

Appendix for Traffic Impact Study

Active Senior Residential Development

Willow Road (Route 133)
Boxford, MA

Prepared by
McMahon Associates, Inc.
120 Water Street, 4th Floor
Boston, MA 02109
617.556.0020

Prepared for
Toll Brothers, Inc.

November 2020

APPENDIX A

Traffic Count Data

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

S: Deer Run Road
E/W: Willow Road (Route 133)
City, State: Boxford, MA
Client: McM/E. Gruber

File Name : 05324A
Site Code : Y1866911
Start Date : 3/11/2020
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

	Willow Road (Route 133) From East			Deer Run Road From South			Willow Road (Route 133) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	79	0	0	0	0	0	0	73	0	152
07:15 AM	69	0	0	0	0	0	0	63	0	132
07:30 AM	68	0	0	0	0	0	0	66	0	134
07:45 AM	95	0	0	0	0	0	0	54	0	149
Total	311	0	0	0	0	0	0	256	0	567
08:00 AM	66	0	0	0	1	0	0	69	0	136
08:15 AM	73	0	0	2	0	0	0	64	0	139
08:30 AM	77	0	0	1	0	0	0	53	0	131
08:45 AM	62	0	0	1	0	0	0	51	0	114
Total	278	0	0	4	1	0	0	237	0	520
Grand Total	589	0	0	4	1	0	0	493	0	1087
Apprch %	100	0	0	80	20	0	0	100	0	
Total %	54.2	0	0	0.4	0.1	0	0	45.4	0	
Cars & Peds	574	0	0	4	1	0	0	477	0	1056
% Cars & Peds	97.5	0	0	100	100	0	0	96.8	0	97.1
Trucks & Buses	15	0	0	0	0	0	0	16	0	31
% Trucks & Buses	2.5	0	0	0	0	0	0	3.2	0	2.9
Bikes by Direction	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
07:00 AM	79	0	0	79	0	0	0	0	0	73	0	73	152
07:15 AM	69	0	0	69	0	0	0	0	0	63	0	63	132
07:30 AM	68	0	0	68	0	0	0	0	0	66	0	66	134
07:45 AM	95	0	0	95	0	0	0	0	0	54	0	54	149
Total Volume	311	0	0	311	0	0	0	0	0	256	0	256	567
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.818	.000	.000	.818	.000	.000	.000	.000	.000	.877	.000	.877	.933
Cars & Peds	305	0	0	305	0	0	0	0	0	246	0	246	551
% Cars & Peds	98.1	0	0	98.1	0	0	0	0	0	96.1	0	96.1	97.2
Trucks & Buses	6	0	0	6	0	0	0	0	0	10	0	10	16
% Trucks & Buses	1.9	0	0	1.9	0	0	0	0	0	3.9	0	3.9	2.8
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Peak Hour for Entire Intersection Begins at 07:00 AM

Transportation Data Corporation

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E/W: Willow Road (Route 133)
City, State: Boxford, MA
Client: McM/E. Gruber

File Name : 05324A
Site Code : Y1866911
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Page No : 1

Groups Printed- Cars & Peds

	Willow Road (Route 133) From East			Deer Run Road From South			Willow Road (Route 133) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	79	0	0	0	0	0	0	72	0	151
07:15 AM	66	0	0	0	0	0	0	61	0	127
07:30 AM	65	0	0	0	0	0	0	62	0	127
07:45 AM	95	0	0	0	0	0	0	51	0	146
Total	305	0	0	0	0	0	0	246	0	551
08:00 AM	65	0	0	0	1	0	0	66	0	132
08:15 AM	71	0	0	2	0	0	0	63	0	136
08:30 AM	75	0	0	1	0	0	0	52	0	128
08:45 AM	58	0	0	1	0	0	0	50	0	109
Total	269	0	0	4	1	0	0	231	0	505
Grand Total	574	0	0	4	1	0	0	477	0	1056
Apprch %	100	0	0	80	20	0	0	100	0	
Total %	54.4	0	0	0.4	0.1	0	0	45.2	0	

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	79	0	0	79	0	0	0	0	0	72	0	72	151
07:15 AM	66	0	0	66	0	0	0	0	0	61	0	61	127
07:30 AM	65	0	0	65	0	0	0	0	0	62	0	62	127
07:45 AM	95	0	0	95	0	0	0	0	0	51	0	51	146
Total Volume	305	0	0	305	0	0	0	0	0	246	0	246	551
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.803	.000	.000	.803	.000	.000	.000	.000	.000	.854	.000	.854	.912

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File Name : 05324A
Site Code : Y1866911
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Page No : 1

Groups Printed- Trucks & Buses

	Willow Road (Route 133) From East			Deer Run Road From South			Willow Road (Route 133) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	1	0	1
07:15 AM	3	0	0	0	0	0	0	2	0	5
07:30 AM	3	0	0	0	0	0	0	4	0	7
07:45 AM	0	0	0	0	0	0	0	3	0	3
Total	6	0	0	0	0	0	0	10	0	16
08:00 AM	1	0	0	0	0	0	0	3	0	4
08:15 AM	2	0	0	0	0	0	0	1	0	3
08:30 AM	2	0	0	0	0	0	0	1	0	3
08:45 AM	4	0	0	0	0	0	0	1	0	5
Total	9	0	0	0	0	0	0	6	0	15
Grand Total	15	0	0	0	0	0	0	16	0	31
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	48.4	0	0	0	0	0	0	51.6	0	

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	3	0	0	3	0	0	0	0	0	2	0	2	5
07:30 AM	3	0	0	3	0	0	0	0	0	4	0	4	7
07:45 AM	0	0	0	0	0	0	0	0	0	3	0	3	3
08:00 AM	1	0	0	1	0	0	0	0	0	3	0	3	4
Total Volume	7	0	0	7	0	0	0	0	0	12	0	12	19
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.583	.000	.000	.583	.000	.000	.000	.000	.000	.750	.000	.750	.679

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Groups Printed- Bikes by Direction

[illegible][illegible]

Transportation Data Corporation

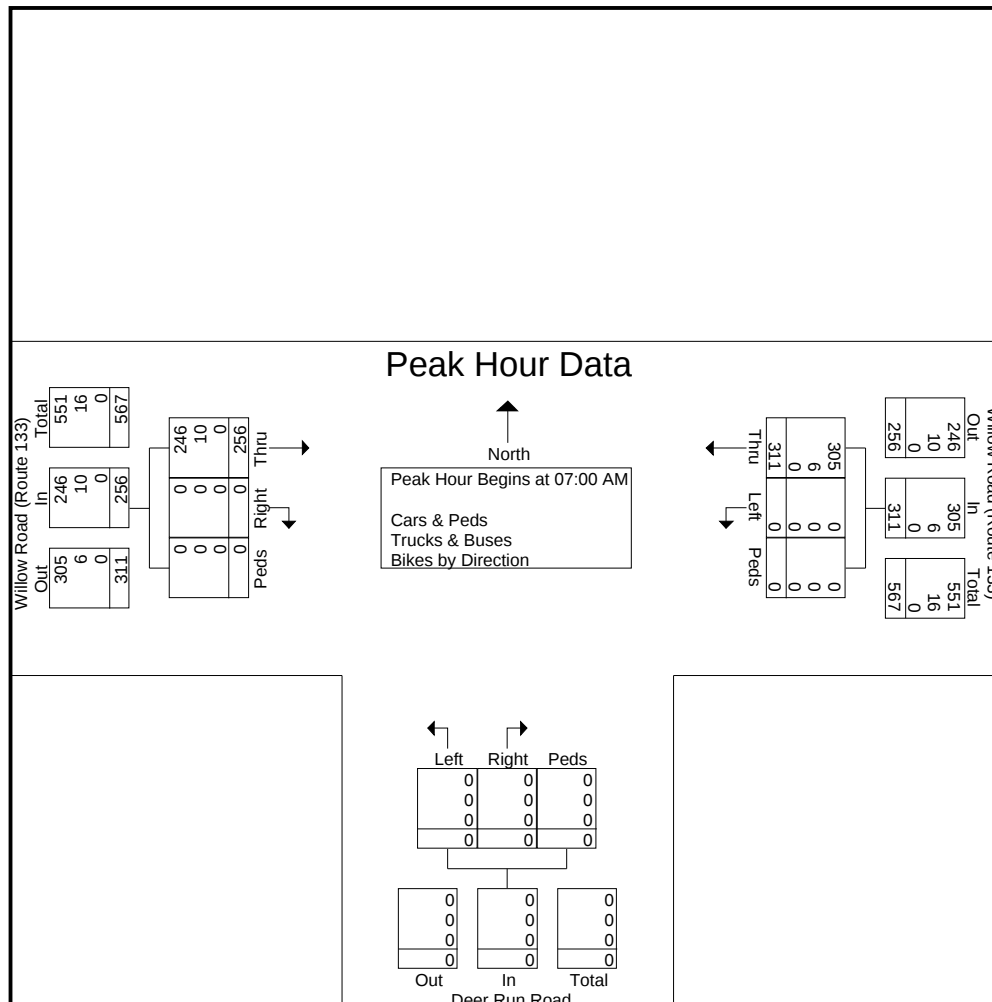
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	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	79	0	0	79	0	0	0	0	0	73	0	73	152
07:15 AM	69	0	0	69	0	0	0	0	0	63	0	63	132
07:30 AM	68	0	0	68	0	0	0	0	0	66	0	66	134
07:45 AM	95	0	0	95	0	0	0	0	0	54	0	54	149
Total Volume	311	0	0	311	0	0	0	0	0	256	0	256	567
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.818	.000	.000	.818	.000	.000	.000	.000	.000	.877	.000	.877	.933
Cars & Peds	305	0	0	305	0	0	0	0	0	246	0	246	551
% Cars & Peds	98.1	0	0	98.1	0	0	0	0	0	96.1	0	96.1	97.2
Trucks & Buses	6	0	0	6	0	0	0	0	0	10	0	10	16
% Trucks & Buses	1.9	0	0	1.9	0	0	0	0	0	3.9	0	3.9	2.8
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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File Name : 05324AA
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Groups Printed- Cars & Peds

	Willow Road (Route 133) From East			Deer Run Road From South			Willow Road (Route 133) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	77	0	0	0	0	0	0	58	0	135
04:15 PM	66	0	0	0	1	0	0	71	0	138
04:30 PM	58	0	0	0	1	0	0	66	0	125
04:45 PM	63	0	0	1	0	0	1	70	0	135
Total	264	0	0	1	2	0	1	265	0	533
05:00 PM	58	0	0	0	0	0	0	69	0	127
05:15 PM	80	1	0	0	1	0	2	97	0	181
05:30 PM	68	0	0	3	0	0	0	83	0	154
05:45 PM	55	1	0	0	0	0	0	81	0	137
Total	261	2	0	3	1	0	2	330	0	599
Grand Total	525	2	0	4	3	0	3	595	0	1132
Apprch %	99.6	0.4	0	57.1	42.9	0	0.5	99.5	0	
Total %	46.4	0.2	0	0.4	0.3	0	0.3	52.6	0	

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	58	0	0	58	0	0	0	0	0	69	0	69	127
05:15 PM	80	1	0	81	0	1	0	1	2	97	0	99	181
05:30 PM	68	0	0	68	3	0	0	3	0	83	0	83	154
05:45 PM	55	1	0	56	0	0	0	0	0	81	0	81	137
Total Volume	261	2	0	263	3	1	0	4	2	330	0	332	599
% App. Total	99.2	0.8	0		75	25	0		0.6	99.4	0		
PHF	.816	.500	.000	.812	.250	.250	.000	.333	.250	.851	.000	.838	.827

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File Name : 05324AA
Site Code : Y1866911
Start Date : 3/11/2020
Page No : 1

Groups Printed- Trucks & Buses

	Willow Road (Route 133) From East			Deer Run Road From South			Willow Road (Route 133) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	6	0	0	0	0	0	0	0	0	6
04:15 PM	2	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	1	0	1
Total	8	0	0	0	0	0	0	2	0	10
05:00 PM	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	1	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	1	0	1
Total	2	0	0	0	0	0	0	1	0	3
Grand Total	10	0	0	0	0	0	0	3	0	13
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	76.9	0	0	0	0	0	0	23.1	0	

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	6	0	0	6	0	0	0	0	0	0	0	0	6
04:15 PM	2	0	0	2	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	8	0	0	8	0	0	0	0	0	2	0	2	10
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.333	.000	.000	.333	.000	.000	.000	.000	.000	.500	.000	.500	.417

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Client: McM/E. Gruber

File Name : 05324AA
Site Code : Y1866911
Start Date : 3/11/2020
Page No : 1

Groups Printed- Bikes by Direction

[illegible][illegible]

Transportation Data Corporation

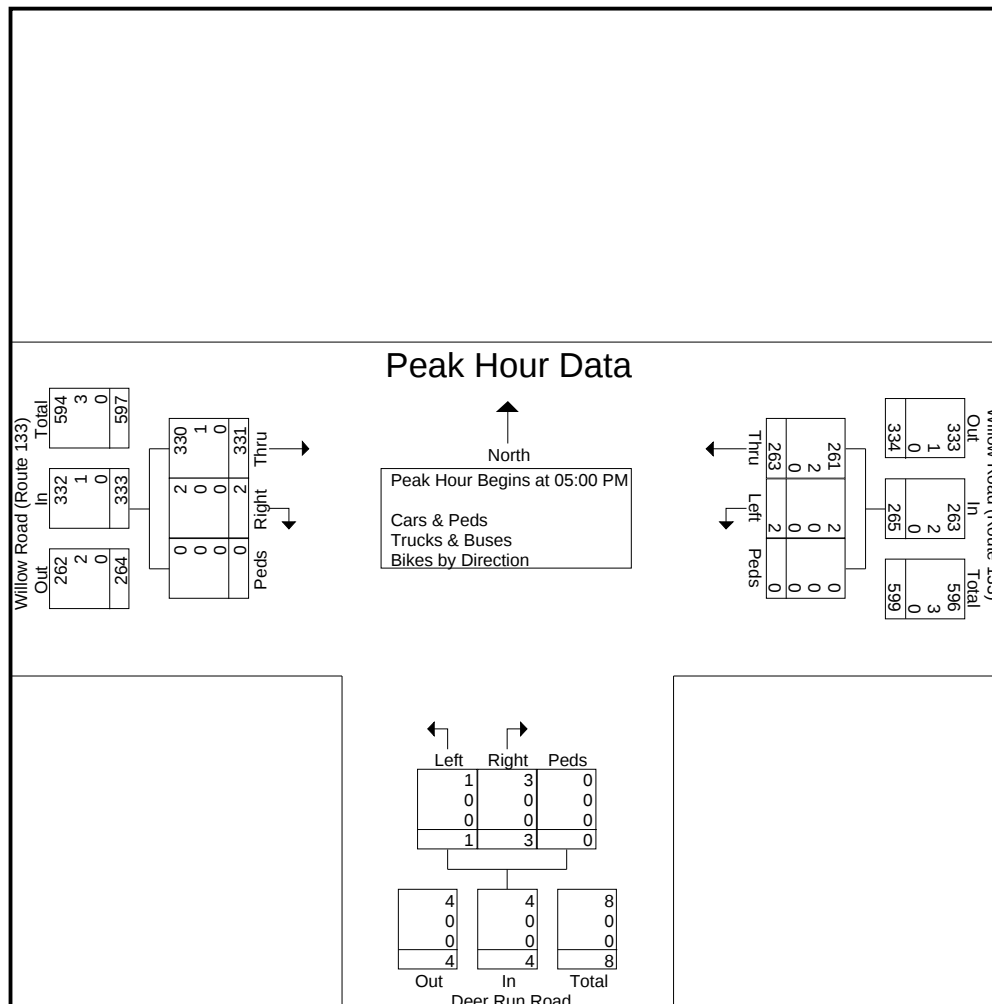
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E/W: Willow Road (Route 133)
City, State: Boxford, MA
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File Name : 05324AA
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Page No : 1

	Willow Road (Route 133) From East				Deer Run Road From South				Willow Road (Route 133) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	59	0	0	59	0	0	0	0	0	69	0	69	128
05:15 PM	80	1	0	81	0	1	0	1	2	97	0	99	181
05:30 PM	69	0	0	69	3	0	0	3	0	83	0	83	155
05:45 PM	55	1	0	56	0	0	0	0	0	82	0	82	138
Total Volume	263	2	0	265	3	1	0	4	2	331	0	333	602
% App. Total	99.2	0.8	0		75	25	0		0.6	99.4	0		
PHF	.822	.500	.000	.818	.250	.250	.000	.333	.250	.853	.000	.841	.831
Cars & Peds	261	2	0	263	3	1	0	4	2	330	0	332	599
% Cars & Peds	99.2	100	0	99.2	100	100	0	100	100	99.7	0	99.7	99.5
Trucks & Buses	2	0	0	2	0	0	0	0	0	1	0	1	3
% Trucks & Buses	0.8	0	0	0.8	0	0	0	0	0	0.3	0	0.3	0.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



tel (781) 587-0086 cell (781) 439-4999

Client: McM/E. Gruber

Page No : 1

[illegible][illegible]

Transportation Data Corporation

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N/S: Pine Plain/Spoftford Road

E/W: Willow Road (Route 133)

City, State: Boxford, MA

Client: McM/E. Gruber

File Name : 05324B

Site Code : Y1866911

Start Date : 3/11/2020

Page No : 1

Groups Printed- Cars & Peds

	Pine Plain Road From North				Willow Road (Route 133) From East				Spoftford Road From South				Willow Road (Route 133) From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	3	1	0	0	76	2	0	1	1	5	0	19	54	1	0	163
07:15 AM	1	1	1	0	0	53	1	0	1	3	5	0	6	52	0	1	125
07:30 AM	1	6	1	0	0	60	0	0	0	1	2	0	7	55	1	0	134
07:45 AM	2	4	0	0	0	91	1	0	2	2	4	0	10	35	2	0	153
Total	4	14	3	0	0	280	4	0	4	7	16	0	42	196	4	1	575
08:00 AM	0	6	0	0	0	67	1	0	1	3	3	0	9	62	1	0	153
08:15 AM	3	4	0	0	0	60	1	0	1	2	2	0	16	48	0	0	137
08:30 AM	1	1	0	0	1	65	0	0	3	0	8	0	8	46	1	0	134
08:45 AM	0	2	1	0	0	55	1	0	2	0	3	0	3	46	2	0	115
Total	4	13	1	0	1	247	3	0	7	5	16	0	36	202	4	0	539
Grand Total	8	27	4	0	1	527	7	0	11	12	32	0	78	398	8	1	1114
Apprch %	20.5	69.2	10.3	0	0.2	98.5	1.3	0	20	21.8	58.2	0	16.1	82.1	1.6	0.2	
Total %	0.7	2.4	0.4	0	0.1	47.3	0.6	0	1	1.1	2.9	0	7	35.7	0.7	0.1	

	Pine Plain Road From North					Willow Road (Route 133) From East					Spoftford Road From South					Willow Road (Route 133) From West					Int. Total
Start Time	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	6	1	0	8	0	60	0	0	60	0	1	2	0	3	7	55	1	0	63	134
07:45 AM	2	4	0	0	6	0	91	1	0	92	2	2	4	0	8	10	35	2	0	47	153
08:00 AM	0	6	0	0	6	0	67	1	0	68	1	3	3	0	7	9	62	1	0	72	153
08:15 AM	3	4	0	0	7	0	60	1	0	61	1	2	2	0	5	16	48	0	0	64	137
Total Volume	6	20	1	0	27	0	278	3	0	281	4	8	11	0	23	42	200	4	0	246	577
% App. Total	22.2	74.1	3.7	0		0	98.9	1.1	0		17.4	34.8	47.8	0		17.1	81.3	1.6	0		
PHF	.500	.833	.250	.000	.844	.000	.764	.750	.000	.764	.500	.667	.688	.000	.719	.656	.806	.500	.000	.854	.943

Transportation Data Corporation

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N/S: Pine Plain/Spoftford Road

E/W: Willow Road (Route 133)

City, State: Boxford, MA

Client: McM/E. Gruber

File Name : 05324B

Site Code : Y1866911

Start Date : 3/11/2020

Page No : 1

Groups Printed- Trucks & Buses

	Pine Plain Road From North				Willow Road (Route 133) From East				Spoftford Road From South				Willow Road (Route 133) From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
07:15 AM	0	0	0	0	0	2	0	0	0	1	1	0	0	2	0	0	6
07:30 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	5	0	0	8
07:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	4
Total	0	2	0	0	0	5	0	0	0	1	1	0	0	10	1	0	20
08:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	3	0	0	5
08:15 AM	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	3
08:30 AM	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	3
08:45 AM	0	0	0	0	0	4	0	0	0	1	0	0	0	1	0	0	6
Total	0	1	0	0	0	7	0	0	0	1	2	0	2	4	0	0	17
Grand Total	0	3	0	0	0	12	0	0	0	2	3	0	2	14	1	0	37
Apprch %	0	100	0	0	0	100	0	0	0	40	60	0	11.8	82.4	5.9	0	
Total %	0	8.1	0	0	0	32.4	0	0	0	5.4	8.1	0	5.4	37.8	2.7	0	

	Pine Plain Road From North					Willow Road (Route 133) From East					Spoftford Road From South					Willow Road (Route 133) From West					Int. Total
Start Time	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	2	0	0	2	0	1	1	0	2	0	2	0	0	2	6
07:30 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	8
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	4
08:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	5
Total Volume	0	2	0	0	2	0	6	0	0	6	0	1	1	0	2	0	12	1	0	13	23
% App. Total	0	100	0	0		0	100	0	0		0	50	50	0		0	92.3	7.7	0		
PHF	.000	.500	.000	.000	.500	.000	.500	.000	.000	.500	.000	.250	.250	.000	.250	.000	.600	.250	.000	.650	.719

tel (781) 587-0086 cell (781) 439-4999

File Name : 05324B
Site Code : Y1866911
Start Date : 3/11/2020
Page No : 1

[illegible][illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

N/S: Pine Plain/Spofford Road

E/W: Willow Road (Route 133)

City, State: Boxford, MA

Client: McM/E. Gruber

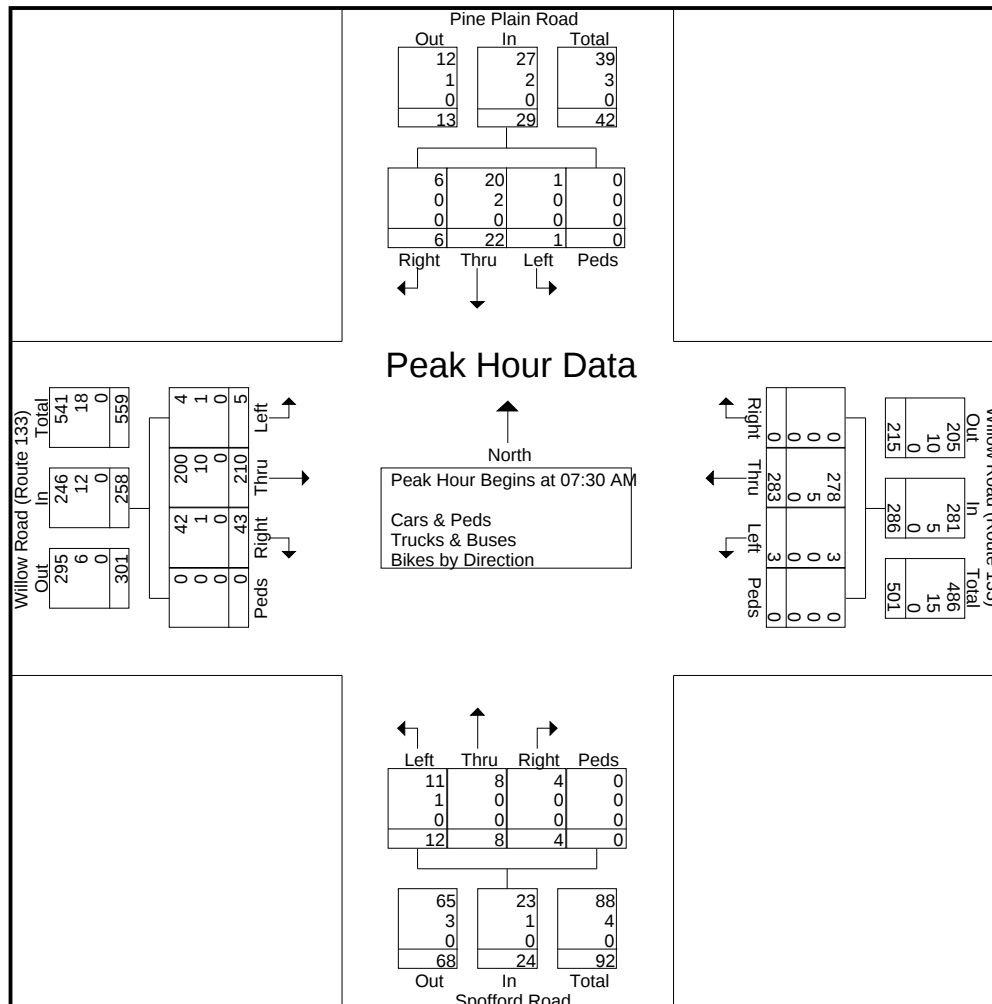
File Name : 05324B

Site Code : Y1866911

Start Date : 3/11/2020

Page No : 1

	Pine Plain Road From North					Willow Road (Route 133) From East					Spofford Road From South					Willow Road (Route 133) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	6	1	0	8	0	63	0	0	63	0	1	2	0	3	7	60	1	0	68	142
07:45 AM	2	5	0	0	7	0	91	1	0	92	2	2	4	0	8	10	37	3	0	50	157
08:00 AM	0	7	0	0	7	0	68	1	0	69	1	3	3	0	7	9	65	1	0	75	158
08:15 AM	3	4	0	0	7	0	61	1	0	62	1	2	3	0	6	17	48	0	0	65	140
Total Volume	6	22	1	0	29	0	283	3	0	286	4	8	12	0	24	43	210	5	0	258	597
% App. Total	20.7	75.9	3.4	0		0	99	1	0		16.7	33.3	50	0		16.7	81.4	1.9	0		
PHF	.500	.786	.250	.000	.906	.000	.777	.750	.000	.777	.500	.667	.750	.000	.750	.632	.808	.417	.000	.860	.945
Cars & Peds	6	20	1	0	27	0	278	3	0	281	4	8	11	0	23	42	200	4	0	246	577
% Cars & Peds	100	90.9	100	0	93.1	0	98.2	100	0	98.3	100	100	91.7	0	95.8	97.7	95.2	80.0	0	95.3	96.6
Trucks & Buses	0	2	0	0	2	0	5	0	0	5	0	0	1	0	1	1	10	1	0	12	20
% Trucks & Buses	0	9.1	0	0	6.9	0	1.8	0	0	1.7	0	0	8.3	0	4.2	2.3	4.8	20.0	0	4.7	3.4
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



tel (781) 587-0086 cell (781) 439-4999

Client: McM/E. Gruber

Page No : 1

[illegible][illegible]

Transportation Data Corporation
 Mario Perone, mperone1@verizon.net
 tel (781) 587-0086 cell (781) 439-4999

N/S: Pine Plain/Spoftford Road
 E/W: Willow Road (Route 133)
 City, State: Boxford, MA
 Client: McM/E. Gruber

File Name : 05324BB
 Site Code : Y1866911
 Start Date : 3/11/2020
 Page No : 1

Groups Printed- Cars & Peds

	Pine Plain Road From North				Willow Road (Route 133) From East				Spoftford Road From South				Willow Road (Route 133) From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	1	0	0	0	0	71	1	0	2	4	6	0	0	55	1	0	141
04:15 PM	0	2	1	0	1	62	3	0	1	5	6	0	5	67	0	1	154
04:30 PM	0	1	1	0	1	49	2	0	1	6	8	0	0	63	0	0	132
04:45 PM	0	1	0	0	2	53	3	0	3	1	7	0	5	70	0	0	145
Total	1	4	2	0	4	235	9	0	7	16	27	0	10	255	1	1	572
05:00 PM	2	1	1	0	0	56	1	0	2	7	4	0	1	67	0	0	142
05:15 PM	0	1	1	0	0	69	0	0	4	5	11	0	6	89	2	0	188
05:30 PM	1	5	1	0	2	56	1	0	2	7	10	0	11	70	2	0	168
05:45 PM	0	0	1	0	0	51	2	0	0	7	8	0	4	76	3	0	152
Total	3	7	4	0	2	232	4	0	8	26	33	0	22	302	7	0	650
Grand Total	4	11	6	0	6	467	13	0	15	42	60	0	32	557	8	1	1222
Apprch %	19	52.4	28.6	0	1.2	96.1	2.7	0	12.8	35.9	51.3	0	5.4	93.1	1.3	0.2	
Total %	0.3	0.9	0.5	0	0.5	38.2	1.1	0	1.2	3.4	4.9	0	2.6	45.6	0.7	0.1	

	Pine Plain Road From North					Willow Road (Route 133) From East					Spoftford Road From South					Willow Road (Route 133) From West					Int. Total
Start Time	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	2	1	1	0	4	0	56	1	0	57	2	7	4	0	13	1	67	0	0	68	142
05:15 PM	0	1	1	0	2	0	69	0	0	69	4	5	11	0	20	6	89	2	0	97	188
05:30 PM	1	5	1	0	7	2	56	1	0	59	2	7	10	0	19	11	70	2	0	83	168
05:45 PM	0	0	1	0	1	0	51	2	0	53	0	7	8	0	15	4	76	3	0	83	152
Total Volume	3	7	4	0	14	2	232	4	0	238	8	26	33	0	67	22	302	7	0	331	650
% App. Total	21.4	50	28.6	0		0.8	97.5	1.7	0		11.9	38.8	49.3	0		6.6	91.2	2.1	0		
PHF	.375	.350	1.00	.000	.500	.250	.841	.500	.000	.862	.500	.929	.750	.000	.838	.500	.848	.583	.000	.853	.864

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

N/S: Pine Plain/Spoftford Road

E/W: Willow Road (Route 133)

City, State: Boxford, MA

Client: McM/E. Gruber

File Name : 05324BB

Site Code : Y1866911

Start Date : 3/11/2020

Page No : 1

Groups Printed- Trucks & Buses

	Pine Plain Road From North				Willow Road (Route 133) From East				Spoftford Road From South				Willow Road (Route 133) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6
04:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	8	0	0	0	0	0	0	0	1	0	0	9
05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3
Grand Total	0	0	0	0	0	10	0	0	0	0	0	0	0	2	0	0	12
Apprch %	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	83.3	0	0	0	0	0	0	0	16.7	0	0	

	Pine Plain Road From North					Willow Road (Route 133) From East					Spofford Road From South					Willow Road (Route 133) From West						
Start Time	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	Right			Peds	App. Total	Int. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 04:00 PM																						
04:00 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	6	
04:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Volume	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	0	1	0	0	1	9
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	100	0	0			
PHF	.000	.000	.000	.000	.000	.000	.333	.000	.000	.333	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.375	

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Client: McM/E. Gruber

Page No : 1

[illegible]

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

N/S: Pine Plain/Spoftford Road

E/W: Willow Road (Route 133)

City, State: Boxford, MA

Client: McM/E. Gruber

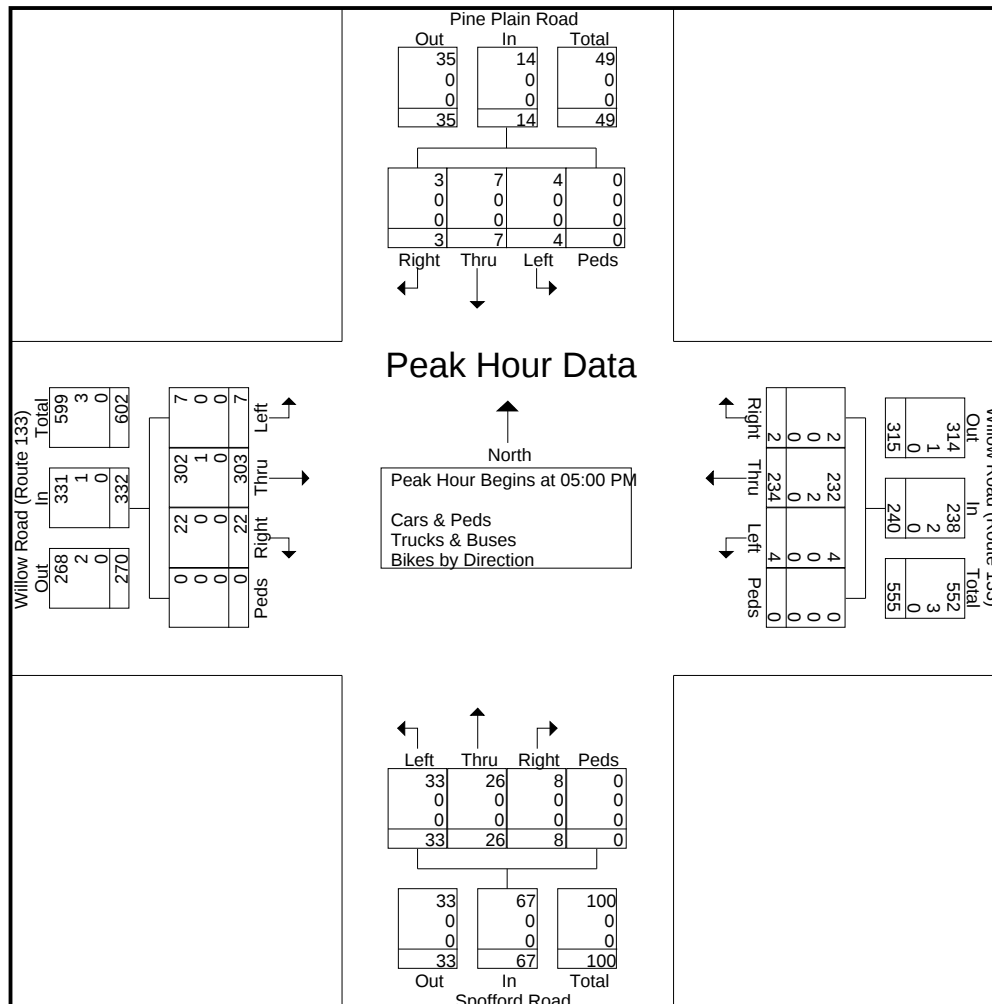
File Name : 05324BB

Site Code : Y1866911

Start Date : 3/11/2020

Page No : 1

	Pine Plain Road From North					Willow Road (Route 133) From East					Spoftford Road From South					Willow Road (Route 133) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	2	1	1	0	4	0	57	1	0	58	2	7	4	0	13	1	67	0	0	68	143
05:15 PM	0	1	1	0	2	0	69	0	0	69	4	5	11	0	20	6	89	2	0	97	188
05:30 PM	1	5	1	0	7	2	57	1	0	60	2	7	10	0	19	11	70	2	0	83	169
05:45 PM	0	0	1	0	1	0	51	2	0	53	0	7	8	0	15	4	77	3	0	84	153
Total Volume	3	7	4	0	14	2	234	4	0	240	8	26	33	0	67	22	303	7	0	332	653
% App. Total	21.4	50	28.6	0		0.8	97.5	1.7	0		11.9	38.8	49.3	0		6.6	91.3	2.1	0		
PHF	.375	.350	1.00	.000	.500	.250	.848	.500	.000	.870	.500	.929	.750	.000	.838	.500	.851	.583	.000	.856	.868
Cars & Peds	3	7	4	0	14	2	232	4	0	238	8	26	33	0	67	22	302	7	0	331	650
% Cars & Peds	100	100	100	0	100	100	99.1	100	0	99.2	100	100	100	0	100	100	99.7	100	0	99.7	99.5
Trucks & Buses	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	3
% Trucks & Buses	0	0	0	0	0	0	0.9	0	0	0.8	0	0	0	0	0	0	0.3	0	0	0.3	0.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Invoice

Date	Invoice #
9/28/2018	186488

Bill To

McMahon Associates
425 Commerce Drive
Suite 200
Fort Washington, PA 19034

Engineer	Client Job #	Terms	Job Location
A. Bleeker	Y18669.11	2% 15 Net 60	Boxford, MA

Description	Hours/Quantity	Rate	Amount
(1) 48 HR ATR (Class, Speed & Volume) Wed 9/26 thru Thurs 9/27/18	1	270.00	270.00
Time and Travel	1	80.00	80.00

"Traffic Counts with Precision" Thank you for your business

Total \$350.00

Balance Due \$350.00



PRECISION
DATA
INDUSTRIES, LLC

Location Map: 186488 Boxford, MA

Precision Data Industries, LLC 46 Morton Street, Framingham, MA 01702 ph: 508-875-0100 email: datarequests@pdillc.com

(1) 48HR (v/c/s) ATR
just east of #81 Driveway

VFW Hall

Andover St

Google

Map data ©2018 Google United States Terms Send feedback 200 ft

Show all

Client:
McMahon Associates

Engineer:
A. Bleeker

Site Code:
Y18669.11

Date:
Wed 9/26 thru Thur 9/27/2018

PDI Job #
186488

City, State:
Boxford, MA



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
WB

186488 A Class
Site Code: Y18669.11

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/26/1														
8	0	12	1	0	0	0	0	0	0	0	0	0	0	13
01:00	0	1	1	0	1	0	0	0	0	0	0	0	0	3
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	2	0	0	1	0	0	0	1	0	0	0	0	4
04:00	0	10	4	0	0	0	0	0	0	0	0	0	0	14
05:00	0	49	22	2	3	1	1	0	1	0	0	0	0	79
06:00	2	176	40	2	7	2	0	1	4	0	0	0	0	234
07:00	4	300	41	1	2	0	1	2	0	0	0	0	0	351
08:00	3	287	38	1	7	0	0	2	2	0	0	0	0	340
09:00	3	147	29	6	5	4	0	1	1	0	0	0	1	197
10:00	1	133	27	3	5	3	0	1	2	0	0	0	0	175
11:00	0	136	34	4	8	8	0	1	2	0	0	0	0	193
12 PM	1	109	24	4	9	12	1	1	0	0	0	0	0	161
13:00	2	125	29	2	6	5	0	0	2	0	0	0	0	171
14:00	3	175	43	4	8	3	0	3	2	0	0	0	0	241
15:00	11	201	31	7	3	1	1	2	0	0	0	0	0	257
16:00	1	235	37	2	2	2	0	1	2	0	0	0	0	282
17:00	4	226	35	0	7	3	0	0	0	0	0	0	0	275
18:00	5	156	22	0	2	0	0	1	0	0	0	0	0	186
19:00	1	94	13	0	4	0	0	0	0	0	0	0	0	112
20:00	2	57	9	0	3	0	0	2	0	0	0	0	0	73
21:00	2	70	4	0	1	0	0	0	0	0	0	0	0	77
22:00	0	23	4	0	1	0	0	0	0	0	0	0	0	28
23:00	0	18	2	1	1	0	0	0	0	0	0	0	0	22
Total	45	2744	490	39	86	44	4	18	19	0	0	0	1	3490
Percent	1.3%	78.6%	14.0%	1.1%	2.5%	1.3%	0.1%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	07:00	09:00	11:00	11:00	05:00	07:00	06:00				09:00	07:00
Vol.	4	300	41	6	8	8	1	2	4				1	351
PM Peak	15:00	16:00	14:00	15:00	12:00	12:00	12:00	14:00	13:00					16:00
Vol.	11	235	43	7	9	12	1	3	2					282



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
WB

186488 A Class
Site Code: Y18669.11

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/27/1														
8	0	14	1	0	0	0	0	0	0	0	0	0	0	15
01:00	0	2	0	1	0	0	0	0	0	0	0	0	0	3
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
04:00	0	16	2	0	0	0	0	0	0	0	0	0	0	18
05:00	0	49	21	1	1	1	0	0	5	0	0	0	0	78
06:00	0	173	44	3	7	1	0	1	3	0	0	0	0	232
07:00	5	300	53	1	6	6	0	2	1	0	0	0	0	374
08:00	2	253	44	3	8	5	0	0	1	0	0	0	0	316
09:00	2	154	36	2	7	3	0	0	3	0	0	0	0	207
10:00	0	136	24	9	9	7	0	2	2	0	0	0	0	189
11:00	3	115	38	2	9	2	0	1	2	0	0	0	0	172
12 PM	3	103	23	1	5	3	0	2	3	0	0	0	0	143
13:00	1	139	41	5	6	3	0	3	1	0	0	0	0	199
14:00	6	185	46	3	6	1	0	1	0	0	0	0	0	248
15:00	3	201	53	3	10	1	0	1	0	0	0	0	0	272
16:00	5	216	23	2	8	1	0	0	0	0	0	0	0	255
17:00	12	243	31	0	3	0	0	0	0	0	0	0	0	289
18:00	7	192	13	0	1	0	0	0	0	0	0	0	0	213
19:00	0	144	15	0	0	1	0	1	1	0	0	0	0	162
20:00	0	120	12	0	1	0	0	0	0	0	0	0	0	133
21:00	1	98	9	0	1	0	0	0	0	0	0	0	0	109
22:00	0	35	5	0	0	0	0	0	0	0	0	0	0	40
23:00	0	22	3	0	1	0	0	0	0	0	0	0	0	26
Total	50	2917	538	36	89	35	0	14	22	0	0	0	0	3701
Percent	1.4%	78.8%	14.5%	1.0%	2.4%	0.9%	0.0%	0.4%	0.6%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	07:00	10:00	10:00	10:00		07:00	05:00					07:00
Vol.	5	300	53	9	9	7		2	5					374
PM Peak	17:00	17:00	15:00	13:00	15:00	12:00		13:00	12:00					17:00
Vol.	12	243	53	5	10	3		3	3					289



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
EB

186488 A Class
Site Code: Y18669.11

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/26/1														
8	0	7	1	0	0	0	0	0	0	0	0	0	0	8
01:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
02:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	12	1	0	0	0	0	0	0	0	0	0	0	13
05:00	0	83	17	0	3	0	0	0	0	0	0	0	0	103
06:00	2	126	26	1	7	1	0	0	1	0	0	0	0	164
07:00	2	213	38	6	10	0	1	2	2	0	0	0	0	274
08:00	1	165	47	4	16	2	0	1	3	0	0	0	0	239
09:00	1	127	37	4	5	2	7	2	0	0	0	0	0	185
10:00	1	87	26	3	10	2	3	2	2	0	0	0	0	136
11:00	2	104	22	1	7	3	6	0	0	0	0	0	0	145
12 PM	1	124	36	3	13	2	4	0	2	0	0	0	0	185
13:00	1	133	28	2	5	1	4	1	5	0	0	0	0	180
14:00	0	163	43	1	13	2	10	4	5	0	0	0	0	241
15:00	7	191	52	1	11	0	6	0	1	0	0	0	0	269
16:00	4	252	52	2	9	0	2	1	0	0	0	0	0	322
17:00	7	299	43	1	8	0	0	0	0	0	0	0	0	358
18:00	0	225	31	1	9	0	0	2	0	0	0	0	0	268
19:00	1	132	22	0	2	0	0	0	0	0	0	0	0	157
20:00	0	80	8	0	2	0	0	0	0	0	0	0	0	90
21:00	2	56	12	0	1	0	0	0	0	0	0	0	0	71
22:00	0	31	5	0	0	0	0	0	0	0	0	0	0	36
23:00	0	29	1	0	3	0	0	0	0	0	0	0	0	33
Total	32	2655	549	30	134	15	43	15	21	0	0	0	0	3494
Percent	0.9%	76.0%	15.7%	0.9%	3.8%	0.4%	1.2%	0.4%	0.6%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	07:00	08:00	07:00	08:00	11:00	09:00	07:00	08:00					07:00
Vol.	2	213	47	6	16	3	7	2	3					274
PM Peak	15:00	17:00	15:00	12:00	12:00	12:00	14:00	14:00	13:00					17:00
Vol.	7	299	52	3	13	2	10	4	5					358



PRECISION
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Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
EB

186488 A Class
Site Code: Y18669.11

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
09/27/1														
8	0	6	0	0	1	0	0	0	0	0	0	0	0	7
01:00	0	6	3	0	0	0	0	0	0	0	0	0	0	9
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
04:00	0	9	1	0	1	0	0	0	0	0	0	0	0	11
05:00	0	81	16	0	6	0	0	0	0	0	0	0	0	103
06:00	4	127	39	1	2	1	5	1	0	0	0	0	0	180
07:00	6	211	45	4	11	6	4	3	1	0	0	0	0	291
08:00	6	177	44	6	7	2	2	2	2	0	0	0	0	248
09:00	1	123	34	0	11	2	6	0	1	0	0	0	0	178
10:00	0	108	40	8	15	6	5	0	1	0	0	0	0	183
11:00	2	119	38	1	12	4	6	3	1	0	0	0	0	186
12 PM	7	130	29	1	6	0	1	3	1	0	0	0	0	178
13:00	4	136	37	1	7	2	1	1	3	0	0	0	0	192
14:00	6	149	35	2	7	1	0	0	4	0	0	0	0	204
15:00	5	216	48	1	15	1	0	2	1	0	0	0	0	289
16:00	9	259	43	1	10	0	0	0	0	0	0	0	0	322
17:00	8	373	52	1	2	3	0	0	0	0	0	0	0	439
18:00	6	227	50	2	6	0	0	1	1	0	0	0	0	293
19:00	4	126	27	0	1	1	0	0	0	0	0	0	0	159
20:00	1	91	13	0	3	0	0	0	0	0	0	0	0	108
21:00	2	84	8	0	1	0	0	0	0	0	0	0	0	95
22:00	2	41	8	1	0	0	0	0	0	0	0	0	0	52
23:00	0	24	1	0	0	0	0	0	0	0	0	0	0	25
Total	73	2833	611	30	124	29	30	16	16	0	0	0	0	3762
Percent	1.9%	75.3%	16.2%	0.8%	3.3%	0.8%	0.8%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	07:00	10:00	10:00	07:00	09:00	07:00	08:00					07:00
Vol.	6	211	45	8	15	6	6	3	2					291
PM Peak	16:00	17:00	17:00	14:00	15:00	17:00	12:00	12:00	14:00					17:00
Vol.	9	373	52	2	15	3	1	3	4					439



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Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
WB

186488 A Speed
Site Code: Y18669.11

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
09/26/ 18	0	0	0	0	3	4	5	1	0	0	0	0	0	13	43	39
01:00	0	0	0	0	0	0	1	1	1	0	0	0	0	3	51	47
02:00	0	0	0	0	1	0	0	1	0	0	0	0	0	2	47	40
03:00	0	0	0	0	0	1	2	1	0	0	0	0	0	4	46	42
04:00	0	0	0	0	1	5	6	2	0	0	0	0	0	14	43	40
05:00	0	0	0	0	8	34	30	7	0	0	0	0	0	79	43	39
06:00	7	0	1	2	31	86	95	12	0	0	0	0	0	234	42	38
07:00	8	0	1	6	34	135	147	19	1	0	0	0	0	351	42	38
08:00	6	0	0	1	33	135	147	17	1	0	0	0	0	340	42	39
09:00	1	0	0	4	25	87	64	16	0	0	0	0	0	197	42	38
10:00	0	0	0	0	17	80	64	13	1	0	0	0	0	175	43	39
11:00	2	0	0	0	25	95	59	11	0	0	0	0	1	193	42	38
12 PM	0	0	0	1	7	82	63	8	0	0	0	0	0	161	42	39
13:00	3	0	2	0	15	70	72	9	0	0	0	0	0	171	42	38
14:00	4	0	1	0	23	122	81	10	0	0	0	0	0	241	42	38
15:00	11	1	1	2	11	100	101	27	3	0	0	0	0	257	43	39
16:00	3	0	1	8	24	112	114	19	1	0	0	0	0	282	43	39
17:00	2	0	0	4	14	108	121	24	1	1	0	0	0	275	43	40
18:00	2	0	0	0	28	86	58	10	1	1	0	0	0	186	42	38
19:00	0	0	0	0	10	38	54	8	2	0	0	0	0	112	43	40
20:00	2	0	0	2	13	19	29	8	0	0	0	0	0	73	43	38
21:00	0	0	1	0	3	37	26	8	1	0	0	1	0	77	43	40
22:00	0	0	0	3	4	7	11	3	0	0	0	0	0	28	43	38
23:00	0	0	0	2	5	5	8	2	0	0	0	0	0	22	43	38
Total	51	1	8	35	335	1448	1358	237	13	2	0	1	1	3490		
%	1.5%	0.0%	0.2%	1.0%	9.6%	41.5%	38.9%	6.8%	0.4%	0.1%	0.0%	0.0%	0.0%			
AM Peak	07:00		06:00	07:00	07:00	07:00	07:00	07:00	01:00				11:00	07:00		
Vol.	8		1	6	34	135	147	19	1				1	351		
PM Peak	15:00	15:00	13:00	16:00	18:00	14:00	17:00	15:00	15:00	17:00		21:00		16:00		
Vol.	11	1	2	8	28	122	121	27	3	1		1		282		

Stats

15th Percentile : 34 MPH
50th Percentile : 38 MPH
85th Percentile : 43 MPH
95th Percentile : 45 MPH

Mean Speed(Average) : 39 MPH
10 MPH Pace Speed : 35-44 MPH
Number in Pace : 2806
Percent in Pace : 80.4%
Number of Vehicles > 40 MPH : 1340
Percent of Vehicles > 40 MPH : 38.4%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
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Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker
WB

186488 A Speed
Site Code: Y18669.11

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
09/27/ 18	0	0	0	2	6	3	3	1	0	0	0	0	0	15	41	35
01:00	0	0	0	0	1	0	0	2	0	0	0	0	0	3	47	42
02:00	0	0	0	0	0	0	1	2	1	0	0	0	0	4	51	47
03:00	0	0	0	0	1	2	1	0	0	0	0	0	0	4	41	37
04:00	0	0	0	0	0	4	10	3	1	0	0	0	0	18	46	42
05:00	1	1	3	2	15	25	17	11	3	0	0	0	0	78	45	38
06:00	3	0	3	5	7	97	102	13	2	0	0	0	0	232	43	39
07:00	8	0	0	2	31	173	146	11	3	0	0	0	0	374	42	38
08:00	3	0	1	1	24	154	118	13	1	0	1	0	0	316	42	39
09:00	3	0	0	5	26	80	73	19	1	0	0	0	0	207	43	38
10:00	0	0	0	5	39	83	49	11	2	0	0	0	0	189	42	38
11:00	1	0	0	3	14	88	58	8	0	0	0	0	0	172	42	38
12 PM	1	1	1	0	9	62	61	7	0	0	0	0	1	143	42	39
13:00	1	0	0	1	20	97	69	11	0	0	0	0	0	199	42	39
14:00	2	0	2	2	19	90	120	13	0	0	0	0	0	248	42	39
15:00	9	0	2	12	30	121	80	17	1	0	0	0	0	272	42	37
16:00	4	0	0	1	12	107	104	26	0	0	0	0	1	255	43	39
17:00	14	3	1	0	15	132	111	12	1	0	0	0	0	289	42	37
18:00	3	0	1	2	30	102	64	10	1	0	0	0	0	213	42	38
19:00	0	0	0	0	29	62	63	6	2	0	0	0	0	162	42	39
20:00	0	0	0	2	15	71	37	7	0	1	0	0	0	133	42	38
21:00	0	0	0	0	17	40	40	11	1	0	0	0	0	109	43	39
22:00	0	0	0	1	3	17	15	4	0	0	0	0	0	40	43	39
23:00	0	0	0	0	1	11	7	5	1	1	0	0	0	26	47	41
Total %	53 1.4%	5 0.1%	14 0.4%	46 1.2%	364 9.8%	1621 43.8%	1349 36.4%	223 6.0%	21 0.6%	2 0.1%	1 0.0%	0 0.0%	0 0.1%	3701		
AM Peak	07:00	05:00	05:00	06:00	10:00	07:00	07:00	09:00	05:00		08:00			07:00		
Vol.	8	1	3	5	39	173	146	19	3		1			374		
PM Peak	17:00	17:00	14:00	15:00	15:00	17:00	14:00	16:00	19:00	20:00			12:00	17:00		
Vol.	14	3	2	12	30	132	120	26	2	1			1	289		

Stats

15th Percentile :	34 MPH
50th Percentile :	38 MPH
85th Percentile :	42 MPH
95th Percentile :	45 MPH
Mean Speed(Average) :	38 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2970
Percent in Pace :	80.2%
Number of Vehicles > 40 MPH :	1328
Percent of Vehicles > 40 MPH :	35.9%



PRECISION
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EB

186488 A Speed
Site Code: Y18669.11

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
09/26/ 18	0	0	0	0	0	3	4	1	0	0	0	0	0	8	43	41
01:00	0	0	0	0	4	1	1	0	1	1	1	0	0	9	57	42
02:00	0	0	0	0	2	0	2	1	0	0	0	0	0	5	45	39
03:00	0	0	0	0	1	0	1	1	0	0	0	0	0	3	46	40
04:00	0	0	0	0	0	2	9	2	0	0	0	0	0	13	44	42
05:00	0	0	0	0	6	26	54	17	0	0	0	0	0	103	44	41
06:00	4	0	0	0	5	48	86	19	2	0	0	0	0	164	43	40
07:00	3	0	0	0	25	81	128	35	2	0	0	0	0	274	43	40
08:00	2	1	0	0	22	97	90	26	1	0	0	0	0	239	43	39
09:00	2	0	0	0	16	66	83	18	0	0	0	0	0	185	43	39
10:00	1	0	1	0	4	53	56	18	2	1	0	0	0	136	44	40
11:00	4	0	1	0	4	44	72	17	2	1	0	0	0	145	43	40
12 PM	1	1	0	0	7	72	80	20	2	2	0	0	0	185	43	40
13:00	2	0	0	1	6	64	84	20	3	0	0	0	0	180	43	40
14:00	3	1	0	1	18	86	97	31	3	0	0	1	0	241	43	40
15:00	6	0	1	0	9	77	132	36	7	1	0	0	0	269	44	40
16:00	7	0	1	0	13	105	154	36	5	1	0	0	0	322	43	40
17:00	7	0	0	3	5	79	206	54	4	0	0	0	0	358	44	41
18:00	1	0	0	1	15	99	124	26	2	0	0	0	0	268	43	40
19:00	1	1	0	1	7	62	60	24	1	0	0	0	0	157	44	40
20:00	0	0	0	0	3	26	43	16	1	1	0	0	0	90	45	41
21:00	2	0	0	1	5	23	34	5	1	0	0	0	0	71	43	39
22:00	0	0	0	0	1	13	14	4	4	0	0	0	0	36	47	42
23:00	0	0	0	0	8	13	8	3	1	0	0	0	0	33	43	38
Total %	46 1.3%	4 0.1%	4 0.1%	8 0.2%	186 5.3%	1140 32.6%	1622 46.4%	430 12.3%	44 1.3%	8 0.2%	1 0.0%	1 0.0%	0 0.0%	3494		
AM Peak	06:00	08:00	10:00		07:00	08:00	07:00	07:00	06:00	01:00	01:00			07:00		
Vol.	4	1	1		25	97	128	35	2	1	1			274		
PM Peak	16:00	12:00	15:00	17:00	14:00	16:00	17:00	17:00	15:00	12:00		14:00		17:00		
Vol.	7	1	1	3	18	105	206	54	7	2		1		358		

Stats

15th Percentile : 35 MPH
50th Percentile : 40 MPH
85th Percentile : 43 MPH
95th Percentile : 47 MPH

Mean Speed(Average) : 40 MPH
10 MPH Pace Speed : 35-44 MPH
Number in Pace : 2762
Percent in Pace : 79.0%
Number of Vehicles > 40 MPH : 1782
Percent of Vehicles > 40 MPH : 51.0%



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186488 A Speed
Site Code: Y18669.11

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
09/27/ 18	0	0	0	0	0	4	3	0	0	0	0	0	0	7	42	39
01:00	0	0	0	0	0	2	3	4	0	0	0	0	0	9	47	43
02:00	0	0	0	0	0	1	1	2	0	0	0	0	0	4	47	43
03:00	0	0	0	0	1	0	1	1	1	2	0	0	0	6	56	48
04:00	0	0	0	0	0	5	4	2	0	0	0	0	0	11	44	41
05:00	1	0	0	0	4	26	47	20	4	1	0	0	0	103	46	42
06:00	4	0	0	0	10	59	80	27	0	0	0	0	0	180	43	40
07:00	6	1	0	8	35	80	125	33	3	0	0	0	0	291	43	39
08:00	13	1	1	9	28	65	101	27	3	0	0	0	0	248	43	38
09:00	2	1	1	2	14	73	62	17	6	0	0	0	0	178	43	39
10:00	3	1	3	1	26	73	65	8	3	0	0	0	0	183	42	38
11:00	2	1	0	2	11	92	66	12	0	0	0	0	0	186	42	39
12 PM	1	0	0	6	11	69	74	15	1	1	0	0	0	178	43	39
13:00	2	2	0	3	13	80	75	16	1	0	0	0	0	192	43	39
14:00	7	0	0	1	10	76	86	21	3	0	0	0	0	204	43	39
15:00	8	0	0	0	17	101	131	29	2	1	0	0	0	289	43	39
16:00	4	1	0	0	9	110	147	47	4	0	0	0	0	322	44	40
17:00	7	3	0	1	15	146	201	63	2	0	0	1	0	439	44	40
18:00	1	1	1	0	10	107	137	33	3	0	0	0	0	293	43	40
19:00	4	1	0	0	6	60	62	23	2	1	0	0	0	159	44	40
20:00	1	0	0	0	12	39	43	9	4	0	0	0	0	108	43	40
21:00	0	0	0	0	0	24	47	19	4	1	0	0	0	95	46	42
22:00	0	0	0	0	4	18	21	5	2	2	0	0	0	52	45	41
23:00	0	0	0	0	0	4	15	6	0	0	0	0	0	25	45	42
Total %	66 1.8%	13 0.3%	6 0.2%	33 0.9%	236 6.3%	1314 34.9%	1597 42.5%	439 11.7%	48 1.3%	9 0.2%	0 0.0%	1 0.0%	0 0.0%	3762		
AM Peak	08:00	07:00	10:00	08:00	07:00	11:00	07:00	07:00	09:00	03:00				07:00		
Vol.	13	1	3	9	35	92	125	33	6	2				291		
PM Peak	15:00	17:00	18:00	12:00	15:00	17:00	17:00	17:00	16:00	22:00		17:00		17:00		
Vol.	8	3	1	6	17	146	201	63	4	2		1		439		

Stats

15th Percentile :	34 MPH
50th Percentile :	39 MPH
85th Percentile :	43 MPH
95th Percentile :	47 MPH
Mean Speed(Average) :	40 MPH
10 MPH Pace Speed :	35-44 MPH
Number in Pace :	2911
Percent in Pace :	77.4%
Number of Vehicles > 40 MPH :	1775
Percent of Vehicles > 40 MPH :	47.2%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker

186488 A Volume
Site Code: Y18669.11

Start	WB		EB		Combin		ed		9/26/201	
Time	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	8	Wed
12:00	7	41	2	48	9	89				
12:15	2	33	2	39	4	72				
12:30	2	41	3	47	5	88				
12:45	2	13 46	1 161	8 51	185	3 97	21	346		
01:00	0	41	3	46	3	87				
01:15	1	47	1	57	2	104				
01:30	1	41	1	49	2	90				
01:45	1	3 42	4 171	9 28	180	5 70	12	351		
02:00	0	51	2	44	2	95				
02:15	0	51	1	64	1	115				
02:30	1	73	0	64	1	137				
02:45	1	2 66	2 241	5 69	241	3 135	7	482		
03:00	2	68	0	54	2	122				
03:15	1	62	1	58	2	120				
03:30	1	68	1	67	2	135				
03:45	0	4 59	1 257	3 90	269	1 149	7	526		
04:00	1	64	2	82	3	146				
04:15	4	81	1	64	5	145				
04:30	2	68	5	83	7	151				
04:45	7	14 69	5 282	13 93	322	12 162	27	604		
05:00	8	66	18	88	26	154				
05:15	19	72	24	91	43	163				
05:30	22	68	32	84	54	152				
05:45	30	79 69	29 275	103 95	358	59 164	182	633		
06:00	42	42	20	78	62	120				
06:15	51	68	36	70	87	138				
06:30	54	40	52	71	106	111				
06:45	87	234 36	186 56	164 49	268	143 85	398	454		
07:00	77	32	85	48	162	80				
07:15	81	33	73	32	154	65				
07:30	95	27	53	43	148	70				
07:45	98	351 20	112 63	274 34	157	161 54	625	269		
08:00	92	19	77	26	169	45				
08:15	79	22	64	20	143	42				
08:30	96	17	50	23	146	40				
08:45	73	340 15	73 48	239 21	90	121 36	579	163		
09:00	56	31	45	25	101	56				
09:15	50	24	59	16	109	40				
09:30	48	14	40	19	88	33				
09:45	43	197 8	77 41	185 11	71	84 19	382	148		
10:00	43	7	32	13	75	20				
10:15	49	12	35	11	84	23				
10:30	43	6	28	4	71	10				
10:45	40	175 3	28 41	136 8	36	81 11	311	64		
11:00	36	4	44	8	80	12				
11:15	61	10	30	10	91	20				
11:30	51	6	36	9	87	15				
11:45	45	193 2	22 35	145 6	33	80 8	338	55		
Total	1605	1885	1284	2210	2889	4095				
Percent	55.6%	46.0%	44.4%	54.0%						
Day Total		3490		3494		6984				
Peak	07:15	-	04:15	-	07:00	-	05:00	-	-	-
Vol.	366	-	284	-	274	-	358	-	632	-
P.H.F.	0.934	-	0.877	-	0.806	-	0.942	-	0.935	-



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

Willow Road
just east of #81 Willow Road
City, State: Boxford, MA
Client: McMahon Associates / A. Bleeker

186488 A Volume
Site Code: Y18669.11

Start	WB				EB				Combin ed		9/27/201 8 Thu		
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		
12:00	4		37		1		38		5		75		
12:15	6		33		2		51		8		84		
12:30	5		45		3		52		8		97		
12:45	0	15	28	143	1	7	37	178	1	22	65	321	
01:00	1		57		5		43		6		100		
01:15	0		44		1		37		1		81		
01:30	1		49		2		44		3		93		
01:45	1	3	49	199	1	9	68	192	2	12	117	391	
02:00	4		53		2		39		6		92		
02:15	0		61		0		47		0		108		
02:30	0		68		1		53		1		121		
02:45	0	4	66	248	1	4	65	204	1	8	131	452	
03:00	1		59		0		77		1		136		
03:15	2		70		3		75		5		145		
03:30	0		66		1		62		1		128		
03:45	1	4	77	272	2	6	75	289	3	10	152	561	
04:00	0		51		3		72		3		123		
04:15	6		65		2		78		8		143		
04:30	3		72		3		91		6		163		
04:45	9	18	67	255	3	11	81	322	12	29	148	577	
05:00	9		60		16		93		25		153		
05:15	20		77		22		112		42		189		
05:30	13		69		34		101		47		170		
05:45	36	78	83	289	31	103	133	439	67	181	216	728	
06:00	34		57		20		92		54		149		
06:15	57		58		34		81		91		139		
06:30	67		51		62		63		129		114		
06:45	74	232	47	213	64	180	57	293	138	412	104	506	
07:00	86		64		85		44		171		108		
07:15	86		31		67		40		153		71		
07:30	116		40		74		40		190		80		
07:45	86	374	27	162	65	291	35	159	151	665	62	321	
08:00	88		36		65		25		153		61		
08:15	73		34		65		29		138		63		
08:30	86		34		55		29		141		63		
08:45	69	316	29	133	63	248	25	108	132	564	54	241	
09:00	62		42		49		17		111		59		
09:15	55		35		39		32		94		67		
09:30	51		18		45		29		96		47		
09:45	39	207	14	109	45	178	17	95	84	385	31	204	
10:00	52		10		41		18		93		28		
10:15	43		10		48		13		91		23		
10:30	59		12		50		11		109		23		
10:45	35	189	8	40	44	183	10	52	79	372	18	92	
11:00	51		6		46		9		97		15		
11:15	38		15		52		6		90		21		
11:30	40		3		39		7		79		10		
11:45	43	172	2	26	49	186	3	25	92	358	5	51	
Total	1612		2089		1406		2356		3018		4445		
Percent	53.4%		47.0%		46.6%		53.0%						
Day Total			3701				3762				7463		
Peak	07:15	-	05:00	-	07:00	-	05:00	-	07:00	-	05:00	-	-
Vol.	376	-	289	-	291	-	439	-	665	-	728	-	-
P.H.F.	0.810		0.870		0.856		0.825		0.875		0.843		

APPENDIX B

MS2 Historical Traffic Comparison Data

MS2 HISTORICAL TRAFFIC COMPARISON DATA

Active Senior Residential Development
Boxford, MA

Date ▼	State Traffic	State Truck	National Traffic	National Truck
Thursday, Mar 26, 2020	-41.9%		-32.9%	-4.5%
Wednesday, Mar 25, 2020	-43.9%		-30.9%	-6.4%
Tuesday, Mar 24, 2020	-42.8%		-30.3%	-4.0%
Monday, Mar 23, 2020	-34.8%		-26.5%	-4.3%
Sunday, Mar 22, 2020	-35.9%		-38.4%	-3.7%
Saturday, Mar 21, 2020	-35.4%		-33.4%	-3.6%
Friday, Mar 20, 2020	-31.5%		-26.0%	-5.3%
Thursday, Mar 19, 2020	-35.2%		-22.9%	-3.4%
Wednesday, Mar 18, 2020	-25.7%		-17.5%	-2.3%
Tuesday, Mar 17, 2020	-28.4%		-13.4%	-0.2%
Monday, Mar 16, 2020	-12.6%	9.2%	-7.6%	0.4%
Sunday, Mar 15, 2020	-21.0%	-0.0%	-12.1%	0.1%
Saturday, Mar 14, 2020	-15.6%	6.1%	-11.7%	-0.7%
Friday, Mar 13, 2020	-9.9%	-1.1%	-6.0%	-1.7%
Thursday, Mar 12, 2020	-3.5%	0.3%	-1.7%	1.3%
Wednesday, Mar 11, 2020	0.4%	2.5%	0.4%	2.5%
Tuesday, Mar 10, 2020	-1.0%	-4.3%	0.1%	2.2%
Monday, Mar 9, 2020	7.4%	5.3%	0.4%	2.6%
Sunday, Mar 8, 2020	2.2%	-3.6%	0.4%	3.4%
Saturday, Mar 7, 2020	0.5%	1.8%	1.5%	3.3%
Friday, Mar 6, 2020	2.6%	-4.6%	-0.2%	0.9%
Thursday, Mar 5, 2020	1.4%	-5.7%	-0.7%	0.8%
Wednesday, Mar 4, 2020	2.9%	-5.1%	-1.4%	-0.0%
Tuesday, Mar 3, 2020	0.3%	-7.2%	0.6%	1.8%
Monday, Mar 2, 2020	6.4%	2.4%	-0.2%	2.7%
Sunday, Mar 1, 2020	2.7%	-2.0%	1.9%	2.2%
Saturday, Feb 29, 2020	3.2%	1.5%	7.0%	5.3%
Friday, Feb 28, 2020	3.9%	-6.1%	5.3%	5.0%
Thursday, Feb 27, 2020	2.7%	-5.5%	2.0%	3.1%

APPENDIX C

Seasonal Adjustment Data

SEASONAL ADJUSTMENT DATA

Active Senior Residential Development

Boxford, MA

MassDOT Continuous Count Station					% Above	
ID	Town	Roadway	Year	AADT	March ADT	AADT
5085	Boxford	I-95	2019	87,147	78,489	-9.9%
			2017	83,239	77,003	-7.5%
			2016	83,460	76,113	-8.8%
			2015	81,586	71,071	-12.9%
			2008	76,164	70,340	-7.6%
			2007	79,987	74,496	-6.9%
Average				81,876	74,585	-8.9%

APPENDIX D

Crash Summary

CRASH ANALYSIS

Active Senior Residential Development

Boxford, MA

	Willow Road at Deer Run Road	Willow Road at Site Driveway	Willow Road at Pine Plain Road/ Spofford Road
Year			
2013	0	0	2
2014	0	1	0
2015	0	1	0
2016	0	0	1
2017	2	0	1
Type			
Angle	0	0	1
Rear-end	0	0	0
Sideswipe	0	0	1
Head-on	0	0	1
Single Vehicle	2	2	1
Severity			
Property Damage	1	1	3
Personal Injury	1	1	1
Fatality	0	0	0
Weather			
Clear	2	1	3
Cloudy	0	0	0
Rain	0	1	1
Snow	0	0	0
Time			
7:00 AM to 9:00 AM	0	0	0
9:00 AM to 4:00 PM	0	0	2
4:00 PM to 6:00 PM	0	0	1
6:00 PM to 7:00 AM	2	2	1
Total	2	2	4
Crash Rate	0.17	0.17	0.32
State Average	0.57	0.57	0.57
District 4 Average	0.57	0.57	0.57

Source: MassDOT

APPENDIX E

Traffic Projection Model

TRAFFIC PROJECTION MODEL

Weekday Morning Peak Hour
Active Senior Residential Development
Boxford, MA

Intersection	Dir.	Turn	2019 Counted Volumes	Seasonal Adjustment	Balancing Volumes	2020 Existing Volumes	Background Growth 7 yrs (at 1% per year)	2027 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2027 Build Volumes
Willow Road (Route 133) at Deer Run Road	EB	T	256	25		281	20	301	45%	5		0	5	306
		R	0	0		0	0	0		0		0	0	0
	WB	L	0	0		0	0	0		0		0	0	0
		T	311	30		341	24	365		0	45%	9	9	374
	NB	L	0	0		0	0	0		0		0	0	0
		R	0	0		0	0	0		0		0	0	0
Willow Road (Route 133) at Site Driveway	EB	L	0	0		0	0	0	45%	5		0	5	5
		T	256	25	0	281	20	301		0		0	0	301
	WB	T	311	30	0	341	24	365		0		0	0	365
		R	0	0		0	0	0	55%	5		0	5	5
	SB	L	0	0		0	0	0		0	55%	11	11	11
		R	0	0		0	0	0		0	45%	9	9	9
Willow Road (Route 133) at Spofford Road/Pine Plain Road	EB	L	5	0	0	5	0	5		0		0	0	5
		T	206	20	3	229	17	246		0	30%	6	6	252
		R	42	4	1	47	3	50		0	25%	5	5	55
	WB	L	4	0		4	0	4		0		0	0	4
		T	285	28	5	318	23	341	30%	3		0	3	344
		R	0	0		0	0	0		0		0	0	0
	NB	L	17	2	0	19	1	20	25%	2		0	2	22
		T	8	1		9	1	10		0		0	0	10
		R	4	0		4	0	4		0		0	0	4
	SB	L	3	0		3	0	3		0		0	0	3
		T	16	2		18	1	19		0		0	0	19
		R	4	0	0	4	0	4		0		0	0	4

Peak Hour: 7:00 AM - 8:00 AM

TRAFFIC PROJECTION MODEL

Weekday Afternoon Peak Hour
Active Senior Residential Development
Boxford, MA

Intersection	Dir.	Turn	2019 Counted Volumes	Seasonal Adjustment	Balancing Volumes	2020 Existing Volumes	Background Growth 7 yrs (at 1% per year)	2027 No-Build Volumes	New Project PERCENT ENTER	New Project Trips ENTER	New Project PERCENT EXIT	New Project Trips EXIT	New Project Trips TOTAL	2027 Build Volumes
Willow Road (Route 133) at Deer Run Road	EB	T	331	32		363	27	390	45%	9		0	9	399
		R	2	0		2	0	2		0		0	0	2
	WB	L	2	0		2	0	2		0		0	0	2
		T	263	26	5	294	22	316		0	45%	6	6	322
	NB	L	1	0		1	0	1		0		0	0	1
		R	3	0		3	0	3		0		0	0	3
Willow Road (Route 133) at Site Driveway	EB	L	0	0		0	0	0	45%	9		0	9	9
		T	334	32	0	366	27	393		0		0	0	393
	WB	T	265	26	5	296	22	318		0		0	0	318
		R	0	0		0	0	0	55%	12		0	12	12
	SB	L	0	0		0	0	0		0	55%	8	8	8
		R	0	0		0	0	0		0	45%	6	6	6
Willow Road (Route 133) at Spofford Road/Pine Plain Road	EB	L	7	1		8	1	9		0		0	0	9
		T	303	30	1	334	24	358		0	30%	4	4	362
		R	22	2		24	2	26		0	25%	4	4	30
	WB	L	4	0		4	0	4		0		0	0	4
		T	234	23		257	19	276	30%	7		0	7	283
		R	2	0		2	0	2		0		0	0	2
	NB	L	33	3		36	3	39	25%	5		0	5	44
		T	26	3		29	2	31		0		0	0	31
		R	8	1		9	1	10		0		0	0	10
	SB	L	4	0		4	0	4		0		0	0	4
		T	7	1		8	1	9		0		0	0	9
		R	3	0		3	0	3		0		0	0	3

Peak Hour: 5:00 PM - 6:00 PM

APPENDIX F

Journey-to-Work Data

JOURNEY-TO-WORK DATA

Active Senior Residential Development

Boxford, MA

Location of Work of		Number of	Percent	Assigned Route(s)	
#	Boxford Residents	Workers			
1	Boston city	691	20.6%	Willow Road (West)	Spofford Road (South)
2	Boxford town	625	18.7%	Willow Road (West)	Spofford Road (South)
3	Danvers town	359	10.7%	Willow Road (East)	Spofford Road (South)
4	North Andover town	139	4.2%	Willow Road (West)	
5	Peabody city	138	4.1%	Willow Road (West)	Spofford Road (South)
6	Cambridge city	137	4.1%	Willow Road (West)	Spofford Road (South)
7	Beverly city	133	4.0%	Willow Road (East)	Spofford Road (South)
8	Woburn city	104	3.1%	Willow Road (West)	Spofford Road (South)
9	Chelmsford town	88	2.6%	Willow Road (West)	
10	Haverhill city	85	2.5%	Willow Road (West)	
11	Topsfield town	80	2.4%	Willow Road (East)	Spofford Road (South)
12	Burlington town	80	2.4%	Willow Road (West)	Spofford Road (South)
13	Tewksbury town	66	2.0%	Willow Road (West)	
14	Revere city	63	1.9%	Willow Road (West)	Willow Road (East)
15	Lynn city	61	1.8%	Willow Road (West)	Willow Road (East)
16	Taunton city	56	1.7%	Willow Road (West)	Spofford Road (South)
17	Andover town	55	1.6%	Willow Road (West)	
18	Billerica town	54	1.6%	Willow Road (West)	
19	Malden city	51	1.5%	Willow Road (West)	Spofford Road (South)
20	Waltham city	51	1.5%	Willow Road (West)	Spofford Road (South)
21	Lawrence city	49	1.5%	Willow Road (West)	
22	Salem city	48	1.4%	Willow Road (East)	Spofford Road (South)
23	Georgetown town	46	1.4%	Willow Road (East)	Spofford Road (South)
24	Arlington town	46	1.4%	Willow Road (West)	Spofford Road (South)
25	Carver town	43	1.3%	Willow Road (West)	Spofford Road (South)
Total		3,348	100.0%		

Trip Distribution	% Of Total	% of Existing	Trips
	Workers	Traffic	Assigned
Willow Road to West	46.9%	48.3%	45%
Willow Road to East	9.1%	43.8%	30%
Spofford Road to South	44.0%	7.9%	25%
Total	100.0%	100.0%	100%

APPENDIX G

Highway Capacity Manual Methodologies

CAPACITY/LEVEL-OF-SERVICE ANALYSES METHODOLOGY

The detailed capacity/level-of-service analysis contained in this traffic impact study was performed in accordance with the standard techniques contained in the *Highway Capacity Manual*.⁽¹⁾ By definition, capacity represents “the maximum rate of flow that can reasonably be expected to pass a point on a uniform section of a lane or roadway under prevailing roadway, traffic, and control conditions.” The level of functioning of an intersection or a uniform section of a lane or roadway can be expressed in terms of levels of service. Level of service (LOS) is defined as “a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers”. Such measures include “speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.”

At unsignalized intersections, a methodology for evaluating the relative functioning of intersections controlled by stop or yield signs has been developed, and is based on several assumptions, including:

- Major street flows are not affected by the minor (stop-sign controlled) street movements.
- Left turns from the major street to the minor street are influenced only by opposing major street through flow.
- Minor street left turns are impeded by all major street traffic plus opposing minor street traffic.
- Minor street through traffic is impeded by all major street traffic.
- Minor street right turns are impeded only by the major street traffic coming from the left.

The concept of stop-controlled or yield-controlled intersection analysis is based on the estimate of average total delay on minor streets. The methodology of analysis relies on three elements: the size and distribution of gaps in the major traffic stream, the usefulness of these gaps to the minor stream drivers, and the relative priority of the various traffic streams at the intersection. The results of the analysis provide an estimate of average total delay for the various critical movements at the unsignalized intersections. Correlation between average total delay and the respective levels of service are provided for unsignalized intersections as follows:

(1) *Transportation Research Board, Highway Capacity Manual, 6th Edition, published by the Transportation Research Board, Washington, DC, 2016.*

<i>Unsignalized Intersections</i>	
Level of Service	Control Delay Per Vehicle (seconds)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

At signalized intersections, an additional element must be considered: time allocation. Level of service is based on the average control delay per vehicle for various movements within the intersection. Volume/capacity relationships also affect the operations of signalized intersections. Thus, both volume/capacity and delay must be considered to evaluate the overall operation of a signalized intersection. Correlation between average delay per vehicle and the respective levels of service are provided for signalized intersections as follows:

<i>Signalized Intersections</i>	
Level of Service	Control Delay Per Vehicle (seconds)
A	≤ 10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	> 80

APPENDIX H

2020 Existing Capacity/Level-of-Service Analysis

Boxford Active Senior Residential
1: Deer Run Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2020 Existing

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	281	0	0	341	0	0
Future Vol, veh/h	281	0	0	341	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	82	82	92	92
Heavy Vehicles, %	4	2	2	2	2	2
Mvmt Flow	319	0	0	416	0	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	319	0	735	319
Stage 1	-	-	-	-	319	-
Stage 2	-	-	-	-	416	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1241	-	387	722
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1241	-	387	722
Mov Cap-2 Maneuver	-	-	-	-	387	-
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	666	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	-	-	-	1241	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2020 Existing

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	229	47	4	318	0	19	9	4	3	18	4
Future Vol, veh/h	5	229	47	4	318	0	19	9	4	3	18	4
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	79	79	79	66	66	66	72	72	72
Heavy Vehicles, %	20	5	0	0	2	2	6	13	0	0	13	0
Mvmt Flow	6	273	56	5	403	0	29	14	6	4	25	6
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	403	0	0	329	0	0	743	726	301	736	754	404
Stage 1	-	-	-	-	-	-	313	313	-	413	413	-
Stage 2	-	-	-	-	-	-	430	413	-	323	341	-
Critical Hdwy	4.3	-	-	4.1	-	-	7.16	6.63	6.2	7.1	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Follow-up Hdwy	2.38	-	-	2.2	-	-	3.554	4.117	3.3	3.5	4.117	3.3
Pot Cap-1 Maneuver	1065	-	-	1242	-	-	326	338	743	337	325	651
Stage 1	-	-	-	-	-	-	689	638	-	620	575	-
Stage 2	-	-	-	-	-	-	596	575	-	693	620	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1065	-	-	1242	-	-	301	334	743	321	321	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	334	-	321	321	-
Stage 1	-	-	-	-	-	-	684	634	-	616	572	-
Stage 2	-	-	-	-	-	-	562	572	-	668	616	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			17.6			16.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	335	1065	-	-	1242	-	-	349				
HCM Lane V/C Ratio	0.145	0.006	-	-	0.004	-	-	0.099				
HCM Control Delay (s)	17.6	8.4	0	-	7.9	0	-	16.5				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile O(veh)	0.5	0	-	-	0	-	-	0.3				

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	363	2	2	294	1	3
Future Vol, veh/h	363	2	2	294	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	82	82	80	80
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	432	2	2	359	1	4
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	434	0	796	433
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	363	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1136	-	359	627
Stage 1	-	-	-	-	658	-
Stage 2	-	-	-	-	708	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1136	-	358	627
Mov Cap-2 Maneuver	-	-	-	-	358	-
Stage 1	-	-	-	-	658	-
Stage 2	-	-	-	-	707	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		11.9	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	528	-	-	1136	-	
HCM Lane V/C Ratio	0.009	-	-	0.002	-	
HCM Control Delay (s)	11.9	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Afternoon Peak Hour
2020 Existing

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	334	24	4	257	2	36	29	9	4	8	3
Future Vol, veh/h	8	334	24	4	257	2	36	29	9	4	8	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	87	87	87	84	84	84	50	50	50
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	9	388	28	5	295	2	43	35	11	8	16	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	297	0	0	416	0	0	737	727	402	749	740	296
Stage 1	-	-	-	-	-	-	420	420	-	306	306	-
Stage 2	-	-	-	-	-	-	317	307	-	443	434	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1276	-	-	1154	-	-	337	353	653	331	347	748
Stage 1	-	-	-	-	-	-	615	593	-	708	665	-
Stage 2	-	-	-	-	-	-	698	665	-	598	585	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1276	-	-	1154	-	-	319	348	653	298	342	748
Mov Cap-2 Maneuver	-	-	-	-	-	-	319	348	-	298	342	-
Stage 1	-	-	-	-	-	-	609	588	-	702	662	-
Stage 2	-	-	-	-	-	-	672	662	-	549	580	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	18.6	15.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	352	1276	-	-	1154	-	-	367
HCM Lane V/C Ratio	0.25	0.007	-	-	0.004	-	-	0.082
HCM Control Delay (s)	18.6	7.8	0	-	8.1	0	-	15.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.3

APPENDIX I

2027 No Build Capacity/Level-of-Service Analysis

Boxford Active Senior Residential
1: Deer Run Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2027 No Build

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	301	0	0	365	0	0
Future Vol, veh/h	301	0	0	365	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	82	82	92	92
Heavy Vehicles, %	4	2	2	2	2	2
Mvmt Flow	342	0	0	445	0	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	342	0	787	342
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1217	-	360	701
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	360	701
Mov Cap-2 Maneuver	-	-	-	-	360	-
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	646	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	-	-	-	1217	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2027 No Build

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	246	50	4	341	0	20	10	4	3	19	4
Future Vol, veh/h	5	246	50	4	341	0	20	10	4	3	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	79	79	79	66	66	66	72	72	72
Heavy Vehicles, %	20	5	0	0	2	2	6	13	0	0	13	0
Mvmt Flow	6	293	60	5	432	0	30	15	6	4	26	6
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	432	0	0	353	0	0	794	777	323	788	807	433
Stage 1	-	-	-	-	-	-	335	335	-	442	442	-
Stage 2	-	-	-	-	-	-	459	442	-	346	365	-
Critical Hdwy	4.3	-	-	4.1	-	-	7.16	6.63	6.2	7.1	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Follow-up Hdwy	2.38	-	-	2.2	-	-	3.554	4.117	3.3	3.5	4.117	3.3
Pot Cap-1 Maneuver	1038	-	-	1217	-	-	301	316	723	311	303	627
Stage 1	-	-	-	-	-	-	671	623	-	598	558	-
Stage 2	-	-	-	-	-	-	574	558	-	674	604	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1038	-	-	1217	-	-	275	312	723	294	299	626
Mov Cap-2 Maneuver	-	-	-	-	-	-	275	312	-	294	299	-
Stage 1	-	-	-	-	-	-	666	619	-	594	555	-
Stage 2	-	-	-	-	-	-	539	555	-	647	600	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			19			17.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	308	1038	-	-	1217	-	-	324				
HCM Lane V/C Ratio	0.167	0.006	-	-	0.004	-	-	0.111				
HCM Control Delay (s)	19	8.5	0	-	8	0	-	17.5				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.4				

Boxford Active Senior Residential
1: Deer Run Road & Willow Road (Rt 133)

Weekday Afternoon Peak Hour
2027 No Build

Intersection

Int Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	390	2	2	316	1	3
Future Vol, veh/h	390	2	2	316	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	82	82	33	33
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	464	2	2	385	3	9

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	466
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1106
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1106
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	500	-	-	1106	-
HCM Lane V/C Ratio	0.024	-	-	0.002	-
HCM Control Delay (s)	12.4	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Afternoon Peak Hour
2027 No Build

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	358	26	4	276	2	39	31	19	4	9	3
Future Vol, veh/h	9	358	26	4	276	2	39	31	19	4	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	87	87	87	84	84	84	50	50	50
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	10	416	30	5	317	2	46	37	23	8	18	6
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	319	0	0	446	0	0	791	780	431	809	794	318
Stage 1	-	-	-	-	-	-	451	451	-	328	328	-
Stage 2	-	-	-	-	-	-	340	329	-	481	466	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1252	-	-	1125	-	-	310	329	629	301	323	727
Stage 1	-	-	-	-	-	-	592	574	-	689	651	-
Stage 2	-	-	-	-	-	-	679	650	-	570	566	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1252	-	-	1125	-	-	290	324	629	262	318	727
Mov Cap-2 Maneuver	-	-	-	-	-	-	290	324	-	262	318	-
Stage 1	-	-	-	-	-	-	585	568	-	681	648	-
Stage 2	-	-	-	-	-	-	651	647	-	508	560	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			20.2			16.9		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	342	1252	-	-	1125	-	-	335				
HCM Lane V/C Ratio	0.31	0.008	-	-	0.004	-	-	0.096				
HCM Control Delay (s)	20.2	7.9	0	-	8.2	0	-	16.9				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-	0.3				

APPENDIX J

2027 Build Capacity/Level-of-Service Analysis

Boxford Active Senior Residential
1: Deer Run Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2027 Build

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	306	0	0	374	0	0
Future Vol, veh/h	306	0	0	374	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	82	82	92	92
Heavy Vehicles, %	4	2	2	2	2	2
Mvmt Flow	348	0	0	456	0	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	348	0	804	348
Stage 1	-	-	-	-	348	-
Stage 2	-	-	-	-	456	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1211	-	352	695
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1211	-	352	695
Mov Cap-2 Maneuver	-	-	-	-	352	-
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	638	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	-	-	-	1211	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	301	365	5	11	9
Future Vol, veh/h	5	301	365	5	11	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	82	82	92	92
Heavy Vehicles, %	2	4	2	2	2	2
Mvmt Flow	6	342	445	6	12	10
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	451	0	-	0	802	448
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	354	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1109	-	-	-	353	611
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1109	-	-	-	351	611
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	710	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		13.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1109	-	-	-	434	
HCM Lane V/C Ratio	0.005	-	-	-	0.05	
HCM Control Delay (s)	8.3	0	-	-	13.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Morning Peak Hour
2027 Build

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	252	55	4	344	0	22	10	4	3	19	4
Future Vol, veh/h	5	252	55	4	344	0	22	10	4	3	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	79	79	79	66	66	66	72	72	72
Heavy Vehicles, %	20	5	0	0	2	2	6	13	0	0	13	0
Mvmt Flow	6	300	65	5	435	0	33	15	6	4	26	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	435	0	0	365	0	0	807	790	333	800	822	436
Stage 1	-	-	-	-	-	-	345	345	-	445	445	-
Stage 2	-	-	-	-	-	-	462	445	-	355	377	-
Critical Hdwy	4.3	-	-	4.1	-	-	7.16	6.63	6.2	7.1	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.63	-	6.1	5.63	-
Follow-up Hdwy	2.38	-	-	2.2	-	-	3.554	4.117	3.3	3.5	4.117	3.3
Pot Cap-1 Maneuver	1035	-	-	1205	-	-	295	310	713	306	297	625
Stage 1	-	-	-	-	-	-	662	617	-	596	556	-
Stage 2	-	-	-	-	-	-	572	556	-	666	597	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1035	-	-	1205	-	-	270	306	713	289	293	624
Mov Cap-2 Maneuver	-	-	-	-	-	-	270	306	-	289	293	-
Stage 1	-	-	-	-	-	-	657	613	-	592	553	-
Stage 2	-	-	-	-	-	-	537	553	-	640	593	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			19.6			17.8		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	301	1035	-	-	1205	-	-	318
HCM Lane V/C Ratio	0.181	0.006	-	-	0.004	-	-	0.114
HCM Control Delay (s)	19.6	8.5	0	-	8	0	-	17.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.4

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	399	2	2	322	1	3
Future Vol, veh/h	399	2	2	322	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	82	82	80	80
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	475	2	2	393	1	4
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	477	0	873	476
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	397	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1096	-	323	593
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1096	-	322	593
Mov Cap-2 Maneuver	-	-	-	-	322	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	682	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		12.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	490	-	-	1096	-	
HCM Lane V/C Ratio	0.01	-	-	0.002	-	
HCM Control Delay (s)	12.4	-	-	8.3	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	393	318	12	8	6
Future Vol, veh/h	9	393	318	12	8	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	2	1	1	2	2	2
Mvmt Flow	10	457	388	15	9	7

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	403	0	-	0	873	396
Stage 1	-	-	-	-	396	-
Stage 2	-	-	-	-	477	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1156	-	-	-	321	653
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	624	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1156	-	-	-	317	653
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	672	-
Stage 2	-	-	-	-	624	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.2
HCM LOS	B		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1156	-	-	-	407
HCM Lane V/C Ratio	0.009	-	-	-	0.037
HCM Control Delay (s)	8.1	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Boxford Active Senior Residential
3: Spofford Road/Pine Plain Road & Willow Road (Rt 133)

Weekday Afternoon Peak Hour
2027 Build

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	362	30	4	283	2	44	31	10	4	9	3
Future Vol, veh/h	9	362	30	4	283	2	44	31	10	4	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	87	87	87	84	84	84	50	50	50
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	10	421	35	5	325	2	52	37	12	8	18	6
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	327	0	0	456	0	0	807	796	439	819	812	326
Stage 1	-	-	-	-	-	-	459	459	-	336	336	-
Stage 2	-	-	-	-	-	-	348	337	-	483	476	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1244	-	-	1115	-	-	302	322	622	297	315	720
Stage 1	-	-	-	-	-	-	586	570	-	682	645	-
Stage 2	-	-	-	-	-	-	672	645	-	569	560	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1244	-	-	1115	-	-	283	317	622	262	310	720
Mov Cap-2 Maneuver	-	-	-	-	-	-	283	317	-	262	310	-
Stage 1	-	-	-	-	-	-	580	564	-	674	642	-
Stage 2	-	-	-	-	-	-	644	642	-	516	554	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			21.7			17.1		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	316	1244	-	-	1115	-	-	330				
HCM Lane V/C Ratio	0.32	0.008	-	-	0.004	-	-	0.097				
HCM Control Delay (s)	21.7	7.9	0	-	8.2	0	-	17.1				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-	0.3				

APPENDIX K

Capacity/Level-of-Service Analysis Summary

CAPACITY ANALYSIS SUMMARY

Weekday Morning Peak Hour

Active Senior Residential Development

Boxford, MA

Intersection	Movement	2020 Existing			2027 No Build			2027 Build		
		LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C	LOS	Delay	V/C
Willow Road (Route 133) at Deer Run Road ⁴	EB TR	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
	WB LT	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
	NB LR	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
Willow Road (Route 133) at Site Driveway	EB LT	n/a	n/a	n/a	n/a	n/a	n/a	A	0.1	0.01
	WB TR	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00
	SB LR	n/a	n/a	n/a	n/a	n/a	n/a	B	13.7	0.05
Willow Road (Route 133) at Spofford Road/ Pine Plain Road	EB LTR	A	0.1	0.01	A	0.1	0.01	A	0.1	0.01
	WB LTR	A	0.1	0.00	A	0.1	0.00	A	0.1	0.00
	NB LTR	C	17.6	0.15	C	19.0	0.17	C	19.6	0.18
	SB LTR	C	16.5	0.10	C	17.5	0.11	C	17.8	0.11

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

4 Zero peak hour vehicles shown making a turn from Deer Run Road.

n/a Not applicable

QUEUE SUMMARY

Weekday Morning Peak Hour

Active Senior Residential Development

Boxford, MA

Intersection	Movement	2020 Existing	2027 No Build	2027 Build
		95th Queue ¹	95th Queue	95th Queue
Willow Road (Route 133) at Deer Run Road ²	EB TR	0	0	0
	WB LT	0	0	0
	NB LR	0	0	0
Willow Road (Route 133) at Site Driveway	EB LT	n/a	n/a	0
	WB TR	n/a	n/a	0
	SB LR	n/a	n/a	5
Willow Road (Route 133) at Spofford Road/ Pine Plain Road	EB LTR	0	0	0
	WB LTR	0	0	0
	NB LTR	13	15	18
	SB LTR	8	10	10

¹ 95th Percentile Queue Length (ft)

² Zero peak hour vehicles shown making a turn from Deer Run Road.

n/a Not applicable

CAPACITY ANALYSIS SUMMARY

Weekday Afternoon Peak Hour

Active Senior Residential Development

Boxford, MA

Intersection	Movement		2020 Existing			2027 No Build			2027 Build		
			LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C	LOS	Delay	V/C
Willow Road (Route 133) at Deer Run Road	EB	TR	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00
	WB	LT	A	0.1	0.00	A	0.1	0.00	A	0.1	0.00
	NB	LR	B	11.9	0.01	B	12.3	0.01	B	12.4	0.01
Willow Road (Route 133) at Site Driveway	EB	LT	n/a	n/a	n/a	n/a	n/a	n/a	A	0.2	0.01
	WB	TR	n/a	n/a	n/a	n/a	n/a	n/a	A	0.0	0.00
	SB	LR	n/a	n/a	n/a	n/a	n/a	n/a	B	14.2	0.04
Willow Road (Route 133) at Spofford Road/ Pine Plain Road	EB	LTR	A	0.2	0.01	A	0.2	0.01	A	0.2	0.01
	WB	LTR	A	0.1	0.00	A	0.1	0.00	A	0.1	0.00
	NB	LTR	C	18.6	0.25	C	20.2	0.31	C	21.7	0.32
	SB	LTR	C	15.7	0.08	C	16.9	0.10	C	17.1	0.10

1 Level-of-Service

2 Average vehicle delay in seconds

3 Volume to capacity ratio

n/a Not applicable

QUEUE SUMMARY

Weekday Afternoon Peak Hour

Active Senior Residential Development

Boxford, MA

Intersection	Movement		2020 Existing	2027 No Build	2027 Build
			95th Queue ¹	95th Queue	95th Queue
Willow Road (Route 133) at Deer Run Road	EB	TR	0	0	0
	WB	LT	0	0	0
	NB	LR	0	0	0
Willow Road (Route 133) at Site Driveway	EB	LT	n/a	n/a	0
	WB	TR	n/a	n/a	0
	SB	LR	n/a	n/a	3
Willow Road (Route 133) at Spofford Road/ Pine Plain Road	EB	LTR	0	0	0
	WB	LTR	0	0	0
	NB	LTR	25	33	33
	SB	LTR	8	8	8

¹ 95th Percentile Queue Length (ft)

n/a Not applicable