Attachments

- ☐ Traffic Volume Data
- ☐ Seasonal/ Yearly Growth Data
- ☐ Crash Data
- ☐ Trip Generation Calculations
- ☐ Trip Distribution Calculations
- ☐ Capacity Analyses
- ☐ Sight Distance Calculations

□ Traffic Volume Data

Transportation Data Corporation
Mario Perone, mperone1@verizon.net
t. (781) 587-0086 f. (781) 587-0189

Route 119/225 just north of
Route 40 (Lowell Road)
City, State: Groton, MA
Client: MDM/D. Dumais

04115Avolume
Site Code: 604

Start Time	19-May-11 Thu	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		14	132			4	135				
12:15		13	142			4	130				
12:30		17	141			3	141				
12:45		10	136	54	551	4	154	15	560	69	1111
01:00		8	132			4	137				
01:15		6	130			5	132				
01:30		7	155			1	125				
01:45		4	162	25	579	5	150	15	544	40	1123
02:00		9	147			1	181				
02:15		6	207			2	165				
02:30		3	203			7	163				
02:45		1	211	19	768	6	128	16	637	35	1405
03:00		4	220			4	148				
03:15		3	222			4	179				
03:30		2	253			6	168				
03:45		1	284	10	979	10	148	24	643	34	1622
04:00		8	280			12	149				
04:15		4	261			11	144				
04:30		1	301			25	139				
04:45		7	305	20	1147	45	147	93	579	113	1726
05:00		12	287			69	120				
05:15		18	317			113	130				
05:30		13	309			144	103				
05:45		17	309	60	1222	183	153	509	506	569	1728
06:00		26	297			214	116				
06:15		47	303			288	112				
06:30		54	288			311	104				
06:45		91	247	218	1135	296	98	1109	430	1327	1565
07:00		134	197			287	111				
07:15		96	172			300	89				
07:30		128	160			290	80				
07:45		144	123	502	652	259	73	1136	353	1638	1005
08:00		90	101			268	84				
08:15		89	116			265	47				
08:30		118	94			232	57				
08:45		140	82	437	393	234	54	999	242	1436	635
09:00		119	94			214	131				
09:15		113	85			194	67				
09:30		96	72			175	49				
09:45		102	64	430	315	138	41	721	288	1151	603
10:00		98	65			139	37				
10:15		109	55			134	32				
10:30		86	40			142	18				
10:45		117	46	410	206	145	21	560	108	970	314
11:00		111	41			130	18				
11:15		118	37			119	12				
11:30		139	43			139	14				
11:45		136	22	504	143	138	11	526	55	1030	198
Total		2689	8090			5723	4945			8412	13035
Percent		24.9%	75.1%			53.6%	46.4%			39.2%	60.8%

Transportation Data Corporation
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Route 119/225 just north of
Route 40 (Lowell Road)
City, State: Groton, MA
Client: MDM/D. Dumais

04115Avolume
Site Code: 604

Start Time	20-May-11 Fri	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		29	161			5	145				
12:15		18	121			6	138				
12:30		6	130			4	171				
12:45		16	131	69	543	3	130	18	584	87	1127
01:00		11	153			6	139				
01:15		4	139			4	116				
01:30		12	155			4	150				
01:45		5	165	32	612	5	137	19	542	51	1154
02:00		10	202			6	161				
02:15		6	237			2	171				
02:30		8	275			8	172				
02:45		2	208	26	922	8	168	24	672	50	1594
03:00		6	288			3	164				
03:15		1	215			4	183				
03:30		4	230			9	152				
03:45		6	272	17	1005	6	149	22	648	39	1653
04:00		3	288			8	151				
04:15		5	313			13	148				
04:30		3	286			33	129				
04:45		5	251	16	1138	43	123	97	551	113	1689
05:00		13	277			72	136				
05:15		13	287			108	114				
05:30		19	282			121	137				
05:45		20	301	65	1147	161	116	462	503	527	1650
06:00		37	266			212	144				
06:15		46	276			261	120				
06:30		55	200			262	114				
06:45		92	180	230	922	305	93	1040	471	1270	1393
07:00		123	189			283	87				
07:15		89	148			296	88				
07:30		132	138			272	85				
07:45		167	116	511	591	239	85	1090	345	1601	936
08:00		92	113			266	87				
08:15		84	94			233	68				
08:30		124	87			241	57				
08:45		144	67	444	361	230	60	970	272	1414	633
09:00		129	87			225	83				
09:15		123	73			190	51				
09:30		118	70			178	47				
09:45		111	63	481	293	127	34	720	215	1201	508
10:00		98	56			134	36				
10:15		108	73			149	28				
10:30		136	68			157	36				
10:45		137	46	479	243	149	20	589	120	1068	363
11:00		123	42			165	24				
11:15		141	33			142	18				
11:30		144	31			163	15				
11:45		136	27	544	133	158	12	628	69	1172	202
Total		2914	7910			5679	4992			8593	12902
Percent		26.9%	73.1%			53.2%	46.8%			40.0%	60.0%
Grand Total		5603	16000			11402	9937			17005	25937
Percent		25.9%	74.1%			53.4%	46.6%			39.6%	60.4%

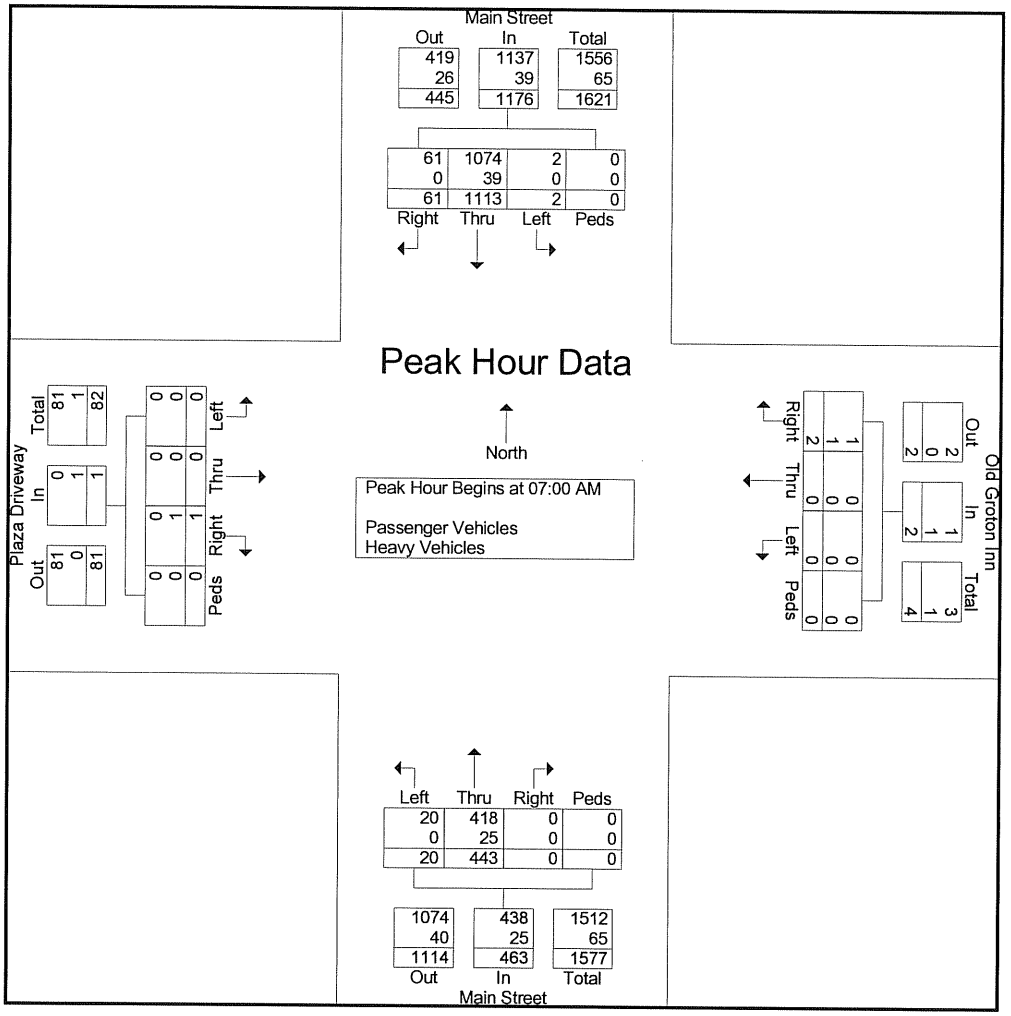
ADT ADT 21,471 AADT 21,471

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Plaza Driveway/Old Groton Inn
Groton, MA

File Name : 604-Main St at Plaza Drive-Old Groton Inn AM
Site Code : 60400001
Start Date : 5/25/2011
Page No : 2



MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
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N/S: Main Street
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File Name : 604-Main St at Plaza Drive-Old Groton Inn AM
Site Code : 60400001
Start Date : 5/25/2011
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

	Main Street From North					Old Groton Inn From East					Main Street From South					Plaza Driveway 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
07:00 AM	17	289	0	0	306	0	0	0	0	0	0	116	4	0	120	0	0	0	0	0	426
07:15 AM	20	297	0	0	317	0	0	0	0	0	0	81	4	0	85	0	0	0	0	0	402
07:30 AM	12	285	0	0	297	0	0	0	0	0	0	108	6	0	114	1	0	0	0	1	412
07:45 AM	12	242	2	0	256	2	0	0	0	2	0	138	6	0	144	0	0	0	0	0	402
Total	61	1113	2	0	1176	2	0	0	0	2	0	443	20	0	463	1	0	0	0	1	1642
08:00 AM	17	264	0	0	281	1	0	0	0	1	0	102	3	0	105	0	0	0	0	0	387
08:15 AM	13	262	0	0	275	0	0	0	0	0	1	81	8	0	90	0	0	0	0	0	365
08:30 AM	16	228	0	0	244	0	0	1	0	1	0	113	8	0	121	0	0	0	0	0	366
08:45 AM	19	228	0	0	247	2	0	1	0	3	1	129	11	0	141	0	0	0	0	0	391
Total	65	982	0	0	1047	3	0	2	0	5	2	425	30	0	457	0	0	0	0	0	1509
Grand Total	126	2095	2	0	2223	5	0	2	0	7	2	868	50	0	920	1	0	0	0	1	3151
Apprch %	5.7	94.2	0.1	0		71.4	0	28.6	0		0.2	94.3	5.4	0		100	0	0	0		
Total %	4	66.5	0.1	0	70.5	0.2	0	0.1	0	0.2	0.1	27.5	1.6	0	29.2	0	0	0	0	0	
Passenger Vehicles	126	2021	2	0	2149	4	0	2	0	6	2	819	50	0	871	0	0	0	0	0	3026
% Passenger Vehicles	100	96.5	100	0	96.7	80	0	100	0	85.7	100	94.4	100	0	94.7	0	0	0	0	0	96
Heavy Vehicles	0	74	0	0	74	1	0	0	0	1	0	49	0	0	49	1	0	0	0	1	125
% Heavy Vehicles	0	3.5	0	0	3.3	20	0	0	0	14.3	0	5.6	0	0	5.3	100	0	0	0	100	4

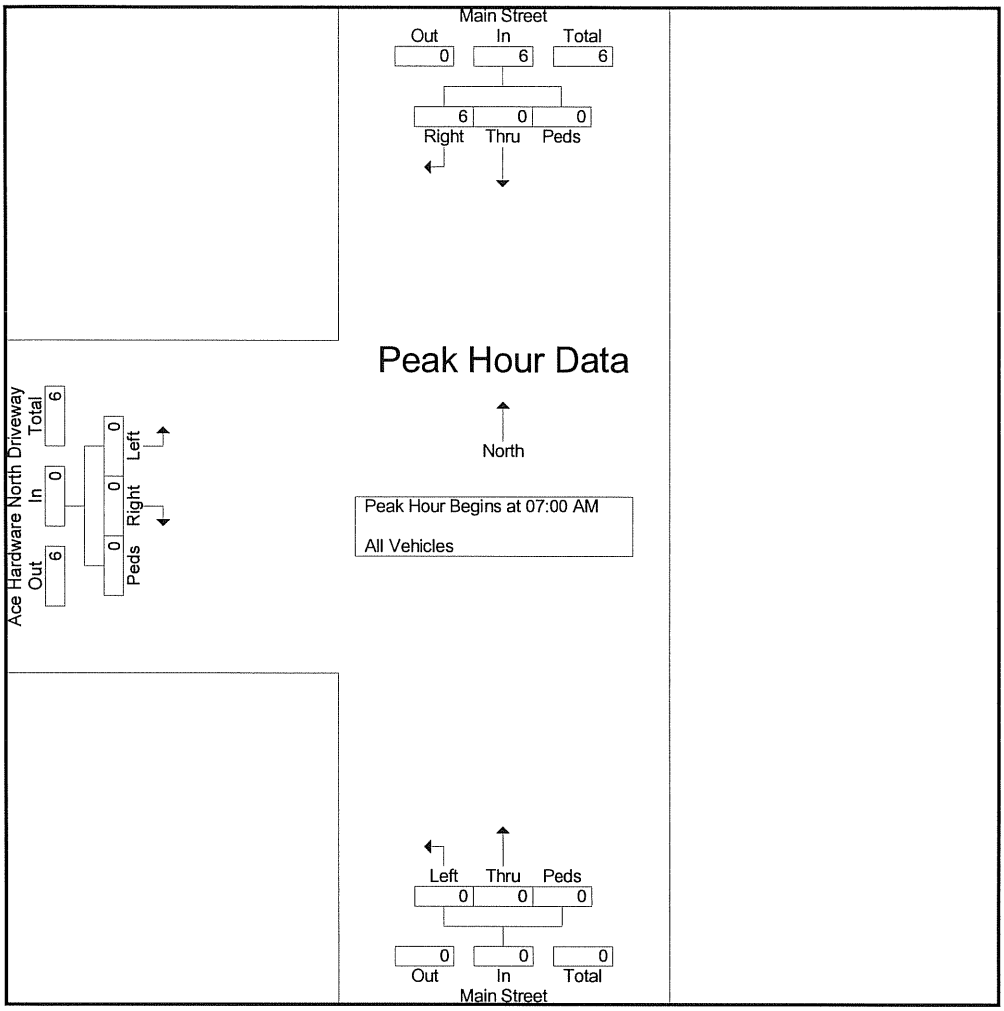
	Main Street From North					Old Groton Inn From East					Main Street From South					Plaza Driveway From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	17	289	0	0	306	0	0	0	0	0	0	116	4	0	120	0	0	0	0	0	**426**
07:15 AM	**20**	**297**	0	0	**317**	0	0	0	0	0	0	81	4	0	85	0	0	0	0	0	402
07:30 AM	12	285	0	0	297	0	0	0	0	0	0	108	**6**	0	114	**1**	0	0	0	**1**	412
07:45 AM	12	242	**2**	0	256	**2**	0	0	0	**2**	0	**138**	6	0	**144**	0	0	0	0	0	402
Total Volume	61	1113	2	0	1176	2	0	0	0	2	0	443	20	0	463	1	0	0	0	1	1642
% App. Total	5.2	94.6	0.2	0		100	0	0	0		0	95.7	4.3	0		100	0	0	0		
PHF	.763	.937	.250	.000	.927	.250	.000	.000	.000	.250	.000	.803	.833	.000	.804	.250	.000	.000	.000	.250	.964
Passenger Vehicles	61	1074																			
% Passenger Vehicles	100	96.5	100	0	96.7	50.0	0	0	0	50.0	0	94.4	100	0	94.6	0	0	0	0	0	96.0
Heavy Vehicles	0	39	0	0	39	1	0	0	0	1	0	25	0	0	25	1	0	0	0	1	66
% Heavy Vehicles	0	3.5	0	0	3.3	50.0	0	0	0	50.0	0	5.6	0	0	5.4	100	0	0	0	100	4.0

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Ace Driveway North Driveway
Groton, MA

File Name : 604-Main St at Ace Drive North AM
Site Code : 60400001
Start Date : 5/25/2011
Page No : 2



MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Ace Driveway North Driveway
Groton, MA

File Name : 604-Main St at Ace Drive North AM
Site Code : 60400001
Start Date : 5/25/2011
Page No : 1

Groups Printed- All Vehicles

	Main Street From North				Main Street From South				Ace Hardware North Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
07:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
07:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	3	0	0	3	0	0	0	0	0	0	0	0	3
07:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
Total	6	0	0	6	0	0	0	0	0	0	0	0	6
08:00 AM	2	0	0	2	0	0	0	0	0	0	0	0	2
08:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
08:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	0	0	4	0	0	0	0	0	0	0	0	4
Grand Total	10	0	0	10	0	0	0	0	0	0	0	0	10
Apprch %	100	0	0		0	0	0		0	0	0		
Total %	100	0	0	100	0	0	0	0	0	0	0	0	

	Main Street From North				Main Street From South				Ace Hardware North Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
07:15 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	**3**	0	0	**3**	0	0	0	0	0	0	0	0	**3**
07:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
Total Volume	6	0	0	6	0	0	0	0	0	0	0	0	6
% App. Total	100	0	0		0	0	0		0	0	0		
PHF	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

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28 Lord Road, Suite 280
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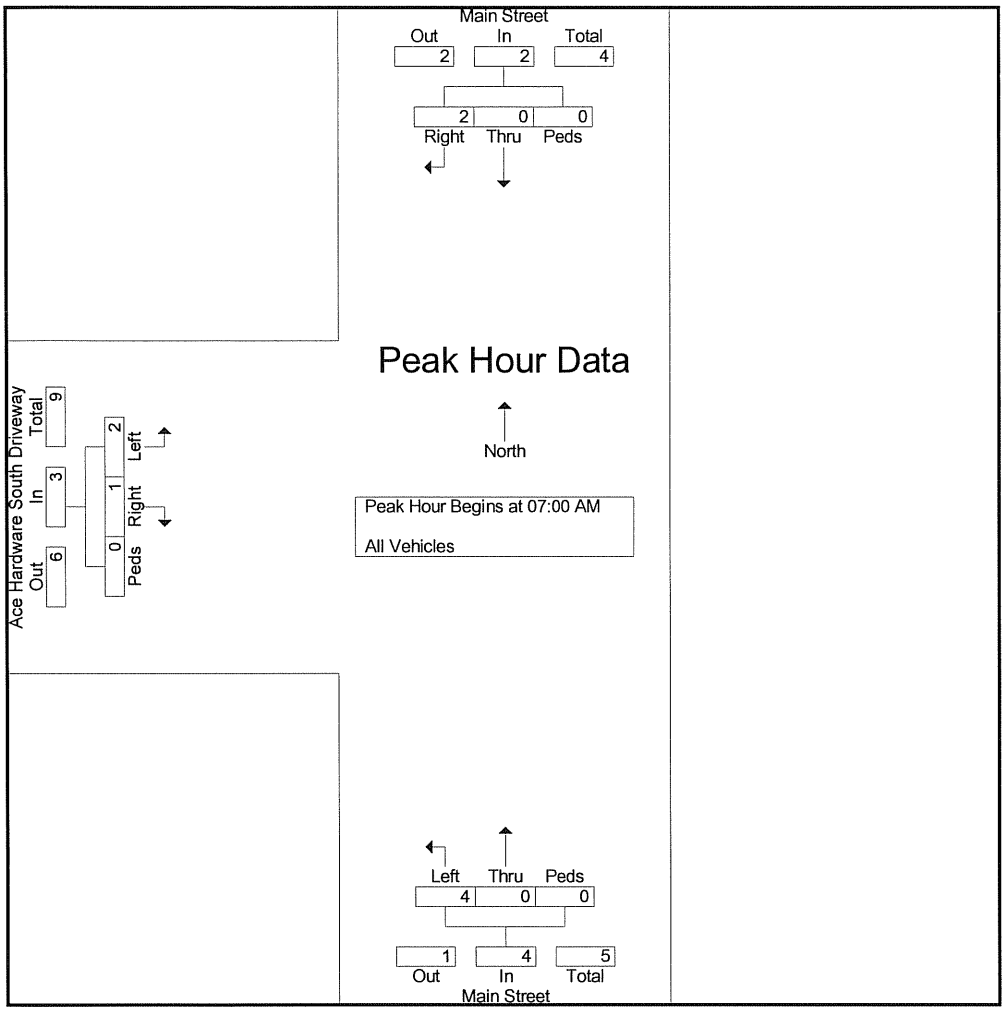
Start Date : 5/25/2011
Page No : 2



MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Ace Driveway South Driveway
Groton, MA

File Name : 604-Main St at Ace Drive South AM
Site Code : 60400001
Start Date : 5/25/2011
Page No : 1

Groups Printed- All Vehicles

	Main Street From North				Main Street From South				Ace Hardware South Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	2	0	2	0	1	0	1	3
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	1
07:45 AM	2	0	0	2	0	1	0	1	0	1	0	1	4
Total	2	0	0	2	0	4	0	4	1	2	0	3	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	1
08:30 AM	1	0	0	1	0	0	0	0	0	1	0	1	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	1	0	1	0	1	0	1	0	1	3
Grand Total	3	0	0	3	0	5	0	5	1	3	0	4	12
Apprch %	100	0	0		0	100	0		25	75	0		
Total %	25	0	0	25	0	41.7	0	41.7	8.3	25	0	33.3	

	Main Street From North				Main Street From South				Ace Hardware South Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	**2**	0	**2**	0	**1**	0	**1**	3
07:30 AM	0	0	0	0	0	0	0	0	**1**	0	0	1	1
07:45 AM	**2**	0	0	**2**	0	1	0	1	0	1	0	1	**4**
Total Volume	2	0	0	2	0	4	0	4	1	2	0	3	9
% App. Total	100	0	0		0	100	0		33.3	66.7	0		
PHF	.250	.000	.000	.250	.000	.500	.000	.500	.250	.500	.000	.750	.563

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Plaza Driveway/Old Groton Inn
Groton, MA

File Name : 604-Main St at Plaza Drive-Old Groton Inn PM
Site Code : 60400004
Start Date : 5/25/2011
Page No : 2

Peak Hour Data

Peak Hour Begins at 05:00 PM

Passenger Vehicles
Heavy Vehicles

North

Main Street

Out	In	Total
1176	645	1821
23	17	40
1199	662	1861

Right	Thru	Left	Peds
31	614	0	0
1	16	0	0
32	630	0	0

Plaza Driveway

Out	In	Total
45	1	46
1	0	1
46	1	47

Left	Thru	Right	Peds
0	0	0	0
0	0	0	0
1	0	1	0
0	0	0	0

Old Groton Inn

Out	In	Total
1	3	4
0	0	0
1	3	4

Right	Thru	Left	Peds
2	0	2	0
0	0	0	0
2	0	1	0
0	0	0	0

Main Street

Left	Thru	Right	Peds
14	1174	1	0
0	23	0	0
14	1197	1	0

Out	In	Total
616	1189	1805
16	23	39
632	1212	1844

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Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

	Main Street From North					Old Groton Inn From East					Main Street From South					Plaza Driveway 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
04:00 PM	13	131	0	0	144	0	0	0	0	0	0	214	3	0	217	0	0	0	0	0	361
04:15 PM	10	131	0	0	141	1	0	0	0	1	0	219	4	0	223	0	0	0	0	0	365
04:30 PM	4	136	0	0	140	0	0	0	0	0	3	282	7	0	292	0	0	0	0	0	432
04:45 PM	9	169	0	0	178	1	0	0	0	1	0	270	4	0	274	0	0	0	0	0	453
Total	36	567	0	0	603	2	0	0	0	2	3	985	18	0	1006	0	0	0	0	0	1611
05:00 PM	10	148	0	0	158	0	0	1	0	1	0	287	2	0	289	1	0	0	0	1	449
05:15 PM	8	165	0	0	173	1	0	0	0	1	0	296	5	0	301	0	0	0	0	0	475
05:30 PM	7	180	0	0	187	1	0	0	0	1	1	300	2	0	303	0	0	0	0	0	491
05:45 PM	7	137	0	0	144	0	0	0	0	0	0	314	5	0	319	0	0	0	0	0	463
Total	32	630	0	0	662	2	0	1	0	3	1	1197	14	0	1212	1	0	0	0	1	1878
Grand Total	68	1197	0	0	1265	4	0	1	0	5	4	2182	32	0	2218	1	0	0	0	1	3489
Apprch %	5.4	94.6	0	0		80	0	20	0		0.2	98.4	1.4	0		100	0	0	0		
Total %	1.9	34.3	0	0	36.3	0.1	0	0	0	0.1	0.1	62.5	0.9	0	63.6	0	0	0	0	0	
Passenger Vehicles	67	1173	0	0	1240	4	0	1	0	5	4	2140	32	0	2176	1	0	0	0	1	3422
% Passenger Vehicles	98.5	98	0	0	98	100	0	100	0	100	100	98.1	100	0	98.1	100	0	0	0	100	98.1
Heavy Vehicles	1	24	0	0	25	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	67
% Heavy Vehicles	1.5	2	0	0	2	0	0	0	0	0	0	1.9	0	0	1.9	0	0	0	0	0	1.9

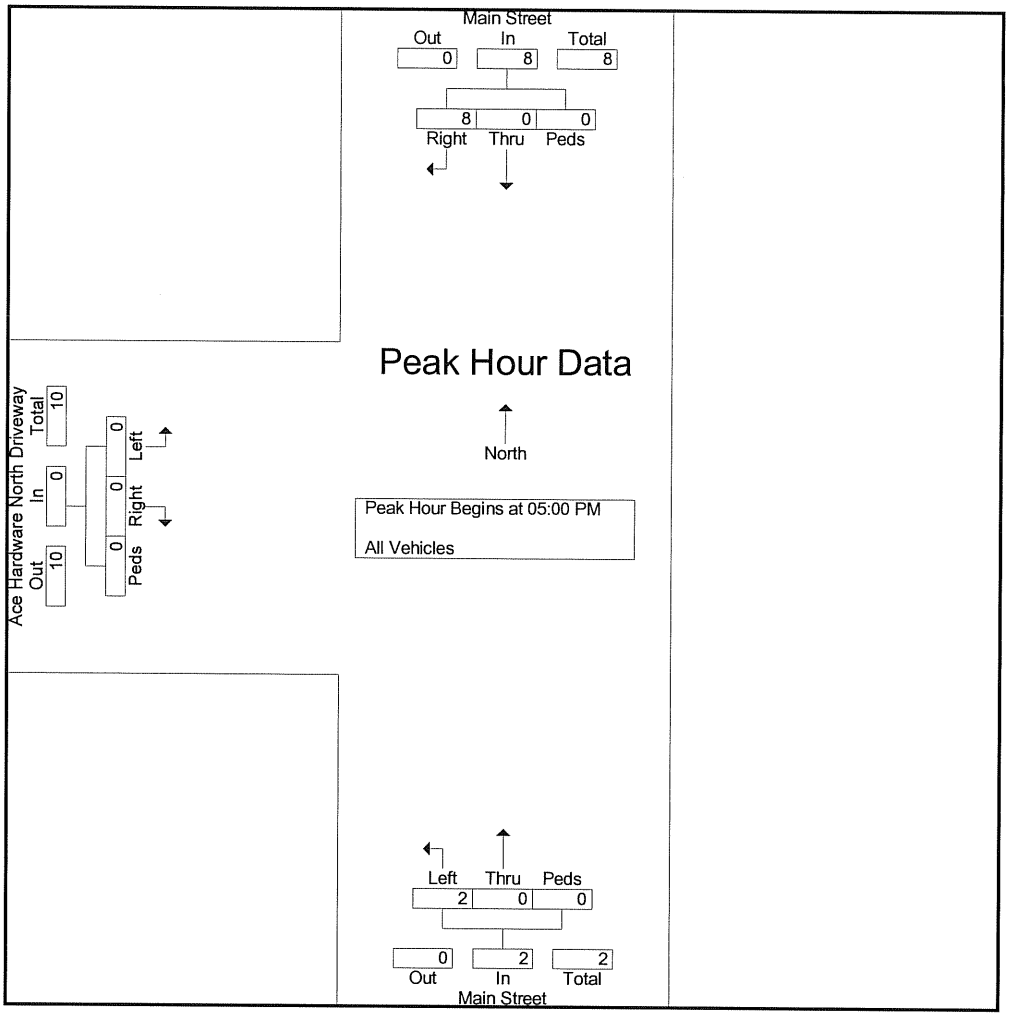
	Main Street From North					Old Groton Inn From East					Main Street From South					Plaza Driveway From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**10**	148	0	0	158	0	0	**1**	0	**1**	0	287	2	0	289	**1**	0	0	0	**1**	449
05:15 PM	8	165	0	0	173	**1**	0	0	0	1	0	296	**5**	0	301	0	0	0	0	0	475
05:30 PM	7	**180**	0	0	**187**	1	0	0	0	1	**1**	300	2	0	303	0	0	0	0	0	**491**
05:45 PM	7	137	0	0	144	0	0	0	0	0	0	**314**	5	0	**319**	0	0	0	0	0	463
Total Volume	32	630	0	0	662	2	0	1	0	3	1	1197	14	0	1212	1	0	0	0	1	1878
% App. Total	4.8	95.2	0	0		66.7	0	33.3	0		0.1	98.8	1.2	0		100	0	0	0		
PHF	.800	.875	.000	.000	.885	.500	.000	.250	.000	.750	.250	.953	.700	.000	.950	.250	.000	.000	.000	.250	.956
Passenger Vehicles	31	614	0	0	645	2	0	1	0	3	1	1174									
% Passenger Vehicles	96.9	97.5	0	0	97.4	100	0	100	0	100	100	98.1	100	0	98.1	100	0	0	0	100	97.9
Heavy Vehicles	1	16	0	0	17	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	40
% Heavy Vehicles	3.1	2.5	0	0	2.6	0	0	0	0	0	0	1.9	0	0	1.9	0	0	0	0	0	2.1

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752

N/S: Main Street
E/W: Ace Hardware North Driveway
Groton, MA

File Name : 604-Main St at Ace Drive North PM
Site Code : 60400004
Start Date : 5/25/2011
Page No : 2



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Page No : 1

Groups Printed- All Vehicles

	Main Street From North				Main Street From South				Ace Hardware North Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	1	0	0	1	0	1	0	1	0	0	0	0	2
04:30 PM	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	2	0	0	2	0	0	0	0	0	0	0	0	2
Total	4	0	0	4	0	1	0	1	0	0	0	0	5
05:00 PM	3	0	0	3	0	1	0	1	0	0	0	0	4
05:15 PM	4	0	0	4	0	1	0	1	0	0	0	0	5
05:30 PM	1	0	0	1	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
Total	8	0	0	8	0	2	0	2	0	0	0	0	10
Grand Total	12	0	0	12	0	3	0	3	0	0	0	0	15
Apprch %	100	0	0		0	100	0		0	0	0		
Total %	80	0	0	80	0	20	0	20	0	0	0	0	

	Main Street From North				Main Street From South				Ace Hardware North Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	3	0	0	3	0	**1**	0	**1**	0	0	0	0	4
05:15 PM	**4**	0	0	**4**	0	1	0	1	0	0	0	0	**5**
05:30 PM	1	0	0	1	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
Total Volume	8	0	0	8	0	2	0	2	0	0	0	0	10
% App. Total	100	0	0		0	100	0		0	0	0		
PHF	.500	.000	.000	.500	.000	.500	.000	.500	.000	.000	.000	.000	.500

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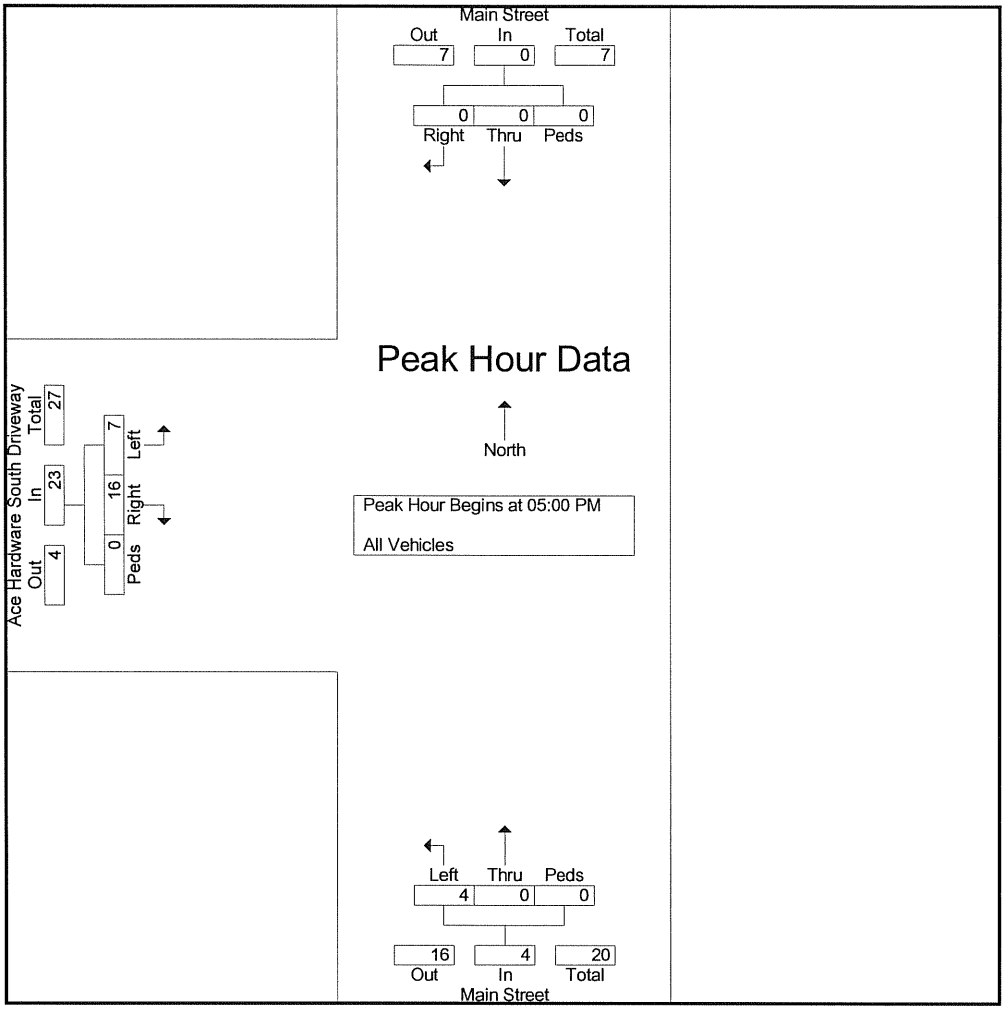

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Groups Printed- All Vehicles

	Main Street From North				Main Street From South				Ace Hardware South Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	1	0	1	2	1	0	3	4
04:30 PM	0	0	0	0	0	1	0	1	3	2	0	5	6
04:45 PM	0	0	0	0	0	1	0	1	3	2	0	5	6
Total	0	0	0	0	0	3	0	3	8	5	0	13	16
05:00 PM	0	0	0	0	0	0	0	0	6	2	0	8	8
05:15 PM	0	0	0	0	0	1	0	1	4	3	0	7	8
05:30 PM	0	0	0	0	0	1	0	1	4	2	0	6	7
05:45 PM	0	0	0	0	0	2	0	2	2	0	0	2	4
Total	0	0	0	0	0	4	0	4	16	7	0	23	27
Grand Total	0	0	0	0	0	7	0	7	24	12	0	36	43
Apprch %	0	0	0		0	100	0		66.7	33.3	0		
Total %	0	0	0	0	0	16.3	0	16.3	55.8	27.9	0	83.7	

	Main Street From North				Main Street From South				Ace Hardware South Driveway From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	0	0	0	0	0	0	0	**6**	2	0	**8**	**8**
05:15 PM	0	0	0	0	0	1	0	1	4	**3**	0	7	8
05:30 PM	0	0	0	0	0	1	0	1	4	2	0	6	7
05:45 PM	0	0	0	0	0	**2**	0	**2**	2	0	0	2	4
Total Volume	0	0	0	0	0	4	0	4	16	7	0	23	27
% App. Total	0	0	0		0	100	0		69.6	30.4	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.667	.583	.000	.719	.844

□ Seasonal/ Yearly Growth Data

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 403 - CONCORD - RTE.2 - EAST OF CONCORD ROTARY

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	May Adjustment
05	41,051	43,677	45,426	46,370	46,939	51,129	44,632	46,318	46,004	49,000	45,178	*43,329*	45,754	0.97
	8%	0%	2%	-2%	-1%	-3%	-3%	-2%	0%	0%	0%	0%	0%	
06	44,150	43,659	46,395	45,607	46,453	49,481	43,449	45,449	45,925	49,000	44,963	*43,417*	45,662	0.98
	-5%	-4%	-5%	-2%	1%	-1%	2%	0%	-1%	0%	-4%	-4%	-2%	
07	41,988	41,749	43,930	44,696	46,932	49,031	44,131	45,508	45,546	49,000	43,366	41,478	44,780	0.95
	2%	2%	-1%	2%	-3%	-3%	-1%	-4%	-1%	-5%	-3%	-4%	-1%	
08	43,000	42,665	43,583	45,399	45,662	47,666	43,805	43,567	45,196	46,795	42,144	39,843	44,110	0.97
												Growth	**-1.21%**	0.97

STATION 4114 - CHELMSFORD - LOWELL CONNECTOR - SOUTH OF RTE.I-495

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
06	24,000	24,426	26,340	24,316	24,030	24,620	23,036	23,217	24,200	25,148	25,140	23,281	24,313	1.01
	-2%	-1%	-5%	2%	5%	1%	1%	6%	3%	6%	-1%	6%	2%	
07	23,503	24,074	25,046	24,685	25,137	24,905	23,225	24,568	24,868	26,610	24,930	*24,633*	24,682	0.98
	14%	3%	4%	5%	0%	0%	4%	-2%	3%	0%	-3%	-3%	2%	
08	26,823	24,798	26,000	26,021	25,223	24,987	24,237	23,980	25,730	26,585	24,120	*24,000*	25,209	1.00
	-14%	1%	-3%	-1%	-2%	2%	2%	-1%	2%	2%	5%	4%	0%	
09	23,134	24,965	25,163	25,832	24,792	25,548	24,720	23,857	26,189	27,028	25,256	*24,945*	25,119	1.01
												Growth	**1.10%**	1.00

STATION 4080 - LOWELL - LOWELL CONNECTOR - SOUTH OF PLAIN ST.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
06	35,000	36,475	39,150	37,961	37,617	38,268	34,588	36,654	37,876	38,777	38,051	36,612	37,252	0.99
	6%	5%	-1%	0%	2%	0%	4%	2%	-1%	4%	1%	2%	2%	
07	37,210	38,289	38,662	37,879	38,471	38,241	35,883	37,385	37,647	40,173	38,551	37,341	37,978	0.99
	0%	-1%	-1%	4%	0%	-2%	1%	-3%	2%	0%	-3%	-2%	0%	
08	37,200	38,079	38,400	39,408	38,350	37,620	36,393	36,443	38,422	40,056	37,433	36,480	37,857	0.99
	-1%	3%	1%	1%	-1%	3%	5%	0%	2%	1%	13%	6%	3%	
09	36,722	39,072	38,807	39,637	37,923	38,683	38,076	36,597	39,011	40,508	42,224	38,806	38,839	1.02
												Growth	**1.41%**	1.00

STATION 4170 - CHELMSFORD - RTE.I-495 - NORTH OF RTE. 4

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
06	100,000	102,000	102,000	104,000	103,243	108,638	117,000	117,356	105,105	102,950	98,868	92,481	104,470	1.01
	-8%	-7%	-8%	-8%	1%	1%	-3%	2%	1%	2%	-3%	-5%	-3%	
07	91,950	94,873	94,099	95,258	103,802	109,192	113,808	120,103	106,428	105,467	95,598	*88,019*	101,550	0.98
	-10%	-6%	1%	1%	-4%	-4%	-5%	-7%	-3%	-3%	-3%	-2%	-4%	
08	82,908	89,494	95,000	96,549	99,670	104,487	107,612	111,258	103,346	101,899	92,885	*86,352*	97,622	0.98
	4%	0%	-7%	1%	-1%	1%	3%	1%	0%	-1%	1%	4%	1%	
09	86,006	89,523	88,806	97,307	98,894	105,468	111,003	112,512	103,316	100,554	94,083	*90,186*	98,138	0.99
												Growth	**-2.04%**	0.99

Average Month Adjustment Factor **0.99**

Average Yearly Growth Calculated -0.2%
Yearly Growth Factor Used **1.0%**

ITALICS = ESTIMATED DATA
MADT

□ Crash Data

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Groton, MA COUNT DATE : May-11 **MHD USE ONLY**

DISTRICT : 4 UNSIGNALIZED : x SIGNALIZED : Source #

~ INTERSECTION DATA ~

MAJOR STREET : Main Street Routes 119/125) ST #

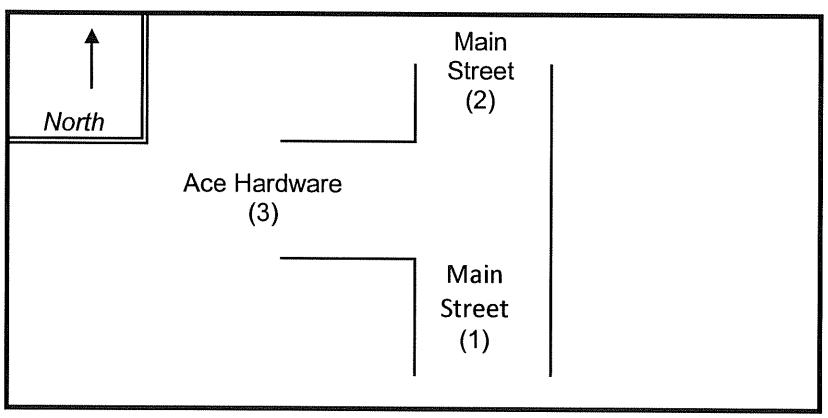
MINOR STREET(S) : Ace Hardware ST #

ST #

ST #

ST #

INTERSECTION DIAGRAM
(Label Approaches)



INTERSECTION REF #

(1)

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (**PM**) :	1,199	646	23	0		**1,868**

" K " FACTOR : **0.08** APPROACH ADT : **23,350** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 3 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : **1.00**

CRASH RATE CALCULATION : 0.12 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments :

Project Title & Date: 604 - Groton

massDOT

MassDOT Crash Report for Groton for the year 2009

Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type

MASS HIGHWAY

MassHighway Crash Report for Groton in the year 2007

ash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
18688	GROTON	16-Aug-2007	5:40 PM	Property damage only (none injured)	2	0	0	Sideswipe, same direction	V1: Travelling straight ahead / V2:Parked	V1:Westbound / V2:Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires / V2:Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Daylight	Clear		140 MAIN STREET				
22541	GROTON	24-Aug-2007	1:10 PM	Property damage only (none injured)	4	0	0	Rear-end	V1: Slowing or stopped in traffic / V2:Slowing or stopped in traffic / V3:Slowing or stopped in traffic / V4:Travelling straight ahead	V1:Eastbound / V2:Eastbound / V3:Eastbound / V4:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic / V3: Collision with motor vehicle in traffic / V4: Collision with motor vehicle in traffic	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires / V2:Light truck(van, mini-van, panel, pickup, sport utility) with only four tires / V3:Passenger car / V4:Passenger car	Dry	Daylight	Clear		145 MAIN STREET Rte 119 E				

massDOT

MassDOT Crash Report for Groton for the year 2008

ash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
25001	GROTON	07-May-2008	6:37 PM	Property damage only (none injured)	2	0	0	Rear-end	V1: Slowing or stopped in traffic / V2:Travelling straight ahead	V1:Eastbound / V2:Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Passenger car / V2:Passenger car	Dry	Daylight	Clear		145 MAIN STREET Rte 119 E				

□ Trip Generation Calculations

Institute of Transportation Engineers (ITE) 8th Edition
Land Use Code (LUC) 220 - Apartment

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 3

AVERAGE WEEKDAY DAILY

T = 6.65 * X
T = 6.65 * 3
T = 19.95
T = 20 vehicle trips
with 50% (**10** vpd) entering and 50% (**10** vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.51 * X
T = 0.51 * 3
T = 1.53
T = 2 vehicle trips
with 20% (**0** vph) entering and 80% (**2** vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.62 * X
T = 0.62 * 3
T = 1.86
T = 2 vehicle trips
with 65% (**1** vph) entering and 35% (**1** vph) exiting.

SATURDAY DAILY

T = 6.39 * X
T = 6.39 * 3
T = 19.17
T = 20 vehicle trips
with 50% (**10** vpd) entering and 50% (**10** vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.52 * X
T = 0.52 * 3
T = 1.56
T = 2 vehicle trips
with 50% (**1** vph) entering and 50% (**1** vph) exiting.

Institute of Transportation Engineers (ITE) 8th Edition
Land Use Code (LUC) 230 - Residential Condominium/Townhouse

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 15

AVERAGE WEEKDAY DAILY

T = 5.81 * (X)
T = 5.81 * 15
T = 87.15
T = 87 vehicle trips
with 50% (44 vpd) entering and 50% (43 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.44 * (X)
T = 0.44 * 15
T = 6.60
T = 7 vehicle trips
with 17% (1 vpd) entering and 83% (6 vpd) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.52 * (X)
T = 0.52 * 15
T = 7.80
T = 8 vehicle trips
with 67% (5 vpd) entering and 33% (3 vpd) exiting.

SATURDAY DAILY

T = 5.67 * (X)
T = 5.67 * 15
T = 85.05
T = 85 vehicle trips
with 50% (43 vpd) entering and 50% (42 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.47 * (X)
T = 0.47 * 15
T = 7.05
T = 7 vehicle trips
with 54% (4 vpd) entering and 46% (3 vpd) exiting.

Institute of Transportation Engineers (ITE) 8th Edition
Land Use Code (LUC) 720 - Medical-Dental Office Building

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
Independent Variable (X): 2.50

AVERAGE WEEKDAY DAILY

T = 36.13 * (X)
T = 36.13 * 2.50
T = 90.33
T = 90 vehicle trips
with 50% (45 vpd) entering and 50% (45 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 2.30* (X)
T = 2.30* 2.50
T = 5.75
T = 6 vehicle trips
with 79% (5 vpd) entering and 21% (1 vpd) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 3.46* (X)
T = 3.46* 0.00
T = 8.65
T = 9 vehicle trips
with 27% (2 vpd) entering and 73% (7 vpd) exiting.

SATURDAY DAILY

T = 8.96 * (X)
T = 8.96 * 2.5
T = 22.40
T = 22 vehicle trips
with 50% (11 vpd) entering and 50% (11 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 3.63 * (X)
T = 3.63 * 2.5
T = 9.08
T = 9 vehicle trips
with 57% (5 vph) entering and 43% (4 vph) exiting.

Institute of Transportation Engineers (ITE) 8th Edition
Land Use Code (LUC) 814 - Specialty Retail Center

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 1.00

AVERAGE WEEKDAY DAILY

T = 44.32 * (X) (Small Sample Size - Use with Caution)
T = 44.32 * 1
T = 44.32
T = 44 vehicle trips
with 50% (22 vpd) entering and 50% (22 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\frac{\text{ITE LUC 820 Weekday Morning Trip Rate}}{\text{ITE LUC 820 Weekday Evening Trip Rate}} = \frac{\text{ITE LUC 814 Weekday Morning Trip Rate}}{\text{ITE LUC 814 Weekday Evening Trip Rate}}$$

$$\frac{1.00}{3.73} = \frac{(Y)}{2.71} \qquad Y = 0.72654155$$

T = Y * 1.0
T = 0.7265
T = 1 vehicle trips
with 61% (0 vph) entering and 39% (1 vph) exiting.

(same distribution split as ITE LUC 820 during the weekday morning peak hour of adjacent street traffic)

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 2.71 * (X) (Small Sample Size - Use with Caution)
T = 2.71 * 1.0
T = 2.71
T = 3 vehicle trips
with 44% (1 vph) entering and 56% (2 vph) exiting.

SATURDAY DAILY

T = 42.040 * (X) (Small Sample Size - Use with Caution)
T = 42.040 * 1
T = 42.04
T = 42 vehicle trips
with 50% (21 vpd) entering and 50% (21 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

$$\frac{\text{ITE LUC 820 Saturday Midday Trip Rate}}{\text{ITE LUC 820 Saturday Daily Trip Rate}} = \frac{\text{ITE LUC 814 Saturday Midday Trip Rate}}{\text{ITE LUC 814 Saturday Daily Trip Rate}}$$

$$\frac{4.89}{49.97} = \frac{(Y)}{42.04} \qquad Y = 4.11398039$$

T = Y * 1.0
T = 4.114
T = 4 vehicle trips
with 52% (2 vph) entering and 48% (2 vph) exiting.

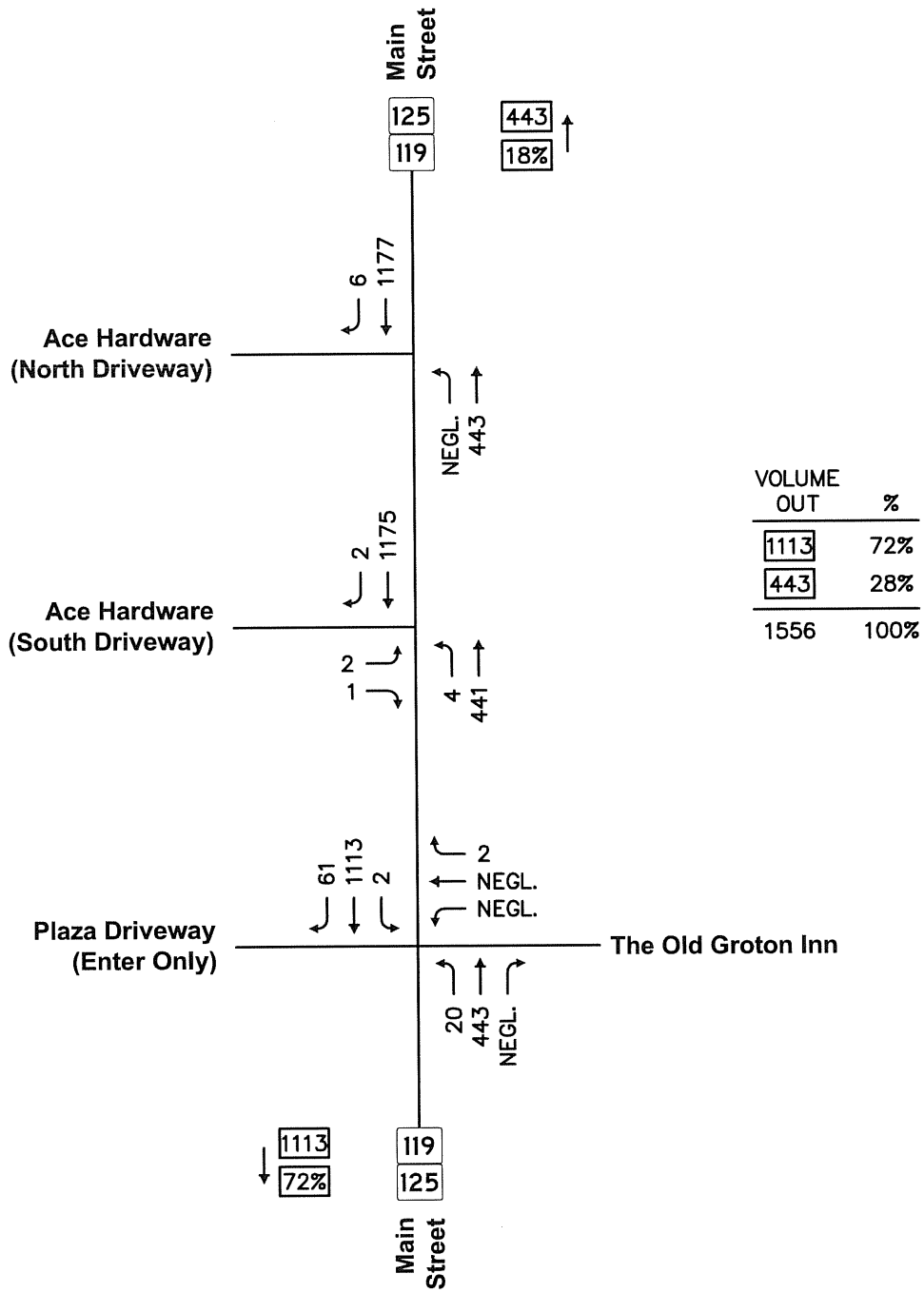
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Summary

Pass-By: 0.25

	Total	Pass-By	Net New
PM			
In	1	0	**1**
Out	2	0	**2**
Total	3	1	**2**
Sat			
In	2	1	**1**
Out	2	1	**2**
Total	4	1	**3**
Daily			
In	22	6	**17**
Out	22	6	**17**
Total	44	11	**33**
Sat Daily			
In	21	5	**16**
Out	21	5	**16**
Total	42	11	**32**

□ Trip Distribution Calculations



VOLUME OUT	%
1113	72%
443	28%
1556	100%

North

Scale: Not to Scale

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Trip Distribution
Step 1
Weekday Morning Peak Hour Volumes

Date: June 2011
Dwg No. 604 TIAS.dwg
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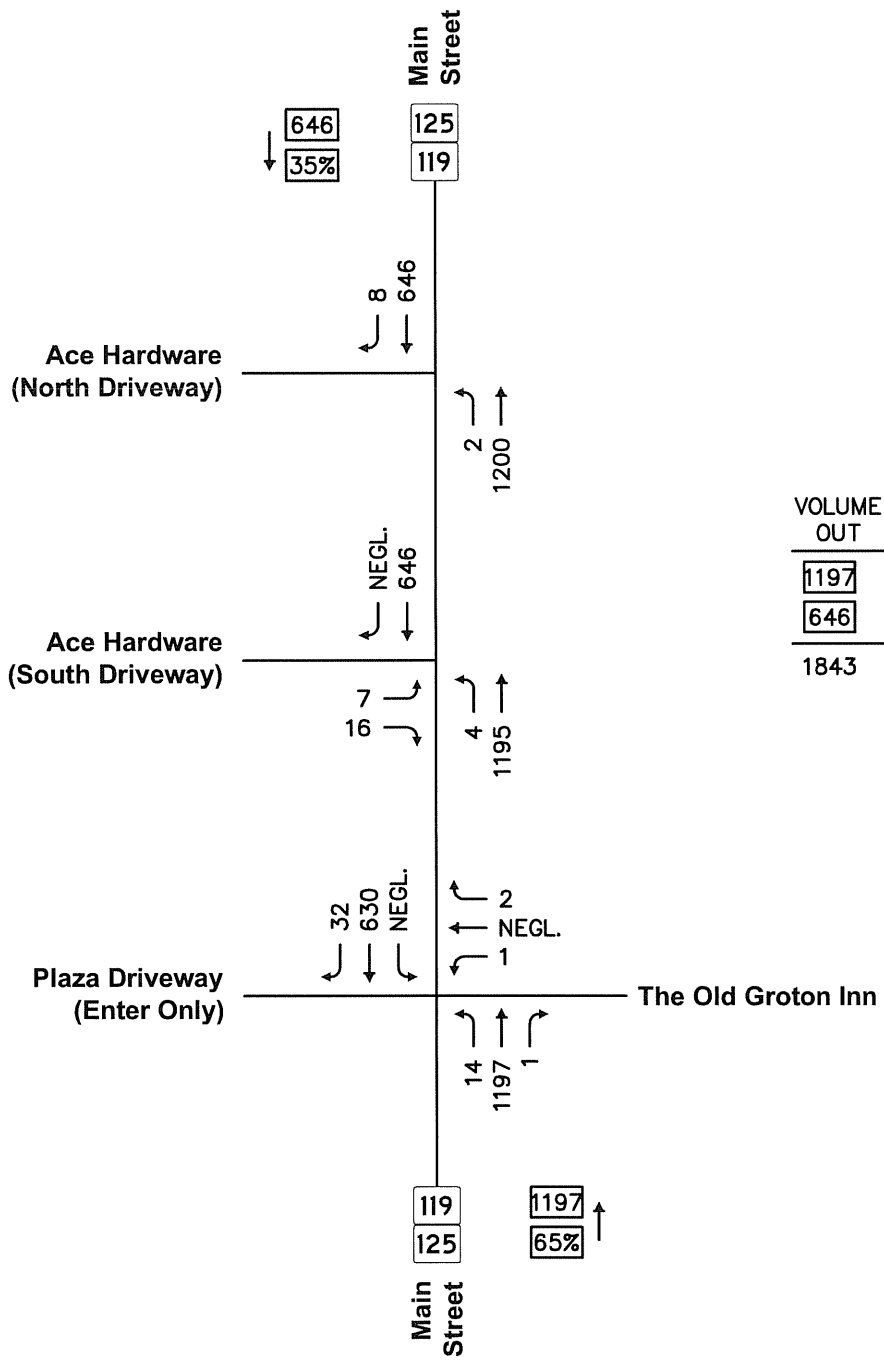
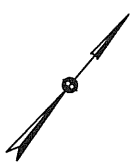


VOLUME OUT	%
1197	65%
646	35%
1843	100%



North

Scale: Not to Scale

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Trip Distribution
Step 2
Weekday Evening Peak Hour Volumes

Date: June 2011
Dwg No. 604 TIAS.dwg
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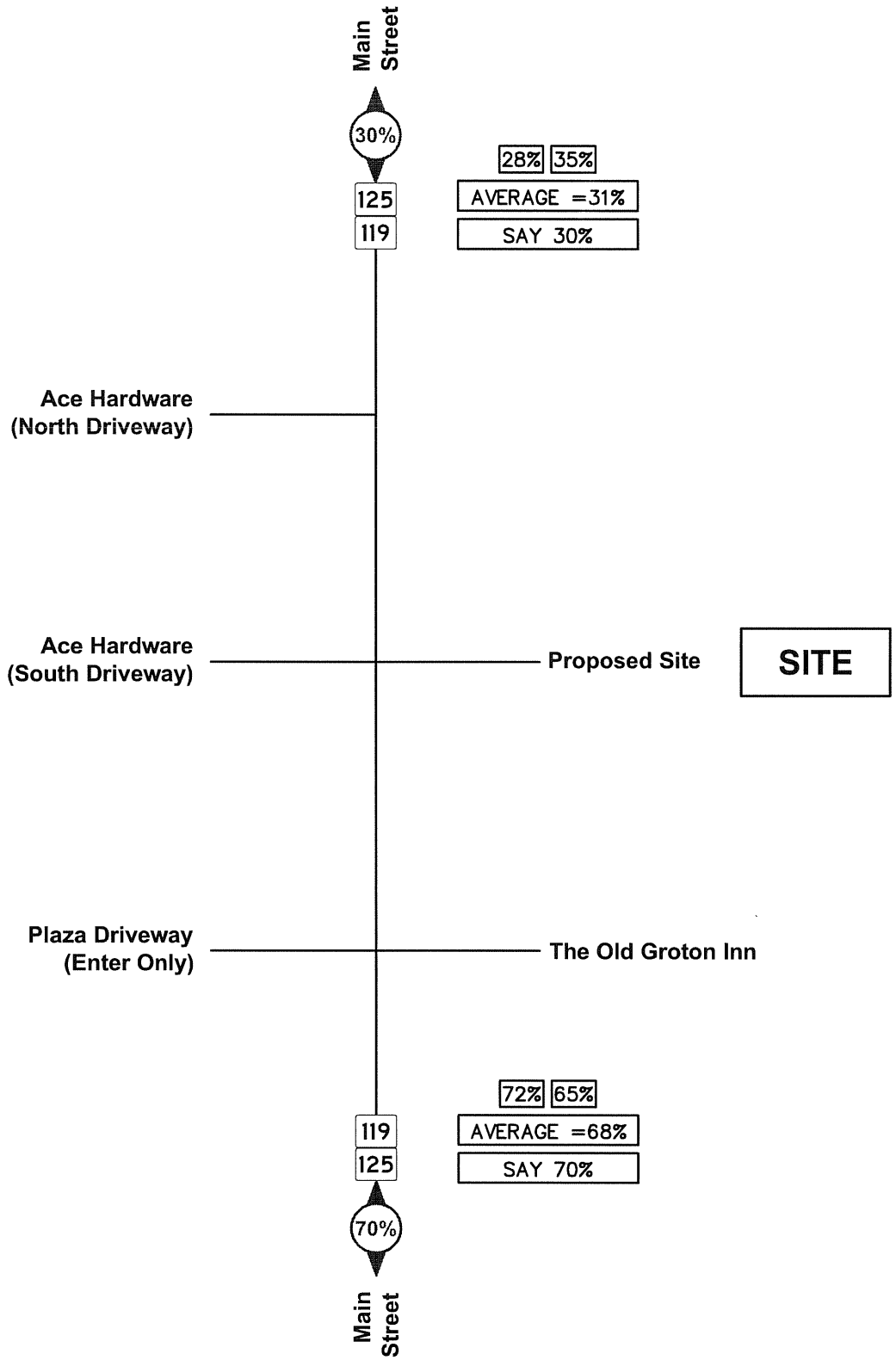

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Trip Distribution
Step 3
Average of Weekday Morning & Evening Peak Hour Volumes

Date: June 2011
Dwg No. 604 TIAS.dwg
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□ Capacity Analyses

LEVEL OF SERVICE METHODOLOGY

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2000 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

Signalized Intersection Performance Measures

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

The LOS for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*.[1] This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. **Table A1** summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table A1
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[1]

Level of Service	Control (Signal) Delay per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[1]Source: *Highway Capacity Manual 2000;* Transportation Research Board; Washington, DC; 2000.

[1]*Highway Capacity Manual* 2000; Transportation Research Board; Washington, DC; 2000.

Unsignalized Intersection Performance Measures

The six LOS designations for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The LOS designations of unsignalized intersections are determined by application of a procedure described in the 2000 *Highway Capacity Manual.*[2] LOS is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for LOS at unsignalized intersections are also given in the *Highway Capacity Manual 2000*. **Table A2** summarizes the relationship between LOS and average control delay.

Table A2
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[1]

Level of Service	Average Control Delay (seconds per vehicle)
A	≤ 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	>50.0

[1]Source: *Highway Capacity Manual 2000,* Transportation Research Board; Washington, DC; 2000.

[2] ibid

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	2	1	4	441	1175	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	1	4	459	1224	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1693	1225	1226			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1693	1225	1226			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	99			
cM capacity (veh/h)	103	220	576			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	464	1226
Volume Left	2	4	0
Volume Right	1	0	2
cSH	125	576	1700
Volume to Capacity	0.03	0.01	0.72
Queue Length 95th (ft)	2	1	0
Control Delay (s)	34.6	0.2	0.0
Lane LOS	D	A	
Approach Delay (s)	34.6	0.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	443	1177	6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	461	1226	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1691	1229	1232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1691	1229	1232			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	104	219	572			

Direction, Lane #	NB 1	SB 1
Volume Total	461	1232
Volume Left	0	0
Volume Right	0	6
cSH	572	1700
Volume to Capacity	0.00	0.72
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	2	20	443	0	2	1113	61
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	0	0	2	21	461	0	2	1159	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1701	1698	1191	1698	1730	461	1223			461		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1701	1698	1191	1698	1730	461	1223			461		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	96			100		
cM capacity (veh/h)	71	90	230	72	86	512	577			1110		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	482	1225
Volume Left	0	21	2
Volume Right	2	0	64
cSH	512	577	1110
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	3	0
Control Delay (s)	12.1	1.0	0.1
Lane LOS	B	A	A
Approach Delay (s)	12.1	1.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	2	1	4	464	1235	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	1	4	483	1286	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1779	1288	1289			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1779	1288	1289			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	91	202	545			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	488	1289
Volume Left	2	4	0
Volume Right	1	0	2
cSH	111	545	1700
Volume to Capacity	0.03	0.01	0.76
Queue Length 95th (ft)	2	1	0
Control Delay (s)	38.3	0.2	0.0
Lane LOS	E	A	
Approach Delay (s)	38.3	0.2	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	466	1237	6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	485	1289	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1777	1292	1295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1777	1292	1295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	92	201	542			

Direction, Lane #	NB 1	SB 1
Volume Total	485	1295
Volume Left	0	0
Volume Right	0	6
cSH	542	1700
Volume to Capacity	0.00	0.76
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	2	20	466	0	2	1173	61
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	0	0	2	21	485	0	2	1222	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1787	1785	1254	1785	1817	485	1285			485		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1787	1785	1254	1785	1817	485	1285			485		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	96			100		
cM capacity (veh/h)	62	79	212	62	76	496	546			1088		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	506	1288
Volume Left	0	21	2
Volume Right	2	0	64
cSH	496	546	1088
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	3	0
Control Delay (s)	12.3	1.1	0.1
Lane LOS	B	A	A
Approach Delay (s)	12.3	1.1	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	0	1	7	0	3	4	464	4	2	1235	2
Peak Hour Factor	0.96	0.92	0.96	0.92	0.92	0.92	0.96	0.96	0.92	0.92	0.96	0.96
Hourly flow rate (vph)	2	0	1	8	0	3	4	483	4	2	1286	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1789	1788	1288	1787	1787	486	1289			488		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1789	1788	1288	1787	1787	486	1289			488		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	99	88	100	99	99			100		
cM capacity (veh/h)	63	80	202	62	81	582	545			1075		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	11	492	1291
Volume Left	2	8	4	2
Volume Right	1	3	4	2
cSH	82	85	545	1075
Volume to Capacity	0.04	0.13	0.01	0.00
Queue Length 95th (ft)	3	10	1	0
Control Delay (s)	50.8	53.3	0.2	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	50.8	53.3	0.2	0.1
Approach LOS	F	F		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	469	1239	6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	489	1291	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1782	1294	1297			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1782	1294	1297			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	91	201	541			

Direction, Lane #	NB 1	SB 1
Volume Total	489	1297
Volume Left	0	0
Volume Right	0	6
cSH	541	1700
Volume to Capacity	0.00	0.76
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	0	2	20	470	0	2	1180	61
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	0	0	2	21	490	0	2	1229	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1798	1796	1261	1796	1828	490	1293			490		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1798	1796	1261	1796	1828	490	1293			490		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.7	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	96			100		
cM capacity (veh/h)	61	78	210	61	74	493	543			1084		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	510	1295
Volume Left	0	21	2
Volume Right	2	0	64
cSH	493	543	1084
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	3	0
Control Delay (s)	12.3	1.1	0.1
Lane LOS	B	A	A
Approach Delay (s)	12.3	1.1	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	7	16	4	1195	646	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	17	4	1245	673	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1926	673	673			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1926	673	673			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	96	100			
cM capacity (veh/h)	74	459	927			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	1249	673
Volume Left	7	4	0
Volume Right	17	0	0
cSH	177	927	1700
Volume to Capacity	0.14	0.00	0.40
Queue Length 95th (ft)	11	0	0
Control Delay (s)	28.4	0.2	0.0
Lane LOS	D	A	
Approach Delay (s)	28.4	0.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	2	1200	646	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	2	1250	673	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1931	677	681			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1931	677	681			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	73	456	921			

Direction, Lane #	NB 1	SB 1
Volume Total	1252	681
Volume Left	2	0
Volume Right	0	8
cSH	921	1700
Volume to Capacity	0.00	0.40
Queue Length 95th (ft)	0	0
Control Delay (s)	0.1	0.0
Lane LOS	A	
Approach Delay (s)	0.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	2	14	1197	1	0	630	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	1	0	2	15	1247	1	0	656	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1952	1950	673	1949	1966	1247	690			1248		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1952	1950	673	1949	1966	1247	690			1248		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	100	99	98			100		
cM capacity (veh/h)	48	64	459	48	63	214	914			565		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	1262	690
Volume Left	1	15	0
Volume Right	2	1	33
cSH	100	914	565
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (ft)	2	1	0
Control Delay (s)	42.1	0.6	0.0
Lane LOS	E	A	
Approach Delay (s)	42.1	0.6	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	7	16	4	1256	679	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	17	4	1308	707	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2024	707	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2024	707	707			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	100			
cM capacity (veh/h)	64	439	901			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	1312	707
Volume Left	7	4	0
Volume Right	17	0	0
cSH	158	901	1700
Volume to Capacity	0.15	0.00	0.42
Queue Length 95th (ft)	13	0	0
Control Delay (s)	31.8	0.2	0.0
Lane LOS	D	A	
Approach Delay (s)	31.8	0.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		79.3%	ICU Level of Service D
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	2	1261	679	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	2	1314	707	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2029	711	716			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2029	711	716			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	64	436	894			

Direction, Lane #	NB 1	SB 1
Volume Total	1316	716
Volume Left	2	0
Volume Right	0	8
cSH	894	1700
Volume to Capacity	0.00	0.42
Queue Length 95th (ft)	0	0
Control Delay (s)	0.1	0.0
Lane LOS	A	
Approach Delay (s)	0.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	2	14	1258	1	0	663	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	1	0	2	15	1310	1	0	691	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2049	2048	707	2047	2064	1311	724			1311		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2049	2048	707	2047	2064	1311	724			1311		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	100	99	98			100		
cM capacity (veh/h)	41	56	439	41	54	196	888			534		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	1326	724
Volume Left	1	15	0
Volume Right	2	1	33
cSH	87	888	534
Volume to Capacity	0.04	0.02	0.00
Queue Length 95th (ft)	3	1	0
Control Delay (s)	47.8	0.7	0.0
Lane LOS	E	A	
Approach Delay (s)	47.8	0.7	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	0	16	9	0	4	4	1256	6	3	679	0
Peak Hour Factor	0.96	0.92	0.96	0.92	0.92	0.92	0.96	0.96	0.92	0.92	0.96	0.96
Hourly flow rate (vph)	7	0	17	10	0	4	4	1308	7	3	707	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2038	2037	707	2050	2034	1312	707			1315		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2038	2037	707	2050	2034	1312	707			1315		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	96	75	100	98	100			99		
cM capacity (veh/h)	41	56	439	39	56	194	901			526		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	24	14	1319	711
Volume Left	7	10	4	3
Volume Right	17	4	7	0
cSH	111	52	901	526
Volume to Capacity	0.22	0.27	0.00	0.01
Queue Length 95th (ft)	19	23	0	0
Control Delay (s)	46.0	98.4	0.2	0.2
Lane LOS	E	F	A	A
Approach Delay (s)	46.0	98.4	0.2	0.2
Approach LOS	E	F		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	2	1265	682	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	2	1318	710	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2036	715	719			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2036	715	719			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	63	434	892			

Direction, Lane #	NB 1	SB 1
Volume Total	1320	719
Volume Left	2	0
Volume Right	0	8
cSH	892	1700
Volume to Capacity	0.00	0.42
Queue Length 95th (ft)	0	0
Control Delay (s)	0.1	0.0
Lane LOS	A	
Approach Delay (s)	0.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	2	14	1264	1	0	672	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	1	0	2	15	1317	1	0	700	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2065	2064	717	2063	2080	1317	733			1318		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2065	2064	717	2063	2080	1317	733			1318		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	100	99	98			100		
cM capacity (veh/h)	40	54	433	40	53	194	881			531		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	1332	733
Volume Left	1	15	0
Volume Right	2	1	33
cSH	85	881	531
Volume to Capacity	0.04	0.02	0.00
Queue Length 95th (ft)	3	1	0
Control Delay (s)	48.8	0.8	0.0
Lane LOS	E	A	
Approach Delay (s)	48.8	0.8	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

□ Sight Distance Calculations

Metric				US Customary			
Design speed (km/h)	Stopping sight distance (m)	Intersection sight distance for passenger cars: Calculated (m)	Intersection sight distance for passenger cars: Design (m)	Design speed (mph)	Stopping sight distance (ft)	Intersection sight distance for passenger cars: Calculated (ft)	Intersection sight distance for passenger cars: Design (ft)
20	20	41.7	45	15	80	165.4	170
30	35	62.6	65	20	115	220.5	225
40	50	83.4	85	25	155	275.6	280
50	65	104.3	105	30	200	330.8	335
60	85	125.1	130	35	250	385.9	390
70	105	146.0	150	40	305	441.0	445
80	130	166.8	170	45	360	496.1	500
90	160	187.7	190	50	425	551.3	555
100	185	208.5	210	55	495	606.4	610
110	220	229.4	230	60	570	661.5	665
120	250	250.2	255	65	645	716.6	720
130	285	271.1	275	70	730	771.8	775
				75	820	826.9	830
				80	910	882.0	885

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

Exhibit 9-55. Design Intersection Sight Distance—Case B1—Left Turn from Stop

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m [3 ft] at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (Case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of Case B3.

If the design vehicle can be stored in the median with adequate clearance to the through lanes, a departure sight triangle to the right for left turns should be provided for that design vehicle turning left from the median roadway. Where the median is not wide enough to store the design vehicle, a departure sight triangle should be provided for that design vehicle to turn left from the minor-road approach.

The median width should be considered in determining the number of lanes to be crossed. The median width should be converted to equivalent lanes. For example, a 7.2-m [24-ft] median should be considered as two additional lanes to be crossed in applying the multilane highway adjustment for time gaps in Exhibit 9-54. Furthermore, a departure sight triangle for left turns

Design vehicle	Time gap (t_g) (seconds) at design speed of major road
Passenger car	6.5
Single-unit truck	8.5
Combination truck	10.5

Note: Time gaps are for a stopped vehicle to turn right onto or cross a two-lane highway with no median and grades 3 percent or less. The table values require adjustment as follows:

For multilane highways:

For crossing a major road with more than two lanes, add 0.5 seconds for passenger cars and 0.7 seconds for trucks for each additional lane to be crossed and for narrow medians that cannot store the design vehicle.

For minor road approach grades:

If the approach grade is an upgrade that exceeds 3 percent, add 0.1 seconds for each percent grade.

Exhibit 9-57. Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Metric				US Customary			
Design speed (km/h)	Stopping sight distance (m)	Intersection sight distance for passenger cars: Calculated (m)	Intersection sight distance for passenger cars: Design (m)	Design speed (mph)	Stopping sight distance (ft)	Intersection sight distance for passenger cars: Calculated (ft)	Intersection sight distance for passenger cars: Design (ft)
20	20	36.1	40	15	80	143.3	145
30	35	54.2	55	20	115	191.1	195
40	50	72.3	75	25	155	238.9	240
50	65	90.4	95	30	200	286.7	290
60	85	108.4	110	35	250	334.4	335
70	105	126.5	130	40	305	382.2	385
80	130	144.6	145	45	360	430.0	430
90	160	162.6	165	50	425	477.8	480
100	185	180.7	185	55	495	525.5	530
110	220	198.8	200	60	570	573.3	575
120	250	216.8	220	65	645	621.1	625
130	285	234.9	235	70	730	668.9	670
				75	820	716.6	720
				80	910	764.4	765

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or cross a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

Exhibit 9-58. Design Intersection Sight Distance—Case B2—Right Turn from Stop and Case B3—Crossing Maneuver