



# BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Town of Norwood

Federal Highway Administration  
(nonvoting)

Federal Transit Administration  
(nonvoting)

## MEMORANDUM

**DATE** March 1, 2012  
**TO** Town of Milton  
**FROM** Mark Abbott, Seth Asante, and Efi Pagitsas  
Boston Region MPO Staff  
**RE** FFY 2011 Safety and Operations Analyses at Selected Boston Region MPO Intersections: Neponset Valley Parkway at Brush Hill Road and Milton Street in Milton

## INTRODUCTION

This memorandum summarizes safety and operations analyses and proposes improvement strategies for the intersections of Neponset Valley Parkway at Brush Hill Road and Neponset Valley Parkway at Milton Street in Milton. It contains the following sections:

- Intersection Layout and Traffic Control
- Issues and Concerns
- Crash Data Analysis
- Intersection Capacity Analysis
- Preliminary Analysis of Traffic Signal Warrants
- Analysis of Traffic Signal Alternative
- Review of Roundabout Alternative
- Improvement Recommendations and Discussion

The memorandum also includes a collection of technical appendices that contain methods and data applied in the study and detailed reports of the intersection capacity analyses.

## INTERSECTION LAYOUT AND TRAFFIC CONTROL

The two intersections, shown in Figure 1, are owned by the Department of Conservation and Recreation. They are located in the western portion of Milton, near the Hyde Park section of Boston. Neponset Valley Parkway, the major street of the two intersections, is a two-lane roadway running in the northwest-southeast direction between Blue Hill Avenue (Route 138) and Truman Parkway; it is categorized as an urban principal arterial. Brush Hill Road in Milton is a town-owned roadway, classified as an urban collector. It runs north-south in direction, north from Blue Hill Avenue (Route 138) south of the intersections, continuing

past Milton Street, to Truman Parkway. Milton Street is an east-west street that also runs from Blue Hill Avenue, east of the intersections, to Neponset Valley Parkway. It is also town-owned and is an urban collector.

Figure 1 shows the intersection layouts and the area nearby. Traffic operation at the Brush Hill Road and Neponset Valley Parkway intersection is under stop-control, with a stop sign located on the Brush Hill Road approach. Both of the Neponset Valley Parkway approaches are uncontrolled. All of the approaches are one lane that is shared by all movements. The traffic operations at the Neponset Valley Parkway and Milton Street intersection is under yield control, with a yield sign located on the northbound Neponset Valley Parkway approach.

The land use in the vicinity of the intersections is mainly residential and public open space. Milton Health care, a nursing home and rehabilitation hospital, is located on Brush Hill Road, south of the Neponset Valley Parkway intersection.

The two intersections are located within about 400 feet of each other. Both intersections are skewed, and a sharp roadway curve is located between them. This limits the sight distance between the intersections and sometimes causes driver confusion.

There are currently no paved sidewalks along either Brush Hill Road or Neponset Valley Parkway. However, there is a pedestrian path located adjacent to Neponset Valley Parkway on the eastern side of the roadway. This pathway leads to the parking area located adjacent to the Brush Hill Road intersection. In addition to the path along Neponset Valley Parkway, there are numerous recreational trails in the area. The parking area is provided to allow access to these trails.

## **ISSUES AND CONCERNS**

Staff met with Milton officials to discuss their concerns about the intersections. Their main concern was the lack of safety at the Brush Hill Road intersection. Numerous crashes have occurred at both intersections, with a majority occurring at the Brush Hill Road intersection. Another concern is the problem of a number of large trucks encroaching into the opposite lane (oncoming traffic) at this intersection. A review of the recent crash data indicates that the Brush Hill Road intersection has a high number of crashes and a crash rate higher than the average for unsignalized intersections in MassDOT Highway Division District 6 (see the next section for further analyses).

The issues and concerns for this intersection can be summarized as follows:

- Skewed approaches of the intersections
- High number of crashes and high crash rate
- Truck traffic encroaching into the lane of oncoming traffic



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**FIGURE 1**  
**Neponset Valley Parkway/Brush Hill Road/  
Milton Street, Milton**

*Safety and Operations  
Improvements at  
Selected Intersections*

## CRASH DATA ANALYSIS

Staff collected crash data for the most recent three years available from the MassDOT Registry of Motor Vehicles Division, from 2006 to 2008. Some additional crash reports were available for both intersections. The crash report data were used to develop a crash diagram for both intersections. This crash diagram is shown in Figure 2, and shows that there is a significant number of angle crashes at the Brush Hill Road intersection.

Table 1 show that on average eight crashes occurred at the Brush Hill Road intersection each year. In total, about 30 percent of the crashes resulted in personal injuries and the rest were property damage only. The collision types consist predominantly of angle collisions and single-vehicle collisions. There were no crashes that involved pedestrians or cyclists in that period.

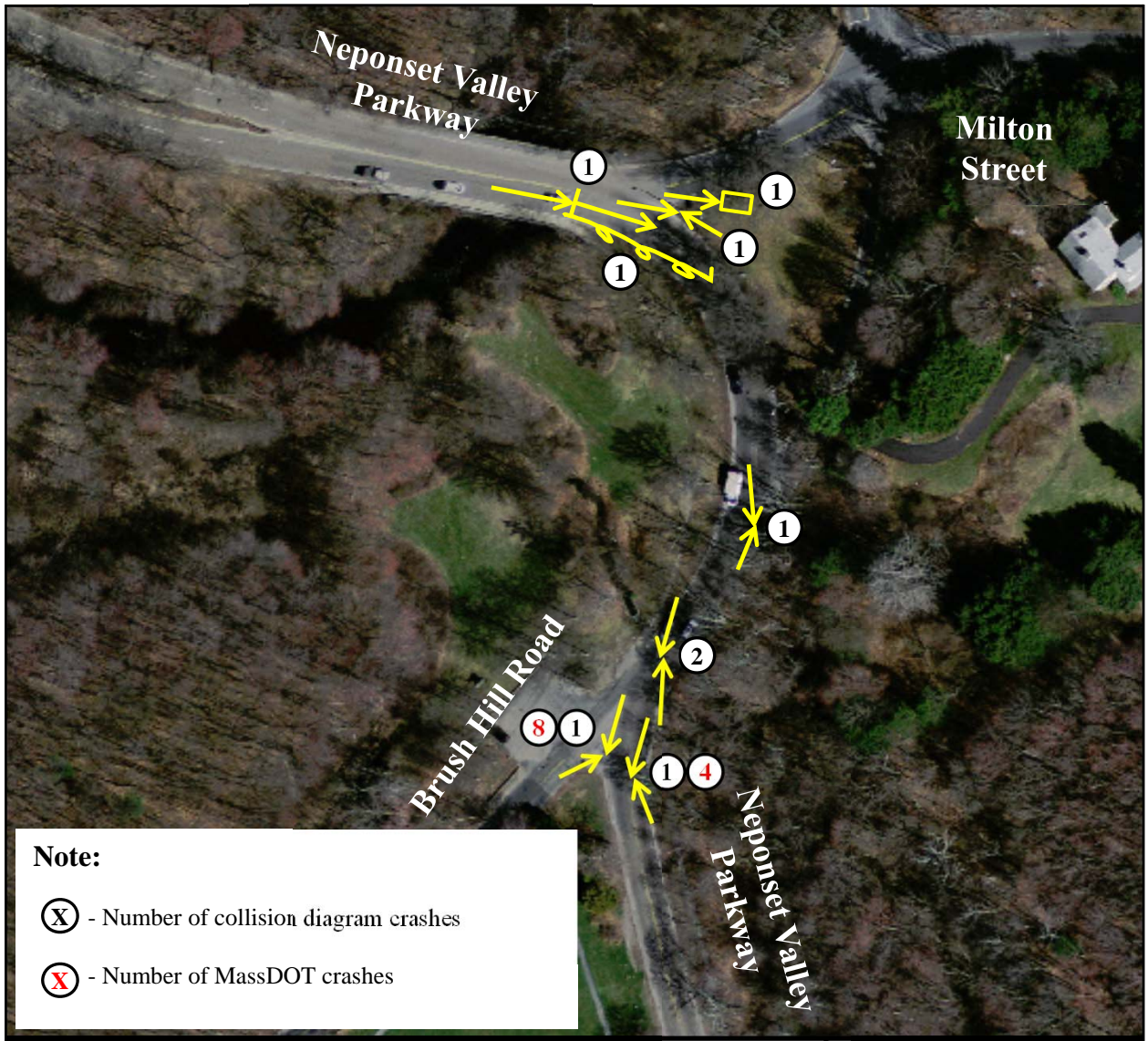
**TABLE 1**  
**Summary of MassDOT Crash Data (2006–2008):**  
**Neponset Valley Parkway at Brush Hill Road**

		2006	2007	2008	2006–2008	
					Total	Average
<b>Total Number of Crashes</b>		<b>10</b>	<b>7</b>	<b>6</b>	<b>23</b>	<b>8</b>
<b>Crash Severity</b>	Property Damage Only	6	4	6	16	5
	Personal Injury	4	3	0	7	2
	Fatality	0	0	0	0	0
	Not Reported	0	0	0	0	0
<b>Collision Type</b>	Angle	6	1	1	8	3
	Rear-end	1	0	0	1	0
	Sideswipe	2	1	0	3	1
	Head-on	0	1	3	4	1
	Single Vehicle	1	4	2	7	2
	Not Reported	0	0	0	0	0
<b>Roadway Conditions</b>	Wet or icy pavement	7	3	2	12	4
	Dark/lighted	3	4	1	8	3
<b>Weather Conditions</b>	Clear	2	4	1	7	2
	Cloudy	2	2	1	5	1
	Rain	6	1	4	11	4
	Snow	0	0	0	0	0
<b>Crashes during weekday peak periods*</b>		4	1	3	8	3
<b>Crashes involving pedestrian(s)</b>		0	0	0	0	0
<b>Crashes involving bicyclist(s)</b>		0	0	0	0	0

\* Peak periods are defined as 7:00–10:00 AM and 3:30–6:30 PM.

Table 2 shows that on average two crashes occurred at the Milton Street intersection each year. Over the three-year period, the majority of the crashes resulted in property damage only. There were no predominant collision types. There were no crashes involving pedestrians or cyclists during that period.





SYMBOLS	TYPES OF CRASH	SEVERITY
Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Bicycle Animal	Head On Angle Turning Move Rear End Sideswipe Out of Control	Injury Accident Fatal Accident

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**FIGURE 2**  
Collision Diagram

*Safety and Operations Improvements at Selected Intersections*

**TABLE 2**  
**Summary of MassDOT Crash Data (2006–2008):**  
**Neponset Valley Parkway at Brush Hill Road/Milton Street**

		2006	2007	2008	2006-2008	
					Total	Average
<b>Total Number of Crashes</b>		<b>4</b>	<b>1</b>	<b>1</b>	<b>6</b>	<b>2</b>
<b>Crash Severity</b>	Property Damage Only	3	1	1	5	2
	Personal Injury	1	0	0	1	0
	Fatality	0	0	0	0	0
	Not Reported	0	0	0	0	0
<b>Collision Type</b>	Angle	1	0	1	2	1
	Rear-end	1	0	0	1	0
	Sideswipe	0	1	0	1	0
	Head-on	0	0	0	0	0
	Single Vehicle	1	0	0	1	0
	Not Reported	1	0	0	1	0
<b>Roadway Conditions</b>	Wet or icy pavement	1	0	0	1	0
	Dark/lighted	0	0	0	0	0
<b>Weather Conditions</b>	Clear	2	1	1	4	1
	Cloudy	2	0	0	2	1
	Rain	0	0	0	0	0
	Snow	0	0	0	0	0
<b>Crashes during weekday peak periods*</b>		1	0	1	2	1
<b>Crashes involving pedestrian(s)</b>		0	0	0	0	0
<b>Crashes involving bicyclist(s)</b>		0	0	0	0	0

\* Peak periods are defined as 7:00–10:00 AM and 3:30–6:30 PM.

Crash rate is another effective tool for examining the relative safety of a particular location.<sup>1</sup> Based on the 2006–2008 crash data and the recently collected traffic volume data, the crash rate for the Brush Hill Road intersection is calculated as 1.84, and for the Milton Street intersection the crash rate is 0.36 (see Appendix B for MassDOT intersection crash rate worksheets). The crash rate at the Brush Hill Road intersection is over three times higher than the average rate for the unsignalized intersections in MassDOT Highway Division District 6, which is estimated to be 0.57 crashes per million entering vehicles.<sup>2</sup>

<sup>1</sup> Crash rates are estimated based on crash frequency (crashes per year) and vehicle exposure (traffic volumes or miles traveled). Crash rates are expressed as “crashes per million entering vehicles” for intersection locations and as “crashes per million miles traveled” for roadway segments.

<sup>2</sup> The average crash rates estimated by the MassDOT Highway Division (as of July 7, 2011) are based upon a database that contains intersection crash rates submitted to MassDOT as part of the review process for an Environmental Impact Report or Functional Design Report. The most recent average crash rates, which are updated on a nearly annual basis, are based on all entries in the database, not just those entries made within the past year.

## INTERSECTION CAPACITY ANALYSIS

MPO staff collected turning-movement counts at the intersection on June 7, 2011. The data were recorded in 15-minute intervals for the peak traffic periods in the morning, from 7:00 to 9:00 AM, and in the evening, from 4:00 to 6:00 PM. The Brush Hill Road intersection had peak hours, which occurred between 7:00 and 8:00 AM and between 5:00 and 6:00 PM. There was observed pedestrian activity during both peak hours at this intersection—7 pedestrians and 16 pedestrians were observed during the AM and PM peak hours, respectively. The Milton Street intersection had peak hours between 7:30 and 8:30 AM and between 5:00 and 6:00 PM. There were 31 and 11 pedestrians observed during the AM and PM peak hours, respectively. The peak hour traffic volumes are shown in Figure 3.

Based on the turning-movement counts and the signal timings measured on the site, the intersection capacity was analyzed by using an intersection capacity analysis program, Synchro.<sup>3</sup> The intersections were both modeled as unsignalized intersections, with stop control at the Brush Hill Road intersection and yield control at the Milton Street intersection. Tables 3 and 4 shows the AM and PM peak hour analyses, respectively, for the existing conditions and the two alternatives provided.

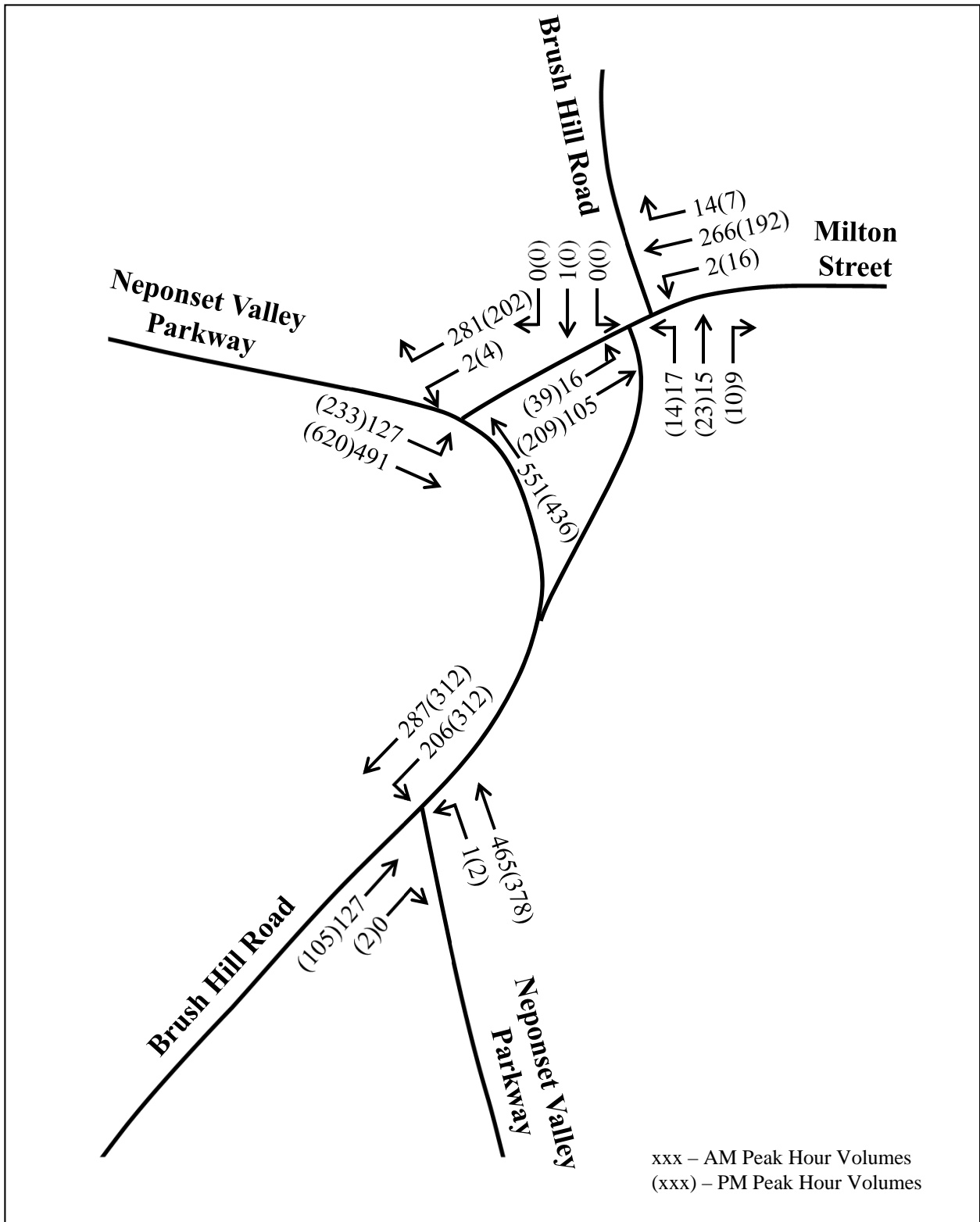
**TABLE 3**  
**AM Peak Hour Intersection Capacity Analysis**

Approach	Mvmt	Existing Conditions				Alternative 1			
		LOS	Delay <sup>1</sup>	V/C	Q <sup>2</sup>	LOS	Delay <sup>1</sup>	V/C	Q <sup>2</sup>
<b>Neponset Valley Parkway at Brush Hill Road</b>									
Neponset Valley Parkway – NB	LT	A	0.0	0.00	0	A	0.00	0.00	0
Neponset Valley Parkway – SB	TR	A	0.0	0.30	0	A	0.00	0.30	0
Brush Hill Road – EB	LR	C	19.1	0.36	41	C	24.6	0.44	55
<b>Neponset Valley Parkway at Milton Street</b>									
Neponset Valley Parkway – NB	TR	F	110.2	1.14	529	A	0.0	0.38	0
Neponset Valley Parkway – EB	LT	A	0.0	0.00	0	A	3.7	0.15	13
Milton Street – WB	LT	A	0.1	0.41	0	D	28.0	0.68	126
<b>Brush Hill Road at Milton Street</b>									
Brush Hill Road – NB	LTR	B	11.7	0.10	8	B	11.1	0.05	4
Brush Hill Road – SB	LTR	B	11.9	0.01	0	B	11.9	0.01	0
Milton Street – EB	LTR	A	1.1	0.01	1	A	1.1	0.01	1
Milton Street – WB	LTR	A	0.1	0.00	0	A	0.1	0.00	0

<sup>1</sup> Delay in seconds per vehicle.

<sup>2</sup> Queue in feet.

<sup>3</sup> Synchro Version 7 was used for these analyses. This software is developed and distributed by Trafficware Ltd. It can perform capacity analysis and traffic simulation (when combined with SimTraffic) for an individual intersection or a series of intersections.



**FIGURE 3**  
**Peak Hour Traffic Volumes**



**TABLE 4  
PM Peak-Hour Intersection Capacity Analysis**

Approach	Mvmt	Existing Conditions				Alternative 1			
		LOS	Delay <sup>1</sup>	V/C	Q <sup>2</sup>	LOS	Delay <sup>1</sup>	V/C	Q <sup>2</sup>
<b>Neponset Valley Parkway at Brush Hill Road</b>									
Neponset Valley Parkway – NB	LT	A	0.1	0.00	0	A	0.1	0.00	0
Neponset Valley Parkway – SB	TR	A	0.0	0.30	0	A	0.0	0.38	0
Brush Hill Road – EB	LR	C	18.4	0.36	41	C	23.5	0.39	44
<b>Neponset Valley Parkway at Milton Street</b>									
Neponset Valley Parkway – NB	TR	F	56.9	0.95	308	A	0.0	0.30	0
Neponset Valley Parkway – EB	LT	A	0.0	0.01	0	A	5.6	0.25	25
Milton Street – WB	LT	A	0.1	0.57	0	E	37.2	0.71	130
<b>Brush Hill Road at Milton Street</b>									
Brush Hill Road – NB	LTR	B	13.4	0.14	12	B	12.3	0.09	7
Brush Hill Road – SB	LTR	A	0.0	0.01	0	B	0.0	0.01	0
Milton Street – EB	LTR	A	1.4	0.03	2	A	1.4	0.03	2
Milton Street – WB	LTR	A	0.8	0.01	1	A	0.0	0.00	0

<sup>1</sup> Delay in seconds per vehicle.

<sup>2</sup> Queue in feet.

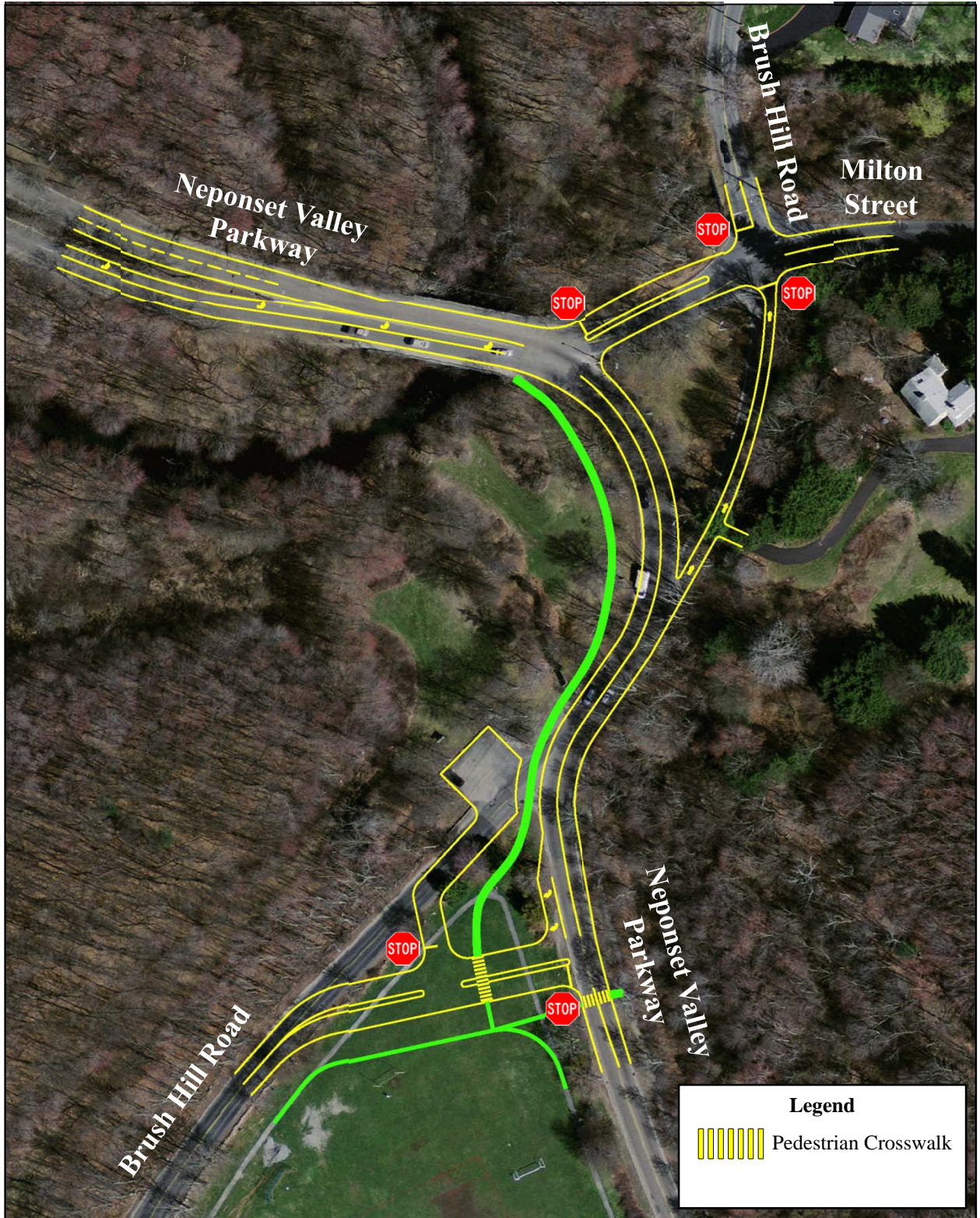
## ALTERNATIVES

To address the concerns about safety, two alternatives were developed to improve safety as well as traffic operations at both intersections. The two alternatives, described below, share common features.

### Alternative 1: Realignment of the Brush Hill Road and Milton Street Intersections

Alternative 1 contains modifications to both the Brush Hill Road and Milton Street intersections, as shown in Figure 4. The intersection of Brush Hill Road and Neponset Valley Parkway is realigned to a traditional “T” intersection. The intersection is moved approximately 150 feet south of its current location. A Neponset Valley Parkway southbound right-turn lane is added to accommodate the right turns onto Brush Hill Road. A stop sign is provided on the realigned eastbound Brush Hill Road approach. Access to the existing parking area for the recreational trails is now provided via a new driveway, which uses the abandoned Brush Hill Road segment. This eliminates the problem of vehicles turning into the parking area from the roadway curve. The addition of crosswalks across Neponset Valley Parkway and Brush Hill Road are included in this alternative.

The intersection at Neponset Valley Parkway and Milton Street is also realigned to provide for increased sight distance for entering Milton Street drivers. A left-turn lane is provided for the Neponset Valley Parkway left-turns onto Milton Street. The intersection is stop-sign controlled, with the stop sign being placed onto the Milton Street approach. This creates improved traffic flow through the intersection based on existing traffic volumes. The existing segment of Brush



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**FIGURE 4**  
**Alternative 1: Realignment of Brush Hill**  
**Road and Milton Street**

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*Selected Intersections*

Hill Road between Neponset Valley Parkway and Milton Street is one-way northbound. An estimate of the construction cost is approximately \$1,000,000 to \$1,250,000.

### **Alternative 2: Roundabout at Milton Street and Realignment of Brush Hill Road**

Alternative 2, the roundabout alternative, is shown in Figure 5. While the Brush Hill Road intersection is the same as in Alternative 1, this alternative provides a roundabout at the Milton Street intersection in place of the existing “T” intersection. This is a single-lane roundabout that would fit into the existing area between Neponset Valley Parkway, Milton Street, and Brush Hill Road. As shown, it has an inscribed circle with a diameter of 130 feet, and is designed to accommodate large trucks. An estimate of the construction cost for this alternative is approximately \$1,000,000 to \$1,500,000.

### **Conceptual Plan for Neponset Valley Parkway at Brush Hill Road**

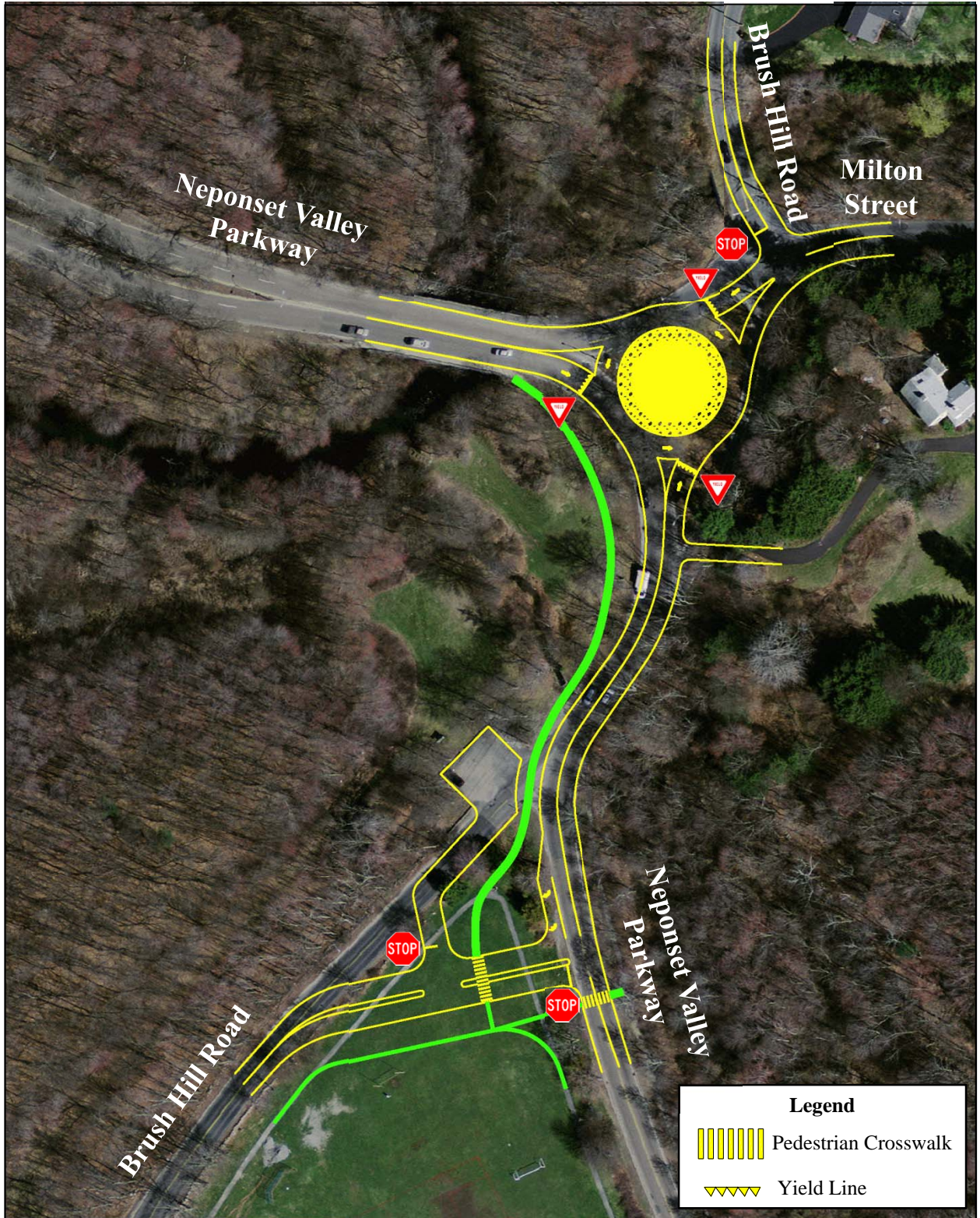
The Town of Milton provided a conceptual plan for this intersection (see Appendix E). The conceptual plan of the intersection includes constructing a large delta island separating the approach and departure lanes of Brush Hill Road, and maintaining the southbound movement of Neponset Valley Parkway to Brush Hill Road on the existing roadway. This plan would either eliminate the northbound Neponset Valley Parkway left turns to Brush Hill Road or maintain the left turns onto Brush Hill Road at the existing problem location, on a sharp curve. In addition, the Brush Hill Road northbound left turn onto Neponset Valley Parkway would still be located near its current location, on a curve, which could limit sight distance for both southbound Neponset Valley Parkway traffic and Brush Hill Road left-turning vehicles.

## **IMPROVEMENT RECOMMENDATIONS**



The above safety and operations analyses indicate that either of the two alternatives would improve the safety operations, as well as the traffic operations, at both intersections. Both of the alternatives are longer-term projects. However, in either alternative, the Brush Hill Road and Milton Street intersections could be designed and constructed separately. Completing either alternative or intersection does not preclude the eventual construction of the other.

Due to the existing geometry at the Brush Hill Road intersection, there are no short-term improvements that can be recommended. At the Milton Street intersection, consideration should be given to removing the existing yield sign on Neponset Valley Parkway northbound and placing a stop sign on the Milton Street approach. Based on the traffic volumes, traffic flow through the intersection would be improved. In addition to the signing changes, Neponset Valley Parkway southbound at the Milton Street intersection should be restriped to two-lanes: one exclusive left-turn lane and one through lane. The estimated cost is approximately \$5,000.





**Legend**

-  Pedestrian Crosswalk
-  Yield Line

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**FIGURE 5**  
**Alternative 2: Roundabout at Milton Street and Realignment of Brush Hill Road**

*Safety and Operations Improvements at Selected Intersections*

## **APPENDIX A**

### **Calculation of Crash Rates for:**

Neponset Valley Parkway at Brush Hill Road

and

Neponset Valley Parkway at Milton Street







## **APPENDIX B**

### **Average Daily Traffic (ADT) of the Study Area Roadways**



Locations 1 to 5 in Milton

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/23/2011

STA. 1 NB

Site Reference: 110270000759  
 Site ID: 000000010102  
 Location: NEPONSET VALLEY PKWY S/E OF BRUSH HILL  
 Direction: NORTH

File: 10102.prn  
 City: MILTON  
 County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		39	42	57		46			46	138
02:00		26	26	23		25			25	75
03:00		23	21	22		22			22	66
04:00		23	29	29		27			27	81
05:00		70	86	72		76			76	228
06:00		245	247	246		246			246	738
07:00		488	504	481		491			491	1473
08:00		538	546	537		540			540	1621
09:00		433	437	402		424			424	1272
10:00		346	313	330		329			329	989
11:00		275	287	285		282			282	847
12:00		241	298			269			269	539
13:00	290	283	320			297			297	893
14:00	278	295	316			296			296	889
15:00	249	272	307			276			276	828
16:00	361	376	387			374			374	1124
17:00	333	352	368			351			351	1053
18:00	370	369	371			370			370	1110
19:00	252	295	284			277			277	831
20:00	215	225	250			230			230	690
21:00	187	170	221			192			192	578
22:00	150	156	160			155			155	466
23:00	89	117	123			109			109	329
24:00	99	95	109			101			101	303
-----										
TOTALS	2873	5752	6052	2484	0	5805	0	0	5805	17161
-----										
% AVG WKDY	49.4	99	104.2	42.7						
% AVG WEEK	49.4	99	104.2	42.7						
-----										
AM Times		08:00	08:00	08:00		08:00			08:00	
AM Peaks		538	546	537		540			540	
-----										
PM Times	18:00	16:00	16:00			16:00			16:00	
PM Peaks	370	376	387			374			374	

U3  
 NB 5805  
 SB 3496  
 -----  
 COMB AWD 9301  
 FAC .91 (.98)  
 COMB ADT 8,300



Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 5/23/2011

STA 1 SB

Site Reference: 110270000759

Site ID: 000000010102

Location: NEPONSET VALLEY PKWY S/E OF BRUSH HILL

Direction: SOUTH

File: 10102.prn

City: MILTON

County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		18	29	30		25			25	77
02:00		19	19	11		16			16	49
03:00		13	13	14		13			13	40
04:00		10	15	13		12			12	38
05:00		27	30	24		27			27	81
06:00		75	70	81		75			75	226
07:00		140	138	136		138			138	414
08:00		188	206	207		200			200	601
09:00		166	205	210		193			193	581
10:00		164	180	170		171			171	514
11:00		189	189	190		189			189	568
12:00		157	187			172			172	344
13:00	166	190	189			181			181	545
14:00	211	202	221			211			211	634
15:00	253	245	239			245			245	737
16:00	270	268	305			281			281	843
17:00	296	302	305			301			301	903
18:00	339	323	305			322			322	967
19:00	204	240	247			230			230	691
20:00	143	171	177			163			163	491
21:00	102	135	118			118			118	355
22:00	80	102	86			89			89	268
23:00	54	60	94			69			69	208
24:00	63	52	50			55			55	165
TOTALS	2181	3456	3617	1086	0	3496	0	0	3496	10340
% AVG WKDY	62.3	98.8	103.4	31						
% AVG WEEK	62.3	98.8	103.4	31						
AM Times		11:00	08:00	09:00		08:00			08:00	
AM Peaks		189	206	210		200			200	
PM Times	18:00	18:00	16:00			18:00			18:00	
PM Peaks	339	323	305			322			322	

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/24/2011

STA. 2 NB

Site Reference: 110270000673

Site ID: 00000020102

Location: BRUSH HILL RD. S. OF NEPONSET VALLEY

Direction: NORTH

File: 20102.prn

City: MILTON

County: DIR VOL N&S

TIME	MON	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00			13	15		14			14	28
02:00			5	0		2			2	5
03:00			5	2		3			3	7
04:00			3	3		3			3	6
05:00			6	2		4			4	8
06:00			19	9		14			14	28
07:00			81	48		64			64	129
08:00			133	46		89			89	179
09:00			147	97		122			122	244
10:00			104	50		77			77	154
11:00			98	61		79			79	159
12:00		81	76			78			78	157
13:00		91	111			101			101	202
14:00		83	24			53			53	107
15:00		100	28			64			64	128
16:00		119	73			96			96	192
17:00		102	105			103			103	207
18:00		115	51			83			83	166
19:00		73	45			59			59	118
20:00		77	48			62			62	125
21:00		44	62			53			53	106
22:00		40	46			43			43	86
23:00		33	34			33			33	67
24:00		35	32			33			33	67
TOTALS	0	993	1349	333	0	1332	0	0	1332	2675
% AVG WKDY		74.5	101.2	25						
% AVG WEEK		74.5	101.2	25						
AM Times		12:00	09:00	09:00		09:00			09:00	
AM Peaks		81	147	97		122			122	
PM Times		16:00	13:00			17:00			17:00	
PM Peaks		119	111			103			103	

U6

NB 1332  
 SB 4519

COMB AWD 5851

FAC .91(.99)

COMB ADT 5300

Mass Highway Department  
WEEKLY SUMMARY FOR LANE 2  
Starting: 5/24/2011

STA. 2 SB

Site Reference: 110270000673  
Site ID: 000000020102  
Location: BRUSH HILL RD. S. OF NEPONSET VALLEY  
Direction: SOUTH

File: 20102.prn  
City: MILTON  
County: DIR VOL N&S

TIME	MON	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00			22	29		25			25	51
02:00			13	20		16			16	33
03:00			7	14		10			10	21
04:00			4	8		6			6	12
05:00			21	27		24			24	48
06:00			56	80		68			68	136
07:00			171	206		188			188	377
08:00			266	381		323			323	647
09:00			279	373		326			326	652
10:00			174	260		217			217	434
11:00			188	290		239			239	478
12:00		187	182			184			184	369
13:00		195	195			195			195	390
14:00		238	330			284			284	568
15:00		302	394			348			348	696
16:00		316	424			370			370	740
17:00		327	416			371			371	743
18:00		303	383			343			343	686
19:00		241	368			304			304	609
20:00		200	279			239			239	479
21:00		140	177			158			158	317
22:00		105	152			128			128	257
23:00		72	85			78			78	157
24:00		58	93			75			75	151
-----										
TOTALS	0	2684	4679	1688	0	4519	0	0	4519	9051
-----										
% AVG WKDY		59.3	103.5	37.3						
% AVG WEEK		59.3	103.5	37.3						
-----										
AM Times		12:00	09:00	08:00		09:00			09:00	
AM Peaks		187	279	381		326			326	
-----										
PM Times		17:00	16:00			17:00			17:00	
PM Peaks		327	424			371			371	

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/23/2011

Page: 1

STA. 3 EB

Site Reference: 110270000844

Site ID: 000000000303

Location: NEPONSET VALLEY PKWY OF W. OF BRUSH HILL

Direction: EAST

File: 303.prn

City: MILTON

County: VOL E.B.

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		59	62	77		66			66	198
02:00		32	31	36		33			33	99
03:00		30	26	28		28			28	84
04:00		30	33	31		31			31	94
05:00		78	97	85		86			86	260
06:00		278	274	275		275			275	827
07:00		642	655	664		653			653	1961
08:00		839	891	863		864			864	2593
09:00		724	740	676		713			713	2140
10:00		512	510	520		514			514	1542
11:00		392	427	435		418			418	1254
12:00		393	456			424			424	849
13:00		421	500			460			460	921
14:00	434	462	478			458			458	1374
15:00	441	476	492			469			469	1409
16:00	543	588	639			590			590	1770
17:00	555	596	600			583			583	1751
18:00	578	594	610			594			594	1782
19:00	397	455	484			445			445	1336
20:00	338	336	374			349			349	1048
21:00	276	255	315			282			282	846
22:00	209	233	254			232			232	696
23:00	124	168	159			150			150	451
24:00	133	143	152			142			142	428
<hr/>										
TOTALS	4028	8736	9259	3690	0	8859	0	0	8859	25713
<hr/>										
% AVG WKDY	45.4	98.6	104.5	41.6						
% AVG WEEK	45.4	98.6	104.5	41.6						
<hr/>										
AM Times		08:00	08:00	08:00		08:00			08:00	
AM Peaks		839	891	863		864			864	
<hr/>										
PM Times	18:00	17:00	16:00			18:00			18:00	
PM Peaks	578	596	639			594			594	

U3

EB 8859

WB 9051

COMB AWD 17910

FAC .91 (.98)

COMB ADT 16,000

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/23/2011

Page: 1

STA. 3WB

Site Reference: 110270000561  
 Site ID: 000000000304  
 Location: NEPONSET VALLEY PKWY OF W. OF BRUSH HILL  
 Direction: WEST

File: 304.prn  
 City: MILTON  
 County: VOL W.B.

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		57	56	64		59			59	177
02:00		28	38	28		31			31	94
03:00		28	27	28		27			27	83
04:00		16	20	22		19			19	58
05:00		49	59	53		53			53	161
06:00		161	143	152		152			152	456
07:00		320	359	318		332			332	997
08:00		532	557	582		557			557	1671
09:00		567	607	601		591			591	1775
10:00		396	418	424		412			412	1238
11:00		417	438	459		438			438	1314
12:00		426	439			432			432	865
13:00		455	467			461			461	922
14:00	524	525	553			534			534	1602
15:00	665	669	647			660			660	1981
16:00	694	740	790			741			741	2224
17:00	785	817	853			818			818	2455
18:00	809	847	821			825			825	2477
19:00	574	595	723			630			630	1892
20:00	396	454	492			447			447	1342
21:00	267	318	315			300			300	900
22:00	193	238	276			235			235	707
23:00	138	167	208			171			171	513
24:00	131	114	133			126			126	378
-----										
TOTALS	5176	8936	9439	2731	0	9051	0	0	9051	26282
-----										
% AVG WKDY	57.1	98.7	104.2	30.1						
% AVG WEEK	57.1	98.7	104.2	30.1						
-----										
AM Times		09:00	09:00	09:00		09:00			09:00	
AM Peaks		567	607	601		591			591	
-----										
PM Times	18:00	18:00	17:00			18:00			18:00	
PM Peaks	809	847	853			825			825	



Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/23/2011

STA. 4 EB

Site Reference: 110270000862  
 Site ID: 000000040304  
 Location: MILTON ST. EAST OF BRUSH HILL RD.  
 Direction: EAST

File: 40304.prn  
 City: MILTON  
 County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		7	4	7		6		6	6	18
02:00		2	6	4		4		4	4	12
03:00		5	7	5		5		5	5	17
04:00		1	1	1		1		1	1	3
05:00		7	6	8		7		7	7	21
06:00		13	15	10		12		12	12	38
07:00		41	56	46		47		47	47	143
08:00		102	107	103		104		104	104	312
09:00		111	117	113		113		113	113	341
10:00		70	82	81		77		77	77	233
11:00		74	72	68		71		71	71	214
12:00		85	74			79		79	79	159
13:00	69	78	92			79		79	79	239
14:00	91	84	108			94		94	94	283
15:00	125	121	111			119		119	119	357
16:00	135	150	153			146		146	146	438
17:00	183	193	232			202		202	202	608
18:00	225	250	263			246		246	246	738
19:00	147	108	182			145		145	145	437
20:00	77	79	98			84		84	84	254
21:00	51	43	50			48		48	48	144
22:00	26	34	55			38		38	38	115
23:00	21	24	26			23		23	23	71
24:00	8	10	17			11		11	11	35
-----										
TOTALS	1158	1692	1934	446	0	1761	0	0	1761	5230
-----										
% AVG WKDY	65.7	96	109.8	25.3						
% AVG WEEK	65.7	96	109.8	25.3						
-----										
AM Times		09:00	09:00	09:00		09:00			09:00	
AM Peaks		111	117	113		113			113	
-----										
PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	225	250	263			246			246	

u6

EB 1761  
 WB 1808

COMB AWD 3569  
 FAC .91(.99)  
 COMB ADT 3,200

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 5/23/2011

Page: 2

STA. 4WB

Site Reference: 110270000862  
 Site ID: 000000040304  
 Location: MILTON ST. EAST OF BRUSH HILL RD.  
 Direction: WEST

File: 40304.prn  
 City: MILTON  
 County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		7	6	11		8			8	24
02:00		4	3	6		4			4	13
03:00		3	3	1		2			2	7
04:00		3	3	1		2			2	7
05:00		7	8	8		7			7	23
06:00		28	18	22		22			22	68
07:00		92	91	114		99			99	297
08:00		216	223	211		216			216	650
09:00		178	185	172		178			178	535
10:00		93	104	96		97			97	293
11:00		75	67	70		70			70	212
12:00		79	90			84			84	169
13:00	95	68	85			82			82	248
14:00	83	99	76			86			86	258
15:00	99	114	99			104			104	312
16:00	131	140	128			133			133	399
17:00	145	167	165			159			159	477
18:00	138	147	167			150			150	452
19:00	81	104	130			105			105	315
20:00	64	53	81			66			66	198
21:00	58	55	47			53			53	160
22:00	28	47	57			44			44	132
23:00	16	22	24			20			20	62
24:00	14	21	16			17			17	51
TOTALS	952	1822	1876	712	0	1808	0	0	1808	5362
% AVG WKDY	52.6	100.7	103.7	39.3						
% AVG WEEK	52.6	100.7	103.7	39.3						
AM Times		08:00	08:00	08:00		08:00			08:00	
AM Peaks		216	223	211		216			216	
PM Times	17:00	17:00	18:00			17:00			17:00	
PM Peaks	145	167	167			159			159	

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 5/23/2011

Page: 1

STA. 5 NB

Site Reference: 110270000625  
 Site ID: 000000050102  
 Location: BRUSH HILL RD. NORTH OF MILTON ST.  
 Direction: NORTH

File: 50102.prn  
 City: MILTON  
 County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		5	3	4		4		4	4	12
02:00		4	3	2		3		3	3	9
03:00		2	2	0		1		1	1	4
04:00		0	2	2		1		1	1	4
05:00		1	2	1		1		1	1	4
06:00		4	7	6		5		5	5	17
07:00		13	17	17		15		15	15	47
08:00		31	36	32		33		33	33	99
09:00		67	78	62		69		69	69	207
10:00		24	31	42		32		32	32	97
11:00		38	32	37		35		35	35	107
12:00		35	35			35		35	35	70
13:00	46	31	39			38		38	38	116
14:00	35	46	59			46		46	46	140
15:00	50	31	53			44		44	44	134
16:00	70	74	59			67		67	67	203
17:00	51	60	77			62		62	62	188
18:00	77	72	58			69		69	69	207
19:00	49	48	59			52		52	52	156
20:00	54	43	55			50		50	50	152
21:00	38	32	38			36		36	36	108
22:00	14	28	19			20		20	20	61
23:00	7	18	13			12		12	12	38
24:00	10	8	15			11		11	11	33
TOTALS	501	715	792	205	0	741	0	0	741	2213
% AVG WKDY	67.6	96.4	106.8	27.6						
% AVG WEEK	67.6	96.4	106.8	27.6						
AM Times		09:00	09:00	09:00		09:00			09:00	
AM Peaks		67	78	62		69			69	
PM Times	18:00	16:00	17:00			18:00			18:00	
PM Peaks	77	74	77			69			69	

u6  
 NB 741  
 SB 783  
 -----  
 COMB AWD 1524  
 FAC .91(.99)  
 COMB ADT 1,400

Mass Highway Department  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 5/23/2011

STA. 5SB

Site Reference: 110270000625  
 Site ID: 000000050102  
 Location: BRUSH HILL RD. NORTH OF MILTON ST.  
 Direction: SOUTH

File: 50102.prn  
 City: MILTON  
 County: DIR VOL N&S

TIME	MON 23	TUE 24	WED 25	THU 26	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		2	2	3		2			2	7
02:00		3	1	2		2			2	6
03:00		0	3	1		1			1	4
04:00		0	0	0		0			0	0
05:00		0	0	1		0			0	1
06:00		9	13	8		10			10	30
07:00		26	34	36		32			32	96
08:00		52	66	58		58			58	176
09:00		67	58	62		62			62	187
10:00		43	47	43		44			44	133
11:00		36	38	54		42			42	128
12:00		50	45			47			47	95
13:00	49	45	51			48			48	145
14:00	34	49	55			46			46	138
15:00	57	51	61			56			56	169
16:00	43	59	68			56			56	170
17:00	68	71	78			72			72	217
18:00	63	58	73			64			64	194
19:00	60	46	61			55			55	167
20:00	43	32	47			40			40	122
21:00	17	25	16			19			19	58
22:00	14	18	9			13			13	41
23:00	4	16	6			8			8	26
24:00	7	10	1			6			6	18
TOTALS	459	768	833	268	0	783	0	0	783	2328
% AVG WKDY	58.6	98	106.3	34.2						
% AVG WEEK	58.6	98	106.3	34.2						
AM Times		09:00	08:00	09:00		09:00			09:00	
AM Peaks		67	66	62		62			62	
PM Times	17:00	17:00	17:00			17:00			17:00	
PM Peaks	68	71	78			72			72	

## **APPENDIX C**

### **Turning-Movement Counts (TMCs) for the Study Area Roadways**



Central Transportation Planning Staff

www.ctps.org

Neponset Valley Pkwy @ Milton Street TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_PM

Site Code : 06071022

Start Date : 6/7/2011

Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Milton Street From East				Neponset Valley Pkwy From South				Neponset Valley Pkwy From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
16:00	34	4	0	38	0	103	0	103	166	0	62	228	369
16:15	44	0	0	44	0	100	0	100	138	0	61	199	343
16:30	47	0	0	47	0	99	0	99	138	0	62	200	346
16:45	40	1	0	41	0	113	3	116	141	0	59	200	357
Total	165	5	0	170	0	415	3	418	583	0	244	827	1415
17:00	56	1	0	57	0	108	0	108	168	0	79	247	412
17:15	59	8	2	69	0	124	0	124	147	1	43	191	384
17:30	34	0	0	34	0	99	1	100	156	0	63	219	353
17:45	43	1	2	46	0	123	0	123	149	0	47	196	365
Total	192	10	4	206	0	454	1	455	620	1	232	853	1514
Grand Total	357	15	4	376	0	869	4	873	1203	1	476	1680	2929
Apprch %	94.9	4	1.1		0	99.5	0.5		71.6	0.1	28.3		
Total %	12.2	0.5	0.1	12.8	0	29.7	0.1	29.8	41.1	0	16.3	57.4	
Vehicles	352	15	4	371	0	838	4	842	1171	1	476	1648	2861
% Vehicles	98.6	100	100	98.7	0	96.4	100	96.4	97.3	100	100	98.1	97.7
Heavy Vehicles	5	0	0	5	0	31	0	31	32	0	0	32	68
% Heavy Vehicles	1.4	0	0	1.3	0	3.6	0	3.6	2.7	0	0	1.9	2.3

Start Time	Milton Street From East				Neponset Valley Pkwy From South				Neponset Valley Pkwy From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	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	56	1	0	57	0	108	0	108	<b>168</b>	0	<b>79</b>	<b>247</b>	<b>412</b>
17:15	<b>59</b>	<b>8</b>	<b>2</b>	<b>69</b>	0	<b>124</b>	0	<b>124</b>	147	<b>1</b>	43	191	384
17:30	34	0	0	34	0	99	<b>1</b>	100	156	0	63	219	353
17:45	43	1	2	46	0	123	0	123	149	0	47	196	365
Total Volume	192	10	4	206	0	454	1	455	620	1	232	853	1514
% App. Total	93.2	4.9	1.9		0	99.8	0.2		72.7	0.1	27.2		
PHF	.814	.313	.500	.746	.000	.915	.250	.917	.923	.250	.734	.863	.919
Vehicles	191	10	4	205	0	441	1	442	606	1	232	839	1486
% Vehicles	99.5	100	100	99.5	0	97.1	100	97.1	97.7	100	100	98.4	98.2
Heavy Vehicles	1	0	0	1	0	13	0	13	14	0	0	14	28
% Heavy Vehicles	0.5	0	0	0.5	0	2.9	0	2.9	2.3	0	0	1.6	1.8

Neponset Valley Pkwy @ Milton Street TMC

June 7, 2011

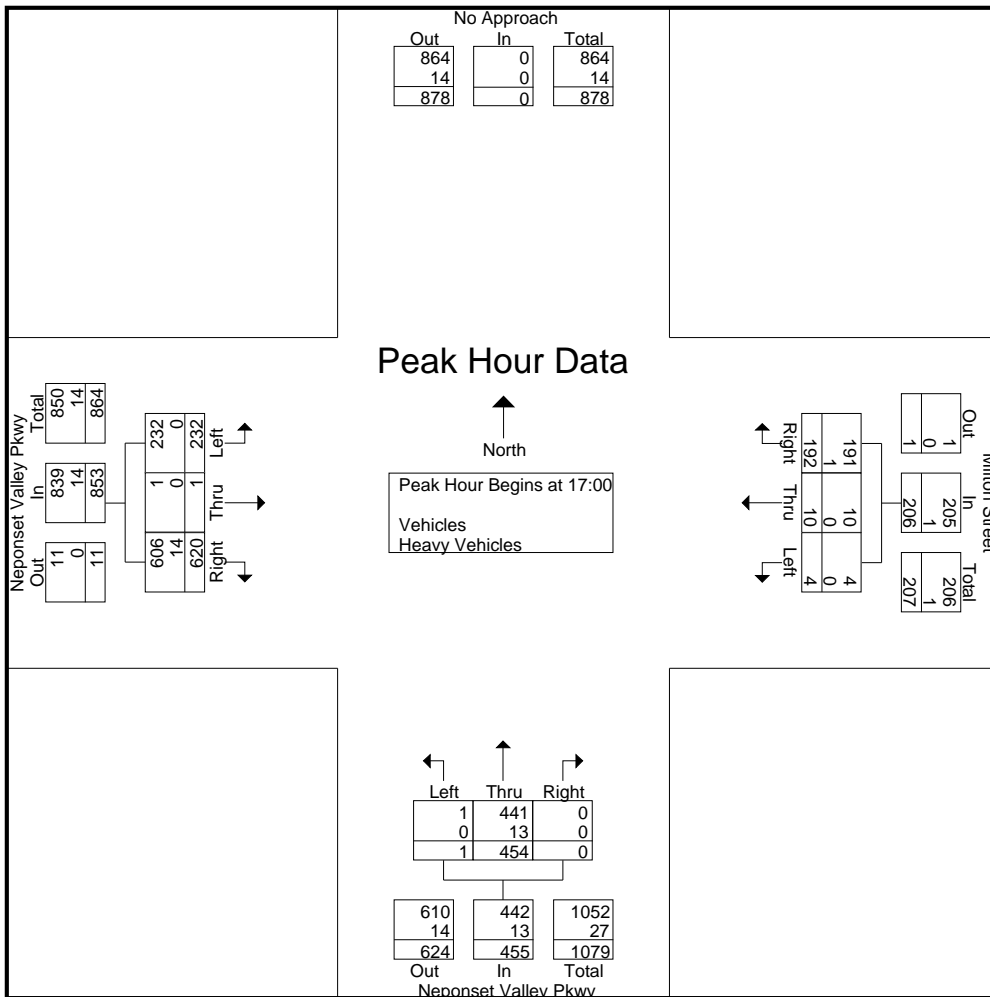
AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_PM

Site Code : 06071022

Start Date : 6/7/2011

Page No : 2



Left and thru  
go to Milton St

Right and Thru  
go to N.V. Pkwy

Thru goes to N.V. Pkwy from West

Neponset Valley Pkwy @ Milton Street TMC  
June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_PM  
Site Code : 06071022  
Start Date : 6/7/2011  
Page No : 3

Pedestrians are by crossing approach  
Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Milton Street From East					Neponset Valley Pkwy From South					Neponset Valley Pkwy From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
16:00	1	0	0	0	1	0	1	0	0	1	2	0	0	0	2	4
16:15	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	2
16:30	0	0	0	0	0	0	1	0	0	1	7	0	0	0	7	8
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	1	0	2	0	2	0	0	2	10	0	0	0	10	14
17:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
17:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
17:30	0	0	0	0	0	0	0	0	2	2	2	0	1	0	3	5
17:45	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	2
Total	1	0	0	0	1	0	1	0	2	3	5	0	1	0	6	10
Grand Total	2	0	1	0	3	0	3	0	2	5	15	0	1	0	16	24
Apprch %	66.7	0	33.3	0		0	60	0	40		93.8	0	6.2	0		
Total %	8.3	0	4.2	0	12.5	0	12.5	0	8.3	20.8	62.5	0	4.2	0	66.7	

Central Transportation Planning Staff

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Neponset Valley Pkwy @ Milton Street TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_AM

Site Code : 06071021

Start Date : 6/7/2011

Page No : 1

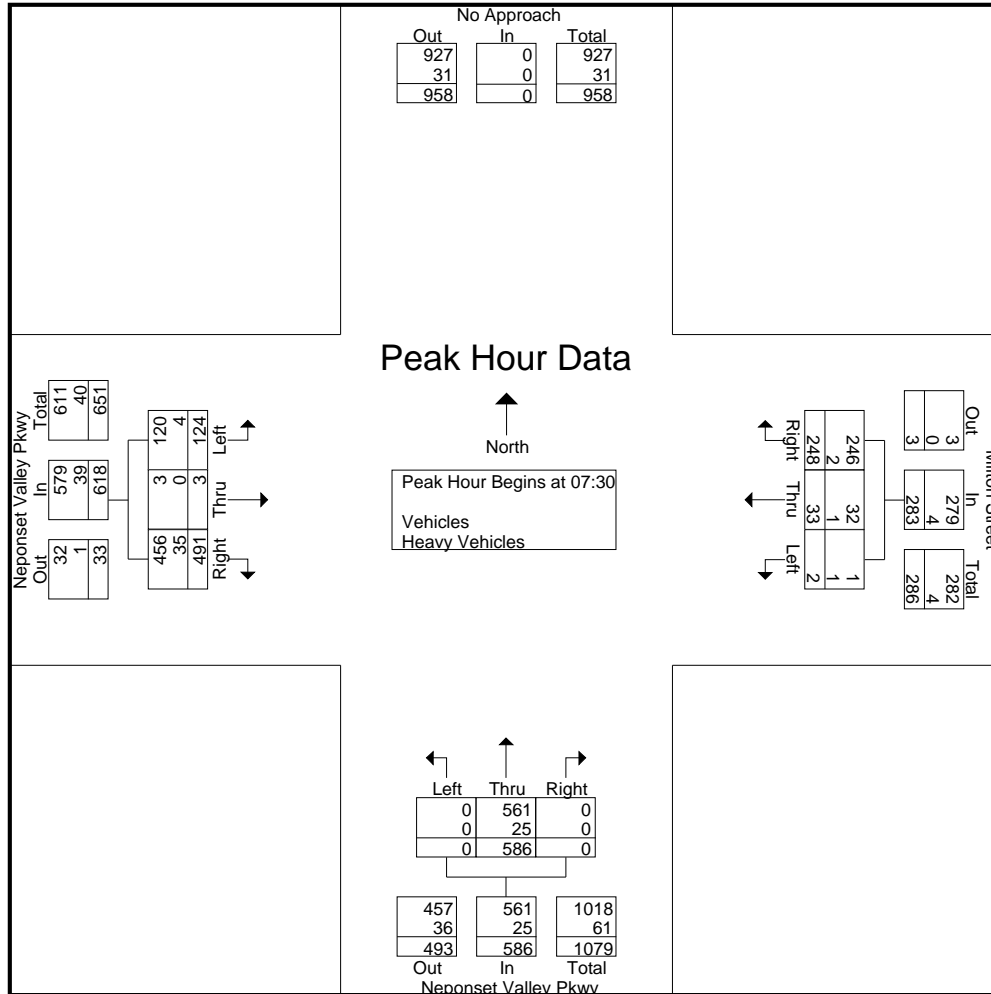
Groups Printed- Vehicles - Heavy Vehicles

Start Time	Milton Street From East				Neponset Valley Pkwy From South				Neponset Valley Pkwy From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
07:00	69	0	1	70	0	134	2	136	98	0	10	108	314
07:15	54	0	0	54	1	144	1	146	116	0	29	145	345
07:30	62	17	0	79	0	169	0	169	120	3	21	144	392
07:45	54	11	0	65	0	151	0	151	114	0	35	149	365
Total	239	28	1	268	1	598	3	602	448	3	95	546	1416
08:00	66	5	1	72	0	145	0	145	118	0	32	150	367
08:15	66	0	1	67	0	121	0	121	139	0	36	175	363
08:30	54	3	0	57	0	132	0	132	117	0	22	139	328
08:45	43	0	0	43	0	128	0	128	74	0	26	100	271
Total	229	8	2	239	0	526	0	526	448	0	116	564	1329
Grand Total	468	36	3	507	1	1124	3	1128	896	3	211	1110	2745
Apprch %	92.3	7.1	0.6		0.1	99.6	0.3		80.7	0.3	19		
Total %	17	1.3	0.1	18.5	0	40.9	0.1	41.1	32.6	0.1	7.7	40.4	
Vehicles	461	35	1	497	1	1079	2	1082	844	3	204	1051	2630
% Vehicles	98.5	97.2	33.3	98	100	96	66.7	95.9	94.2	100	96.7	94.7	95.8
Heavy Vehicles	7	1	2	10	0	45	1	46	52	0	7	59	115
% Heavy Vehicles	1.5	2.8	66.7	2	0	4	33.3	4.1	5.8	0	3.3	5.3	4.2

Start Time	Milton Street From East				Neponset Valley Pkwy From South				Neponset Valley Pkwy From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30													
07:30	62	17	0	79	0	169	0	169	120	3	21	144	392
07:45	54	11	0	65	0	151	0	151	114	0	35	149	365
08:00	66	5	1	72	0	145	0	145	118	0	32	150	367
08:15	66	0	1	67	0	121	0	121	139	0	36	175	363
Total Volume	248	33	2	283	0	586	0	586	491	3	124	618	1487
% App. Total	87.6	11.7	0.7		0	100	0		79.4	0.5	20.1		
PHF	.939	.485	.500	.896	.000	.867	.000	.867	.883	.250	.861	.883	.948
Vehicles	246	32	1	279	0	561	0	561	456	3	120	579	1419
% Vehicles	99.2	97.0	50.0	98.6	0	95.7	0	95.7	92.9	100	96.8	93.7	95.4
Heavy Vehicles	2	1	1	4	0	25	0	25	35	0	4	39	68
% Heavy Vehicles	0.8	3.0	50.0	1.4	0	4.3	0	4.3	7.1	0	3.2	6.3	4.6

Neponset Valley Pkwy @ Milton Street TMC  
June 7, 2011  
AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_AM  
Site Code : 06071021  
Start Date : 6/7/2011  
Page No : 2



Left and thru  
go to Milton St

Right and Thru  
go to N.V. Pkwy

Thru goes to N.V. Pkwy from West

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Neponset Valley Pkwy @ Milton Street TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_Milton\_AM

Site Code : 06071021

Start Date : 6/7/2011

Page No : 3

Pedestrians are by crossing approach

Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Milton Street From East					Neponset Valley Pkwy From South					Neponset Valley Pkwy From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	1	0	0	1	0	0	0	3	3	4
07:30	0	0	0	2	2	0	0	0	0	0	2	0	0	17	19	21
07:45	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
Total	0	0	0	3	3	0	1	0	0	1	2	0	0	21	23	27
08:00	0	0	0	2	2	0	0	0	0	0	1	0	0	0	1	3
08:15	0	0	0	3	3	0	1	0	0	1	1	0	0	0	1	5
08:30	1	0	0	12	13	0	0	0	0	0	0	0	0	0	0	13
08:45	1	0	0	1	2	0	1	0	0	1	0	0	0	0	0	3
Total	2	0	0	18	20	0	2	0	0	2	2	0	0	0	2	24
Grand Total	2	0	0	21	23	0	3	0	0	3	4	0	0	21	25	51
Apprch %	8.7	0	0	91.3		0	100	0	0		16	0	0	84		
Total %	3.9	0	0	41.2	45.1	0	5.9	0	0	5.9	7.8	0	0	41.2	49	

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Neponset Valley Pkwy @ Brush Hill Road TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_BrushHill\_PM

Site Code : 06071012

Start Date : 6/7/2011

Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Neponset/Brush Hill From North				Nepsonset From East				Brush Hill Road From South				Int. Total
	Right (to parking)	Thru	Left	App. Total	Right	Thru (to parking)	Left	App. Total	Right	Thru	Left (to parking)	App. Total	
16:00	0	96	78	174	78	0	1	79	0	21	0	21	274
16:15	0	78	65	143	85	0	0	85	2	29	0	31	259
16:30	0	79	63	142	81	0	0	81	0	22	0	22	245
16:45	0	76	66	142	97	0	1	98	0	27	0	27	267
Total	0	329	272	601	341	0	2	343	2	99	0	101	1045
17:00	0	86	105	191	96	0	0	96	1	27	0	28	315
17:15	0	87	77	164	96	0	1	97	0	28	0	28	289
17:30	0	78	77	155	88	0	1	89	1	24	0	25	269
17:45	0	84	76	160	98	0	0	98	0	26	0	26	284
Total	0	335	335	670	378	0	2	380	2	105	0	107	1157
Grand Total	0	664	607	1271	719	0	4	723	4	204	0	208	2202
Apprch %	0	52.2	47.8		99.4	0	0.6		1.9	98.1	0		
Total %	0	30.2	27.6	57.7	32.7	0	0.2	32.8	0.2	9.3	0	9.4	
Vehicles	0	659	581	1240	686	0	4	690	4	203	0	207	2137
% Vehicles	0	99.2	95.7	97.6	95.4	0	100	95.4	100	99.5	0	99.5	97
Heavy Vehicles	0	5	26	31	33	0	0	33	0	1	0	1	65
% Heavy Vehicles	0	0.8	4.3	2.4	4.6	0	0	4.6	0	0.5	0	0.5	3

Start Time	Neponset/Brush Hill From North				Nepsonset From East				Brush Hill Road From South				Int. Total
	Right (to parking)	Thru	Left	App. Total	Right	Thru (to parking)	Left	App. Total	Right	Thru	Left (to parking)	App. Total	
17:00	0	86	<b>105</b>	<b>191</b>	96	0	0	96	<b>1</b>	27	0	<b>28</b>	<b>315</b>
17:15	0	<b>87</b>	77	164	96	0	<b>1</b>	97	0	<b>28</b>	0	28	289
17:30	0	78	77	155	88	0	1	89	1	24	0	25	269
17:45	0	84	76	160	<b>98</b>	0	0	<b>98</b>	0	26	0	26	284
Total Volume	0	335	335	670	378	0	2	380	2	105	0	107	1157
% App. Total	0	50	50		99.5	0	0.5		1.9	98.1	0		
PHF	.000	.963	.798	.877	.964	.000	.500	.969	.500	.938	.000	.955	.918
Vehicles	0	333	323	656	363	0	2	365	2	104	0	106	1127
% Vehicles	0	99.4	96.4	97.9	96.0	0	100	96.1	100	99.0	0	99.1	97.4
Heavy Vehicles	0	2	12	14	15	0	0	15	0	1	0	1	30
% Heavy Vehicles	0	0.6	3.6	2.1	4.0	0	0	3.9	0	1.0	0	0.9	2.6

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

Peak Hour for Entire Intersection Begins at 17:00



Neponset Valley Pkwy @ Brush Hill Road TMC

June 7, 2011

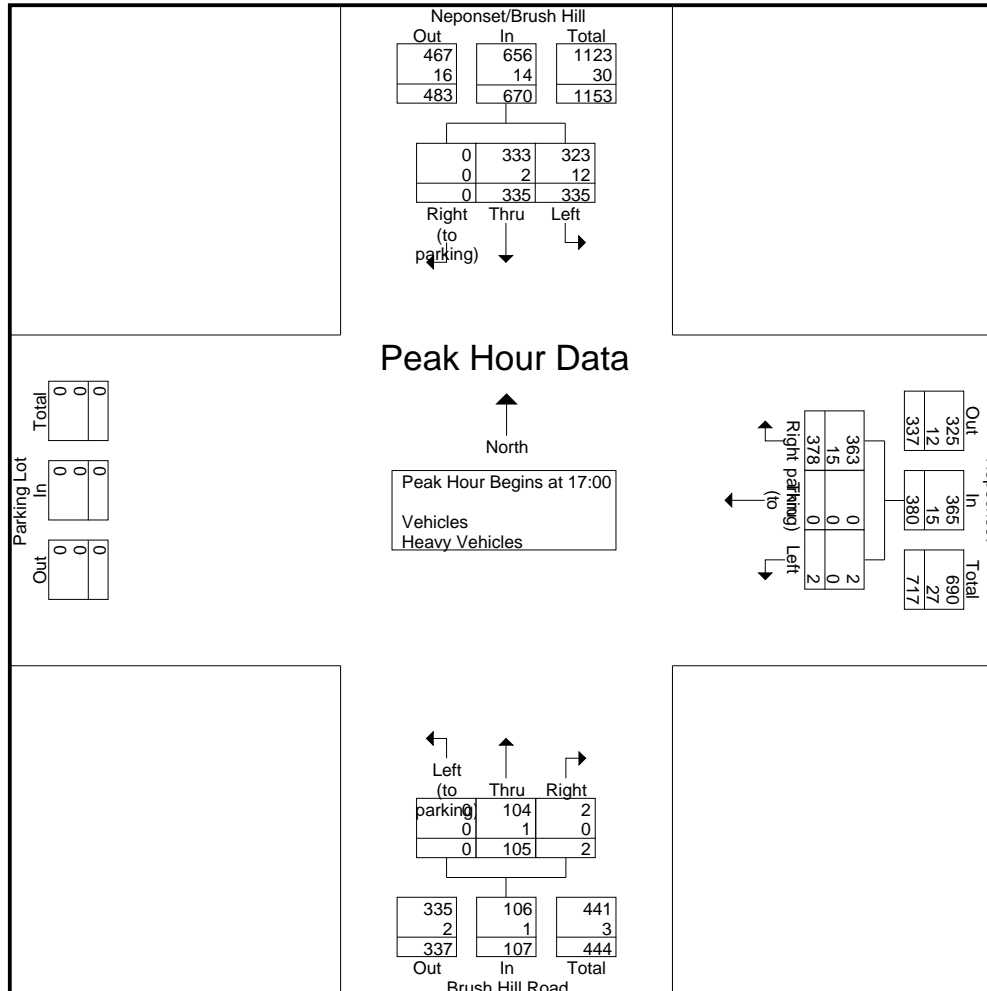
AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_BrushHill\_PM

Site Code : 06071012

Start Date : 6/7/2011

Page No : 2



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Neponset Valley Pkwy @ Brush Hill Road TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_Nepons\_BrushHill\_PM

Site Code : 06071012

Start Date : 6/7/2011

Page No : 3

Pedestrians are by crossing approach

Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Neponset/Brush Hill From North					Nepsonset From East					Brush Hill Road From South					Int. Total
	Right (to parking)	Thru	Left	Peds	App. Total	Right	Thru (to parking)	Left	Peds	App. Total	Right	Thru	Left (to parking)	Peds	App. Total	
16:00	0	2	2	0	4	1	0	0	0	1	0	0	0	0	0	5
16:15	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
16:30	1	7	0	0	8	0	0	0	0	0	0	0	0	1	1	9
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	11	2	0	14	1	0	0	0	1	0	0	0	1	1	16
17:00	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
17:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
17:30	0	3	0	0	3	0	0	0	3	3	0	0	0	0	0	6
17:45	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
Total	0	6	0	0	6	0	0	0	3	3	0	3	0	0	3	12
Grand Total	1	17	2	0	20	1	0	0	3	4	0	3	0	1	4	28
Apprch %	5	85	10	0		25	0	0	75		0	75	0	25		
Total %	3.6	60.7	7.1	0	71.4	3.6	0	0	10.7	14.3	0	10.7	0	3.6	14.3	

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Neponset Valley Pkwy @ Brush Hill Road TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : milton\_nepons\_brushhill\_am

Site Code : 06071011

Start Date : 6/7/2011

Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Neponset/Brush Hill From North				Neponset From East				Brush Hill Road From South				Int. Total
	Right (to parking)	Thru	Left	App. Total	Right	Thru (to parking)	Left	App. Total	Right	Thru	Left (to parking)	App. Total	
07:00	1	71	47	119	126	0	0	126	0	34	0	34	279
07:15	0	73	45	118	111	0	0	111	0	32	0	32	261
07:30	0	65	59	124	125	0	0	125	0	25	0	25	274
07:45	0	72	50	122	103	0	1	104	0	36	0	36	262
Total	1	281	201	483	465	0	1	466	0	127	0	127	1076
08:00	0	75	37	112	108	0	1	109	0	42	0	42	263
08:15	0	97	57	154	89	0	0	89	0	33	0	33	276
08:30	0	74	46	120	97	0	1	98	0	38	0	38	256
08:45	0	45	39	84	90	0	0	90	0	31	0	31	205
Total	0	291	179	470	384	0	2	386	0	144	0	144	1000
Grand Total	1	572	380	953	849	0	3	852	0	271	0	271	2076
Apprch %	0.1	60	39.9		99.6	0	0.4		0	100	0		
Total %	0	27.6	18.3	45.9	40.9	0	0.1	41	0	13.1	0	13.1	
Vehicles	1	570	327	898	806	0	3	809	0	267	0	267	1974
% Vehicles	100	99.7	86.1	94.2	94.9	0	100	95	0	98.5	0	98.5	95.1
Heavy Vehicles	0	2	53	55	43	0	0	43	0	4	0	4	102
% Heavy Vehicles	0	0.3	13.9	5.8	5.1	0	0	5	0	1.5	0	1.5	4.9

Start Time	Neponset/Brush Hill From North				Neponset From East				Brush Hill Road From South				Int. Total
	Right (to parking)	Thru	Left	App. Total	Right	Thru (to parking)	Left	App. Total	Right	Thru	Left (to parking)	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	<b>1</b>	71	47	119	<b>126</b>	0	0	<b>126</b>	0	34	0	34	<b>279</b>
07:15	0	<b>73</b>	45	118	111	0	0	111	0	32	0	32	261
07:30	0	65	<b>59</b>	<b>124</b>	125	0	0	125	0	25	0	25	274
07:45	0	72	50	122	103	0	<b>1</b>	104	0	<b>36</b>	0	<b>36</b>	262
Total Volume	1	281	201	483	465	0	1	466	0	127	0	127	1076
% App. Total	0.2	58.2	41.6		99.8	0	0.2		0	100	0		
PHF	.250	.962	.852	.974	.923	.000	.250	.925	.000	.882	.000	.882	.964
Vehicles	1	280	172	453	440	0	1	441	0	125	0	125	1019
% Vehicles	100	99.6	85.6	93.8	94.6	0	100	94.6	0	98.4	0	98.4	94.7
Heavy Vehicles	0	1	29	30	25	0	0	25	0	2	0	2	57
% Heavy Vehicles	0	0.4	14.4	6.2	5.4	0	0	5.4	0	1.6	0	1.6	5.3

Neponset Valley Pkwy @ Brush Hill Road TMC

June 7, 2011

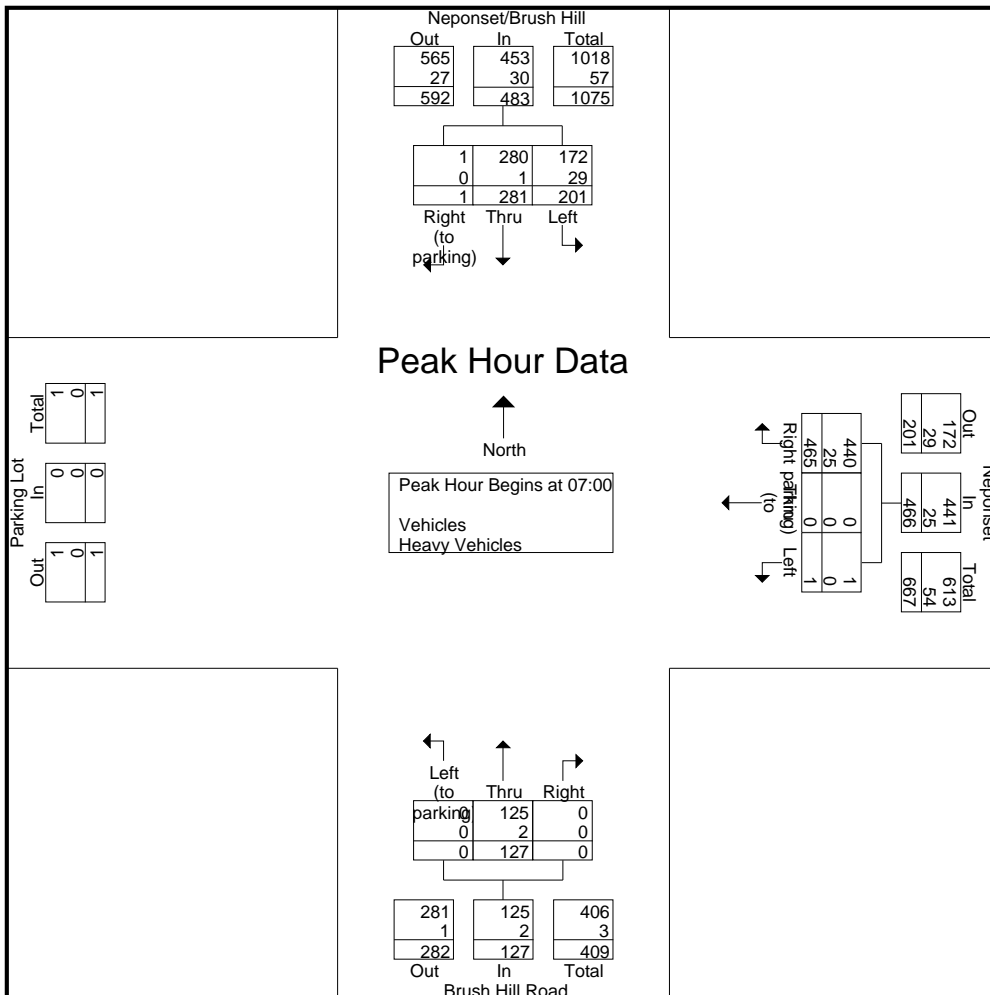
AM: 7:00-9:00 PM: 16:00-18:00

File Name : milton\_nepons\_brushhill\_am

Site Code : 06071011

Start Date : 6/7/2011

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Neponset Valley Pkwy @ Brush Hill Road TMC  
June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : milton\_nepons\_brushhill\_am  
Site Code : 06071011  
Start Date : 6/7/2011  
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Pedestrians are by crossing approach  
Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Neponset/Brush Hill From North					Neponset From East					Brush Hill Road From South					Int. Total	
	Right (to parking)	Thru	Left	Peds	App. Total	Right	Thru (to parking)	Left	Peds	App. Total	Right	Thru	Left (to parking)	Peds	App. Total		
07:00	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2
07:15	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	2
07:30	0	2	0	0	2	0	0	0	0	0	0	1	0	0	0	1	3
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	3	5	0	0	0	0	0	0	2	0	0	0	2	7
08:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:15	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	2
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Total	0	1	1	0	2	0	0	0	0	0	0	2	0	0	0	2	4
Grand Total	0	3	1	3	7	0	0	0	0	0	0	4	0	0	0	4	11
Apprch %	0	42.9	14.3	42.9		0	0	0	0		0	100	0	0			
Total %	0	27.3	9.1	27.3	63.6	0	0	0	0	0	0	36.4	0	0	36.4		



Brush Hill Road @ Milton Street TMC

June 7, 2011

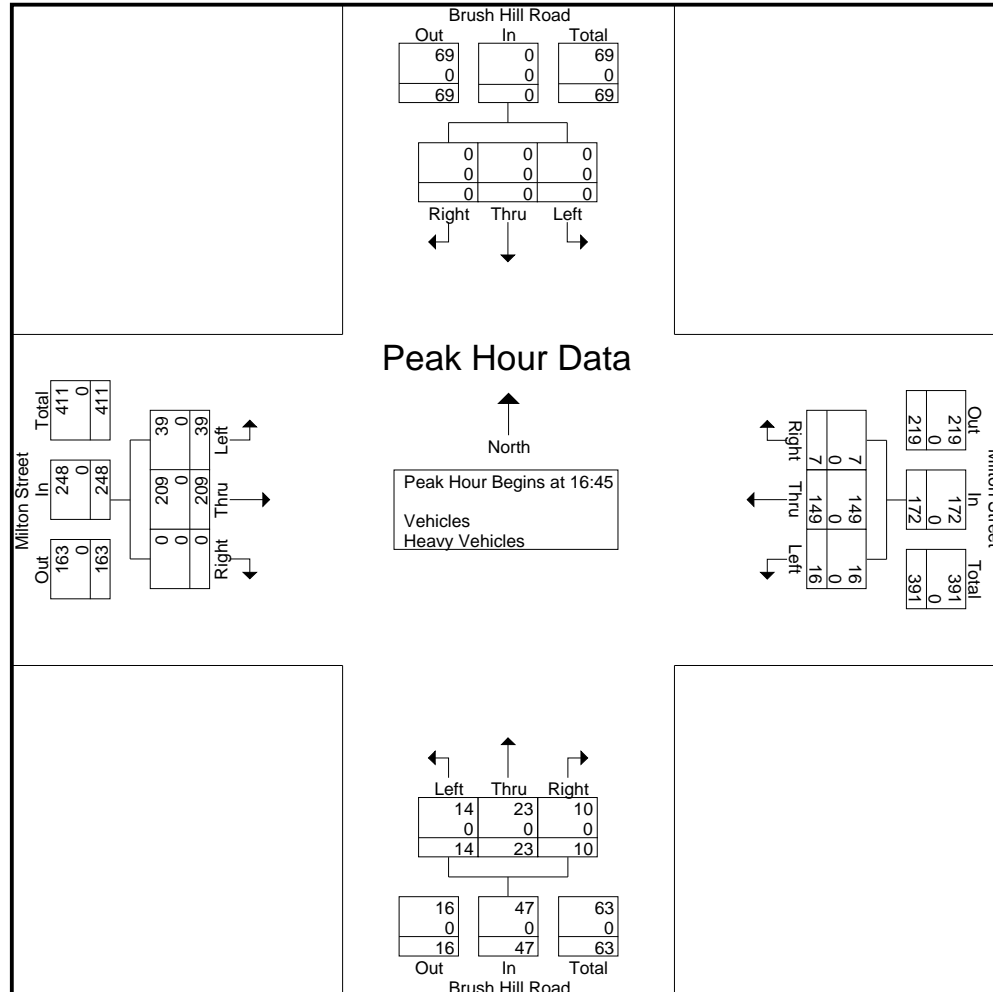
AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_BrushHill\_Milton\_PM

Site Code : 06071102

Start Date : 6/7/2011

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Brush Hill Road @ Milton Street TMC

June 7, 2011

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Site Code : 06071102

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Page No : 3

Pedestrians are by crossing approach  
Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Brush Hill Road From North					Milton Street From East					Brush Hill Road From South					Milton Street From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
16:00	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
16:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
17:00	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
17:45	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	0	0	1	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	2	3	5	
Grand Total	0	0	0	0	0	0	2	0	0	2	0	0	2	0	2	0	1	0	2	3	7	
Apprch %	0	0	0	0		0	100	0	0		0	0	100	0		0	33.3	0	66.7			
Total %	0	0	0	0		0	28.6	0	0	28.6	0	0	28.6	0	28.6	0	14.3	0	28.6	42.9		



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Brush Hill Road @ Milton Street TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_BrushHill\_Milton\_AM

Site Code : 06071101

Start Date : 6/7/2011

Page No : 1

Groups Printed- Vehicles - Heavy Vehicles

Start Time	Brush Hill Road From North				Milton Street From East				Brush Hill Road From South				Milton Street From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
07:00	4	7	2	13	0	26	1	27	0	3	6	9	0	17	2	19	68
07:15	0	1	0	1	2	54	0	56	0	1	10	11	0	23	4	27	95
07:30	0	0	0	0	4	60	0	64	3	4	1	8	1	24	3	28	100
07:45	0	0	0	0	6	53	2	61	4	2	2	8	0	28	5	33	102
Total	4	8	2	14	12	193	3	208	7	10	19	36	1	92	14	107	365
08:00	0	0	0	0	2	62	0	64	2	8	4	14	0	30	4	34	112
08:15	0	0	0	0	2	42	1	45	1	6	3	10	0	26	10	36	91
08:30	0	0	0	0	0	39	1	40	2	8	1	11	0	19	3	22	73
08:45	0	0	0	0	3	24	2	29	2	3	0	5	1	21	7	29	63
Total	0	0	0	0	7	167	4	178	7	25	8	40	1	96	24	121	339
Grand Total	4	8	2	14	19	360	7	386	14	35	27	76	2	188	38	228	704
Apprch %	28.6	57.1	14.3		4.9	93.3	1.8		18.4	46.1	35.5		0.9	82.5	16.7		
Total %	0.6	1.1	0.3	2	2.7	51.1	1	54.8	2	5	3.8	10.8	0.3	26.7	5.4	32.4	
Vehicles	4	8	2	14	17	359	7	383	11	34	26	71	0	179	38	217	685
% Vehicles	100	100	100	100	89.5	99.7	100	99.2	78.6	97.1	96.3	93.4	0	95.2	100	95.2	97.3
Heavy Vehicles	0	0	0	0	2	1	0	3	3	1	1	5	2	9	0	11	19
% Heavy Vehicles	0	0	0	0	10.5	0.3	0	0.8	21.4	2.9	3.7	6.6	100	4.8	0	4.8	2.7

Start Time	Brush Hill Road From North				Milton Street From East				Brush Hill Road From South				Milton Street From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15																	
07:15	0	<b>1</b>	0	<b>1</b>	2	54	0	56	0	1	<b>10</b>	11	0	23	4	27	95
07:30	0	0	0	0	4	60	0	<b>64</b>	3	4	1	8	<b>1</b>	24	3	28	100
07:45	0	0	0	0	<b>6</b>	53	<b>2</b>	61	<b>4</b>	2	2	8	0	28	<b>5</b>	33	102
08:00	0	0	0	0	2	<b>62</b>	0	64	2	<b>8</b>	4	<b>14</b>	0	<b>30</b>	4	<b>34</b>	<b>112</b>
Total Volume	0	1	0	1	14	229	2	245	9	15	17	41	1	105	16	122	409
% App. Total	0	100	0		5.7	93.5	0.8		22	36.6	41.5		0.8	86.1	13.1		
PHF	.000	.250	.000	.250	.583	.923	.250	.957	.563	.469	.425	.732	.250	.875	.800	.897	.913
Vehicles	0	1	0	1	12	228	2	242	7	14	17	38	0	100	16	116	397
% Vehicles	0	100	0	100	85.7	99.6	100	98.8	77.8	93.3	100	92.7	0	95.2	100	95.1	97.1
Heavy Vehicles	0	0	0	0	2	1	0	3	2	1	0	3	1	5	0	6	12
% Heavy Vehicles	0	0	0	0	14.3	0.4	0	1.2	22.2	6.7	0	7.3	100	4.8	0	4.9	2.9

Brush Hill Road @ Milton Street TMC

June 7, 2011

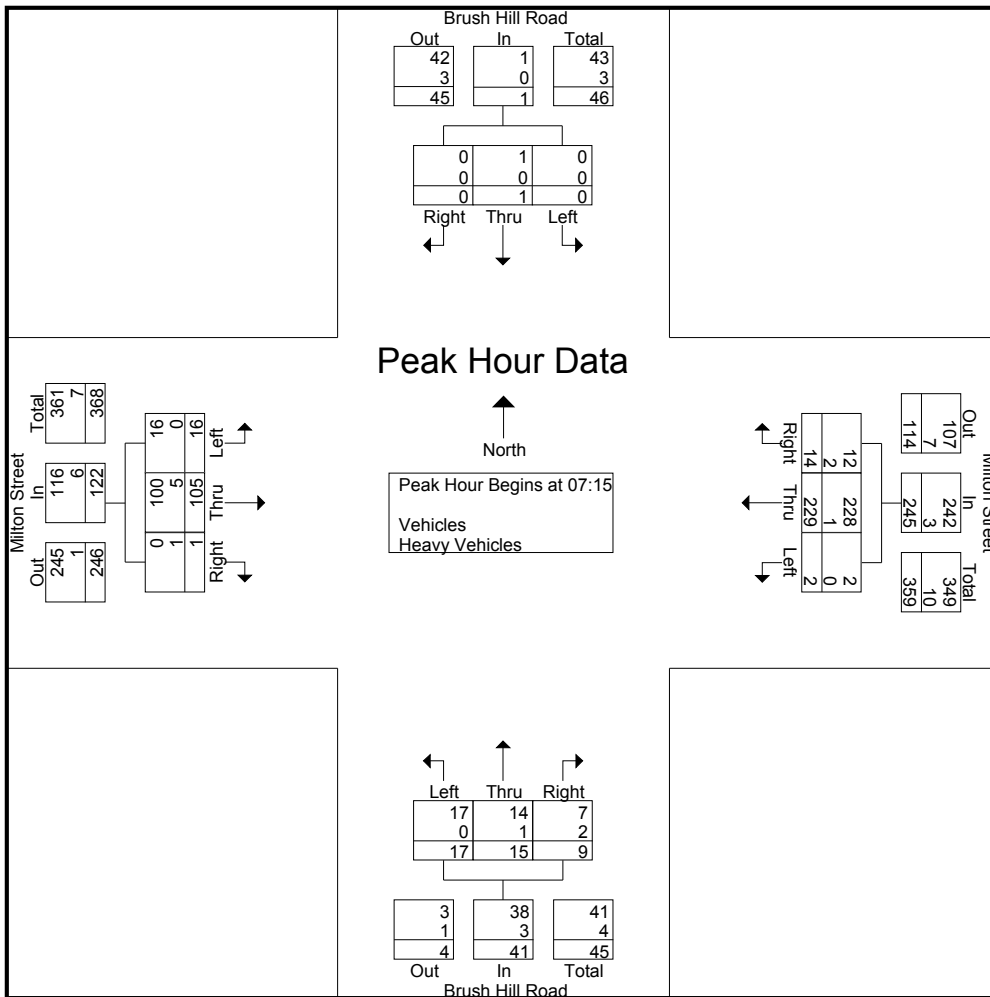
AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_BrushHill\_Milton\_AM

Site Code : 06071101

Start Date : 6/7/2011

Page No : 2



Central Transportation Planning Staff

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Brush Hill Road @ Milton Street TMC

June 7, 2011

AM: 7:00-9:00 PM: 16:00-18:00

File Name : Milton\_BrushHill\_Milton\_AM

Site Code : 06071101

Start Date : 6/7/2011

Page No : 3

Pedestrians are by crossing approach

Bicycles are by movement

Groups Printed- Bicycles and Pedestrians

Start Time	Brush Hill Road From North					Milton Street From East					Brush Hill Road From South					Milton Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	2
07:30	0	0	0	1	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	3
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	1	0	1	2	1	0	0	0	1	0	0	0	1	1	5
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:30	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	2
Grand Total	0	0	0	1	1	0	2	0	1	3	1	0	0	1	2	0	0	0	1	1	7
Apprch %	0	0	0	100		0	66.7	0	33.3		50	0	0	50		0	0	0	100		
Total %	0	0	0	14.3	14.3	0	28.6	0	14.3	42.9	14.3	0	0	14.3	28.6	0	0	0	14.3	14.3	

## **APPENDIX D**

### **MassDOT Project Implementation Process**

## **MassDOT Project Implementation Process**

The following description of the implementation process is based on Chapter 2 of the MassDOT Highway Division's *Project Development and Design Guide (2005)*. The text below borrows heavily from that document.

### **1 NEEDS IDENTIFICATION**

For each of the locations at which an improvement is to be implemented, the MassDOT Highway Division leads an effort to define the problem, establishes project goals and objectives, and defines the scope of the planning needed for implementation. To that end, it has to complete a Project Need Form (PNF), which states in general terms the deficiencies or needs related to the transportation facility or location. The PNF documents the problems and explains why corrective action is needed. For this study, the information defining the need for the project will be drawn primarily, perhaps exclusively, from the present report. Also, at this point in the process, the MassDOT Highway Division meets with potential participants, such as the Boston Region Metropolitan Planning Organization (MPO) and community members, to allow for an informal review of the project.

The PNF is reviewed by the MassDOT Highway Division district office whose jurisdiction includes the location of the proposed project. The MassDOT Highway Division also sends the PNF to the MPO, for informational purposes. The outcome of this step determines whether the project requires further planning, whether it is already well supported by prior planning studies, and, therefore, whether it is ready to move forward into the design phase, or whether it should be dismissed from further consideration.

### **2 PLANNING**

This phase will likely not be required for the implementation of the improvements proposed in this planning study, as this planning report should constitute the outcome of this step. However, in general, the purpose of this implementation step is for the project proponent to identify issues, impacts, and approvals that may need to be obtained, so that the subsequent design and permitting processes are understood.

The level of planning needed will vary widely, based on the complexity of the project. Typical tasks include: define the existing context, confirm project need, establish goals and objectives, initiate public outreach, define the project, collect data, develop and analyze alternatives, make recommendations, and provide documentation. Likely outcomes include consensus on the project definition to enable it to move forward into environmental documentation (if needed) and design, or a recommendation to delay the project or dismiss it from further consideration.

### **3 PROJECT INITIATION**

At this point in the process, the proponent, the MassDOT Highway Division, fills out, for each improvement, a Project Initiation Form (PIF), which is reviewed by its Project Review Committee (PRC) and the MPO. The PRC is composed of the Chief Engineer, each District Highway Director, and representatives of the Project Management, Environmental, Planning, Right-of-Way, Traffic,

and Bridge departments, and the Capital Expenditure Program Office (CEPO). The PIF documents the project type and description, summarizes the project planning process, identifies likely funding and project management responsibility, and defines a plan for interagency and public participation. First the PRC reviews and evaluates the proposed project based on MassDOT's statewide priorities and criteria. If the result is positive, the MassDOT Highway Division moves the project forward to the design phase, and to programming review by the MPO. The PRC may provide a Project Management Plan to define roles and responsibilities for subsequent steps. The MPO review includes project evaluation based on the MPO's regional priorities and criteria. The MPO may assign a project evaluation criteria score, a Transportation Improvement Program (TIP) year, a tentative project category, and a tentative funding category.

#### 4 ENVIRONMENTAL, DESIGN, AND RIGHT-OF-WAY PROCESS

This step has four distinct but closely integrated elements: public outreach, environmental documentation and permitting (if required), design, and right-of-way acquisition (if required). The outcome of this step is a fully designed and permitted project ready for construction. However, a project does not have to be fully designed in order for the MPO to program it in the TIP.

#### 5 PROGRAMMING

Programming, which typically begins during the design phase, can actually occur at any time during the process, from planning to design. In this step, which is distinct from project initiation, where the MPO receives preliminary information on the proposed project, the proponent requests that the MPO place the project in the region's TIP. The MPO considers the project in terms of regional needs, evaluation criteria, and compliance with the Long-Range Transportation Plan and decides whether to place it in the draft TIP for public review and then in the final TIP.

#### 6 PROCUREMENT

Following project design and programming, the MassDOT Highway Division publishes a request for proposals. It then reviews the bids and awards the contract to the qualified bidder with the lowest bid.

#### 7 CONSTRUCTION

After a construction contract is awarded, the MassDOT Highway Division and the contractor develop a public participation plan and a management plan for the construction process.

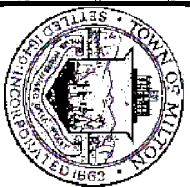
#### 8 PROJECT ASSESSMENT

The purpose of this step is to receive constituents' comments on the project development process and the project's design elements. The MassDOT Highway Division can apply what is learned in this process to future projects.

**APPENDIX E**

**Town of Milton's Conceptual Plan for:**

Neponset Valley Parkway at Brush Hill Road



**CONCEPTUAL PLAN  
NOT FOR CONSTRUCTION**