7pm with Theater Event

Project Generated Peak Parking Demand

Retail (8,576 SF):

$$3.02^a \text{ (Parked Vehicles/1,000 SF)} \times 8,576 \text{ SF} \times 90\%^b \times 90\%^c = \underline{21 \text{ Parked Vehicles}}$$

Office (17,761 SF):

$$2.84^d \text{ (Parked Vehicles/1,000 SF)} \times 17,761 \text{ SF} \times 10\%^e = \underline{5 \text{ Parked Vehicles}}$$

Restaurant (57 Seats):

$$0.33^f \text{ (Parked Vehicles/Seat)} \times 57 \text{ Seats} \times 75\%^g \times 50\%^h = \underline{7 \text{ Parked Vehicles}}$$

Theater (300 Seats):

$$70 \text{ cast/crew over driving age, 2 cast/crew per vehicle, so parking demand} = \underline{35 \text{ Parked Vehicles}}$$

$$\text{Drop-off vehicles for 25 children cast (1.5 children per vehicle) enter the theater in PM peak hour, 50\% of the vehicles park for the show, so parking demand} = \underline{8 \text{ Parked Vehicles}}$$

$$300 \text{ visitors per show (2 visitors per vehicle), so parking demand} = (300 \div 2) - 8 \text{ parked parent vehicles} = \underline{142 \text{ Parked Vehicles}}$$

$$\text{Total Peak Parking Demand} = 21 + 5 + 7 + 35 + 8 + 142 = \underline{218 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

$$\text{New off-street parking spaces in the project site} = \underline{72 \text{ Parking Spaces}}$$

$$\text{New on-street parking spaces} = \underline{20 \text{ Parking Spaces}}$$

$$\text{Existing off-street parking spaces in the project site} = \underline{3 \text{ Parking Spaces (Playground)}}$$

$$\text{Project site net new parking supply} = 72 + 20 - 3 = \underline{89 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking Demand} = 92 - 218 = \underline{-129 \text{ Space Deficiency}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p200.

^b Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^c Assume 10% parked vehicles are "internal vehicles" (already on site).

^d Average peak period parking demand (Land Use Code: 701). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p173.

^e Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526.

^f Average peak period parking demand (Land Use Code: 932). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004. p276.

^g Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999. p526

^h Assume 50% of patrons will be theater show patrons.

Project Site Parking Utilization

Mid-day on Saturday with Theater Event

Project Generated Peak Parking Demand

Retail (8,576 SF):

$$2.97^a \text{ (Parked Vehicles/1,000 SF)} \times 8,576 \text{ SF} \times 90\%^b = \underline{23 \text{ Parked Vehicles}}$$

Office (17,761 SF):

$$\text{No parking demand} = \underline{0 \text{ Parked Vehicles}}$$

Restaurant (57 Seats):

$$0.35^c \text{ (Parked Vehicles/Seat)} \times 57 \text{ Seats} \times 80\%^d \times 50\%^e = \underline{8 \text{ Parked Vehicles}}$$

Theater (300 Seats):

$$70 \text{ cast/crew over driving age, 2 cast/crew per vehicle, so parking demand} = \underline{35 \text{ Parked Vehicles}}$$

50% drop-off vehicles for 25 children cast (1.5 children per vehicle), 50% of the vehicles park for the show, so parking demand =

$$\underline{8 \text{ Parked Vehicles}}$$

$$300 \text{ visitors per show (2 visitors per vehicle), so parking demand} = (300 \div 2) - 8 \text{ parked parent vehicles} = \underline{142 \text{ Parked Vehicles}}$$

$$\text{Total Parking Demand: } 23 + 0 + 8 + 35 + 8 + 142 = \underline{216 \text{ Parking Spaces}}$$

Project Site Net New Parking Supply

$$\text{New off-street parking spaces in the project site} = \underline{72 \text{ Parking Spaces}}$$

$$\text{New on-street parking spaces} = \underline{20 \text{ Parking Spaces}}$$

$$\text{Existing off-street parking spaces in the project site} = \underline{3 \text{ Parking Spaces (Playground)}}$$

$$\text{Project site net new parking supply} = 72 + 20 - 3 = \underline{89 \text{ Parking Spaces}}$$

On Site Peak Parking Utilization

$$= \text{Project Site Net New Parking Supply} - \text{Project Generated Peak Parking}$$

$$\text{Demand} = 89 - 216 = \underline{-127 \text{ Space Deficiency}}$$

^a Average peak period parking demand (Land Use Code: 820). "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004, p201.

^b Assume 10% parked vehicles are "internal vehicles" (already on site).

^c Average peak period parking demand. "Parking Generation", 3rd Edition, Institute of Transportation Engineers, 2004, p278.

^d Percent of peak demand. "Transportation Planning Handbook", 2nd Edition, Institute of Transportation Engineers, 1999, p526.

^e Assume 50% of patrons will be theater show patrons.