



***Ron Müller & Associates***

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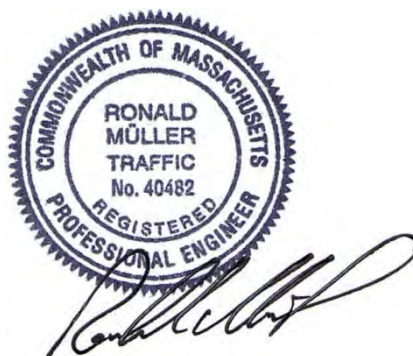
## Traffic Assessment

**Gas Station/Convenience Store**  
**23 Central Street**  
**Byfield, Massachusetts**

**Prepared for:**

**A.L. Prime Energy Consultant, Inc.**  
**18 Lark Avenue**  
**Saugus, MA 01906**

**March 11, 2020**



### Quality



### Accuracy



### Integrity





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## **Traffic Assessment**

To:	Mr. Anthony Guba A.L. Prime Energy Consultant, Inc. 18 Lark Avenue Saugus, MA 01906	Reg:	Gas Station/Convenience Store 23 Central Street Byfield, MA
From:	Kirsten Braun, P.E., Senior Traffic Eng. Ron Müller, P.E., Principal	Date:	March 11, 2020
		Project #:	19046

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### **INTRODUCTION**

**Ron Müller & Associates** (RMA) has conducted this Traffic Assessment for the development of a gas station and convenience store to be located at 23 Central Street in Byfield, Massachusetts. As proposed the project consists razing the single-family home on site and constructing a gasoline station with 12 vehicle fueling positions and an approximately 4,850 square-foot convenience store with drive-through window for a coffee/donut shop. Access will be provided via two curb cuts on Central Street. The site is located just east of exit 55 on Route I-95. The site location is shown in Figure 1.

This report has been prepared to estimate the project traffic generation, evaluate site access and on-site circulation, and provide a qualitative assessment of the impacts of this traffic on the adjacent streets. As documented in this report, the majority of traffic to/from the gas station and convenience store (and in particular the drive-through coffee/donut shop) is drawn from the traffic that already exists on the adjacent street or is diverted from I-95. Accordingly, traffic increases on Central Street are expected in the range of 37 to 38 additional vehicles during peak hours, or an average of one additional vehicle every 1 ½ to two minutes. This additional traffic represents an increase of 5 to 6 percent over existing volumes. The largest increase in traffic from the development project will occur on the short section of Central Street between the site and I-95, with 86 to 89 additional vehicles during the peak hours, or an average of one to two additional vehicles every minute.

The proposed driveway design is appropriate to accommodate both passenger and delivery vehicles and more than adequate sight distances will be provided in all directions to allow safe operation. It is recommended that all landscaping and signs are kept low to the ground or set

outside the sight triangles. The proposed drive-through lane can accommodate an anticipated average maximum queue length of 11 vehicles. The maximum potential queue of 13 vehicles can also be accommodated on-site without affecting circulation or access. It is recommended that the proposed drive-through lane be clearly identified through signing and striping.

**Figure 1**  
**Site Location Map**



## TRAFFIC VOLUMES AND VEHICLE SPEEDS

Traffic volume and vehicle speed information along Central Street just east of Fruit Street near the site was obtained from an automatic traffic recorder (ATR) count conducted in November 2019. To determine if the count data needed to be adjusted to represent annual average-month conditions, historical traffic volume data were obtained from the MassDOT. Based on the nearest MassDOT permanent count station located on Interstate 95, north of Topsfield (Station 5085), traffic during the month of November is approximately four percent below annual average-month conditions. Therefore, the November counts were increased by 4.0 percent. The traffic counts and MassDOT permanent count station data are provided in the Appendix. A summary of the available traffic counts is shown in Table 1. Additionally, a summary of observed travel speeds along Central Street are summarized in Table 2.

**Table 1**  
**Existing Traffic Volume Summary**

Location	Daily Volume <sup>a</sup>	Peak Hour Volume <sup>b</sup>	K-Factor <sup>c</sup>	Directional Distribution <sup>d</sup>
Central Street	7,250	AM: 733	10.1%	56% EB
East the Site:		PM: 646	8.9%	46% EB

<sup>a</sup> In vehicles per day.

<sup>b</sup> In vehicles per hour.

<sup>c</sup> Percentage of daily traffic occurring during the peak hour.

<sup>d</sup> NB = northbound, SB = southbound.

**Table 2**  
**Observed Travel Speeds <sup>a</sup>**

Location/Direction	Posted Speed Limit	Average Speed	85 <sup>th</sup> Percentile Speed <sup>b</sup>
<b>Central Street</b>			
<b>East of the site</b>			
Eastbound	35	31	36
Westbound	35	29	34

<sup>a</sup> In miles per hour (mph).

<sup>b</sup> Speed at, or below which 85 percent of all observed vehicles travel.

As shown, the average recorded speeds along Central Street adjacent to the site were slightly lower than the posted speed limit of 35 miles per hour (mph) with 31 mph eastbound and 29 mph westbound. Average speeds along this stretch of roadway may be slightly lower than the posted speed limit due to the proximity to the I-95 ramps. The 85<sup>th</sup> percentile speeds were recorded to be 36 mph eastbound and 34 mph westbound, comparable to the posted speed limit. 85<sup>th</sup> percentile speeds were accordingly used in the calculation of minimum sight distance requirements, as described below.

## **SIGHT DISTANCE**

To identify potential safety concerns associated with site access and egress, sight distances have been evaluated at the proposed site driveways on Central Street to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO).<sup>1</sup> AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported. The Massachusetts Department of Transportation (MassDOT) and the Executive Office of Energy and Environmental Affairs (EEA) require the use of AASHTO sight distance standards when preparing traffic impact assessments and studies, as stated in their guidelines for traffic impact assessments.

Sight distance is the length of roadway ahead that is visible to the driver. Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The values are based on a driver perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavements. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Stopping sight distance is measured from an eye height of 3.5 feet to an object height of 2 feet above street level, equivalent to the taillight height of a passenger car. The SSD is measured along the centerline of the traveled way of the major road.

Intersection sight distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway. By definition, ISD is the minimum distance required for a motorist exiting a minor street to turn onto the major street, without being overtaken by an approaching vehicle reducing its speed from the design speed to 70 percent of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet above street level. The use of an object height equal to the driver eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle). When the minor street is on an upgrade that exceeds 3 percent, grade correction factors are applied.

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<sup>1</sup>A *Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2009.



SSD is generally more important as it represents the minimum distance required for safe stopping while ISD is based only upon acceptable speed reductions to the approaching traffic stream. However, the ISD must be equal to or greater than the minimum required SSD in order to provide safe operations at the intersection. In accordance with the AASHTO manual, *“If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.”* Accordingly, ISD should be at least equal to the distance required to allow a driver approaching the minor road to safely stop.

The available sight distances at the proposed driveways on Central Street were measured and compared to minimum requirements as established by AASHTO. On Central Street, the 85<sup>th</sup> percentile speeds were used over the posted speed limit of 35 mph to determine minimum required sight distance. The required minimum sight distances are compared to the available distances, as shown in Table 3.

**Table 3**  
**Sight Distance Summary**

Location/Direction	Intersection Sight Distance (feet)		
	Measured	Minimum Required <sup>a</sup>	Desirable <sup>b</sup>
<b>Central St. at East Site Driveway:</b>			
East of intersection	410	250	390
West of Intersection	500+	261	390
<b>Central St. at West Site Driveway:</b>			
East of intersection	490	250	390
West of Intersection	500+	261	390

<sup>a</sup> Values based on AASHTO SSD requirements for the 85<sup>th</sup> percentile speed of 36 mph on Central Street traveling eastbound and 35 mph posted speed limit westbound.

<sup>b</sup> Values based on AASHTO ISD requirements for the posted speed limit of 35 mph on Central Street.

As shown in the table, both the minimum required and desirable sight distances are exceeded at the east and west site driveways on Central Street and safe operation of these driveways can therefore be expected. To ensure that maximum sight distances are maintained, it is recommended that any proposed landscaping or signs in the vicinity of the driveways be kept low (maximum two feet in height from street level), or set back sufficiently so as not to impede the available sight distances.

## **SITE ACCESS, CIRCULATION AND QUEUING**

Access to the site is proposed via two new curb cuts on Central Street. Both driveways are proposed to be 30 feet-wide which allows for less mountable curbing and pavement outside of the defined driveways to accommodate delivery-vehicle access to/from the site, in particular fuel deliveries. The site plan includes a swept path analysis showing how fuel delivery vehicles can navigate the site and driveways under this design.

The drive-through lane will provide approximately 220 feet of storage allowing for a total of 11 cars to be queued at the drive-through window. Beyond the drive-through lane, an additional 6 cars could be queued on site before affecting site access. The roadway around the building with the drive-through queue will be a minimum of 24 feet wide allowing more than adequate room for a vehicle to by-pass the drive-through queue. Although there are parking spaces located in the rear of the site adjacent to the drive-through lane, these spaces will be restricted to employee parking so as to minimize any conflict with the drive-through operation.

Based on a published study<sup>2</sup> of drive-through queuing at a number of different land uses, the average maximum queue at coffee shops was found to be 11 vehicles and the 85<sup>th</sup> percentile maximum queue was 13 vehicles. The study was performed at six different coffee shops including four Starbucks and two Caribou coffee shops located in Minnesota and Kansas. More locally, drive-through queue studies have been performed at four different Dunkin' Donuts coffee shops located in Malden, Kingston, and Dracut, Massachusetts and in Milford, New Hampshire. The maximum observed queue at these locations was 13 vehicles during the weekday AM peak hour, six vehicles during the weekday PM peak hour, and 10 vehicles during the Saturday peak hour. A summary of the queue studies is provided in the Appendix.

Based on these studies, there is adequate queuing space to accommodate the average maximum queue of 11 vehicles. The maximum queue of 13 vehicles observed at any one site can also easily be accommodated on site without affecting on site circulation or site access. The drive-through lane should be clearly marked through signing and striping including DRIVE THRU pavement markings with pavement arrows.

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<sup>2</sup> *Drive-Through Queue Generation*; Mike Spack, PE, PTOE; CountingCars.com; February 2012.

## TRIP GENERATION

The traffic to be generated by the proposed gas station and convenience store was estimated using the 10<sup>th</sup> Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*<sup>3</sup>. The site plan prepared by A.L. Prime Energy Consultant, Inc. shows 12 fueling positions on site as well as a 4,850 square-foot convenience store with coffee/donut shop. Accordingly, ITE Land Use Code 960 (Super Convenience Market/Gas Station) was used in estimating the traffic generation characteristics of the project, as shown in Table 4. The trip generation calculations are provided in the Appendix.

**Table 4**  
**Trip Generation Summary**

Time Period	Total Trips <sup>a</sup>	Pass-by Trips <sup>b</sup>	New Trips
<b>Weekday Daily</b>	2,770	1,550	<b>1,220</b>
<b>Weekday AM Peak Hour</b>			
Enter	169	105	<b>64</b>
<u>Exit</u>	<u>168</u>	<u>105</u>	<u><b>63</b></u>
Total	337	210	<b>127</b>
<b>Weekday PM Peak Hour</b>			
Enter	138	77	<b>61</b>
<u>Exit</u>	<u>138</u>	<u>77</u>	<u><b>61</b></u>
Total	276	154	<b>122</b>

<sup>a</sup> ITE Land Use Code 960 (Super Convenience Market/Gas Station) for 12 fueling positions.

<sup>b</sup> ITE *Trip Generation Handbook*. Pass-by rate of 62% applied to weekday AM total trips and a pass-by rate of 56% applied to weekday daily and PM total trips.

As shown in Table 4, the gas station and convenience store on Central Street is expected to generate 337 vehicle trips (169 in and 168 out) during the weekday AM peak hour and 276 vehicle trips (138 in and 138 out) during the weekday PM peak hour. Not all vehicle trips generated by the project, however, represent new trips. Studies have shown that gas stations with convenience stores generate more than half of their business from the traffic already present on the adjacent roadway. This traffic is referred to as pass-by trips. Based on data published in the ITE *Trip Generation Handbook*,<sup>4</sup> an average of 56 to 62 percent of the total traffic generated by gas stations with convenience stores is typically pass-by traffic, depending on the time period. Therefore, while the

<sup>3</sup> *Trip Generation Manual, 10<sup>th</sup> Edition*; Institute of Transportation Engineers; Washington, DC; 2017.

<sup>4</sup> *Trip Generation Handbook; 3<sup>rd</sup> Edition*; Institute of Transportation Engineers; Washington, DC; August 2014.



total traffic generated by the project will be realized at the site driveways, the impact of that traffic on the adjacent streets is substantially less.

As shown in Table 5, with the influence of pass-by traffic, the actual volume of new traffic to be added to the adjacent streets is 127 trips during the weekday AM peak hour (64 entering and 63 exiting) and 122 trips during the weekday PM peak hour (61 entering and 61 exiting).

## **TRIP DISTRIBUTION**

The distribution of new site traffic on the area roadways was based on population densities near the site as well as access from the regional highway network. Accordingly, approximately 70-percent of site traffic is expected on Central Street to and from the west with at least 40 percent to/from I-95 and 30-percent to and from the east. The distribution of pass-by traffic was based on existing travel patterns on Central Street.

## **TRAFFIC INCREASES**

The proposed development project will result in increases in traffic on the study area roadways. Traffic-volume increases on Central Street to the east of the site and west of I-95 are expected in the range of 37 to 38 vehicles during the peak hours, or an average of one additional vehicle every 1 ½ to two minutes. This additional traffic represents an increase of 5 to 6 percent over existing Central Street traffic. The largest increase in traffic from the development project will occur on the short section of Central Street between the site and I-95, with 86 to 89 additional vehicles during the peak hours, or an average of one to two additional vehicles every minute.

## **CONCLUSIONS**

- The project entails the development of a 12-vehicle fueling position gas station and 4,850 square foot convenience store with coffee/donut shop and drive through window at 23 Central Street in Byfield, Massachusetts. Site access is proposed via two new curb cuts to be constructed on Central Street.
- The proposed gas station with convenience store and coffee shop is expected to generate an additional 337 vehicle trips during the weekday AM peak hour (169 entering and 168

exiting) and 276 vehicle trips during the weekday PM peak hour (138 entering and 138 exiting). These additional trips will be realized at the site driveway.

- More than half of these trips will already be present on the adjacent roadways and will not be new to the area. These trips are referred to as pass-by trips. Accordingly, the increase in traffic on Central Street east of the site and west of I-95 is expected in the range of 37 to 38 vehicles during the peak hours, or an average of one additional vehicle every 1 ½ to two minutes. This additional traffic represents an increase of 5 to 6 percent over existing Central Street traffic.
- In the short section of Central Street between the site and I-95, an increase in traffic of 86 to 89 additional vehicles is expected during the peak hours, averaging about one to two additional vehicles every minute during both the AM and PM peak hours.
- Two 30-foot wide driveways with mountable curbing are proposed to accommodate larger delivery vehicles entering the site.
- Drive-through queue studies at coffee/donut shops have shown an average maximum queue length of 11 vehicles with the maximum queue at any one site observed at 13 vehicles. Based on the latest site plan the drive-through will be able to accommodate 11 vehicles. Beyond this drive-through lane, there is more than adequate room on site to accommodate a maximum potential queue of 13 vehicles without affecting on-site circulation and access. It is recommended that the drive-through lane be clearly marked through signing and striping including DRIVE THRU pavement markings with pavement arrows.
- The minimum required sight distances as well as the desired sight distances are exceeded at both site driveways on Central Street and therefore safe operation can be expected.
- It is recommended that any proposed landscaping or signs in the vicinity of the driveways be kept low to the ground (less than two feet above street level) or set back sufficiently so as not to impede sight distances for drivers exiting the site.

## **APPENDIX**

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Traffic Counts and Vehicle Speed Data  
Seasonal Adjustment Data  
Drive-Through Queue Studies  
Trip Generation Calculations

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**Accurate Counts**  
978-664-2565

Page 1

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024VL1

Start Time	11/20/201 Wed	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	53			2	39				
12:15		0	47			2	42				
12:30		0	48			2	42				
12:45		0	34	1	182	3	43	9	166	10	348
01:00		1	49			4	27				
01:15		0	47			1	39				
01:30		0	41			1	41				
01:45		0	52	1	189	1	66	7	173	8	362
02:00		4	52			0	50				
02:15		1	110			0	66				
02:30		0	81			0	56				
02:45		0	65	5	308	1	58	1	230	6	538
03:00		2	68			0	83				
03:15		2	67			2	64				
03:30		1	94			4	69				
03:45		0	73	5	302	0	70	6	286	11	588
04:00		1	63			0	87				
04:15		2	73			3	78				
04:30		4	95			1	62				
04:45		9	71	16	302	2	65	6	292	22	594
05:00		18	90			5	76				
05:15		18	84			13	65				
05:30		27	83			13	71				
05:45		22	53	85	310	13	70	44	282	129	592
06:00		43	47			22	57				
06:15		43	50			32	46				
06:30		48	51			50	60				
06:45		50	28	184	176	67	48	171	211	355	387
07:00		68	34			100	23				
07:15		96	24			138	32				
07:30		94	19			101	36				
07:45		72	13	330	90	60	32	399	123	729	213
08:00		88	21			48	33				
08:15		69	20			62	25				
08:30		52	12			52	32				
08:45		59	21	268	74	52	17	214	107	482	181
09:00		48	8			36	20				
09:15		49	9			30	18				
09:30		40	6			42	13				
09:45		44	11	181	34	31	12	139	63	320	97
10:00		44	10			42	10				
10:15		64	3			35	8				
10:30		59	2			44	2				
10:45		39	6	206	21	31	4	152	24	358	45
11:00		39	3			27	8				
11:15		41	5			37	11				
11:30		44	0			35	5				
11:45		38	1	162	9	43	3	142	27	304	36
Total		1444	1997			1290	1984			2734	3981
Percent		42.0%	58.0%			39.4%	60.6%			40.7%	59.3%

**Accurate Counts**  
978-664-2565

Page 2

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024VL1

Start Time	11/21/201 Thu	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	44			5	38				
12:15		0	41			3	35				
12:30		1	48			1	39				
12:45		0	32	1	165	2	51	11	163	12	328
01:00		0	36			2	44				
01:15		1	47			2	41				
01:30		1	54			0	36				
01:45		0	45	2	182	0	64	4	185	6	367
02:00		1	54			1	56				
02:15		0	101			1	73				
02:30		0	84			1	46				
02:45		0	70	1	309	0	64	3	239	4	548
03:00		0	84			1	71				
03:15		5	84			1	77				
03:30		3	110			2	59				
03:45		0	88	8	366	3	73	7	280	15	646
04:00		2	91			0	70				
04:15		3	85			3	60				
04:30		2	84			0	68				
04:45		13	74	20	334	6	62	9	260	29	594
05:00		15	113			6	60				
05:15		23	103			4	70				
05:30		25	84			13	83				
05:45		20	56	83	356	28	80	51	293	134	649
06:00		48	59			20	63				
06:15		30	41			27	47				
06:30		57	26			41	54				
06:45		62	31	197	157	69	57	157	221	354	378
07:00		55	33			79	49				
07:15		62	25			129	42				
07:30		111	32			89	65				
07:45		62	25	290	115	94	29	391	185	681	300
08:00		73	16			113	34				
08:15		61	25			74	40				
08:30		67	20			55	30				
08:45		58	16	259	77	65	31	307	135	566	212
09:00		51	20			52	20				
09:15		57	14			53	33				
09:30		55	16			45	20				
09:45		63	30	226	80	40	17	190	90	416	170
10:00		65	8			33	13				
10:15		47	8			36	9				
10:30		37	5			29	9				
10:45		44	16	193	37	47	8	145	39	338	76
11:00		42	5			41	7				
11:15		51	6			39	7				
11:30		53	1			45	5				
11:45		46	3	192	15	40	7	165	26	357	41
Total		1472	2193			1440	2116			2912	4309
Percent		40.2%	59.8%			40.5%	59.5%			40.3%	59.7%
Grand Total		2916	4190			2730	4100			5646	8290
Percent		41.0%	59.0%			40.0%	60.0%			40.5%	59.5%
ADT		ADT 6,968									
			AADT 6,968								

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024VL1

Start Time	11/18/2019		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	*	*	*	*	1	9	1	11	*	*	*	*	*	*	1	10
01:00	*	*	*	*	1	7	2	4	*	*	*	*	*	*	2	6
02:00	*	*	*	*	5	1	1	3	*	*	*	*	*	*	3	2
03:00	*	*	*	*	5	6	8	7	*	*	*	*	*	*	6	6
04:00	*	*	*	*	16	6	20	9	*	*	*	*	*	*	18	8
05:00	*	*	*	*	85	44	83	51	*	*	*	*	*	*	84	48
06:00	*	*	*	*	184	171	197	157	*	*	*	*	*	*	190	164
07:00	*	*	*	*	330	399	290	391	*	*	*	*	*	*	310	395
08:00	*	*	*	*	268	214	259	307	*	*	*	*	*	*	264	260
09:00	*	*	*	*	181	139	226	190	*	*	*	*	*	*	204	164
10:00	*	*	*	*	206	152	193	145	*	*	*	*	*	*	200	148
11:00	*	*	*	*	162	142	192	165	*	*	*	*	*	*	177	154
12:00 PM	*	*	*	*	182	166	165	163	*	*	*	*	*	*	174	164
01:00	*	*	*	*	189	173	182	185	*	*	*	*	*	*	186	179
02:00	*	*	*	*	308	230	309	239	*	*	*	*	*	*	308	234
03:00	*	*	*	*	302	286	366	280	*	*	*	*	*	*	334	283
04:00	*	*	*	*	302	292	334	260	*	*	*	*	*	*	318	276
05:00	*	*	*	*	310	282	356	293	*	*	*	*	*	*	333	288
06:00	*	*	*	*	176	211	157	221	*	*	*	*	*	*	166	216
07:00	*	*	*	*	90	123	115	185	*	*	*	*	*	*	102	154
08:00	*	*	*	*	74	107	77	135	*	*	*	*	*	*	76	121
09:00	*	*	*	*	34	63	80	90	*	*	*	*	*	*	57	76
10:00	*	*	*	*	21	24	37	39	*	*	*	*	*	*	29	32
11:00	*	*	*	*	9	27	15	26	*	*	*	*	*	*	12	26
Lane	0	0	0	0	3441	3274	3665	3556	0	0	0	0	0	0	3554	3414
Day	0	0	0	0	6715	7221	7221	7221	0	0	0	0	0	0	6968	6968
AM Peak	-	-	-	-	07:00	07:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	330	399	290	391	-	-	-	-	-	-	310	395
PM Peak	-	-	-	-	17:00	16:00	15:00	17:00	-	-	-	-	-	-	15:00	17:00
Vol.	-	-	-	-	310	292	366	293	-	-	-	-	-	-	334	288

Comb. Total 0 0 6715 7221 0 0 6968

ADT ADT 6,968 AADT 6,968



Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

WB

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
11/20/19	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00	1	0	1	0	2	1	0	0	0	0	0	0	0	0	5
03:00	0	0	1	3	1	0	0	0	0	0	0	0	0	0	5
04:00	0	0	3	3	6	3	0	1	0	0	0	0	0	0	16
05:00	0	2	3	19	43	14	4	0	0	0	0	0	0	0	85
06:00	0	6	14	47	81	31	4	1	0	0	0	0	0	0	184
07:00	0	9	47	92	129	48	5	0	0	0	0	0	0	0	330
08:00	0	7	23	76	120	38	3	1	0	0	0	0	0	0	268
09:00	0	6	20	65	72	15	3	0	0	0	0	0	0	0	181
10:00	1	7	29	60	88	14	6	1	0	0	0	0	0	0	206
11:00	2	3	24	50	64	15	4	0	0	0	0	0	0	0	162
12 PM	1	7	21	63	65	25	0	0	0	0	0	0	0	0	182
13:00	0	12	19	69	62	23	4	0	0	0	0	0	0	0	189
14:00	0	14	47	109	104	29	5	0	0	0	0	0	0	0	308
15:00	0	11	35	105	93	49	8	1	0	0	0	0	0	0	302
16:00	1	11	59	117	78	30	6	0	0	0	0	0	0	0	302
17:00	1	3	55	146	86	18	1	0	0	0	0	0	0	0	310
18:00	1	8	25	80	44	17	1	0	0	0	0	0	0	0	176
19:00	0	2	14	38	30	4	2	0	0	0	0	0	0	0	90
20:00	0	2	17	33	18	4	0	0	0	0	0	0	0	0	74
21:00	0	1	11	10	11	1	0	0	0	0	0	0	0	0	34
22:00	0	0	2	11	7	0	1	0	0	0	0	0	0	0	21
23:00	0	1	1	4	1	1	1	0	0	0	0	0	0	0	9
Total	8	113	471	1200	1205	380	59	5	0	0	0	0	0	0	3441

Daily

15th Percentile : 24 MPH  
50th Percentile : 29 MPH  
85th Percentile : 34 MPH  
95th Percentile : 38 MPH

Mean Speed(Average) : 30 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 2405  
Percent in Pace : 69.9%  
Number of Vehicles > 30 MPH : 1649  
Percent of Vehicles > 30 MPH : 47.9%

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

WB

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
11/21/19	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
03:00	0	2	4	2	0	0	0	0	0	0	0	0	0	0	8
04:00	0	2	3	5	6	4	0	0	0	0	0	0	0	0	20
05:00	0	4	12	31	27	8	1	0	0	0	0	0	0	0	83
06:00	0	12	17	71	79	17	1	0	0	0	0	0	0	0	197
07:00	2	12	39	91	101	40	5	0	0	0	0	0	0	0	290
08:00	1	8	32	76	97	39	6	0	0	0	0	0	0	0	259
09:00	0	7	13	87	76	37	5	1	0	0	0	0	0	0	226
10:00	0	3	22	56	78	28	6	0	0	0	0	0	0	0	193
11:00	1	8	23	58	68	29	5	0	0	0	0	0	0	0	192
12 PM	0	4	19	57	64	20	1	0	0	0	0	0	0	0	165
13:00	0	2	18	58	70	29	5	0	0	0	0	0	0	0	182
14:00	0	4	32	101	113	47	12	0	0	0	0	0	0	0	309
15:00	0	8	41	148	120	43	5	0	1	0	0	0	0	0	366
16:00	1	7	57	122	115	27	5	0	0	0	0	0	0	0	334
17:00	3	7	68	142	113	22	1	0	0	0	0	0	0	0	356
18:00	0	6	23	64	52	11	1	0	0	0	0	0	0	0	157
19:00	0	5	13	63	28	6	0	0	0	0	0	0	0	0	115
20:00	0	2	9	36	23	6	1	0	0	0	0	0	0	0	77
21:00	1	2	11	28	29	9	0	0	0	0	0	0	0	0	80
22:00	0	0	1	10	22	4	0	0	0	0	0	0	0	0	37
23:00	0	0	3	3	8	1	0	0	0	0	0	0	0	0	15
Total	9	105	461	1311	1290	427	60	1	1	0	0	0	0	0	3665

Daily

15th Percentile : 24 MPH  
50th Percentile : 29 MPH  
85th Percentile : 34 MPH  
95th Percentile : 38 MPH

Mean Speed(Average) : 30 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 2601  
Percent in Pace : 71.0%  
Number of Vehicles > 30 MPH : 1779  
Percent of Vehicles > 30 MPH : 48.5%

Grand Total	17	218	932	2511	2495	807	119	6	1	0	0	0	0	0	7106
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Overall

15th Percentile : 24 MPH  
50th Percentile : 29 MPH  
85th Percentile : 34 MPH  
95th Percentile : 38 MPH

Mean Speed(Average) : 30 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 5006  
Percent in Pace : 70.4%  
Number of Vehicles > 30 MPH : 3428  
Percent of Vehicles > 30 MPH : 48.2%

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

EB

Start Time	15	1	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	Total
11/20/19	0	0	0	0	0	0	4	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
01:00	0	0	2	0	0	0	1	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
02:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	1	0	1	1	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:00	0	0	0	0	2	0	2	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6
05:00	0	0	0	0	2	0	16	2	23	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
06:00	0	0	1	8	8	0	42	0	83	0	33	33	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	171
07:00	3	1	1	19	19	3	90	19	194	0	79	79	11	11	2	0	0	0	0	0	0	0	0	0	0	0	0	399
08:00	2	4	4	15	15	0	48	0	96	0	40	40	7	7	2	0	0	0	0	0	0	0	0	0	0	0	0	214
09:00	0	0	5	4	4	0	38	0	62	0	27	27	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	139
10:00	6	1	8	17	17	0	29	59	65	28	28	20	3	3	1	0	1	0	0	0	0	0	0	0	0	0	0	152
11:00	1	1	1	15	15	0	39	0	65	0	20	20	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	142
12 PM	0	0	3	20	20	0	42	0	66	0	28	28	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	166
13:00	0	0	7	13	18	0	48	0	64	0	31	31	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	173
14:00	5	0	8	20	20	0	76	0	86	0	30	30	4	4	0	0	0	0	1	0	0	0	0	0	0	0	0	230
15:00	2	4	4	33	33	0	86	0	110	0	50	50	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	286
16:00	4	10	10	36	36	0	90	0	121	0	26	26	4	4	0	0	0	0	0	0	0	0	0	1	0	0	0	292
17:00	0	0	11	32	32	0	94	0	109	0	33	33	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	282
18:00	0	0	7	19	19	0	96	0	70	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211
19:00	0	0	4	12	12	0	55	0	47	0	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	123
20:00	0	0	6	17	17	0	34	0	42	0	7	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	107
21:00	0	0	1	5	5	0	23	0	28	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
22:00	0	0	0	4	4	0	8	0	8	0	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	24
23:00	0	0	1	2	2	0	10	0	10	0	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Total	23	84	301	973	1355	472	54	9	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	3274

Daily

15th Percentile : 25 MPH  
50th Percentile : 30 MPH  
85th Percentile : 35 MPH  
95th Percentile : 38 MPH

Mean Speed(Average) : 31 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 2328  
Percent in Pace : 71.1%  
Number of Vehicles > 30 MPH : 1893  
Percent of Vehicles > 30 MPH : 57.8%

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

EB

Start Time	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	Total
11/21/19	0	0	0	0	0	3		6		2		0	0	0		0	0	0	0	0	0	0	0	0	0	0	11
01:00	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	0	1	0	0	1		1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	3	0	2		2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
04:00	0	1	0	2	0	6		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
05:00	1	2	2	6	0	22	14	14		6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51
06:00	0	0	0	10	0	35		77		30	30	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157
07:00	4	1	0	16	0	77		176		106	106	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	391
08:00	2	3	3	11	0	71		130		75	75	11	11	3	3	0	0	0	0	0	1	0	0	0	0	0	307
09:00	1	0	0	14	0	33		89		42	42	8	8	3	3	0	0	0	0	0	0	0	0	0	0	0	190
10:00	1	3	3	17	0	30		56		32	32	5	5	0	0	0	0	0	0	0	1	0	0	0	0	0	145
11:00	2	7	7	17	0	37		50		45	45	6	6	1	1	0	0	0	0	0	0	0	0	0	0	0	165
12 PM	0	3	3	23	0	36		56		37	37	6	6	1	1	0	0	0	0	0	1	0	0	0	0	0	163
13:00	1	2	2	20	0	43		84		31	31	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	185
14:00	2	10	16	16	0	58		100		43	43	6	6	2	2	2	2	0	0	0	0	0	0	0	0	0	239
15:00	0	6	6	22	0	84		116		48	48	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	280
16:00	0	5	5	21	0	90		96		42	42	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	260
17:00	1	8	18	18	0	90		135		37	37	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	293
18:00	2	0	0	14	0	62		113		29	29	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	221
19:00	1	6	16	16	0	48		90		22	22	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	185
20:00	0	2	18	18	0	36		54		21	21	2	2	0	0	2	2	0	0	0	0	0	0	0	0	0	135
21:00	0	1	1	11	0	30		36		10	10	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	90
22:00	0	0	0	4	0	13		16		6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
23:00	0	1	1	1	0	8		9		7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Total	18	62	280	280	1509	671	81	11	4	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3556

Daily

15th Percentile : 25 MPH  
50th Percentile : 31 MPH  
85th Percentile : 36 MPH  
95th Percentile : 39 MPH

Mean Speed(Average) : 32 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 2425  
Percent in Pace : 68.2%  
Number of Vehicles > 30 MPH : 2280  
Percent of Vehicles > 30 MPH : 64.1%

Grand Total	41	146	581	1889	2864	1143	135	20	5	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6830
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Overall

15th Percentile : 25 MPH  
50th Percentile : 31 MPH  
85th Percentile : 36 MPH  
95th Percentile : 39 MPH

Mean Speed(Average) : 31 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 4753  
Percent in Pace : 69.6%  
Number of Vehicles > 30 MPH : 4173  
Percent of Vehicles > 30 MPH : 61.1%

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

WB, EB

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 99	Total
11/20/19	0	0	0	4	5	0	1	0	0	0	0	0	0	0	10
01:00	0	3	0	1	3	1	0	0	0	0	0	0	0	0	8
02:00	1	0	0	1	2	1	0	0	0	0	0	0	0	0	6
03:00	0	0	2	4	4	1	0	0	0	0	0	0	0	0	11
04:00	0	0	5	5	7	3	0	2	0	0	0	0	0	0	22
05:00	0	2	5	35	66	17	4	0	0	0	0	0	0	0	129
06:00	0	7	22	89	164	64	7	2	0	0	0	0	0	0	355
07:00	3	10	66	182	323	127	16	2	0	0	0	0	0	0	729
08:00	2	11	38	124	216	78	10	3	0	0	0	0	0	0	482
09:00	0	11	24	103	134	42	6	0	0	0	0	0	0	0	320
10:00	7	15	46	89	147	46	9	2	1	0	0	0	0	0	358
11:00	3	4	39	89	129	35	4	1	0	0	0	0	0	0	304
12 PM	1	10	41	105	131	53	7	0	0	0	0	0	0	0	348
13:00	0	19	37	117	126	54	8	1	0	0	0	0	0	0	362
14:00	5	22	67	185	190	59	9	0	0	1	0	0	0	0	538
15:00	2	15	68	191	203	99	9	1	0	0	0	0	0	0	588
16:00	5	21	95	207	199	56	10	0	0	0	0	1	0	0	594
17:00	1	14	87	240	195	51	4	0	0	0	0	0	0	0	592
18:00	1	15	44	176	114	36	1	0	0	0	0	0	0	0	387
19:00	0	6	26	93	77	8	3	0	0	0	0	0	0	0	213
20:00	0	8	34	67	60	11	1	0	0	0	0	0	0	0	181
21:00	0	2	16	33	39	7	0	0	0	0	0	0	0	0	97
22:00	0	0	6	19	15	3	2	0	0	0	0	0	0	0	45
23:00	0	2	3	14	11	4	2	0	0	0	0	0	0	0	36
Total	31	197	772	2173	2560	852	113	14	1	1	0	1	0	0	6715

Daily

15th Percentile : 25 MPH  
50th Percentile : 30 MPH  
85th Percentile : 34 MPH  
95th Percentile : 38 MPH

Mean Speed(Average) : 31 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 4733

Percent in Pace : 70.5%  
Number of Vehicles > 30 MPH : 3542  
Percent of Vehicles > 30 MPH : 52.7%

Accurate Counts  
978-664-2565

Location : Central Street  
Location : East of Fruit Street  
City/State: Byfield, MA

19024SP1

WB, EB

Start Time	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	99	76	Total
11/21/19	0	0	0	0	0	4		6		2		0	0	0		0		0	0	0	0	0	0	0	0	0	0	12
01:00	0	0	1	0	1	2		3		0		0	0	0	3		0	0	0	0	0	0	0	0	0	0	0	6
02:00	0	0	1	0	0	1		2		0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	2	7	7	4	4		2		0		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	15
04:00	0	3	5	5	11	6		6		4		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	29
05:00	1	6	18	18	53	41		41		14		1	1	0	0		0	0	0	0	0	0	0	0	0	0	0	134
06:00	0	12	27	27	106	156		156		47		6	6	0	0		0	0	0	0	0	0	0	0	0	0	0	354
07:00	6	13	55	55	168	277		277		146		16	16	0	0		0	0	0	0	0	0	0	0	0	0	0	681
08:00	3	11	43	43	147	227		227		114		17	17	3	3		0	0	0	0	1	0	0	0	0	0	0	566
09:00	1	7	27	27	120	165		165		79		13	13	4	4		0	0	0	0	0	0	0	0	0	0	0	416
10:00	1	6	39	39	86	134		134		60		11	11	0	0		0	0	0	0	1	0	0	0	0	0	0	338
11:00	3	15	40	40	95	118		118		74		11	11	1	1		0	0	0	0	1	0	0	0	0	0	0	357
12 PM	0	7	42	42	93	120		120		57		7	7	1	1		0	0	0	0	1	0	0	0	0	0	0	328
13:00	1	4	38	38	101	154		154		60		9	9	0	0		0	0	0	0	0	0	0	0	0	0	0	367
14:00	2	14	48	48	159	213		213		90		18	18	2	2		2	0	0	0	0	0	0	0	0	0	0	548
15:00	0	14	63	63	232	236		236		91		9	9	0	0		1	0	0	0	0	0	0	0	0	0	0	646
16:00	1	12	78	78	212	211		211		69		10	10	0	0		0	0	0	0	0	0	0	0	0	1	0	594
17:00	4	15	86	86	232	248		248		59		4	4	1	1		0	0	0	0	0	0	0	0	0	0	0	649
18:00	2	6	37	37	126	165		165		40		2	2	0	0		0	0	0	0	0	0	0	0	0	0	0	378
19:00	1	11	29	29	111	118		118		28		2	2	0	0		0	0	0	0	0	0	0	0	0	0	0	300
20:00	0	4	27	27	72	77		77		27		3	3	0	0		2	0	0	0	0	0	0	0	0	0	0	212
21:00	1	3	22	22	58	65		65		19		2	2	0	0		0	0	0	0	0	0	0	0	0	0	0	170
22:00	0	0	5	5	23	38		38		10		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	76
23:00	0	1	4	4	11	17		17		8		0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	41
Total	27	167	741	741	2227	2799		2799		1098		141	141	12	12		5	5	0	0	3	3	0	0	0	0	1	7221

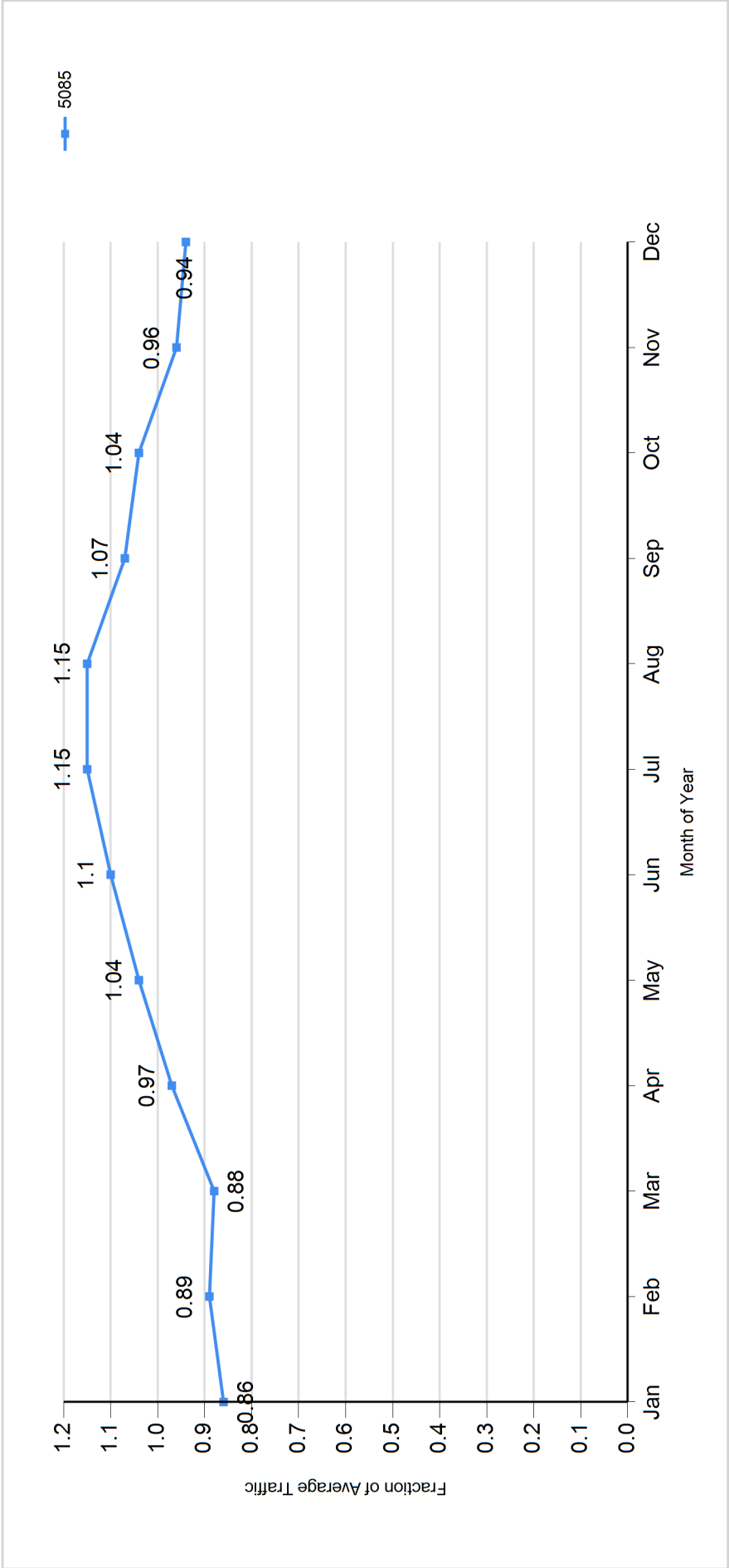
Daily  
15th Percentile : 25 MPH  
50th Percentile : 30 MPH  
85th Percentile : 35 MPH  
95th Percentile : 39 MPH  
  
Mean Speed(Average) : 31 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 5026  
Percent in Pace : 69.6%  
Number of Vehicles > 30 MPH : 4059  
Percent of Vehicles > 30 MPH : 56.2%

Grand Total	58	364	1513	1513	4400	5359		5359		1950		254	254	26		6	6	1	1	3	3	0	0	0	0	0	1	13936
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Overall  
15th Percentile : 25 MPH  
50th Percentile : 30 MPH  
85th Percentile : 35 MPH  
95th Percentile : 38 MPH  
  
Mean Speed(Average) : 31 MPH  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 9759  
Percent in Pace : 70.0%  
Number of Vehicles > 30 MPH : 7601  
Percent of Vehicles > 30 MPH : 54.5%



Traffic Pattern by Month for 1/1/2018 - 12/31/2018



Traffic Pattern by Month for 1/1/2018 - 12/31/2018

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
U1-Essex	5085	1	0.862	0.891	0.878	0.972	1.039	1.098	1.149	1.151	1.072	1.044	0.963	0.938
	Average of Weighted Factors		0.862	0.891	0.878	0.972	1.039	1.098	1.149	1.151	1.072	1.044	0.963	0.938

## *Observed Vehicle Queues at Dunkin Donut Drive-Through Lanes*

Peak Hour/Queue	Sep-97 Malden, MA <sup>a</sup>	May-02 Milford, NH <sup>b</sup>	Sep-10 Kingston, MA <sup>c</sup>	Jul-16 Dracut, MA <sup>d</sup>	Average	Maximum
Weekday AM:						
Maximum	11	11	11	13	12	13
Average	9	4	5	6	6	9
Weekday PM:						
Maximum	6	3	4	--	4	6
Average	4	1	1	--	2	4
Saturday Midday:						
Maximum	8	10	--	--	9	10
Average	6	2	--	--	4	6

<sup>a</sup>Contains a Dunkin' Donuts with a drive-through window located in Adams Plaza in Malden, MA.

<sup>b</sup>Contains a Dunkin' Donuts with a drive-through window located at 143 Elm Street in Milford, NH.

<sup>c</sup>Contains a Dunkin Donuts with a drive-through window located on Routes 53/3A (Summer Street) in Kingston, MA.

<sup>d</sup>Contains a Dunkin Donuts with a drive-through window located at 177 Broadway Road in Dracut, MA.

***Institute of Transportation Engineers (ITE); 10th Edition***  
**Land Use Code (LUC) 960 - Super Convenience Market/Gas Station**

Average Vehicle Trips Ends vs: Vehicle Fueling Positions  
Independent Variable (X): 12

**AVERAGE WEEKDAY DAILY**

$T = 230.52 * (X)$   
 $T = 2,766.24$   
 $T = 2,770$  vehicle trips  
with 50% ( 1,385 vpd) entering and 50% ( 1,385 vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$T = 28.08 * (X)$   
 $T = 336.96$   
 $T = 337$  vehicle trips  
with 50% ( 169 vph) entering and 50% ( 168 vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$T = 22.96 * (X)$   
 $T = 275.52$   
 $T = 276$  vehicle trips  
with 50% ( 138 vph) entering and 50% ( 138 vph) exiting.

**SATURDAY DAILY**

$T = 291.67 * (X)$   
 $T = 3,500.04$   
 $T = 3,500$  vehicle trips  
with 50% ( 1,750 vpd) entering and 50% ( 1,750 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

$T = 23.26 * (X)$   
 $T = 279.12$   
 $T = 279$  vehicle trips  
with 50% ( 140 vph) entering and 50% ( 139 vph) exiting.