

APPENDIX A
Weekday Daily Traffic Counts

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE
 Starting: 3/28/2016

STA. 1

TOTAL

Site Reference: 160080000756
 Site ID: 000000000103
 Location: RTE., 117 EAST OF HUDSON RD.
 Direction: ROAD TOTAL

File: V1-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		25	29	33		29			29	87
02:00		20	15	16		17			17	51
03:00		8	15	13		12			12	36
04:00		19	20	15		18			18	54
05:00		55	46	45		48			48	146
06:00		266	259	248		257			257	773
07:00		851	887	840		859			859	2578
08:00		1220	1312	1270		1267			1267	3802
09:00		1122	1193			1157			1157	2315
10:00		741	780			760			760	1521
11:00	579	538	590			569			569	1707
12:00	587	636	620			614			614	1843
13:00	608	663	697			656			656	1968
14:00	639	640	714			664			664	1993
15:00	797	827	836			820			820	2460
16:00	956	1037	1045			1012			1012	3038
17:00	1099	1135	1195			1143			1143	3429
18:00	1145	1282	1291			1239			1239	3718
19:00	879	933	1004			938			938	2816
20:00	475	545	539			519			519	1559
21:00	300	349	357			335			335	1006
22:00	220	275	267			254			254	762
23:00	101	117	137			118			118	355
24:00	56	74	66			65			65	196

TOTALS	8441	13378	13914	2480	0	13370	0	0	13370	38213

% AVG WKDY	63.1	100	104	18.5						
% AVG WEEK	63.1	100	104	18.5						

AM Times	12:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	587	1220	1312	1270		1267			1267	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	1145	1282	1291			1239			1239	

D%	65	65	65	65						
K%	14	10	9	51						

u3

COMB AWD 13370

FAC 1.01(96)

COMB ADT 13,000

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 1
 Starting: 3/28/2016

STA. 1 EB

Site Reference: 160080000756
 Site ID: 000000000103
 Location: RTE., 117 EAST OF HUDSON RD.
 Direction: EAST

File: V1-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		13	15	14		14			14	42
02:00		14	6	10		10			10	30
03:00		5	9	5		6			6	19
04:00		7	12	9		9			9	28
05:00		44	39	36		39			39	119
06:00		215	214	194		207			207	623
07:00		649	687	648		661			661	1984
08:00		785	842	817		814			814	2444
09:00		734	753			743			743	1487
10:00		441	455			448			448	896
11:00	301	260	332			297			297	893
12:00	304	322	311			312			312	937
13:00	267	333	352			317			317	952
14:00	319	293	346			319			319	958
15:00	381	395	382			386			386	1158
16:00	311	383	367			353			353	1061
17:00	382	398	418			399			399	1198
18:00	391	454	504			449			449	1349
19:00	305	321	332			319			319	958
20:00	194	195	221			203			203	610
21:00	134	158	159			150			150	451
22:00	95	127	123			115			115	345
23:00	38	36	52			42			42	126
24:00	20	32	20			24			24	72
<hr/>										
TOTALS	3442	6614	6951	1733	0	6636	0	0	6636	18740
<hr/>										
% AVG WKDY	51.8	99.6	104.7	26.1						
% AVG WEEK	51.8	99.6	104.7	26.1						
<hr/>										
AM Times	12:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	304	785	842	817		814			814	
<hr/>										
PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	391	454	504			449			449	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 2
 Starting: 3/28/2016

STA. 1 WB

Site Reference: 160080000756
 Site ID: 000000000103
 Location: RTE., 117 EAST OF HUDSON RD.
 Direction: WEST

File: V1-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		12	14	19		15			15	45
02:00		6	9	6		7			7	21
03:00		3	6	8		5			5	17
04:00		12	8	6		8			8	26
05:00		11	7	9		9			9	27
06:00		51	45	54		50			50	150
07:00		202	200	192		198			198	594
08:00		435	470	453		452			452	1358
09:00		388	440			414			414	828
10:00		300	325			312			312	625
11:00	278	278	258			271			271	814
12:00	283	314	309			302			302	906
13:00	341	330	345			338			338	1016
14:00	320	347	368			345			345	1035
15:00	416	432	454			434			434	1302
16:00	645	654	678			659			659	1977
17:00	717	737	777			743			743	2231
18:00	754	828	787			789			789	2369
19:00	574	612	672			619			619	1858
20:00	281	350	318			316			316	949
21:00	166	191	198			185			185	555
22:00	125	148	144			139			139	417
23:00	63	81	85			76			76	229
24:00	36	42	46			41			41	124

TOTALS	4999	6764	6963	747	0	6727	0	0	6727	19473

% AVG WKDY	74.3	100.5	103.5	11.1						
% AVG WEEK	74.3	100.5	103.5	11.1						

AM Times	12:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	283	435	470	453		452			452	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	754	828	787			789			789	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE
 Starting: 3/28/2016

STA. 2
 TOTAL

Site Reference: 160080000599
 Site ID: 000000020304
 Location: RTE., 117 WEST OF HUDSON RD.
 Direction: ROAD TOTAL

File: V2-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		20	26	26		24			24	72
02:00		18	13	10		13			13	41
03:00		7	10	12		9			9	29
04:00		12	17	13		14			14	42
05:00		40	35	34		36			36	109
06:00		223	214	207		214			214	644
07:00		683	714	712		703			703	2109
08:00		1039	1089	1047		1058			1058	3175
09:00		911	976			943			943	1887
10:00		594	621			607			607	1215
11:00	452	437	439			442			442	1328
12:00	452	480	444			458			458	1376
13:00	493	486	534			504			504	1513
14:00	505	507	535			515			515	1547
15:00	640	667	686			664			664	1993
16:00	790	832	826			816			816	2448
17:00	910	955	963			942			942	2828
18:00	899	1011	1041			983			983	2951
19:00	680	739	793			737			737	2212
20:00	333	427	405			388			388	1165
21:00	212	256	239			235			235	707
22:00	154	198	201			184			184	553
23:00	71	84	104			86			86	259
24:00	39	45	47			43			43	131

TOTALS	6630	10671	10972	2061	0	10618	0	0	10618	30334

% AVG WKDY	62.4	100.4	103.3	19.4						
% AVG WEEK	62.4	100.4	103.3	19.4						

AM Times	11:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	452	1039	1089	1047		1058			1058	

PM Times	17:00	18:00	18:00			18:00			18:00	
PM Peaks	910	1011	1041			983			983	

D%	65	60	60	60						
K%	14	10	10	51						

u3
 COMB AWD 10618
 FAC 1.01(.96)
 COMB ADT 10,300

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 1
 Starting: 3/28/2016

STA. 2 EB

Site Reference: 160080000599
 Site ID: 000000020304
 Location: RTE., 117 WEST OF HUDSON RD.
 Direction: EAST

File: V2-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		9	14	9		10			10	32
02:00		14	5	6		8			8	25
03:00		5	7	6		6			6	18
04:00		3	10	6		6			6	19
05:00		32	27	27		28			28	86
06:00		179	176	160		171			171	515
07:00		515	543	547		535			535	1605
08:00		649	673	646		656			656	1968
09:00		585	605			595			595	1190
10:00		354	359			356			356	713
11:00	241	202	238			227			227	681
12:00	216	239	202			219			219	657
13:00	209	235	274			239			239	718
14:00	252	226	248			242			242	726
15:00	307	298	307			304			304	912
16:00	243	288	275			268			268	806
17:00	317	329	328			324			324	974
18:00	343	372	415			376			376	1130
19:00	229	259	279			255			255	767
20:00	134	163	173			156			156	470
21:00	100	114	106			106			106	320
22:00	70	108	95			91			91	273
23:00	30	28	44			34			34	102
24:00	12	15	13			13			13	40
<hr/>										
TOTALS	2703	5221	5416	1407	0	5225	0	0	5225	14747
<hr/>										
% AVG WKDY	51.7	99.9	103.6	26.9						
% AVG WEEK	51.7	99.9	103.6	26.9						
<hr/>										
AM Times	11:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	241	649	673	646		656			656	
<hr/>										
PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	343	372	415			376			376	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 2
 Starting: 3/28/2016

STA. 2WB

Site Reference: 160080000599
 Site ID: 000000020304
 Location: RTE., 117 WEST OF HUDSON RD.
 Direction: WEST

File: V2-0304.prn
 City: STOW
 County: VOL E&W

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		11	12	17		13			13	40
02:00		4	8	4		5			5	16
03:00		2	3	6		3			3	11
04:00		9	7	7		7			7	23
05:00		8	8	7		7			7	23
06:00		44	38	47		43			43	129
07:00		168	171	165		168			168	504
08:00		390	416	401		402			402	1207
09:00		326	371			348			348	697
10:00		240	262			251			251	502
11:00	211	235	201			215			215	647
12:00	236	241	242			239			239	719
13:00	284	251	260			265			265	795
14:00	253	281	287			273			273	821
15:00	333	369	379			360			360	1081
16:00	547	544	551			547			547	1642
17:00	593	626	635			618			618	1854
18:00	556	639	626			607			607	1821
19:00	451	480	514			481			481	1445
20:00	199	264	232			231			231	695
21:00	112	142	133			129			129	387
22:00	84	90	106			93			93	280
23:00	41	56	60			52			52	157
24:00	27	30	34			30			30	91

TOTALS	3927	5450	5556	654	0	5387	0	0	5387	15587

% AVG WKDY	72.8	101.1	103.1	12.1						
% AVG WEEK	72.8	101.1	103.1	12.1						

AM Times	12:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	236	390	416	401		402			402	

PM Times	17:00	18:00	17:00			17:00			17:00	
PM Peaks	593	639	635			618			618	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE
 Starting: 3/28/2016

STA. 3
 TOTAL

Site Reference: 160080000682
 Site ID: 000000000301
 Location: HUDSON RD., SOUTH OF RTE. 117
 Direction: ROAD TOTAL

File: V3-0102.prn
 City: STOW
 County: VOL N&S

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		16	8	20		14			14	44
02:00		1	7	10		6			6	18
03:00		3	7	2		4			4	12
04:00		5	4	7		5			5	16
05:00		16	14	13		14			14	43
06:00		80	92	84		85			85	256
07:00		282	261	250		264			264	793
08:00		393	433	428		418			418	1254
09:00		400	376	385		387			387	1161
10:00		246	280			263			263	526
11:00	189	207	249			215			215	645
12:00	220	264	265			249			249	749
13:00	226	289	280			265			265	795
14:00	240	270	288			266			266	798
15:00	293	309	290			297			297	892
16:00	360	442	420			407			407	1222
17:00	427	478	467			457			457	1372
18:00	435	538	515			496			496	1488
19:00	292	355	391			346			346	1038
20:00	198	214	240			217			217	652
21:00	117	152	162			143			143	431
22:00	99	127	102			109			109	328
23:00	44	57	48			49			49	149
24:00	19	40	25			28			28	84

TOTALS	3159	5184	5224	1199	0	5004	0	0	5004	14766

% AVG WKDY	63.1	103.5	104.3	23.9						
% AVG WEEK	63.1	103.5	104.3	23.9						

AM Times	12:00	09:00	08:00	08:00		08:00			08:00	
AM Peaks	220	400	433	428		418			418	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	435	538	515			496			496	

D%	70	60	60	65						
K%	14	10	10	36						

U6

COMB AWD 5004
 FAC .98(.96)
 COMB ADT 4,700

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 1
 Starting: 3/28/2016

STA. 3 NB

Site Reference: 160080000682
 Site ID: 000000000301
 Location: HUDSON RD., SOUTH OF RTE. 117
 Direction: NORTH

File: V3-0102.prn
 City: STOW
 County: VOL N&S

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		8	4	12		8			8	24
02:00		0	4	6		3			3	10
03:00		2	4	0		2			2	6
04:00		3	3	4		3			3	10
05:00		15	13	10		12			12	38
06:00		57	66	65		62			62	188
07:00		193	186	165		181			181	544
08:00		243	274	272		263			263	789
09:00		241	226	237		234			234	704
10:00		141	156			148			148	297
11:00	91	104	133			109			109	328
12:00	118	131	149			132			132	398
13:00	110	146	129			128			128	385
14:00	114	121	147			127			127	382
15:00	142	160	137			146			146	439
16:00	153	193	184			176			176	530
17:00	172	181	189			180			180	542
18:00	141	205	194			180			180	540
19:00	115	128	134			125			125	377
20:00	82	72	88			80			80	242
21:00	46	65	74			61			61	185
22:00	38	42	44			41			41	124
23:00	16	19	13			16			16	48
24:00	8	22	10			13			13	40

TOTALS	1346	2492	2561	771	0	2430	0	0	2430	7170

% AVG WKDY	55.3	102.5	105.3	31.7						
% AVG WEEK	55.3	102.5	105.3	31.7						

AM Times	12:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	118	243	274	272		263			263	

PM Times	17:00	18:00	18:00			17:00			17:00	
PM Peaks	172	205	194			180			180	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 2
 Starting: 3/28/2016

STA, 3SB

Site Reference: 160080000682
 Site ID: 000000000301
 Location: HUDSON RD., SOUTH OF RTE. 117
 Direction: SOUTH

File: V3-0102.prn
 City: STOW
 County: VOL N&S

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		8	4	8		6			6	20
02:00		1	3	4		2			2	8
03:00		1	3	2		2			2	6
04:00		2	1	3		2			2	6
05:00		1	1	3		1			1	5
06:00		23	26	19		22			22	68
07:00		89	75	85		83			83	249
08:00		150	159	156		155			155	465
09:00		159	150	148		152			152	457
10:00		105	124			114			114	229
11:00	98	103	116			105			105	317
12:00	102	133	116			117			117	351
13:00	116	143	151			136			136	410
14:00	126	149	141			138			138	416
15:00	151	149	153			151			151	453
16:00	207	249	236			230			230	692
17:00	255	297	278			276			276	830
18:00	294	333	321			316			316	948
19:00	177	227	257			220			220	661
20:00	116	142	152			136			136	410
21:00	71	87	88			82			82	246
22:00	61	85	58			68			68	204
23:00	28	38	35			33			33	101
24:00	11	18	15			14			14	44

TOTALS	1813	2692	2663	428	0	2561	0	0	2561	7596

% AVG WKDY	70.7	105.1	103.9	16.7						
% AVG WEEK	70.7	105.1	103.9	16.7						

AM Times	12:00	09:00	08:00	08:00		08:00			08:00	
AM Peaks	102	159	159	156		155			155	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	294	333	321			316			316	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE
 Starting: 3/28/2016

STA. 4
 TOTAL

Site Reference: 160080000623
 Site ID: 000000000403
 Location: RTE. 62, NORTH OF ROCKBOTTOM RD.
 Direction: ROAD TOTAL

File: V4-0304e.prn
 City: STOW
 County: VOL EB

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		8	14	12		11			11	34
02:00		5	12	5		7			7	22
03:00		2	0	3		1			1	5
04:00		3	2	2		2			2	7
05:00		9	10	16		11			11	35
06:00		57	69	58		61			61	184
07:00		215	231	226		224			224	672
08:00		467	390	435		430			430	1292
09:00		451	437	450		446			446	1338
10:00		300	317			308			308	617
11:00	230	279	241			250			250	750
12:00	246	280	260			262			262	786
13:00	238	254	241			244			244	733
14:00	244	278	289			270			270	811
15:00	307	294	280			293			293	881
16:00	344	370	397			370			370	1111
17:00	430	463	486			459			459	1379
18:00	492	582	565			546			546	1639
19:00	336	410	439			395			395	1185
20:00	205	247	244			232			232	696
21:00	134	168	170			157			157	472
22:00	101	137	129			122			122	367
23:00	49	58	81			62			62	188
24:00	24	21	26			23			23	71

TOTALS	3380	5358	5330	1207	0	5186	0	0	5186	15275

% AVG WKDY	65.1	103.3	102.7	23.2						
% AVG WEEK	65.1	103.3	102.7	23.2						

AM Times	12:00	08:00	09:00	09:00		09:00			09:00	
AM Peaks	246	467	437	450		446			446	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	492	582	565			546			546	

D%	55	50	55	50						
K%	15	11	11	37						

u3

COMB AWD 5186

FAC 1.01(.96)

COMB APT 5,000

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 1
 Starting: 3/28/2016

STA 4 EB

Site Reference: 160080000623
 Site ID: 000000000403
 Location: RTE. 62, NORTH OF ROCKBOTTOM RD.
 Direction: EAST

File: V4-0304e.prn
 City: STOW
 County: VOL EB

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		3	6	6		5			5	15
02:00		2	5	0		2			2	7
03:00		0	0	2		0			0	2
04:00		3	2	2		2			2	7
05:00		6	8	13		9			9	27
06:00		40	45	39		41			41	124
07:00		134	139	137		136			136	410
08:00		241	208	217		222			222	666
09:00		221	224	235		226			226	680
10:00		147	147			147			147	294
11:00	111	131	124			122			122	366
12:00	121	145	134			133			133	400
13:00	111	131	123			121			121	365
14:00	130	146	135			137			137	411
15:00	150	134	143			142			142	427
16:00	164	175	189			176			176	528
17:00	218	220	212			216			216	650
18:00	233	282	265			260			260	780
19:00	173	194	197			188			188	564
20:00	116	130	120			122			122	366
21:00	78	98	92			89			89	268
22:00	60	79	77			72			72	216
23:00	31	36	43			36			36	110
24:00	13	10	11			11			11	34
<hr/>										
TOTALS	1709	2708	2649	651	0	2615	0	0	2615	7717
<hr/>										
% AVG WKDY	65.3	103.5	101.3	24.8						
% AVG WEEK	65.3	103.5	101.3	24.8						
<hr/>										
AM Times	12:00	08:00	09:00	09:00		09:00			09:00	
AM Peaks	121	241	224	235		226			226	
<hr/>										
PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	233	282	265			260			260	

MassDOT Highway Division
 WEEKLY SUMMARY FOR LANE 2
 Starting: 3/28/2016

STA. 4WB

Site Reference: 160080000623
 Site ID: 000000000403
 Location: RTE. 62, NORTH OF ROCKBOTTOM RD.
 Direction: WEST

File: V4-0304e.prn
 City: STOW
 County: VOL EB

TIME	MON 28	TUE 29	WED 30	THU 31	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00		5	8	6		6			6	19
02:00		3	7	5		5			5	15
03:00		2	0	1		1			1	3
04:00		0	0	0		0			0	0
05:00		3	2	3		2			2	8
06:00		17	24	19		20			20	60
07:00		81	92	89		87			87	262
08:00		226	182	218		208			208	626
09:00		230	213	215		219			219	658
10:00		153	170			161			161	323
11:00	119	148	117			128			128	384
12:00	125	135	126			128			128	386
13:00	127	123	118			122			122	368
14:00	114	132	154			133			133	400
15:00	157	160	137			151			151	454
16:00	180	195	208			194			194	583
17:00	212	243	274			243			243	729
18:00	259	300	300			286			286	859
19:00	163	216	242			207			207	621
20:00	89	117	124			110			110	330
21:00	56	70	78			68			68	204
22:00	41	58	52			50			50	151
23:00	18	22	38			26			26	78
24:00	11	11	15			12			12	37

TOTALS	1671	2650	2681	556	0	2567	0	0	2567	7558

% AVG WKDY	65	103.2	104.4	21.6						
% AVG WEEK	65	103.2	104.4	21.6						

AM Times	12:00	09:00	09:00	08:00		09:00			09:00	
AM Peaks	125	230	213	218		219			219	

PM Times	18:00	18:00	18:00			18:00			18:00	
PM Peaks	259	300	300			286			286	

APPENDIX B
Intersection Turning Movement Counts
March 28–31, 2016

Study Name Stow - Route 117 and Hudson Road TMC
 Start Date Tuesday, March 29, 2016 6:00 AM
 End Date Tuesday, March 29, 2016 6:00 PM
 Site Code

Report Summary

Time Period	Class.	Westbound					Northbound					Eastbound					Crosswalk			
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O	Total	Pedestrians	Total	
Peak 1																				
Specified Period	Motorcycles	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM - 9:00 AM	%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
One Hour Peak	Cars	268	97	0	365	657	162	54	0	216	162	65	495	0	560	322	1141	5	0	0
7:15 AM - 8:15 AM	%	85%	84%	0%	85%	86%	85%	87%	0%	86%	82%	79%	86%	0%	85%	85%	85%	85%	0%	0%
	Light Goods Vehicles	34	13	0	47	85	25	5	0	30	27	14	60	0	74	39	151	W	0	0
	%	11%	11%	0%	11%	11%	13%	8%	0%	12%	14%	17%	10%	0%	11%	10%	11%	11%	0%	0%
	Buses	3	0	0	3	4	1	0	0	1	1	1	3	0	4	3	8	E	0	0
	%	1%	0%	0%	1%	1%	1%	0%	0%	0%	1%	1%	1%	0%	1%	1%	1%	1%	0%	0%
	Single-Unit Trucks	9	4	0	13	14	1	3	0	4	6	2	13	0	15	12	32	S	0	0
	%	3%	3%	0%	3%	2%	1%	5%	0%	2%	3%	2%	2%	0%	2%	3%	2%	2%	0%	0%
	Articulated Trucks	1	1	0	2	3	0	0	0	0	1	0	3	0	3	1	5	W	0	0
	%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	315	115	0	430	764	190	62	0	252	197	82	574	0	656	377	1338			
	PHF	0.81	0.8	0	0.9	0.94	0.78	0.65	0	0.74	0.83	0.85	0.91	0	0.92	0.79	0.91			
	Approach %				32%	57%				19%	15%				49%	28%				
Peak 2																				
Specified Period	Motorcycles	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 6:00 PM	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
One Hour Peak	Cars	481	233	0	714	407	116	57	0	173	301	68	291	0	359	538	1246	S	0	0
4:45 PM - 5:45 PM	%	87%	85%	0%	86%	89%	84%	85%	0%	84%	86%	88%	92%	0%	91%	86%	87%	87%	0%	0%
	Light Goods Vehicles	63	39	0	102	39	18	10	0	28	47	8	21	0	29	73	159	W	0	0
	%	11%	14%	0%	12%	9%	13%	15%	0%	14%	13%	10%	7%	0%	7%	12%	11%	11%	0%	0%
	Buses	1	0	0	1	1	0	0	0	0	0	0	1	0	1	1	2	E	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Single-Unit Trucks	7	2	0	9	8	3	0	0	3	3	1	5	0	6	7	18	S	0	0
	%	1%	1%	0%	1%	2%	2%	0%	0%	1%	1%	1%	2%	0%	2%	1%	1%	1%	0%	0%
	Articulated Trucks	2	1	0	3	1	1	0	0	1	1	0	0	0	0	2	4	W	0	0
	%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	555	275	0	830	456	138	67	0	205	352	77	318	0	395	622	1430			
	PHF	0.88	0.85	0	0.96	0.93	0.88	0.62	0	0.78	0.9	0.74	0.91	0	0.95	0.84	0.93			
	Approach %				58%	32%				14%	25%				26%	43%				

APPENDIX C
Intersection Capacity Analyses
Weekday AM/PM Peak Hour
2016 Existing Conditions

HCM Unsignalized Intersection Capacity Analysis

1: Hudson Rd & Route 117

6/2/2016



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	→
Traffic Volume (veh/h)	574	82	115	315	62	190
Future Volume (Veh/h)	574	82	115	315	62	190
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	631	90	126	346	68	209
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			721		1274	676
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			721		1274	676
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		57	54
cM capacity (veh/h)			881		157	452
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	721	472	277			
Volume Left	0	126	68			
Volume Right	90	0	209			
cSH	1700	881	599			
Volume to Capacity	0.42	0.14	0.46			
Queue Length 95th (ft)	0	12	61			
Control Delay (s)	0.0	3.9	25.7			
Lane LOS			A	D		
Approach Delay (s)	0.0	3.9	25.7			
Approach LOS			D			
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			71.6%	ICU Level of Service		C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Hudson Rd & Route 117

6/2/2016



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	318	77	275	555	67	138
Future Volume (Veh/h)	318	77	275	555	67	138
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	342	83	296	597	72	148
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			425	1572		384
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			425	1572		384
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			74	20		78
cM capacity (veh/h)			1134	90		666
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	425	893	220			
Volume Left	0	296	72			
Volume Right	83	0	148			
cSH	1700	1134	245			
Volume to Capacity	0.25	0.26	0.90			
Queue Length 95th (ft)	0	26	191			
Control Delay (s)	0.0	5.6	76.7			
Lane LOS			A		F	
Approach Delay (s)	0.0	5.6	76.7			
Approach LOS			F			
Intersection Summary						
Average Delay			14.2			
Intersection Capacity Utilization			79.5%	ICU Level of Service		D
Analysis Period (min)			15			

APPENDIX D

Preliminary Traffic Signal Warrants Analysis

Table D-1
2016 Existing Traffic Conditions

Table D-2
2016 No Traffic Diversion Assumption

Table D-1
Summary of Intersection Hourly Volumes and Warrant Analyses
2016 Existing Traffic Conditions

Hourly period Ending	Route 117 (main street)		Hudson Road (minor street)		Sum of main street*	Max. of minor street**	Volumes above the required minimum on main/minor street		
	EB	WB	NB	SB			Warrant 1	Warrant 2	Warrant 7
7:00	535	198	0	92	711	87			
8:00	656	452	0	168	1074	158	√	√	√
9:00	595	414	0	175	978	165	√	√	√
10:00	356	312	0	163	648	153	√		√
11:00	227	271	0	161	483	151	√		√
12:00	219	302	0	144	505	135			√
13:00	239	338	0	154	559	145			√
14:00	242	345	0	162	569	152	√		√
15:00	304	434	0	193	716	182	√		√
16:00	268	659	0	184	899	173	√	√	√
17:00	324	743	0	170	1035	160	√	√	√
18:00	376	789	0	151	1130	142		√	√
19:00	255	619	0	131	847	123			√
20:00	156	316	0	89	458	84			

* Based on 3/28-31/2016 MassDOT counts and adjusted by seasonal factor 1.01 and axle factor 0.96

** Based on 3/28-31/2016 MassDOT counts and adjusted by seasonal factor 0.98 and axle factor 0.96

Warrant 1 (8-Hour Volume) is fulfilled. It requires that the traffic conditions (observed vehicular volumes higher than the specified minimum volumes) exist for each of any 8 hours of an average day. Condition A (Minimum Vehicular Volume) was applied in this case.

Warrant 2 (4-Hour Volume) is fulfilled. It requires that the traffic conditions (main street combined/minor street maximum volume falling above an applicable curve) exist for each of any 4 hours of an average day.

Warrant 7 (Crash Experience) is not fulfilled. The traffic conditions meets the volume requirement (higher than 80% of the volumes specified in Warrant 1), but does not meet the crash requirement: five or more correctable crashes in the recent 12-month period. There were four correctable crashes in 2015.

Table D-2
Summary of Intersection Hourly Volumes and Warrant Analyses
2016 No Traffic Diversion Assumption

Hourly period Ending	Route 117 (main street)		Hudson Road (minor street)		Sum of main street*	Max. of minor street*	Volumes above the required minimum on main/minor street		
	EB	WB	NB	SB			Warrant 1	Warrant 2	Warrant 7
7:00	535	198	0	92	569	69	√		√
8:00	656	452	0	168	859	126	√	√	√
9:00	595	414	0	175	783	132	√		√
10:00	356	312	0	163	518	123			√
11:00	227	271	0	161	386	121			√
12:00	219	302	0	144	404	108			√
13:00	239	338	0	154	448	116			√
14:00	242	345	0	162	455	122			√
15:00	304	434	0	193	572	145	√		√
16:00	268	659	0	184	719	138	√		√
17:00	324	743	0	170	828	128	√		√
18:00	376	789	0	151	904	114	√	√	√
19:00	255	619	0	131	678	99	√		√
20:00	156	316	0	89	366	67			

* Based on 80% MassDOT adjusted counts (3/28-31/2016)

Warrant 1 (8-Hour Volume) is fulfilled. It requires that the traffic conditions (observed vehicular volumes higher than the specified minimum volumes) exist for each of any 8 hours of an average day. Condition C (70% Basic Minimum Hourly Volume, assuming that Route 117 travel speed exceeds 40 MPH) was applied in this case.

Warrant 2 (4-Hour Volume) is not fulfilled. It requires that the traffic conditions (main street combined/minor street maximum volume falling above an applicable curve) exist for each of any 4 hours of an average day.

Warrant 7 (Crash Experience) is not fulfilled. The traffic conditions meets the volume requirement (higher than 80% of the volumes specified in Warrant 1), but does not meet the crash requirement: five or more correctable crashes in the recent 12-month period. There were four correctable crashes in 2015.

APPENDIX E
HCM Reports
Intersection Capacity Analysis
Weekday AM/PM Peak Hour
Traffic Signal Scenario under 2016 Existing Traffic

HCM Signalized Intersection Capacity Analysis

1: Hudson Rd & Route 117

6/2/2016



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (vph)	574	82	115	315	62	190
Future Volume (vph)	574	82	115	315	62	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770		1711	1801	1694	1516
Flt Permitted	1.00		0.18	1.00	0.95	1.00
Satd. Flow (perm)	1770		329	1801	1694	1516
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	631	90	126	346	68	209
RTOR Reduction (vph)	6	0	0	0	0	190
Lane Group Flow (vph)	715	0	126	346	68	19
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	29.4		36.7	36.7	5.1	5.1
Effective Green, g (s)	29.4		36.7	36.7	5.1	5.1
Actuated g/C Ratio	0.51		0.64	0.64	0.09	0.09
Clearance Time (s)	5.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	905		289	1149	150	134
v/s Ratio Prot	c0.40		c0.03	0.19	c0.04	
v/s Ratio Perm			0.25			0.01
v/c Ratio	0.79		0.44	0.30	0.45	0.14
Uniform Delay, d1	11.5		7.4	4.7	24.9	24.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8		1.1	0.1	2.2	0.5
Delay (s)	16.3		8.5	4.8	27.0	24.6
Level of Service	B		A	A	C	C
Approach Delay (s)	16.3			5.8	25.2	
Approach LOS	B			A	C	

Intersection Summary

HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Hudson Rd & Route 117

6/2/2016



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (vph)	318	77	275	555	67	138
Future Volume (vph)	318	77	275	555	67	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0		4.0	5.0	5.0	5.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1753		1711	1801	1728	1546
Flt Permitted	1.00		0.30	1.00	0.95	1.00
Satd. Flow (perm)	1753		532	1801	1728	1546
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	342	83	296	597	72	148
RTOR Reduction (vph)	11	0	0	0	0	133
Lane Group Flow (vph)	414	0	296	597	72	15
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Actuated Green, G (s)	18.5		32.1	32.1	5.2	5.2
Effective Green, g (s)	18.5		32.1	32.1	5.2	5.2
Actuated g/C Ratio	0.35		0.61	0.61	0.10	0.10
Clearance Time (s)	5.0		4.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	615		538	1097	170	152
v/s Ratio Prot	c0.24		0.10	c0.33	c0.04	
v/s Ratio Perm			0.23			0.01
v/c Ratio	0.67		0.55	0.54	0.42	0.10
Uniform Delay, d1	14.5		6.1	6.0	22.3	21.6
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9		1.2	0.6	1.7	0.3
Delay (s)	17.4		7.4	6.6	24.0	21.9
Level of Service	B		A	A	C	C
Approach Delay (s)	17.4			6.8	22.6	
Approach LOS	B			A	C	

Intersection Summary

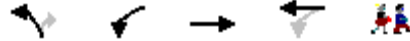
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	52.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX F
Synchro Signal Timing Settings
Intersection Capacity Analysis
Weekday AM/PM Peak Hour
Traffic Signal Scenario under 2016 Existing Traffic

Timing Report, Sorted By Phase
1: Hudson Rd & Route 117

6/20/2016



Phase Number	2	3	4	8	9
Movement	NBL	WBL	EBT	WBTL	Ped
Lead/Lag		Lead	Lag		
Lead-Lag Optimize		Yes	Yes		
Recall Mode	None	None	Min	Min	None
Maximum Split (s)	10	8	31	39	21
Maximum Split (%)	14.3%	11.4%	44.3%	55.7%	30.0%
Minimum Split (s)	10	8	10	10	21
Yellow Time (s)	4	3	4	4	2
All-Red Time (s)	1	1	1	1	1
Minimum Initial (s)	5	4	5	5	5
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					4
Flash Dont Walk (s)					13
Dual Entry	Yes	No	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	10	18	10	49
End Time (s)	10	18	49	49	0
Yield/Force Off (s)	5	14	44	44	67
Yield/Force Off 170(s)	5	14	44	44	54
Local Start Time (s)	0	10	18	10	49
Local Yield (s)	5	14	44	44	67
Local Yield 170(s)	5	14	44	44	54

Intersection Summary

Cycle Length	70
Control Type	Actuated-Uncoordinated
Natural Cycle	80

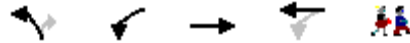
Splits and Phases: 1: Hudson Rd & Route 117



Timing Report, Sorted By Phase

1: Hudson Rd & Route 117

6/20/2016



Phase Number	2	3	4	8	9
Movement	NBL	WBL	EBT	WBTL	Ped
Lead/Lag		Lead	Lag		
Lead-Lag Optimize		Yes	Yes		
Recall Mode	None	None	Min	Min	None
Maximum Split (s)	12	14	23	37	21
Maximum Split (%)	17.1%	20.0%	32.9%	52.9%	30.0%
Minimum Split (s)	10	10	10	10	21
Yellow Time (s)	4	3	4	4	2
All-Red Time (s)	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					4
Flash Dont Walk (s)					13
Dual Entry	Yes	No	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	26	12	49
End Time (s)	12	26	49	49	0
Yield/Force Off (s)	7	22	44	44	67
Yield/Force Off 170(s)	7	22	44	44	54
Local Start Time (s)	0	12	26	12	49
Local Yield (s)	7	22	44	44	67
Local Yield 170(s)	7	22	44	44	54

Intersection Summary

Cycle Length	70
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 1: Hudson Rd & Route 117



APPENDIX G

Meeting Memo

Intersection Study: Route 117 at Hudson Street

June 6, 2016

Town of Stow

Memo

To: Chen-Yen Wang - Chief Transportation Planner
From: Jesse Steadman - Assistant Planner
CC: Mark Abbot - CTPS; Joe Landry - Fire Chief; Bill Bosworth - Police Chief; Mike Clayton - Highway Superintendent; Kathy Sferra - Conservation Coordinator; Karen Kelleher - Town Planner; Bill Wrigley - Town Administrator
Date: 6.13.2016
Re: CTTA Hudson Road/117 Study Follow Up

This memo outlines recommendations for information to be included in the final report for the CTTA Hudson Road/Route 117 study.

Section 5 – Proposed Improvements | Short-Term

- The Fire Chief agreed that deer incidents tended to be further east than the study area, nearer to Gates Lane. The report should recommend deer to be more in line with the incident area and to reduce the number of signs in the study area.
- Highway Superintendent, Mike Clayton noted that the stop line was moved ahead of the crosswalk due to inadequate sight lines, behind the crosswalk. Consider recommending that the Town should work with the owner of the Gulf station to alter the location of their sign to improve visibility of westbound traffic. A recommendation should be included, directing the Town to look into further sight line enhancements near the Elizabeth Brook bridge to allow for the stop line to be moved behind the crosswalk.
- A recommendation should be included that Planning and Building Department staff review licensure dates for the Gulf Station, and reach out to the ownership to determine potential for upgrades to the site, including options to relocate the diesel pump.
- A recommendation could be included providing guidance on the best time to update/design the Hudson Road dividing island. See bullet #2 under long term improvements below.

Section 5 – Proposed Improvements | Long-Term

- Recommendation that the Town pursue further study into northbound lane configuration as part of signalization or Complete Streets design studies.
- The Highway Superintendent noted ongoing problems with vehicles running over the current island bump in Hudson Road. Do CTPS staff have any recommendations for improvements to an island design – and/or whether that should be included within the scope of a signalization study?
- Improvement of pedestrian infrastructure, including any recommendations regarding pedestrian refuge on Hudson road.
- Include note from the meeting that at this preliminary stage there appears to be room within the Right of Way to accommodate a left turn lane.

- It was discussed that the Town should pursue a Functional Design Report (25% design) to determine whether to move forward with signalization of the intersection. A recommendation should reference this discussion.
- Recommendation should be included to be sure that any signalization or traffic designs in the study area not preclude the widening of the 117 Elizabeth Brook bridge.

Gulf Station Comments

Comments regarding the Gulf station's impact should be added to the recommendations based on ideas discussed at the meeting. The following proposed improvements should be considered for the final report:

- The narrowing of the Gulf Station's 117 curb cut
- Creating a right-turn-in and right-turn-out access at the 117 entrance, precluding left turn in movements.
- Working with Gulf Station and Liquor Store owner to determine parking area configuration and access management
- The Police Chief noted there are many fender bender accidents in the Gulf Station parking lot that fall under the \$1000 threshold and therefore do not make it into the crash reports. It should be noted that access management and circulation within the Gulf Station be addressed.