3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Friday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	181	28	119	219	38	104
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.75	0.50	0.89	0.78	0.50	0.81
Hourly flow rate (vph)	241	56	134	281	76	128
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	554	274			414	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	274			414	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	48	93			93	
cM capacity (veh/h)	463	769			1155	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	297	414	204
Volume Left	241	0	76
Volume Right	56	281	0
cSH	501	1700	1155
Volume to Capacity	0.59	0.24	0.07
Queue Length 95th (ft)	95	0	5
Control Delay (s)	22.1	0.0	3.5
Lane LOS	C		A
Approach Delay (s)	22.1	0.0	3.5
Approach LOS	C		

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{5115.9}{689}$ = 7.4 sec/veh = LOS A

3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Friday)

3/29/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	181	28	119	219	38	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	4%		1%			-1%
Total Lost time (s)	6.0		6.0	6.0		6.0
Lane Util. Factor	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		0.98
Satd. Flow (prot)	1686		1809	1553		1812
Flt Permitted	0.96		1.00	1.00		0.85
Satd. Flow (perm)	1686		1809	1553		1575
Peak-hour factor, PHF	0.75	0.50	0.89	0.78	0.50	0.81
Adj. Flow (vph)	241	56	134	281	76	128
RTOR Reduction (vph)	16	0	0	133	0	0
Lane Group Flow (vph)	281	0	134	148	0	204
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	14.2		29.3	29.3		29.3
Effective Green, g (s)	14.2		29.3	29.3		29.3
Actuated g/C Ratio	0.26		0.53	0.53		0.53
Clearance Time (s)	6.0		6.0	6.0		6.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	431		955	820		831
v/s Ratio Prot	c0.17		0.07			
v/s Ratio Perm				0.10		c0.13
v/c Ratio	0.65		0.14	0.18		0.25
Uniform Delay, d1	18.4		6.7	6.8		7.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.5		0.3	0.5		0.7
Delay (s)	22.0		7.0	7.3		7.8
Level of Service	C		A	A		A
Approach Delay (s)	22.0		7.2			7.8
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

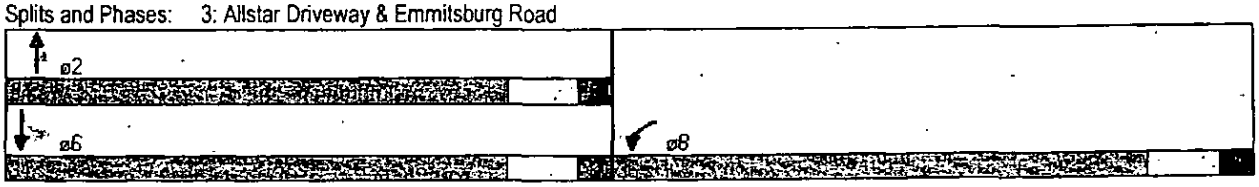
c Critical Lane Group

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	181	119	219	38	104
Lane Group Flow (vph)	297	134	281	0	204
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0
Total Split (s)	36.0	34.0	34.0	34.0	34.0
Total Split (%)	51.4%	48.6%	48.6%	48.6%	48.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
v/c Ratio	0.67	0.14	0.29		0.25
Control Delay	24.4	8.4	2.4		9.2
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	24.4	8.4	2.4		9.2
Queue Length 50th (ft)	78	20	0		32
Queue Length 95th (ft)	111	53	21		71
Internal Link Dist (ft)	517	388			297
Turn Bay Length (ft)			150		
Base Capacity (vph)	923	955	953		832
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.32	0.14	0.29		0.25

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 55.6
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Allstar Driveway & Emmitsburg Road



3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes without Development - PM Peak (Friday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	8	124	27	17	108
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.75	0.50	0.89	0.78	0.50	0.81
Hourly flow rate (vph)	4	16	139	35	34	133
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	358	157			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	157			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	629	894			1415	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	174	167
Volume Left	4	0	34
Volume Right	16	35	0
cSH	824	1700	1415
Volume to Capacity	0.02	0.10	0.02
Queue Length 95th (ft)	2	0	2
Control Delay (s)	9.5	0.0	1.7
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	1.7
Approach LOS	A		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{317}{287}$ = 1.1 sec/veh = LOS A

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Friday) 3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	181	28	124	221	39	108
Sign Control	Stop		Free			Free
Grade	-4%		1%			-1%
Peak Hour Factor	0.75	0.50	0.89	0.78	0.50	0.81
Hourly flow rate (vph)	241	56	139	283	78	133
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	570	281			423	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	281			423	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	47	93			93	
cM capacity (veh/h)	453	762			1147	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	297	423	211
Volume Left	241	0	78
Volume Right	56	283	0
cSH	490	1700	1147
Volume to Capacity	0.61	0.25	0.07
Queue Length 95th (ft)	99	0	5
Control Delay (s)	23.0	0.0	3.5
Lane LOS	C		A
Approach Delay (s)	23.0	0.0	3.5
Approach LOS	C		

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{5321.5}{701}$ = 7.6 sec/veh = LOS A

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Friday)

3/29/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	181	28	124	221	39	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	4%		1%			-1%
Total Lost time (s)	6.0		6.0	6.0		6.0
Lane Util. Factor	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		0.98
Satd. Flow (prot)	1686		1809	1553		1812
Flt Permitted	0.96		1.00	1.00		0.85
Satd. Flow (perm)	1686		1809	1553		1572
Peak-hour factor, PHF	0.75	0.50	0.89	0.78	0.50	0.81
Adj. Flow (vph)	241	56	139	283	78	133
RTOR Reduction (vph)	16	0	0	134	0	0
Lane Group Flow (vph)	281	0	139	149	0	211
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	14.2		29.3	29.3		29.3
Effective Green, g (s)	14.2		29.3	29.3		29.3
Actuated g/C Ratio	0.26		0.53	0.53		0.53
Clearance Time (s)	6.0		6.0	6.0		6.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	431		955	820		830
v/s Ratio Prot	c0.17		0.08			
v/s Ratio Perm				0.10		c0.13
v/c Ratio	0.65		0.15	0.18		0.25
Uniform Delay, d1	18.4		6.7	6.8		7.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.5		0.3	0.5		0.7
Delay (s)	22.0		7.0	7.3		7.9
Level of Service	C		A	A		A
Approach Delay (s)	22.0		7.2			7.9
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Friday)

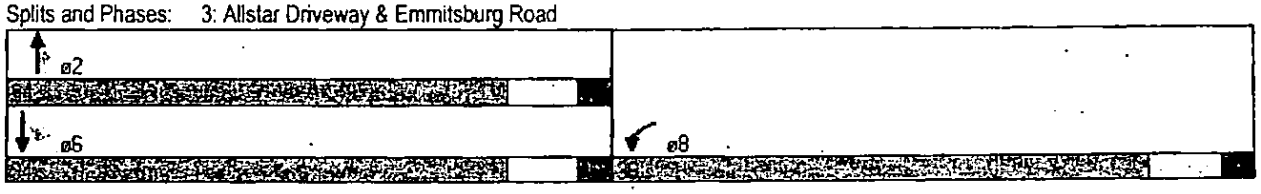
3/29/2010

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	181	124	221	39	108
Lane Group Flow (vph)	297	139	283	0	211
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0
Total Split (s)	36.0	34.0	34.0	34.0	34.0
Total Split (%)	51.4%	48.6%	48.6%	48.6%	48.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
v/c Ratio	0.67	0.15	0.30		0.25
Control Delay	24.4	8.4	2.4		9.3
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	24.4	8.4	2.4		9.3
Queue Length 50th (ft)	78	21	0		34
Queue Length 95th (ft)	111	55	21		74
Internal Link Dist (ft)	517	388			297
Turn Bay Length (ft)			150		
Base Capacity (vph)	923	955	954		831
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.32	0.15	0.30		0.25

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 55.6
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Allstar Driveway & Emmitsburg Road



3: Allstar Driveway & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Saturday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	11	12	105	10	13	143
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.38	0.63	0.67	0.67	0.55	0.84
Hourly flow rate (vph)	29	19	157	15	24	170
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	382	164			172	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	164			172	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			98	
cM capacity (veh/h)	614	885			1418	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	172	194
Volume Left	29	0	24
Volume Right	19	15	0
cSH	699	1700	1418
Volume to Capacity	0.07	0.10	0.02
Queue Length 95th (ft)	6	0	1
Control Delay (s)	10.5	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{397.5}{294}$ = 1.4 sec/veh = LOS A

3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes without Development - PM Peak (Saturday) 3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	11	12	107	10	13	145
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.38	0.63	0.67	0.67	0.55	0.84
Hourly flow rate (vph)	29	19	160	15	24	173
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	387	167			175	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387	167			175	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			98	
cM capacity (veh/h)	609	882			1414	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	175	196
Volume Left	29	0	24
Volume Right	19	15	0
cSH	695	1700	1414
Volume to Capacity	0.07	0.10	0.02
Queue Length 95th (ft)	6	0	1
Control Delay (s)	10.6	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	10.6	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

$$\text{Overall LOS} = \frac{401.8}{298} = 1.3\ \text{sec/veh} = \text{LOS A}$$

3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Saturday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	205	34	107	237	38	145
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.38	0.63	0.67	0.67	0.55	0.84
Hourly flow rate (vph)	539	54	160	354	69	173
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	647	337			513	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	647	337			513	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	92			93	
cM capacity (veh/h)	409	710			1062	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	593	513	242
Volume Left	539	0	69
Volume Right	54	354	0
cSH	426	1700	1062
Volume to Capacity	1.39	0.30	0.07
Queue Length 95th (ft)	718	0	5
Control Delay (s)	216.8	0.0	2.9
Lane LOS	F		A
Approach Delay (s)	216.8	0.0	2.9
Approach LOS	F		

Intersection Summary			
Average Delay	95.9		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

$$\text{Overall LOS} = \frac{52345.9}{766} = 68.3 \text{ sec/veh} = \text{LOS F}$$

3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes with Dev & Imp - PM Peak (Saturday)

3/29/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	205	34	107	237	38	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	4%		1%			-1%
Total Lost time (s)	6.0		6.0	6.0		6.0
Lane Util. Factor	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		0.99
Satd. Flow (prot)	1701		1827	1553		1807
Flt Permitted	0.96		1.00	1.00		0.85
Satd. Flow (perm)	1701		1827	1553		1554
Peak-hour factor, PHF	0.38	0.63	0.67	0.67	0.55	0.84
Adj. Flow (vph)	539	54	160	354	69	173
RTOR Reduction (vph)	6	0	0	254	0	0
Lane Group Flow (vph)	587	0	160	100	0	242
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	21.6		13.2	13.2		13.2
Effective Green, g (s)	21.6		13.2	13.2		13.2
Actuated g/C Ratio	0.46		0.28	0.28		0.28
Clearance Time (s)	6.0		6.0	6.0		6.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	785		515	438		438
v/s Ratio Prot	c0.35		0.09			
v/s Ratio Perm				0.06		c0.16
v/c Ratio	0.75		0.31	0.23		0.55
Uniform Delay, d1	10.4		13.2	12.9		14.3
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.9		0.3	0.3		1.5
Delay (s)	14.3		13.6	13.2		15.8
Level of Service	B		B	B		B
Approach Delay (s)	14.3		13.3			15.8
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

3: Allstar Driveway & Emmitsburg Road
2012 Traffic Volumes with Dev & Imp - PM Peak (Saturday)

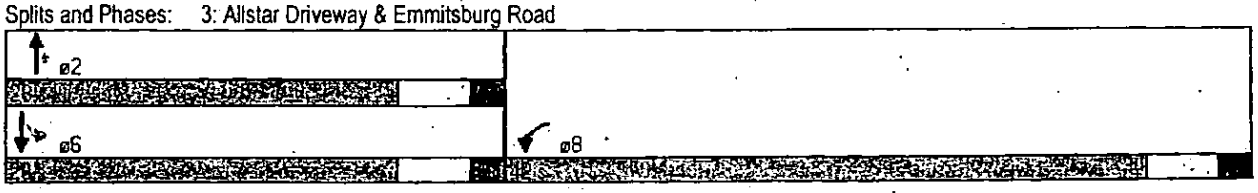
3/29/2010

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	205	107	237	38	145
Lane Group Flow (vph)	593	160	354	0	242
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0
Total Split (s)	42.0	28.0	28.0	28.0	28.0
Total Split (%)	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Min	Min	Min	Min
v/c Ratio	0.76	0.32	0.52		0.56
Control Delay	18.4	17.4	5.4		22.2
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	18.4	17.4	5.4		22.2
Queue Length 50th (ft)	114	33	0		53
Queue Length 95th (ft)	78	68	10		136
Internal Link Dist (ft)	517	388			297
Turn Bay Length (ft)			150		
Base Capacity (vph)	1334	909	951		773
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.44	0.18	0.37		0.31

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 47.8
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Allstar Driveway & Emmitsburg Road



3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes without Development - PM Peak (Saturday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	13	111	11	14	152
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.38	0.63	0.67	0.67	0.55	0.84
Hourly flow rate (vph)	32	21	166	16	25	181
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	406	174			182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	406	174			182	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			98	
cM capacity (veh/h)	594	875			1405	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	182	206
Volume Left	32	0	25
Volume Right	21	16	0
cSH	680	1700	1405
Volume to Capacity	0.08	0.11	0.02
Queue Length 95th (ft)	6	0	1
Control Delay (s)	10.7	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{450.1}{313}$ = 1.4 sec/veh = LOS A

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Saturday)

3/15/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	206	35	111	238	39	152
Sign Control	Stop		Free			Free
Grade	4%		1%			-1%
Peak Hour Factor	0.38	0.63	0.67	0.67	0.55	0.84
Hourly flow rate (vph)	542	56	166	355	71	181
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	666	343			521	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	343			521	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	92			93	
cM capacity (veh/h)	398	704			1056	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	598	521	252
Volume Left	542	0	71
Volume Right	56	355	0
cSH	415	1700	1056
Volume to Capacity	1.44	0.31	0.07
Queue Length 95th (ft)	756	0	5
Control Delay (s)	236.9	0.0	2.9
Lane LOS	F		A
Approach Delay (s)	236.9	0.0	2.9
Approach LOS	F		

Intersection Summary			
Average Delay	103.8		
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{57646.8}{781}$ = 73.8 sec/veh = LOS F

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Dev & Imp - PM Peak (Saturday)

3/29/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	206	35	111	238	39	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Grade (%)	4%		1%			-1%
Total Lost time (s)	6.0		6.0	6.0		6.0
Lane Util. Factor	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		0.99
Satd. Flow (prot)	1700		1827	1553		1807
Flt Permitted	0.96		1.00	1.00		0.87
Satd. Flow (perm)	1700		1827	1553		1586
Peak-hour factor, PHF	0.38	0.63	0.67	0.67	0.55	0.84
Adj. Flow (vph)	542	56	166	355	71	181
RTOR Reduction (vph)	6	0	0	221	0	0
Lane Group Flow (vph)	592	0	166	134	0	252
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	24.9		22.3	22.3		22.3
Effective Green, g (s)	24.9		22.3	22.3		22.3
Actuated g/C Ratio	0.42		0.38	0.38		0.38
Clearance Time (s)	6.0		6.0	6.0		6.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	715		688	585		597
v/s Ratio Prot	c0.35		0.09			
v/s Ratio Perm				0.09		c0.16
v/c Ratio	0.83		0.24	0.23		0.42
Uniform Delay, d1	15.2		12.6	12.6		13.7
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	7.8		0.8	0.9		2.2
Delay (s)	23.1		13.5	13.5		15.9
Level of Service	C		B	B		B
Approach Delay (s)	23.1		13.5			15.9
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

3: Allstar Driveway & Emmitsburg Road
2017 Traffic Volumes with Dev & Imp - PM Peak (Saturday)

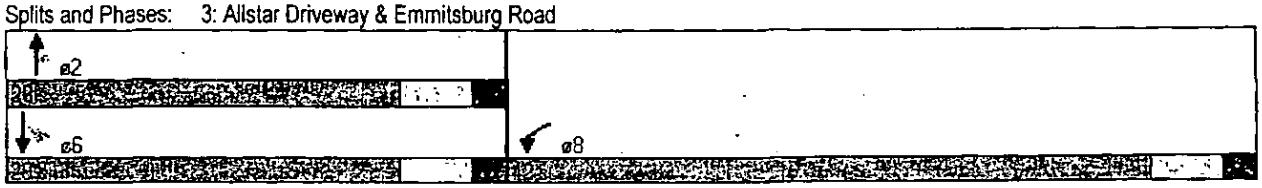
3/29/2010

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	206	111	238	39	152
Lane Group Flow (vph)	598	166	355	0	252
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Detector Phase	8	2	2	6	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0
Total Split (s)	42.0	28.0	28.0	28.0	28.0
Total Split (%)	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	Max	Max	Max	Max
v/c Ratio	0.83	0.24	0.44		0.42
Control Delay	25.8	16.2	4.3		18.7
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	25.8	16.2	4.3		18.7
Queue Length 50th (ft)	176	39	0		64
Queue Length 95th (ft)	78	70	10		140
Internal Link Dist (ft)	517	388			297
Turn Bay Length (ft)			150		
Base Capacity (vph)	1050	687	806		596
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.57	0.24	0.44		0.42

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 59.4
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Allstar Driveway & Emmitsburg Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	30	1	57	0	208	0	0	23	63
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.70	0.25	0.71	0.92	0.81	0.92	0.92	0.89	0.88
Hourly flow rate (vph)	0	0	0	43	4	80	0	257	0	0	26	72
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	320	318	62	318	354	257	97			257		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320	318	62	318	354	257	97			257		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	100	93	99	90	100			100		
cM capacity (veh/h)	567	601	1009	625	574	772	1509			1320		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	127	257	97
Volume Left	43	0	0
Volume Right	80	0	72
cSH	708	1700	1700
Volume to Capacity	0.18	0.15	0.06
Queue Length 95th (ft)	16	0	0
Control Delay (s)	11.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{985.6}{382.0}$ = 2.6 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2012 Traffic Volumes without Development - PM Peak (Weekday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	31	1	58	0	212	0	0	54	64
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.70	0.25	0.71	0.92	0.81	0.92	0.92	0.89	0.88
Hourly flow rate (vph)	0	0	0	44	4	82	0	262	0	0	61	73
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	361	359	97	359	395	262	133			262		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361	359	97	359	395	262	133			262		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	100	92	99	89	100			100		
cM capacity (veh/h)	532	571	965	587	545	767	1464			1314		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	130	262	133
Volume Left	44	0	0
Volume Right	82	0	73
cSH	687	1700	1700
Volume to Capacity	0.19	0.15	0.08
Queue Length 95th (ft)	17	0	0
Control Delay (s)	11.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.5	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1035}{420}$ = 2.5 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Weekday) 3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	31	1	129	0	309	0	0	121	148
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.70	0.25	0.71	0.92	0.81	0.92	0.92	0.89	0.88
Hourly flow rate (vph)	0	0	0	44	4	182	0	381	0	0	136	168
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	604	602	220	602	686	381	304			381		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604	602	220	602	686	381	304			381		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	100	89	99	72	100			100		
cM capacity (veh/h)	297	417	825	405	373	657	1268			1188		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	230	381	304
Volume Left	44	0	0
Volume Right	182	0	168
cSH	580	1700	1700
Volume to Capacity	0.40	0.22	0.18
Queue Length 95th (ft)	47	0	0
Control Delay (s)	15.2	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.2	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2495.5}{739}$ = 3.4 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2017 Traffic Volumes without Development - PM Peak (Weekday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	32	1	60	0	220	0	0	56	67
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.70	0.25	0.71	0.92	0.81	0.92	0.92	0.89	0.88
Hourly flow rate (vph)	0	0	0	46	4	85	0	272	0	0	63	76
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	375	373	101	373	411	272	139			272		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375	373	101	373	411	272	139			272		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	100	92	99	89	100			100		
cM capacity (veh/h)	518	561	960	575	534	758	1457			1303		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	134	272	139
Volume Left	46	0	0
Volume Right	85	0	76
cSH	676	1700	1700
Volume to Capacity	0.20	0.16	0.08
Queue Length 95th (ft)	18	0	0
Control Delay (s)	11.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1078.8}{436}$ = 2.5 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	32	1	131	0	317	0	0	123	151
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.70	0.25	0.71	0.92	0.81	0.92	0.92	0.89	0.88
Hourly flow rate (vph)	0	0	0	46	4	185	0	391	0	0	138	172
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	617	615	224	615	701	391	310			391		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	617	615	224	615	701	391	310			391		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.4	2.2			2.2		
p0 queue free %	100	100	100	88	99	72	100			100		
cM capacity (veh/h)	287	409	820	396	365	649	1262			1178		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	234	391	310
Volume Left	46	0	0
Volume Right	185	0	172
cSH	570	1700	1700
Volume to Capacity	0.41	0.23	0.18
Queue Length 95th (ft)	50	0	0
Control Delay (s)	15.7	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.7	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2574.8}{755}$ = 3.4 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	43	1	63	0	157	0	0	66	57
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.25	0.89	0.92	0.86	0.92	0.92	0.80	0.85
Hourly flow rate (vph)	0	0	0	52	4	71	0	183	0	0	82	67
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	301	299	116	299	332	183	150			183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	301	299	116	299	332	183	150			183		
tC, single (s)	7.1	6.5	6.2	7.2	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	92	99	92	100			100		
cM capacity (veh/h)	599	617	942	648	591	865	1444			1405		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	127	183	150
Volume Left	52	0	0
Volume Right	71	0	67
cSH	751	1700	1700
Volume to Capacity	0.17	0.11	0.09
Queue Length 95th (ft)	15	0	0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1155.6}{387}$ = 3.0 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2012 Traffic Volumes without Development - PM Peak (Friday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	44	1	64	0	160	0	0	67	58
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.25	0.89	0.92	0.86	0.92	0.92	0.80	0.85
Hourly flow rate (vph)	0	0	0	53	4	72	0	186	0	0	84	68
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	306	304	118	304	338	186	152			186		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306	304	118	304	338	186	152			186		
tC, single (s)	7.1	6.5	6.2	7.2	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	92	99	92	100			100		
cM capacity (veh/h)	593	613	939	642	586	861	1441			1401		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	129	186	152
Volume Left	53	0	0
Volume Right	72	0	68
cSH	746	1700	1700
Volume to Capacity	0.17	0.11	0.09
Queue Length 95th (ft)	16	0	0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1177.2}{394}$ = 3.0 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Friday) 3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	44	1	146	0	272	0	0	146	157
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.25	0.89	0.92	0.86	0.92	0.92	0.80	0.85
Hourly flow rate (vph)	0	0	0	53	4	164	0	316	0	0	182	185
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	593	591	275	591	683	316	367			316		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	593	591	275	591	683	316	367			316		
tC, single (s)	7.1	6.5	6.2	7.2	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	87	99	77	100			100		
cM capacity (veh/h)	323	422	769	414	374	729	1202			1255		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	221	316	367
Volume Left	53	0	0
Volume Right	164	0	185
cSH	608	1700	1700
Volume to Capacity	0.36	0.19	0.22
Queue Length 95th (ft)	41	0	0
Control Delay (s)	14.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2731.3}{766}$ = 3.6 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	46	1	67	0	166	0	0	70	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.25	0.89	0.92	0.86	0.92	0.92	0.80	0.85
Hourly flow rate (vph)	0	0	0	55	4	75	0	193	0	0	88	71
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	318	316	123	316	351	193	158			193		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	318	316	123	316	351	193	158			193		
tC, single (s)	7.1	6.5	6.2	7.2	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	91	99	91	100			100		
cM capacity (veh/h)	579	603	934	631	577	854	1434			1392		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	135	193	158
Volume Left	55	0	0
Volume Right	75	0	71
cSH	736	1700	1700
Volume to Capacity	0.18	0.11	0.09
Queue Length 95th (ft)	17	0	0
Control Delay (s)	11.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1254}{410}$ = 3.1 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Friday) 3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	46	1	149	0	278	0	0	149	159
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.25	0.89	0.92	0.86	0.92	0.92	0.80	0.85
Hourly flow rate (vph)	0	0	0	55	4	167	0	323	0	0	186	187
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	605	603	280	603	697	323	373			323		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	605	603	280	603	697	323	373			323		
tC, single (s)	7.1	6.5	6.2	7.2	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	86	99	77	100			100		
cM capacity (veh/h)	314	416	764	406	367	722	1196			1248		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	227	323	373
Volume Left	55	0	0
Volume Right	167	0	187
cSH	598	1700	1700
Volume to Capacity	0.38	0.19	0.22
Queue Length 95th (ft)	44	0	0
Control Delay (s)	14.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2861.6}{782}$ = 3.7 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	21	0	80	0	113	0	0	89	83
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.85	0.25	0.66	0.25	0.66	0.92	0.92	0.87	0.81
Hourly flow rate (vph)	0	0	0	25	0	121	0	171	0	0	102	102
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	325	325	154	325	376	171	205			171		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	325	325	154	325	376	171	205			171		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	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	96	100	86	100			100		
cM capacity (veh/h)	544	596	898	632	558	865	1379			1418		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	146	171	205
Volume Left	25	0	0
Volume Right	121	0	102
cSH	814	1700	1700
Volume to Capacity	0.18	0.10	0.12
Queue Length 95th (ft)	16	0	0
Control Delay (s)	10.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.4	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1050.4}{386}$ = 2.7 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	21	0	81	0	115	0	0	91	84
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.85	0.25	0.66	0.25	0.66	0.92	0.92	0.87	0.81
Hourly flow rate (vph)	0	0	0	25	0	123	0	174	0	0	105	104
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	331	331	156	331	383	174	208			174		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	331	331	156	331	383	174	208			174		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	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	96	100	86	100			100		
cM capacity (veh/h)	537	592	894	626	554	861	1375			1415		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	147	174	208
Volume Left	25	0	0
Volume Right	123	0	104
cSH	810	1700	1700
Volume to Capacity	0.18	0.10	0.12
Queue Length 95th (ft)	17	0	0
Control Delay (s)	10.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.4	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1060.8}{392}$ = 2.7 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	21	0	177	0	246	0	0	177	192
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.85	0.25	0.66	0.25	0.66	0.92	0.92	0.87	0.81
Hourly flow rate (vph)	0	0	0	25	0	268	0	373	0	0	203	237
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	695	695	322	695	813	373	440			373		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	695	695	322	695	813	373	440			373		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	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	93	100	60	100			100		
cM capacity (veh/h)	215	368	724	359	315	667	1130			1197		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	293	373	440
Volume Left	25	0	0
Volume Right	268	0	237
cSH	622	1700	1700
Volume to Capacity	0.47	0.22	0.26
Queue Length 95th (ft)	63	0	0
Control Delay (s)	15.8	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.8	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{3128.4}{813}$ = 3.8 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2017 Traffic Volumes without Development - PM Peak (Saturday) 3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	22	0	85	0	120	0	0	94	88
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.85	0.25	0.66	0.25	0.66	0.92	0.92	0.87	0.81
Hourly flow rate (vph)	0	0	0	26	0	129	0	182	0	0	108	109
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	344	344	162	344	399	182	217			182		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344	344	162	344	399	182	217			182		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	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	96	100	85	100			100		
cM capacity (veh/h)	521	582	888	614	542	853	1365			1406		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	155	182	217
Volume Left	26	0	0
Volume Right	129	0	109
cSH	801	1700	1700
Volume to Capacity	0.19	0.11	0.13
Queue Length 95th (ft)	18	0	0
Control Delay (s)	10.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	23.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1134.2}{409}$ = 2.8 sec/veh = LOS A

9: Route 15 SB On Ramp & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	22	0	181	0	251	0	0	180	196
Sign Control		Stop			Stop			Free			Free	
Grade		0%			1%			-2%			2%	
Peak Hour Factor	0.92	0.92	0.92	0.85	0.25	0.66	0.25	0.66	0.92	0.92	0.87	0.81
Hourly flow rate (vph)	0	0	0	26	0	274	0	380	0	0	207	242
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	708	708	328	708	829	380	449			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	708	708	328	708	829	380	449			380		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	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	93	100	58	100			100		
cM capacity (veh/h)	206	362	718	352	308	660	1122			1189		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	300	380	449
Volume Left	26	0	0
Volume Right	274	0	242
cSH	614	1700	1700
Volume to Capacity	0.49	0.22	0.26
Queue Length 95th (ft)	67	0	0
Control Delay (s)	16.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.3	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{3308.9}{830}$ = 4.0 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Weekday) (NBL)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	208	82	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.55	0.81	0.89	0.92
Hourly flow rate (vph)	0	0	22	257	92	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	393	92	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	393	92	92			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	99			
cM capacity (veh/h)	607	971	1460			

Direction, Lane #	NB 1	SB 1
Volume Total	279	92
Volume Left	22	0
Volume Right	0	0
cSH	1460	1700
Volume to Capacity	0.01	0.05
Queue Length 95th (ft)	1	0
Control Delay (s)	0.7	0.0
Lane LOS	A	
Approach Delay (s)	0.7	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{154}{302}$ = 0.5 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road
2012 Traffic Volumes without Development - PM Peak (Weekday) (NBL)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	212	83	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.55	0.81	0.89	0.92
Hourly flow rate (vph)	0	0	22	262	93	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	399	93	93			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	399	93	93			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	99			
cM capacity (veh/h)	602	969	1458			

Direction, Lane #	NB 1	SB 1
Volume Total	284	93
Volume Left	22	0
Volume Right	0	0
cSH	1458	1700
Volume to Capacity	0.01	0.05
Queue Length 95th (ft)	1	0
Control Delay (s)	0.7	0.0
Lane LOS	A	
Approach Delay (s)	0.7	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{156.8}{307}$ = 0.5 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	309	150	0
Sign Control	Stop			Free	Free	
Grade	0%			2%	2%	
Peak Hour Factor	0.92	0.92	0.55	0.81	0.89	0.92
Hourly flow rate (vph)	0	0	22	381	169	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	594	169	169			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	169	169			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	98			
cM capacity (veh/h)	464	881	1368			

Direction, Lane #	NB 1	SB 1
Volume Total	403	169
Volume Left	22	0
Volume Right	0	0
cSH	1368	1700
Volume to Capacity	0.02	0.10
Queue Length 95th (ft)	1	0
Control Delay (s)	0.6	0.0
Lane LOS	A	
Approach Delay (s)	0.6	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{192.6}{471}$ = 0.4 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	13	220	87	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.55	0.81	0.89	0.92
Hourly flow rate (vph)	0	0	24	272	98	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	417	98	98			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417	98	98			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	98			
cM capacity (veh/h)	587	964	1453			

Direction, Lane #	NB 1	SB 1
Volume Total	295	98
Volume Left	24	0
Volume Right	0	0
cSH	1453	1700
Volume to Capacity	0.02	0.06
Queue Length 95th (ft)	1	0
Control Delay (s)	0.7	0.0
Lane LOS	A	
Approach Delay (s)	0.7	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{163.1}{320}$ = 0.5 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road NBL

2017 Traffic Volumes with Development - PM Peak (Weekday) 3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	13	317	154	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.55	0.81	0.89	0.92
Hourly flow rate (vph)	0	0	24	391	173	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	612	173	173			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612	173	173			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	100	98			
cM capacity (veh/h)	452	876	1362			

Direction, Lane #	NB 1	SB 1
Volume Total	415	173
Volume Left	24	0
Volume Right	0	0
cSH	1362	1700
Volume to Capacity	0.02	0.10
Queue Length 95th (ft)	1	0
Control Delay (s)	0.6	0.0
Lane LOS	A	
Approach Delay (s)	0.6	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{198}{484}$ = 0.4 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road NBL
Existing Traffic Volumes - PM Peak (Friday)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	157	109	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.60	0.86	0.80	0.92
Hourly flow rate (vph)	0	0	20	183	136	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	359	136	136			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	359	136	136			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	634	918	1360			

Direction, Lane #	NB 1	SB 1
Volume Total	203	136
Volume Left	20	0
Volume Right	0	0
cSH	1360	1700
Volume to Capacity	0.01	0.08
Queue Length 95th (ft)	1	0
Control Delay (s)	0.9	0.0
Lane LOS	A	
Approach Delay (s)	0.9	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{152.1}{278}$ = 0.5 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	160	111	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	-2%	
Peak Hour Factor	0.92	0.92	0.60	0.86	0.80	0.92
Hourly flow rate (vph)	0	0	20	186	139	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	365	139	139			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	365	139	139			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	629	915	1358			

Direction, Lane #	NB 1	SB 1
Volume Total	206	139
Volume Left	20	0
Volume Right	0	0
cSH	1358	1700
Volume to Capacity	0.01	0.08
Queue Length 95th (ft)	1	0
Control Delay (s)	0.9	0.0
Lane LOS	A	
Approach Delay (s)	0.9	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{154.8}{283}$ = 0.5 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	12	272	190	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.60	0.86	0.80	0.92
Hourly flow rate (vph)	0	0	20	316	238	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	594	238	238			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	238	238			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	98			
cM capacity (veh/h)	464	806	1246			

Direction, Lane #	NB 1	SB 1
Volume Total	336	238
Volume Left	20	0
Volume Right	0	0
cSH	1246	1700
Volume to Capacity	0.02	0.14
Queue Length 95th (ft)	1	0
Control Delay (s)	0.6	0.0
Lane LOS	A	
Approach Delay (s)	0.6	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{170.4}{474}$ = 0.4 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	13	166	116	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.60	0.86	0.80	0.92
Hourly flow rate (vph)	0	0	22	193	145	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	381	145	145			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	381	145	145			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	98			
cM capacity (veh/h)	615	908	1350			

Direction, Lane #	NB 1	SB 1
Volume Total	215	145
Volume Left	22	0
Volume Right	0	0
cSH	1350	1700
Volume to Capacity	0.02	0.09
Queue Length 95th (ft)	1	0
Control Delay (s)	0.9	0.0
Lane LOS	A	
Approach Delay (s)	0.9	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{161.1}{295}$ = 0.5 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	13	278	195	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.60	0.86	0.80	0.92
Hourly flow rate (vph)	0	0	22	323	244	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	610	244	244			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	610	244	244			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	98			
cM capacity (veh/h)	453	800	1240			

Direction, Lane #	NB 1	SB 1
Volume Total	345	244
Volume Left	22	0
Volume Right	0	0
cSH	1240	1700
Volume to Capacity	0.02	0.14
Queue Length 95th (ft)	1	0
Control Delay (s)	0.7	0.0
Lane LOS	A	
Approach Delay (s)	0.7	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{203.7}{486}$ = 0.4 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road NBL
Existing Traffic Volumes - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	5	113	110	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.50	0.66	0.87	0.92
Hourly flow rate (vph)	0	0	10	171	126	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	318	126	126			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	318	126	126			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	675	929	1329			

Direction, Lane #	NB 1	SB 1
Volume Total	181	126
Volume Left	10	0
Volume Right	0	0
cSH	1329	1700
Volume to Capacity	0.01	0.07
Queue Length 95th (ft)	1	0
Control Delay (s)	0.5	0.0
Lane LOS	A	
Approach Delay (s)	0.5	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{59}{228}$ = 0.3 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	5	115	112	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.50	0.66	0.87	0.92
Hourly flow rate (vph)	0	0	10	174	129	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	323	129	129			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	323	129	129			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	670	927	1327			

Direction, Lane #	NB 1	SB 1
Volume Total	184	129
Volume Left	10	0
Volume Right	0	0
cSH	1327	1700
Volume to Capacity	0.01	0.08
Queue Length 95th (ft)	1	0
Control Delay (s)	0.5	0.0
Lane LOS	A	
Approach Delay (s)	0.5	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.4%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{60}{232}$ = 0.3 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road NBL
2012 Traffic Volumes with Development - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	5	246	198	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.50	0.66	0.87	0.92
Hourly flow rate (vph)	0	0	10	373	228	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	620	228	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	620	228	228			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	451	817	1216			

Direction, Lane #	NB 1	SB 1
Volume Total	383	228
Volume Left	10	0
Volume Right	0	0
cSH	1216	1700
Volume to Capacity	0.01	0.13
Queue Length 95th (ft)	1	0
Control Delay (s)	0.3	0.0
Lane LOS	A	
Approach Delay (s)	0.3	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{75.3}{449}$ = 0.2 sec/veh = LOS A

11: Route 15 SB On Ramp & Emmitsburg Road NBL
2017 Traffic Volumes without Development - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	5	120	117	0
Sign Control	*Stop*			*Free*	*Free*	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.50	0.66	0.87	0.92
Hourly flow rate (vph)	0	0	10	182	134	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	336	134	134			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336	134	134			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	658	920	1320			

Direction, Lane #	NB 1	SB 1
Volume Total	192	134
Volume Left	10	0
Volume Right	0	0
cSH	1320	1700
Volume to Capacity	0.01	0.08
Queue Length 95th (ft)	*1*	*0*
Control Delay (s)	0.5	0.0
Lane LOS	A	
Approach Delay (s)	0.5	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{62.5}{242}$ = 0.3 sec/veh = LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	5	251	203	0
Sign Control	Stop			Free	Free	
Grade	0%			-2%	2%	
Peak Hour Factor	0.92	0.92	0.50	0.66	0.87	0.92
Hourly flow rate (vph)	0	0	10	380	233	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	634	233	233			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	634	233	233			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	100	100	99			
cM capacity (veh/h)	443	811	1210			

Direction, Lane #	NB 1	SB 1
Volume Total	390	233
Volume Left	10	0
Volume Right	0	0
cSH	1210	1700
Volume to Capacity	0.01	0.14
Queue Length 95th (ft)	1	0
Control Delay (s)	0.3	0.0
Lane LOS	A	
Approach Delay (s)	0.3	0.0
Approach LOS		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{76.8}{459}$ = 0.2 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Weekday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	0	4	0	0	0	0	59	26	32	52	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.79	0.25	0.50	0.92	0.92	0.92	0.92	0.82	0.63	0.83	0.88	0.92
Hourly flow rate (vph)	219	0	8	0	0	0	0	72	41	39	59	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	229	249	59	229	229	93	59			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229	249	59	229	229	93	59			113		
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 %	69	100	99	100	100	100	100			97		
cM capacity (veh/h)	716	640	1012	710	657	970	1558			1489		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	227	113	98
Volume Left	219	0	39
Volume Right	8	41	0
cSH	723	1700	1489
Volume to Capacity	0.31	0.07	0.03
Queue Length 95th (ft)	34	0	2
Control Delay (s)	12.2	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2419.8}{346}$ = 7.0 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	176	0	4	0	0	0	0	60	26	33	53	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.79	0.25	0.50	0.92	0.92	0.92	0.92	0.82	0.63	0.83	0.88	0.92
Hourly flow rate (vph)	223	0	8	0	0	0	0	73	41	40	60	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	234	254	60	234	234	94	60			114		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234	254	60	234	234	94	60			114		
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 %	69	100	99	100	100	100	100			97		
cM capacity (veh/h)	710	635	1011	705	652	969	1556			1487		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	231	114	100
Volume Left	223	0	40
Volume Right	8	41	0
cSH	718	1700	1487
Volume to Capacity	0.32	0.07	0.03
Queue Length 95th (ft)	35	0	2
Control Delay (s)	12.4	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	12.4	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2498.6}{352}$ = 7.1 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Weekday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	269	0	4	0	0	0	0	64	26	97	56	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	*0.79*	*0.25*	*0.50*	*0.92*	*0.92*	*0.92*	*0.92*	*0.82*	*0.63*	*0.83*	*0.88*	*0.92*
Hourly flow rate (vph)	341	0	8	0	0	0	0	78	41	117	64	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	396	417	64	396	396	99	64			119		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396	417	64	396	396	99	64			119		
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 %	36	100	99	100	100	100	100			92		
cM capacity (veh/h)	533	488	1006	529	501	963	1552			1481		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	349	119	181
Volume Left	341	0	117
Volume Right	8	41	0
cSH	539	1700	1481
Volume to Capacity	0.65	0.07	0.08
Queue Length 95th (ft)	115	0	6
Control Delay (s)	23.1	0.0	5.2
Lane LOS	C		A
Approach Delay (s)	23.1	0.0	5.2
Approach LOS	C		

Intersection Summary			
Average Delay	13.9		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{7101.9}{516} = 13.8$ sec/veh = LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	183	0	4	0	0	0	0	63	28	34	55	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.79	0.25	0.50	0.92	0.92	0.92	0.92	0.82	0.63	0.83	0.88	0.92
Hourly flow rate (vph)	232	0	8	0	0	0	0	77	44	41	62	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	243	266	62	243	243	99	62			121		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243	266	62	243	243	99	62			121		
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 %	67	100	99	100	100	100	100			97		
cM capacity (veh/h)	699	625	1008	694	643	962	1553			1479		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	240	121	103
Volume Left	232	0	41
Volume Right	8	44	0
cSH	706	1700	1479
Volume to Capacity	0.34	0.07	0.03
Queue Length 95th (ft)	38	0	2
Control Delay (s)	12.7	0.0	3.1
Lane LOS	B		A
Approach Delay (s)	12.7	0.0	3.1
Approach LOS	B		

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{2650.8}{367}$ = 7.2 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
2017 Traffic Volumes with Development - PM Peak (Weekday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	276	0	4	0	0	0	0	67	28	98	58	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.79	0.25	0.50	0.92	0.92	0.92	0.92	0.82	0.63	0.83	0.88	0.92
Hourly flow rate (vph)	349	0	8	0	0	0	0	82	44	118	66	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	406	428	66	406	406	104	66			126		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406	428	66	406	406	104	66			126		
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 %	33	100	99	100	100	100	100			92		
cM capacity (veh/h)	524	480	1004	521	494	956	1549			1473		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	357	126	184
Volume Left	349	0	118
Volume Right	8	44	0
cSH	530	1700	1473
Volume to Capacity	0.67	0.07	0.08
Queue Length 95th (ft)	126	0	7
Control Delay (s)	24.7	0.0	5.1
Lane LOS	C		A
Approach Delay (s)	24.7	0.0	5.1
Approach LOS	C		

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{7711.6}{531}$ = 14.5 sec/veh = LOS B

13: Route 15 NB Off Ramp & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Friday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	122	0	5	0	0	0	0	50	43	36	76	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.88	0.25	0.63	0.92	0.92	0.92	0.92	0.78	0.83	0.82	0.77	0.92
Hourly flow rate (vph)	139	0	8	0	0	0	0	64	52	44	99	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	277	302	99	277	277	90	99			116		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277	302	99	277	277	90	99			116		
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 %	79	100	99	100	100	100	100			97		
cM capacity (veh/h)	660	595	963	659	616	973	1507			1485		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	147	116	143
Volume Left	139	0	44
Volume Right	8	52	0
cSH	672	1700	1485
Volume to Capacity	0.22	0.07	0.03
Queue Length 95th (ft)	21	0	2
Control Delay (s)	11.8	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1778.6}{332}$ = 5.4 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
2012 Traffic Volumes without Development - PM Peak (Friday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	124	0	5	0	0	0	0	51	44	37	77	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.88	0.25	0.63	0.92	0.92	0.92	0.92	0.78	0.83	0.82	0.77	0.92
Hourly flow rate (vph)	141	0	8	0	0	0	0	65	53	45	100	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	282	309	100	282	282	92	100			118		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	282	309	100	282	282	92	100			118		
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 %	78	100	99	100	100	100	100			97		
cM capacity (veh/h)	654	590	961	653	611	971	1505			1482		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	149	118	145
Volume Left	141	0	45
Volume Right	8	53	0
cSH	666	1700	1482
Volume to Capacity	0.22	0.07	0.03
Queue Length 95th (ft)	21	0	2
Control Delay (s)	12.0	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	12.0	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1833}{338}$ = 5.4 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Friday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	232	0	5	0	0	0	0	55	44	112	81	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.88	0.25	0.63	0.92	0.92	0.92	0.92	0.78	0.83	0.82	0.77	0.92
Hourly flow rate (vph)	264	0	8	0	0	0	0	71	53	137	105	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	475	502	105	475	475	97	105			124		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	475	502	105	475	475	97	105			124		
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 %	43	100	99	100	100	100	100			91		
cM capacity (veh/h)	464	430	955	463	446	965	1499			1476		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	272	124	242
Volume Left	264	0	137
Volume Right	8	53	0
cSH	471	1700	1476
Volume to Capacity	0.58	0.07	0.09
Queue Length 95th (ft)	89	0	8
Control Delay (s)	22.5	0.0	4.7
Lane LOS	C		A
Approach Delay (s)	22.5	0.0	4.7
Approach LOS	C		

Intersection Summary			
Average Delay	11.4		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{6239.6}{529}$ = 11.8 sec/veh = LOS B

13: Route 15 NB Off Ramp & Emmitsburg Road
2017 Traffic Volumes without Development - PM Peak (Friday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	129	0	5	0	0	0	0	53	46	38	81	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.88	0.25	0.63	0.92	0.92	0.92	0.92	0.78	0.83	0.82	0.77	0.92
Hourly flow rate (vph)	147	0	8	0	0	0	0	68	55	46	105	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	294	321	105	294	294	96	105			123		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	294	321	105	294	294	96	105			123		
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 %	77	100	99	100	100	100	100			97		
cM capacity (veh/h)	643	580	955	641	601	966	1499			1476		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	155	123	152
Volume Left	147	0	46
Volume Right	8	55	0
cSH	654	1700	1476
Volume to Capacity	0.24	0.07	0.03
Queue Length 95th (ft)	23	0	2
Control Delay (s)	12.2	0.0	2.5
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	2.5
Approach LOS	B		

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1932.3}{352}$ = 5.5 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	237	0	5	0	0	0	0	57	46	113	85	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.88	0.25	0.63	0.92	0.92	0.92	0.92	0.78	0.83	0.82	0.77	0.92
Hourly flow rate (vph)	269	0	8	0	0	0	0	73	55	138	110	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	487	514	110	487	487	101	110			128		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	487	514	110	487	487	101	110			128		
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 %	41	100	99	100	100	100	100			91		
cM capacity (veh/h)	455	423	948	455	438	960	1492			1470		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	277	128	248
Volume Left	269	0	138
Volume Right	8	55	0
cSH	462	1700	1470
Volume to Capacity	0.60	0.08	0.09
Queue Length 95th (ft)	96	0	8
Control Delay (s)	23.8	0.0	4.6
Lane LOS	C		A
Approach Delay (s)	23.8	0.0	4.6
Approach LOS	C		

Intersection Summary			
Average Delay	11.8		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{6670.4}{543}$ = 12.3 sec/veh = LOS B

13: Route 15 NB Off Ramp & Emmitsburg Road
Existing Traffic Volumes - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	104	0	4	0	0	0	0	30	28	50	50	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.76	0.25	0.75	0.92	0.92	0.92	0.92	0.69	0.72	0.79	0.68	0.92
Hourly flow rate (vph)	137	0	5	0	0	0	0	43	39	63	74	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	263	282	74	263	263	63	74			82		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263	282	74	263	263	63	74			82		
tC, single (s)	7.2	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 %	79	100	99	100	100	100	100			96		
cM capacity (veh/h)	662	603	994	668	619	1007	1539			1528		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	142	82	137
Volume Left	137	0	63
Volume Right	5	39	0
cSH	670	1700	1528
Volume to Capacity	0.21	0.05	0.04
Queue Length 95th (ft)	20	0	3
Control Delay (s)	11.8	0.0	3.6
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	3.6
Approach LOS	B		

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1634.4}{266}$ = 6.1 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	106	0	4	0	0	0	0	31	28	51	51	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.76	0.25	0.75	0.92	0.92	0.92	0.92	0.69	0.72	0.79	0.68	0.92
Hourly flow rate (vph)	139	0	5	0	0	0	0	45	39	65	75	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	268	288	75	268	268	64	75			84		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268	288	75	268	268	64	75			84		
tC, single (s)	7.2	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 %	79	100	99	100	100	100	100			96		
cM capacity (veh/h)	656	599	992	662	614	1006	1537			1526		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	145	84	140
Volume Left	139	0	65
Volume Right	5	39	0
cSH	664	1700	1526
Volume to Capacity	0.22	0.05	0.04
Queue Length 95th (ft)	21	0	3
Control Delay (s)	11.9	0.0	3.6
Lane LOS	B		A
Approach Delay (s)	11.9	0.0	3.6
Approach LOS	B		

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1676.2}{271}$ = 6.2 sec/veh = LOS A

13: Route 15 NB Off Ramp & Emmitsburg Road
2012 Traffic Volumes with Development - PM Peak (Saturday)

3/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	232	0	4	0	0	0	0	36	28	133	55	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.76	0.25	0.75	0.92	0.92	0.92	0.92	0.69	0.72	0.79	0.68	0.92
Hourly flow rate (vph)	305	0	5	0	0	0	0	52	39	168	81	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	489	509	81	489	489	72	81			91		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	489	509	81	489	489	72	81			91		
tC, single (s)	7.2	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 %	31	100	99	100	100	100	100			89		
cM capacity (veh/h)	443	418	985	448	429	996	1530			1517		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	311	91	249
Volume Left	305	0	168
Volume Right	5	39	0
cSH	447	1700	1517
Volume to Capacity	0.69	0.05	0.11
Queue Length 95th (ft)	131	0	9
Control Delay (s)	29.4	0.0	5.5
Lane LOS	D		A
Approach Delay (s)	29.4	0.0	5.5
Approach LOS	D		

Intersection Summary			
Average Delay	16.1		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{7972.4}{488}$ = 16.3 sec/veh = LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	110	0	4	0	0	0	0	32	30	53	53	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.76	0.25	0.75	0.92	0.92	0.92	0.92	0.69	0.72	0.79	0.68	0.92
Hourly flow rate (vph)	145	0	5	0	0	0	0	46	42	67	78	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	279	300	78	279	279	67	78			88		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279	300	78	279	279	67	78			88		
tC, single (s)	7.2	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 %	78	100	99	100	100	100	100			96		
cM capacity (veh/h)	644	588	988	651	604	1002	1533			1520		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	150	88	145
Volume Left	145	0	67
Volume Right	5	42	0
cSH	652	1700	1520
Volume to Capacity	0.23	0.05	0.04
Queue Length 95th (ft)	22	0	3
Control Delay (s)	12.2	0.0	3.6
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	3.6
Approach LOS	B		

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{1772.4}{282}$ = 6.3 sec/veh = LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	236	0	4	0	0	0	0	37	30	135	57	0
Sign Control		Stop			Stop			Free			Free	
Grade		3%			0%			2%			-2%	
Peak Hour Factor	0.76	0.25	0.75	0.92	0.92	0.92	0.92	0.69	0.72	0.79	0.68	0.92
Hourly flow rate (vph)	311	0	5	0	0	0	0	54	42	171	84	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	500	521	84	500	500	74	84			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500	521	84	500	500	74	84			95		
tC, single (s)	7.2	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 %	29	100	99	100	100	100	100			89		
cM capacity (veh/h)	435	410	981	440	422	993	1526			1511		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	316	95	255
Volume Left	311	0	171
Volume Right	5	42	0
cSH	439	1700	1511
Volume to Capacity	0.72	0.06	0.11
Queue Length 95th (ft)	141	0	10
Control Delay (s)	31.6	0.0	5.5
Lane LOS	D		A
Approach Delay (s)	31.6	0.0	5.5
Approach LOS	D		

Intersection Summary			
Average Delay	17.1		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Overall LOS = $\frac{8640}{499}$ = 17.3 sec/veh = LOS C

CRASH ANALYSIS

Steve Austin

From: Hunter, William [wihunter@state.pa.us]
Sent: Wednesday, January 13, 2010 13:09
To: Steve Austin
Subject: log #9055 Crash Data Request

January 13, 2009

Mr. Steven D. Austin
Senior Traffic Technician
Transportation Resource Group, Inc.
204 North George Street
Suite 110
York, PA 17401
steveaustin@consulttrg.com

Re: Crash Data – Cumberland Township, Adams County
CISAD Log No. 9055

Dear Mr. Austin:

Please note that there were no reportable crashes for a five year period starting from January 1, 2004 through December 31, 2008 for Emmitsburg Road (S.R. 3001) from Segment / Offset 0080 / 1038 to Segment / Offset 0090 / 0078 in Cumberland Township, Adams County and subsequently no reports were generated for it.

If you have any questions, please feel free to contact John Poremba at (717) 705-1471.

William G. Hunter | Crash Reporting Manager
PA Department of Transportation
Bureau of Highway Safety and Traffic Engineering
P O Box 2047 | Harrisburg, PA 17105-2047
Phone: 717-787-2855 | Fax: 717-783-8012
www.dot.state.pa.us

Cunningham Rd

Barnum Gettysburg Rd

Steve Austin

From: Hunter, William [wihunter@state.pa.us]
Sent: Tuesday, March 23, 2010 14:07
To: Steve Austin
Subject: log #9228 - Crash Data Request

March 23, 2010

Mr. Steven D. Austin
Senior Traffic Technician
Transportation Resource Group, Inc.
204 North George Street, Suite 110
York, PA 17401-1108
steveaustin@consulttrg.com

Re: Crash Data – Freedom Township, Adams County
CISAD Log No. 9228

Dear Mr. Austin:

No crashes were found for Emmitsburg Road, from segment 0030 at offset 2974 through segment 0050 at offset 1290, for the five year period starting from January 1, 2005 through December 31, 2009. Consequently, no reports were generated.

If you have any questions, please feel free to contact Steve Fink at (717) 783-2295.

William G. Hunter | Crash Reporting Manager
PA Department of Transportation
Bureau of Highway Safety and Traffic Engineering
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Phone: 717-787-2855 | Fax: 717-783-8012
www.dot.state.pa.us

TURN LANE ANALYSIS

Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2012 Traffic Volumes with Development
Design Hour: PM Peak (Thursday)
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	28	0%	28	No
	Thru	102	1%	103	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	105	1%	106	
	Right	173	0%	173	

Advancing Volumes: 131
Opposing Volumes: 279

Left Turns: 28
Left Turn Percentage: 20.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3
Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'
Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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TRANSPORTATION RESOURCE GROUP, INC.
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Guidelines for Left Turn Treatments

Two-Lane Highway

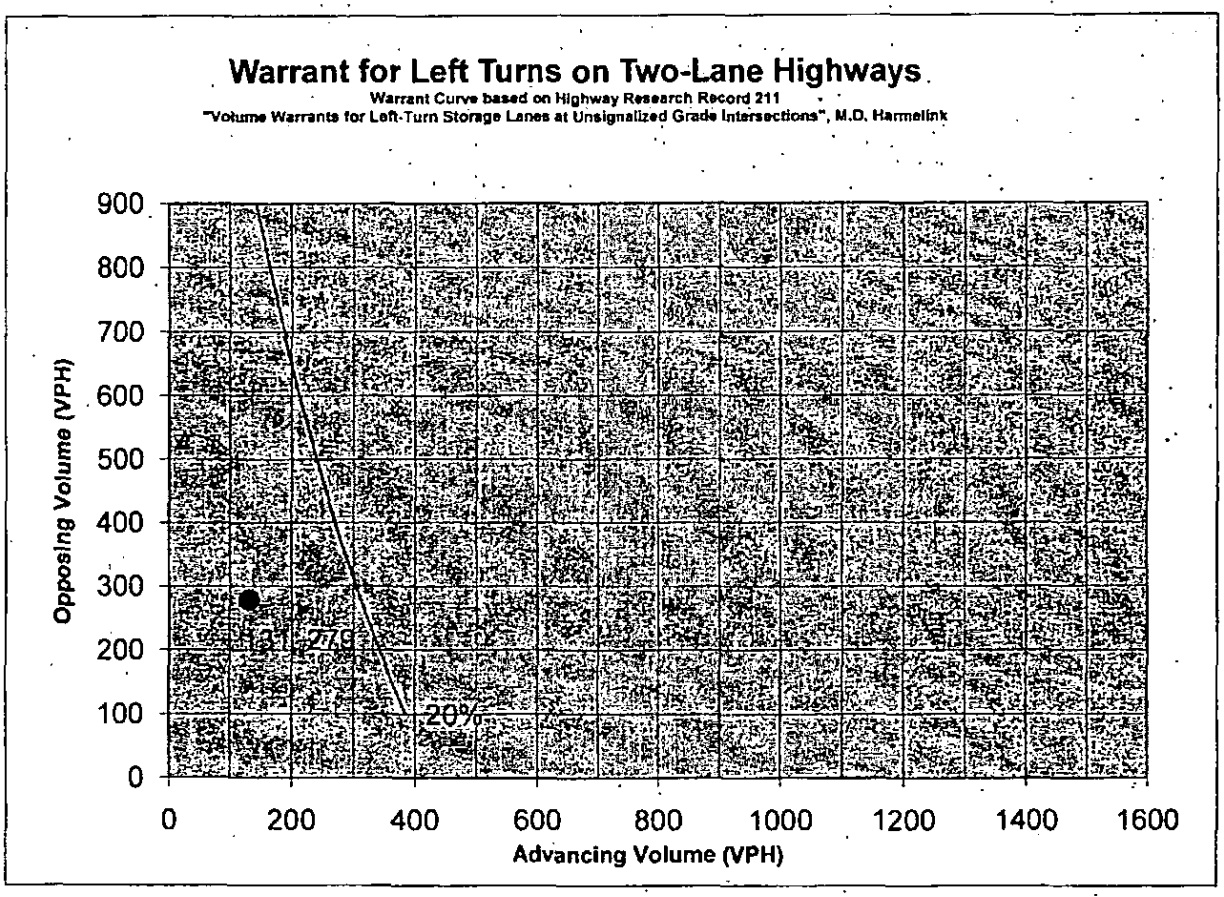
Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

Emmitsburg Road / Complex Driveway

2012 Traffic Volumes with Development

PM Peak (Thursday)

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2017 Traffic Volumes with Development
Design Hour: PM Peak (Thursday)
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	29	0%	29	No
	Thru	106	1%	107	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	109	1%	110	
	Right	173	0%	173	

Advancing Volumes: 136
Opposing Volumes: 283

Left Turns: 29
Left Turn Percentage: 20.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3
Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'
Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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Guidelines for Left Turn Treatments

Two-Lane Highway

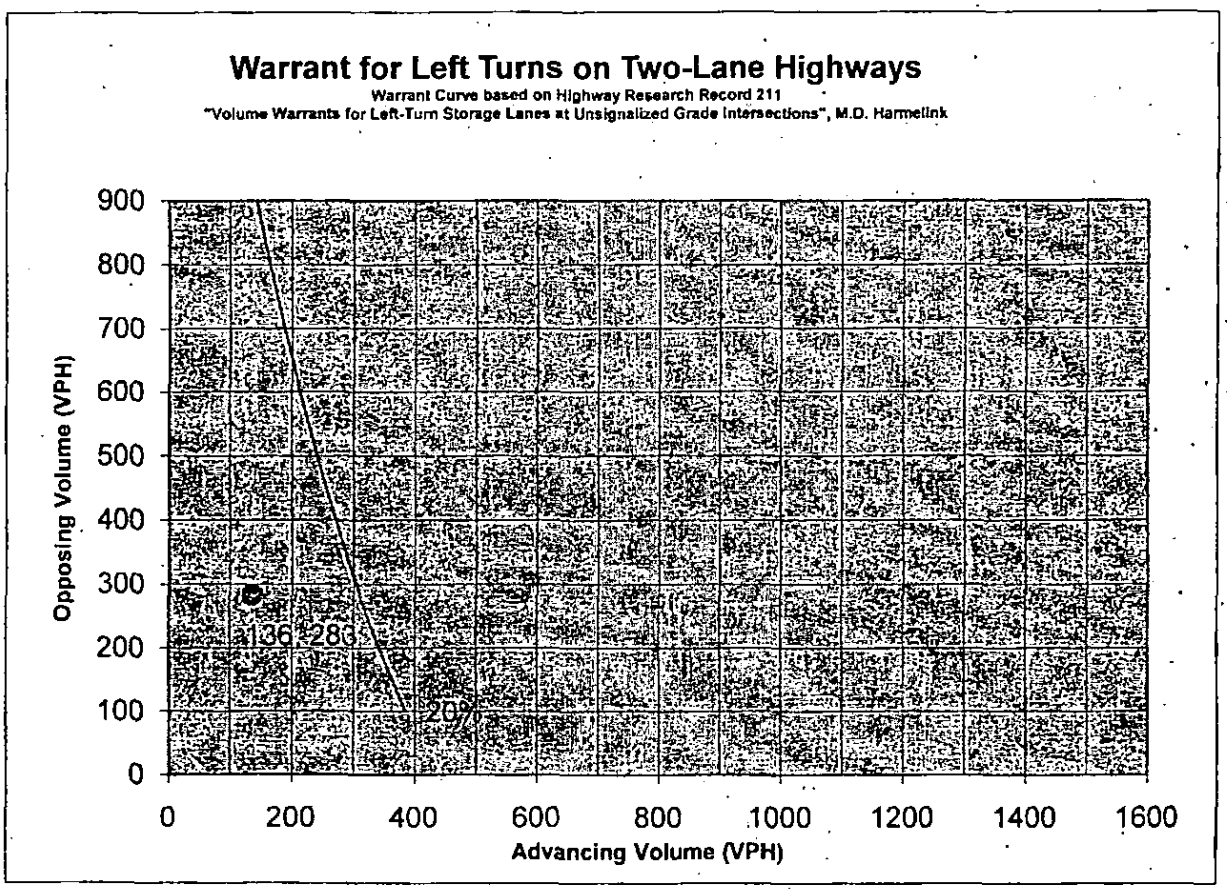
Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

Emmitsburg Road / Complex Driveway

2017 Traffic Volumes with Development

PM Peak (Thursday)

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2012 Traffic Volumes with Development
Design Hour: PM Peak (Friday)
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	38	0%	38	No
	Thru	104	1%	105	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	119	1%	120	
	Right	219	0%	219	

Advancing Volumes: 143
Opposing Volumes: 339

Left Turns: 38
Left Turn Percentage: 30.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3
Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'
Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11:17.5

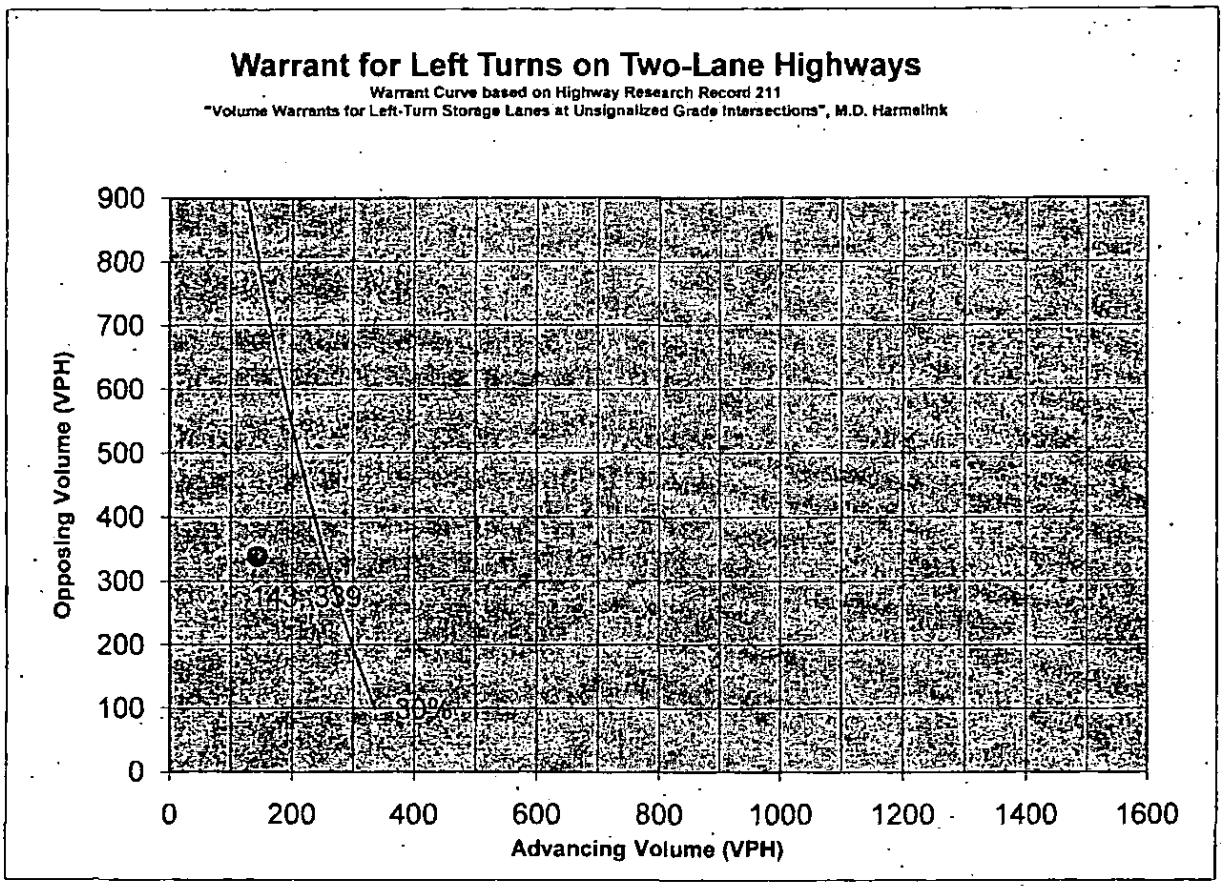
"Turn Lane Warrants" & "Turn Lane Storage Length"

Emmitsburg Road / Complex Driveway

2012 Traffic Volumes with Development

PM Peak (Friday)

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2017 Traffic Volumes with Development
Design Hour: PM Peak (Friday)
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	39	0%	39	No
	Thru	108	1%	109	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	124	1%	125	
	Right	221	0%	221	

Advancing Volumes: 148
Opposing Volumes: 346

Left Turns: 39
Left Turn Percentage: 30.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3

Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'

Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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Guidelines for Left Turn Treatments

Two-Lane Highway

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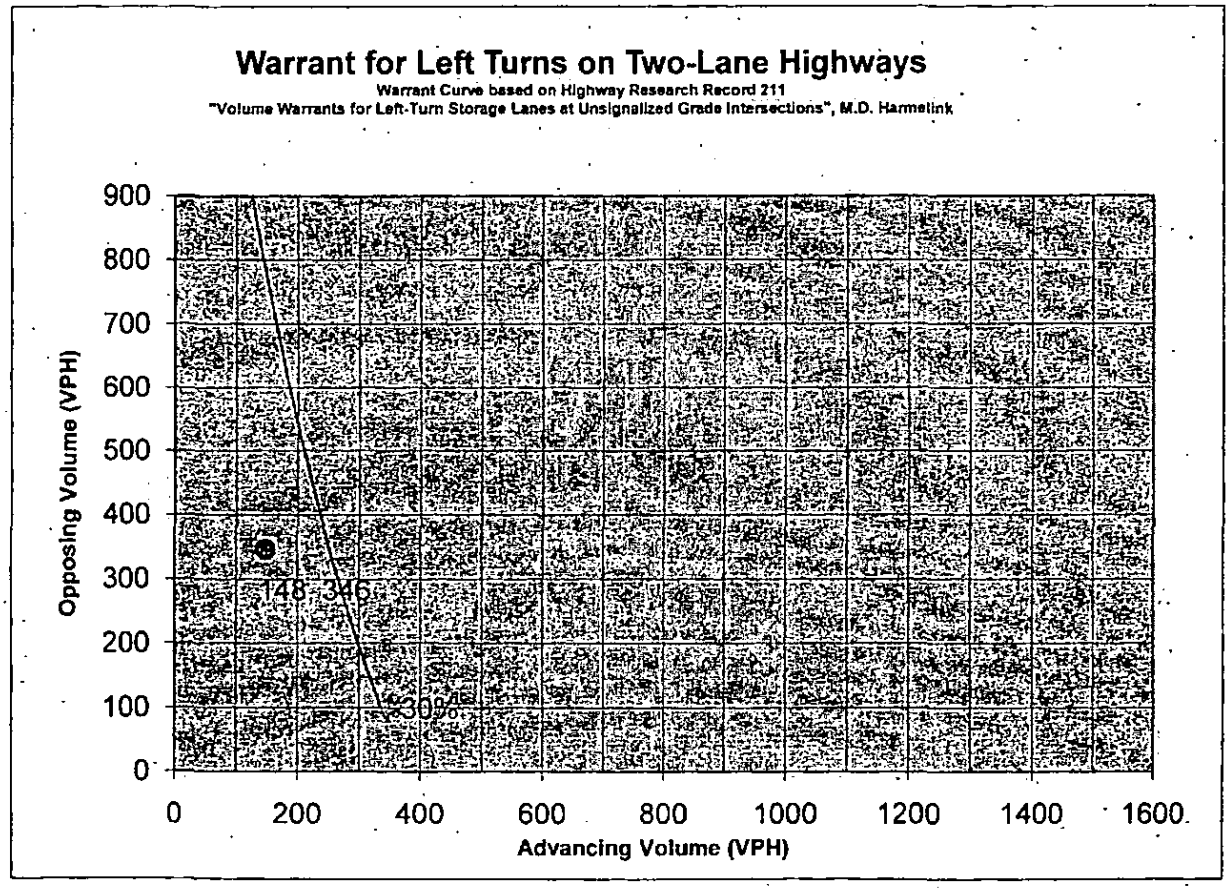
"Turn Lane Warrants" & "Turn Lane Storage Length"

Emmitsburg Road / Complex Driveway

2017 Traffic Volumes with Development

PM Peak (Friday)

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2012 Traffic Volumes with Development
Design Hour: Saturday Peak
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	38	0%	38	No
	Thru	145	1%	146	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	107	1%	108	
	Right	237	0%	237	

Advancing Volumes: 184
Opposing Volumes: 345

Left Turns: 38
Left Turn Percentage: 20.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3
Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'
Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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Guidelines for Left Turn Treatments

Two-Lane Highway

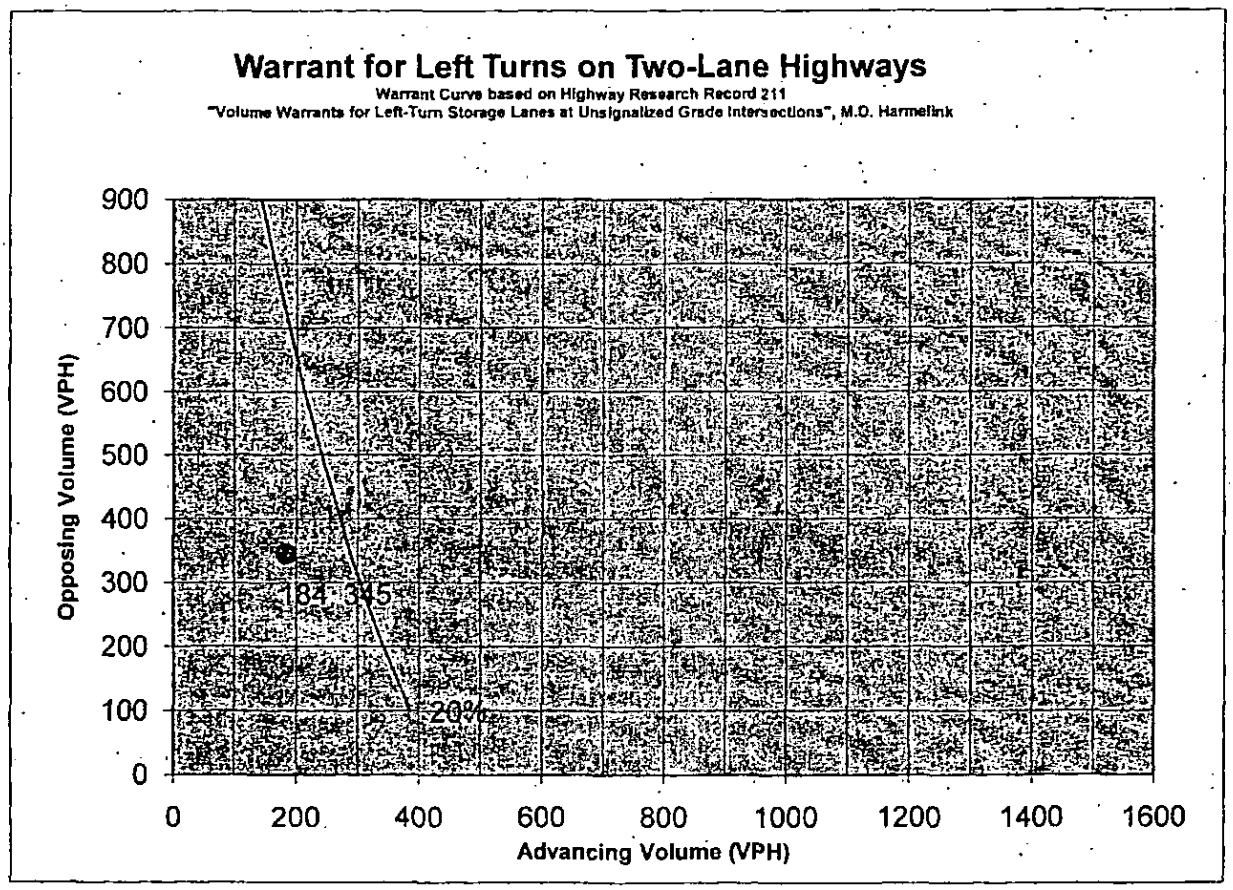
Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length".

Emmitsburg Road / Complex Driveway

2012 Traffic Volumes with Development

Saturday Peak

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Left Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

General Information

Project Number: 388.01
Location: Emmitsburg Road / Complex Driveway
Scenario: 2017 Traffic Volumes with Development
Design Hour: Saturday Peak
Performed By: DJT
Date: 3/16/2010

Speed Limit: 40 mph
Terrain Type: Level
Signalized ?: No

Volume & Warrant Details

Movement		Volume	Percent Trucks	PCEV	Left Turn Lane Warranted ?
Advancing	Left	39	0%	39	No
	Thru	152	1%	153	
	Right	0	0%	0	
Opposing	Left	0	0%	0	
	Thru	111	1%	112	
	Right	238	0%	238	

Advancing Volumes: 192
Opposing Volumes: 350

Left Turns: 39
Left Turn Percentage: 20.00%

Storage Length Calculations

Type of Traffic Control	Speed (MPH)					
	25 - 35		40 - 45		50 - 60	
	Turn Demand Volume					
	High	Low*	High	Low*	High	Low*
Signalized	A	A	B or C **	B or C **	B or C **	B or C **
Unsignalized	A	A	C	B	B or C **	B

* Low is considered 10% or less of approach traffic volume
** Whichever is greater

Condition A	
Speed (MPH)	Storage Length
Any Speed	Length from Table 3

Condition B	
Speed (MPH)	Storage Length
40	75'
45	125'
50	175'
55	235'
60	295'

Condition C	
Speed (MPH)	Storage Length
40	61' + Additional length from Table 3
45	75' + Additional length from Table 3
50	93' + Additional length from Table 3
55	114' + Additional length from Table 3
60	131' + Additional length from Table 3

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Guidelines for Left Turn Treatments

Two-Lane Highway

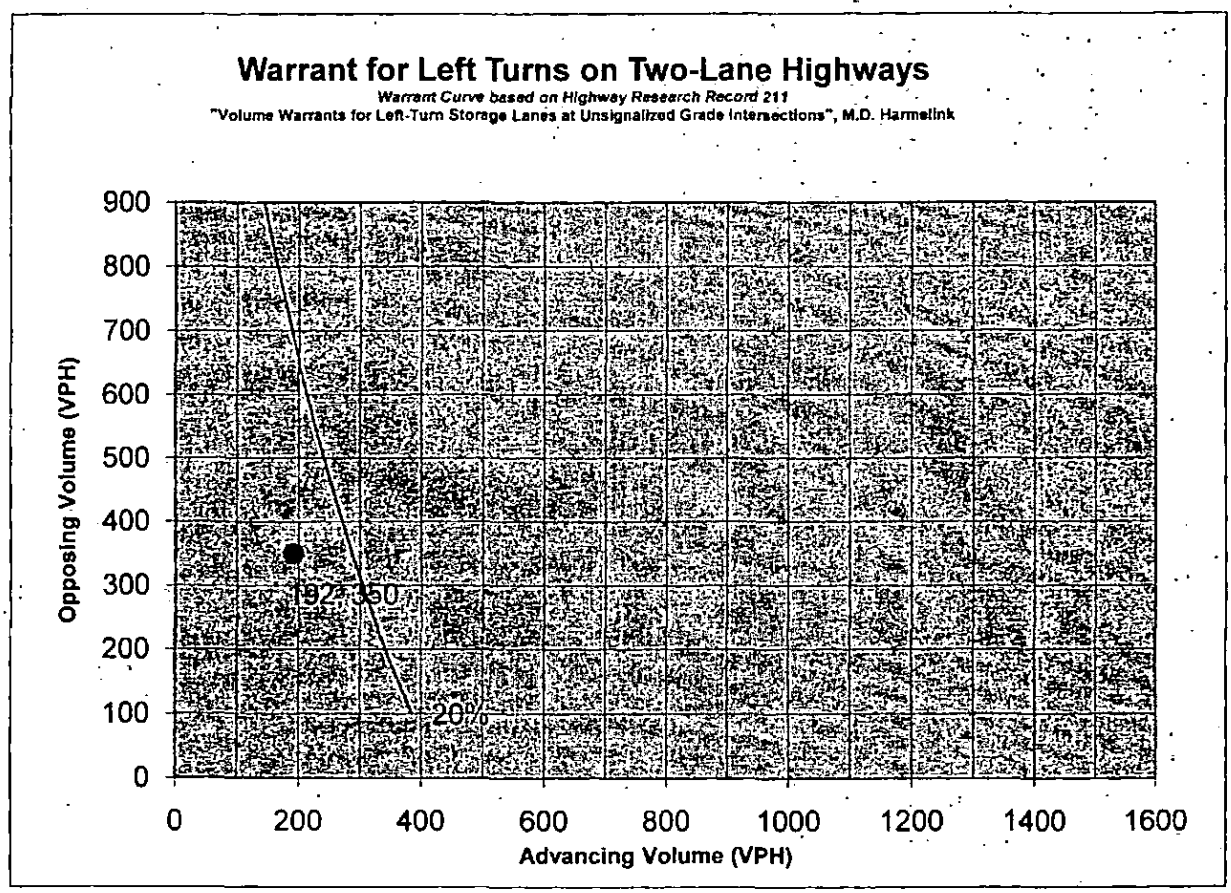
Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

Emmitsburg Road / Complex Driveway

2017 Traffic Volumes with Development

Saturday Peak

Warrant Graph



Storage Length Details

Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
No					

A Left Turn Lane is not Warranted

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Guidelines for Right Turn Treatments

Two-Lane Highway

Based on PennDOT Publication 46, Chapter 11.17.4 & 11.17.5
"Turn Lane Warrants" & "Turn Lane Storage Length"

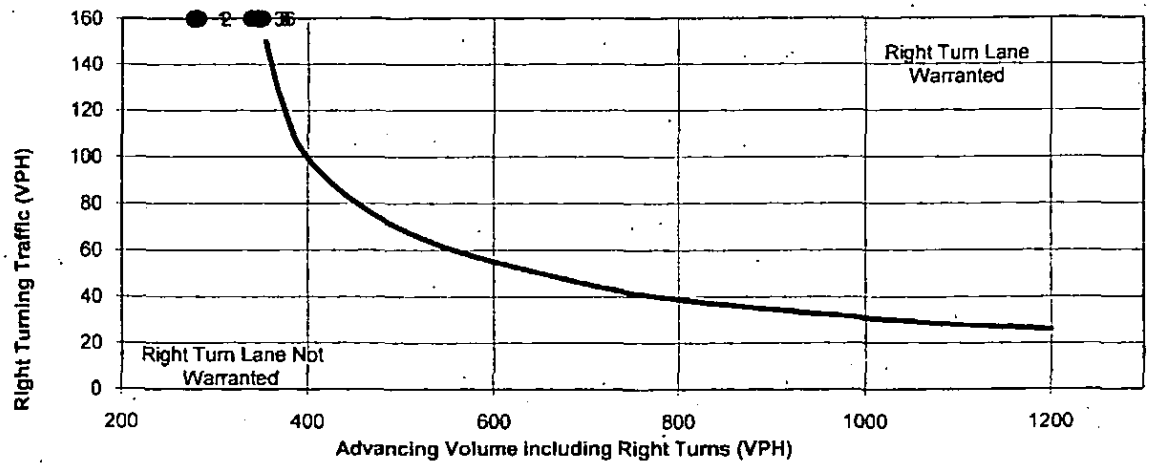
General Information

Project Number: 388.1
Location: Emmitsburg Road / Complex Driveway
Performed By: DJT — Speed Limit: 40 mph — Signalized ?: No
Date: 3/16/2010 — Terrain Type: Level

Analysis Details

	Scenario / Peak Hour	Approach PHV			% Trucks			PCEV Total Approach	PCEV Right Turns
		Left	Thru	Right	Left	Thru	Right		
1	2012 Traffic Volumes with Development - PM (Thurs)	0	105	173	0%	1%	1%	279	174
2	2017 Traffic Volumes with Development - PM (Thurs)	0	109	173	0%	1%	1%	283	174
3	2012 Traffic Volumes with Development - PM (Fri)	0	119	219	0%	1%	1%	340	220
4	2017 Traffic Volumes with Development - PM (Fri)	0	124	221	0%	1%	1%	347	222
5	2012 Traffic Volumes with Development - Sat	0	107	237	0%	1%	1%	346	238
6	2017 Traffic Volumes with Development - Sat	0	111	238	0%	1%	1%	351	239

Figure 9. Warrant for Right Turn Lanes on Two-Lane Roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Storage Length Calculations

Scenario	Turn Lane Warranted?	Condition A	Condition B	Condition C	Storage Length	Storage Length (Rounded to 25')
1	No					
2	No					
3	No					
4	No					
5	No					
6	No					

Results

A Right Turn Lane is not Warranted

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CORRESPONDENCE

TRANSPORTATION IMPACT STUDY SCOPING MEETING APPLICATION

WARRANT 9, ADT VOLUME WARRANT EVALUATION

PennDOT Publication 212.302.b (3) (ii)

CONDITION A – ADT VOLUME WARRANT					
Number of Lanes for Moving Traffic on Each Approach		Estimated ADT*			
Major Street	Minor Street	Major Street (Both Approaches)		Higher Volume Minor Street (One Direction Only)	
		100%	70%**	100%	70%**
1	1	10,000	7,000	3,000	2,100
2 or more	1	12,000	8,400	3,000	2,100
2 or more	2 or more	12,000	8,400	4,000	2,800
1	2 or more	10,000	7,000	4,000	2,800

CONDITION B – ADT VOLUME WARRANT					
Number of Lanes for Moving Traffic on Each Approach		Estimated ADT*			
Major Street	Minor Street	Major Street (Both Approaches)		Higher Volume Minor Street (One Direction Only)	
		100%	70%**	100%	70%**
1	1	15,000	10,500	1,500	1,050
2 or more	1	18,000	12,600	1,500	1,050
2 or more	2 or more	18,000	12,600	2,000	1,400
1	2 or more	15,000	10,500	2,000	1,400

* Based on the volume projected to be present within 6 months of the opening of the development or within 2 years of the opening of the highway.

** May be used if the 85th percentile speed of the major street traffic exceeds 40 miles per hour or the intersection lies within the built-up area of an isolated community having a population of less than 10,000.

Proposed Site Traffic for Proposed Casino:

ADT for entire development assuming full-build out: 7020
Exiting ADT for proposed casino: 7020 / 2 = 3510 exiting
Existing exiting ADT on driveway: 212 trips
Total ADT exiting driveway: 3510 + 212 = 3722 trips

ADT on Emmitsburg Road:

ADT on Emmitsburg Road: 2171
ADT entering from proposed casino: 3510
Total ADT on Emmitsburg Road: 5681

Based on the minimum ADT volumes shown in the Table for Condition A, the minimum ADT volumes are not met to satisfy Traffic Signal Warrant 9.

Based on the minimum ADT volumes shown in the Table for Condition B, the minimum ADT volumes are not met to satisfy Traffic Signal Warrant 9.

Peak Hour Signal Warrant

MUTCD Warrant 3 - Peak Hour (70% Factor)

Based on MUTCD Sect. 4C.04 Signal Warrants and PENNDOT Publication 212

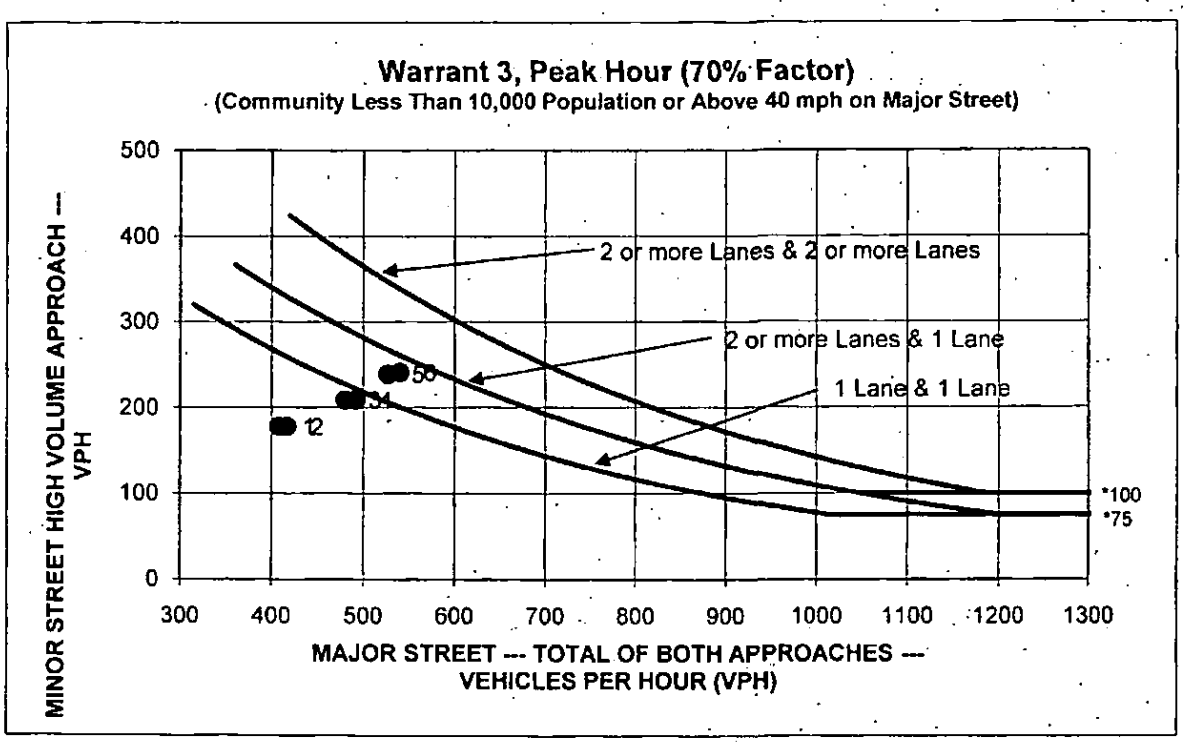
General Information

Project Number: 388.01
Location: Emmitsburg Rd / Complex Driveway
Performed By: DJT

# of Major Street Lanes: 1 Lane # of Minor Street Lanes: 1 Lane

Analysis Details

	Scenario / Peak Hour	PHV Major Street	PHV Minor Street	Warrant Met?
1	2012 Traffic Volumes w/ Dev - PM (Thurs)	408	178	No
2	2017 Traffic Volumes w/ Dev - PM (Thurs)	417	178	No
3	2012 Traffic Volumes w/ Dev - PM (Fri)	480	209	No
4	2017 Traffic Volumes w/ Dev - PM (Fri)	492	209	No
5	2012 Traffic Volumes w/ Dev - Sat	527	239	Yes
6	2017 traffic Volumes w/ Dev - Sat	540	241	Yes



* Note

100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane

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CORRESPONDENCE

OS-2 (10-08)

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us

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MAR 2 4 2010
TRG

March 19, 2010

Daniel J. Thornton, P. E.
Transportation Resource Group, Inc.
204 North George Street
Suite 110
York, PA 17401-1108

Adams Co.-Cumberland Twp.
Emmitsburg Rd. (SR 3001)/(Bus 15), Seg.: 0080
Mason-Dixon Resort & Casino
Scope of Study

Dear Mr. Thornton:

We have received your letter regarding the locations you have chosen to study for the proposed development at the subject location.

We concur with the locations you have chosen. However, you may need to modify the scope of traffic impact study to include all intersections where the proposed development is projected to generate 100 or more new trips during the peak hour. Scope must include the driveway(s) for possible turn lanes.

If you have any further questions regarding this matter, please contact Eric Kinard of the District Traffic Unit at 717-787-9237.

Very truly yours,

for: Tucker Ferguson, P. E.
District Executive

CHT/sab
(cht0319l)

cc: Office of Planning & Zoning, Cumberland Township

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February 17, 2010

Mr. Mazhar Malik
Permit Manager
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103

RE: Proposed Mason Dixon Resort and Casino
Transportation Impact Study (TIS) Scoping Meeting
Cumberland Township, Adams County
TRG Project No. 388.01.H.01

Dear Mr. Malik:

On behalf of Mason-Dixon Resorts, LLC, Transportation Resource Group, Inc. is requesting a TIS Scoping Meeting to discuss the proposed Mason Dixon Resort and Casino located in Cumberland Township, Adams County. The site is proposed at the All-Star Family Fun & Sports Complex located to the east of Emmittsburg Road (S.R.3001). TRG has prepared the TIS Scoping Meeting Application in accordance with the procedures outlined in PennDOT Strike-Off letter 470-09-4 dated February 12, 2009. We are requesting a meeting with PennDOT to discuss the proposed development and site access. Please let me know when the meeting is scheduled. If you have any questions, please feel free to give me a call.

Very truly yours,
Transportation Resource Group, Inc.

Daniel J. Thornton, P.E.
Senior Associate

DJT/vaw
cc: Richard Deen, P.E., PennDOT District 8-0 Traffic Unit
David M. LeVan, Mason-Dixon Resorts, LLC
Bernard A. Yannetti, Jr., Esquire, Hartman & Yannetti
Florence Ford, Township Manager, Cumberland Township
Timothy R. Knoebel, P.E., KPI Technology
Jodie Evans, P.E., PTOE, McMahon Associates, Inc.

TRANSPORTATION IMPACT STUDY (TIS)
SCOPING MEETING APPLICATION

Scoping Meeting Date: To be determined

Applicant: Mason-Dixon Resorts, LLC

Applicant's Consultant: TRG - Daniel J. Thornton, P.E. (dthornton@consulttrg.com)

Applicant's Primary Contact: David LeVan (dlevan@comcast.net)

(Attach a list of meeting attendees along with phone numbers and email addresses)

(1) LOCATION OF PROPOSED DEVELOPMENT: *(Attach location map if available)*

PennDOT Engineering Dist.: 8 -- 0 County: Adams

Municipality: Cumberland Township

State Route(s) (SR): Emmitsburg Road (S.R.3001)

Segment(s): 0080 Offset(s):

Refer to the attached site location map.

(2) DESCRIPTION OF PROPOSED DEVELOPMENT: *(Attach site plan if available)*

Currently on site is the Eisenhower Inn and Conference Center and the All-Star Family Fun & Sports Complex. Access to the existing facilities is provided by an existing full movement driveway on Emmitsburg Road (S.R.3001) to the south of Barlow Greenmount Road. As part of the proposed development, the All-Star Family Fun building is proposed to be converted to a casino. The size of the building will not change but will be renovated to accommodate the casino's need. The casino is proposed to have 600 slots and 50 table games at this time. Access to the proposed casino will continue to be provided by the full movement driveway on Emmitsburg Road (S.R.3001). An aerial of the tract of land is attached for your reference.

Site access: Existing full movement access to Emmittsburg Road (S.R.3001).

Proposed Land Use: Casino with 600 slots and 50 table games.

Community Linkages access to neighboring properties, cross easements, pedestrian and transit accommodation): There are no proposed community linkages for this site. The land use context for this area is Rural Community Arterial.

(3) DEVELOPMENT SCHEDULE AND STAGING:

Anticipated Opening Date: 2012
Full Buildout Date: 2012

Describe Proposed Development Schedule/Staging:

The proposed development will be built in one phase.

(4) TRIP GENERATION: *(Use most recent edition of Institute of Transportation Engineers (ITE) Trip Generation Manual unless PENNDOT approves another source. Non-ITE methods must be fully justified based on surveys of multiple sites of the same land use type and size.)*

Trip generation for the proposed development will be based on:

_____ ITE Trip Generation Manual.

X Other independent surveys.
Attach justification for non-ITE methods.
The ITE article "Trip Generation Characteristics of Small to Medium Casinos" was used to determine the trip generation. Copies of the ITE article are attached.

List land development and trip generation information, as appropriate. If necessary, attach additional sheets to indicate additional land uses or development phases.

Estimated Trip Generation (Mason-Dixon Resort and Casino)										
Land Use	PM Peak Hour (Thursday)			PM Peak Hour (Friday)			Saturday Peak Hour			Average Weekday Daily Traffic
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	
Casino (600 slots)	186	168	354	216	198	414	252	216	468	5,958

(5) ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:

(a) Estimated Daily Trip Generation of Proposed Development – Assuming One Access Point and Full Buildout/Occupancy of Entire Tract: 5,958 trips/day

(b) Driveway Classification Based on Trip Generation and One Access Point:

Minimum Use: _____ Medium Volume: _____

Low Volume: _____ High Volume: X

(6) TRAFFIC IMPACT STUDY REQUIRED BASED ON PENNDOT GUIDELINES?

____ No
_X_ Yes, based on:

__X__ 3,000 or more vehicle trips/day generated

__X__ During any one-hour time period, 100 or more new (added) vehicle trips generated entering or 100 or more new (added) vehicle trips generated exiting development

_____ Other considerations as described below:

(7) TRAFFIC IMPACT ASSESMENT REQUIRED? ___ No _____ Yes

If a TIS is required, the following sections of this checklist will be discussed at the TIS Scoping Meeting. The applicant may provide preliminary information.

(8) TIS STUDY AREA: *(Describe; attach map and/or diagram)*

- Emmitsburg Road (S.R.3001)/Barlow Road (S.R.3006)
- Emmitsburg Road (S.R.3001)/Existing Driveway
- Emmitsburg Road (S.R.3001)/Cunningham Road (S.R.3008)
- Emmitsburg Road (S.R.3001)/US Route 15 Southbound Ramps
- Emmitsburg Road (S.R.3001)/US Route 15 Northbound Ramps

(9) STUDY AREA TYPE: Urban__X__ Rural _____

(10) TIS ANALYSIS PERIODS AND TIMES: *(List periods and times. Normal analysis periods are existing conditions, 15 years in the future without development, and 15 years in the future with development. Normal analysis times for each period are the AM peak hour, the PM peak hour, and the peak hour of site-generated traffic.)*

Weekday Thursday PM Peak Hour between 3:00 and 6:00 PM
Weekday Friday PM Peak Hour between 4:00 and 7:00 PM
Weekend Saturday Peak Hour between 12:00 and 3:00 PM

(11) TRAFFIC ADJUSTMENT FACTORS:

(a) Seasonal Adjustment: *(Identify counts requiring adjustment and methodology)*

The counts will be seasonally adjusted using PennDOT Traffic Data Report.

Source

(b) Annual Base Traffic Growth: 0.86 %/yr compounded PennDOT

(c) Pass-By Trips: *(Attach justification where required)*

N/A

(d) Captured Trips for Multi-Use Sites: *(List % and manner of application. Attach justification where required.)*

N/A

(e) Other Adjustments:

(12) OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC: *(Identify proposed developments with issued permits that need to be included.)*

To be determined by PennDOT and Cumberland Township.

(13) TRIP DISTRIBUTION AND ASSIGNMENT: *(Describe; explain/justify; attach diagram and related information.)*

Cordon Line Methodology & Marketing Analysis

(14) REQUIRED TRAFFIC COUNTS:

Turning movement counts will be conducted at the study intersections.

(15) CAPACITY/LOS ANALYSES:

Synchro 7.0 will be utilized to conduct the capacity analysis at the study intersections.

(16) ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED: *(Projects programmed for construction or other developments with issued permits.)*

To be determined by PennDOT and Cumberland Township.

(17) OTHER NEEDED ANALYSES:

(a) Sight Distance Analyses: *(Required for all site access driveways; identify other locations.)*

Sight distance will be measured at the existing access on Emmitsburg Road (S.R.3001).

(b) Signal Warrant Analysis: *(Identify locations)*

- Emmitsburg Road (S.R.3001)/Existing Access

(c) Required Signal Phasing/Timing Modifications: *(Determine for all signalized intersections; specify methodology.)*

N/A

(d) Traffic Signal Corridor/Network Analyses: *(Identify locations/methodology)*

N/A

(e) Analyses of the Need for Turning Lanes: *(Identify locations/methodology)*

- Emmitsburg Road (S.R.3001)/Existing Access

(f) Turning Lane Lengths: *(Identify methodology to be used)*

Per PennDOT guidelines

(g) Left Turn Signal Phasing Analyses: *(Identify locations/methodology)*

N/A

(h) Queuing Analyses: *(Identify locations and methodology)*

N/A

(i) Gap Studies: *(Identify locations and methodology)*

N/A

(j) Accident Analyses: *(Identify locations)*

At the study intersections.

(k) Weaving Analyses: *(Identify locations)*

N/A

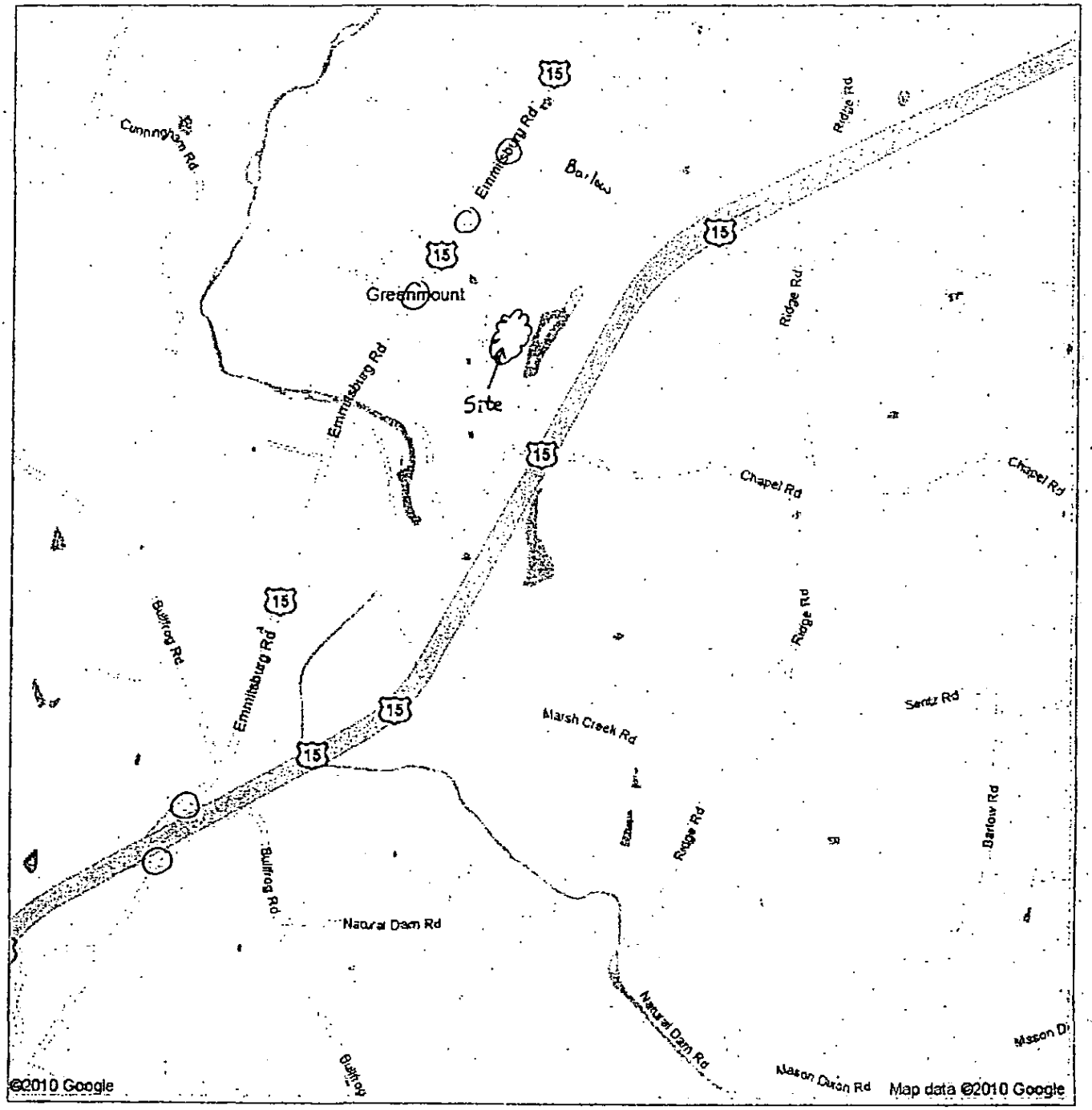
(1) Other Required Studies: *(Specify location and methodology)*

N/A

(18) ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATIVE TO THE SCOPE OF THE TIS:

Google maps

Get Google Maps on your phone
Text the word "GMAPS" to 466453



O - study intersections

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January 27, 2010

Ms. Florence Ford, Manager
Cumberland Township
1370 Fairfield Road
Gettysburg, PA 17325

Re: Mason-Dixon Resorts, LLC
Mason-Dixon Resort and Casino
Traffic Impact Study Scoping Letter
Cumberland Township, Adams County
TRG Project No. 388.01

Dear Ms. Ford:

This letter summarizes the proposed traffic impact study scope for the proposed Mason-Dixon Resort and Casino located to the east of Emmitsburg Road (S.R.3001) in Cumberland Township, Adams County. Currently on site is the Eisenhower Inn and Conference Center and the All-Star Family Fun & Sports Complex. Access to the existing facilities is provided by an existing full movement driveway on Emmitsburg Road (S.R.3001) to the south of Barlow Greenmount Road.

As part of the proposed development, the All-Star Family Fun building is proposed to be converted to a casino. The size of the building will not change but will be renovated to accommodate the casino's need. The casino is proposed to have 600 slots and 50 table games at this time. Access to the proposed casino will continue to be provided by the full movement driveway on Emmitsburg Road (S.R.3001). An aerial of the tract of land is attached for your reference.

As part of the traffic impact study, we are proposing the following study scope:

Study Intersections

- Emmitsburg Road (S.R.3001)/Existing Driveway

Trip Generation

The trip generation for the site was determined based on an ITE article "Trip Generation Characteristics of Small to Medium Sized Casinos". A copy of the ITE article is attached. The article describes the trip generation for five small to medium casinos that had slots and tables. The casinos in the article had more slots than the proposed Mason-Dixon Resorts and Casino will have but the total number of tables are comparative. Therefore, the trip generation rates

included in the article will be utilized to determine the anticipated traffic for the proposed casino. Based on the information in the article, the Adjacent Street Peak Hour Trip Generation table will be utilized for the PM peak hour (Thursday) and the Facility Peak Hour Trip Generation table will be utilized for the PM peak hour (Friday) and for the Saturday peak hour. A table is attached that summarizes the anticipated trip generation.

Due to the existing Eisenhower Inn and Conference Center located on the site as well, an internal capture will be assumed from the hotel to the proposed casino. While ITE Trip Generation Handbook does not have an internal capture percentage between lodging and recreational, it was assumed that 2% of the trips to/from the proposed casino will be from the existing Eisenhower Hotel and will never leave the site. The attached trip generation table shows the proposed internal capture for the proposed casino.

Trip Distribution

Trip distribution will be determined based on the existing turning movement counts (TMC) conducted at the site access intersection. Copies of the existing traffic counts are attached. The anticipated trip distribution will be assumed as follows:

- 55% oriented to/from the north on Emmitsburg Road (S.R.3001)
- 45% oriented to/from the south on Emmitsburg Road (S.R.3001)

A sketch is attached that shows the anticipated trip distribution and assignment for the proposed casino.

Study Time Periods

The study periods for analysis are proposed as follows:

- Weekday Thursday PM Peak Hour 3:00 – 6:00 PM
- Weekday Friday PM Peak Hour 4:00 – 7:00 PM
- Saturday Peak Hour 12:00 – 3:00 PM

The traffic counts were conducted in January 2010 and will be seasonally factored using guidelines from PennDOT Traffic Data. Copies of the seasonal factors are attached. Automatic traffic recorder (ATR) counts will also be conducted on Emmitsburg Road (S.R.3001) and the existing driveway.

Analysis Scenarios

The following analysis scenarios are proposed based on an opening year of 2011 and a 5 year design period:

- Existing traffic volumes
- 2011 traffic volumes without development
- 2011 traffic volumes with development
- 2016 traffic volumes without development
- 2016 traffic volumes with development

The background growth rate factor will be determined based on PennDOT's Growth Factors for July 2009 to July 2010. For this development, the growth rate factor is 0.86% per year.

Please review the attached information and respond in writing with your required scope of work. We are also requesting any developments and/or committed roadway improvements within our study area that the Township will require to be included in the Traffic Impact Analysis for the proposed development.

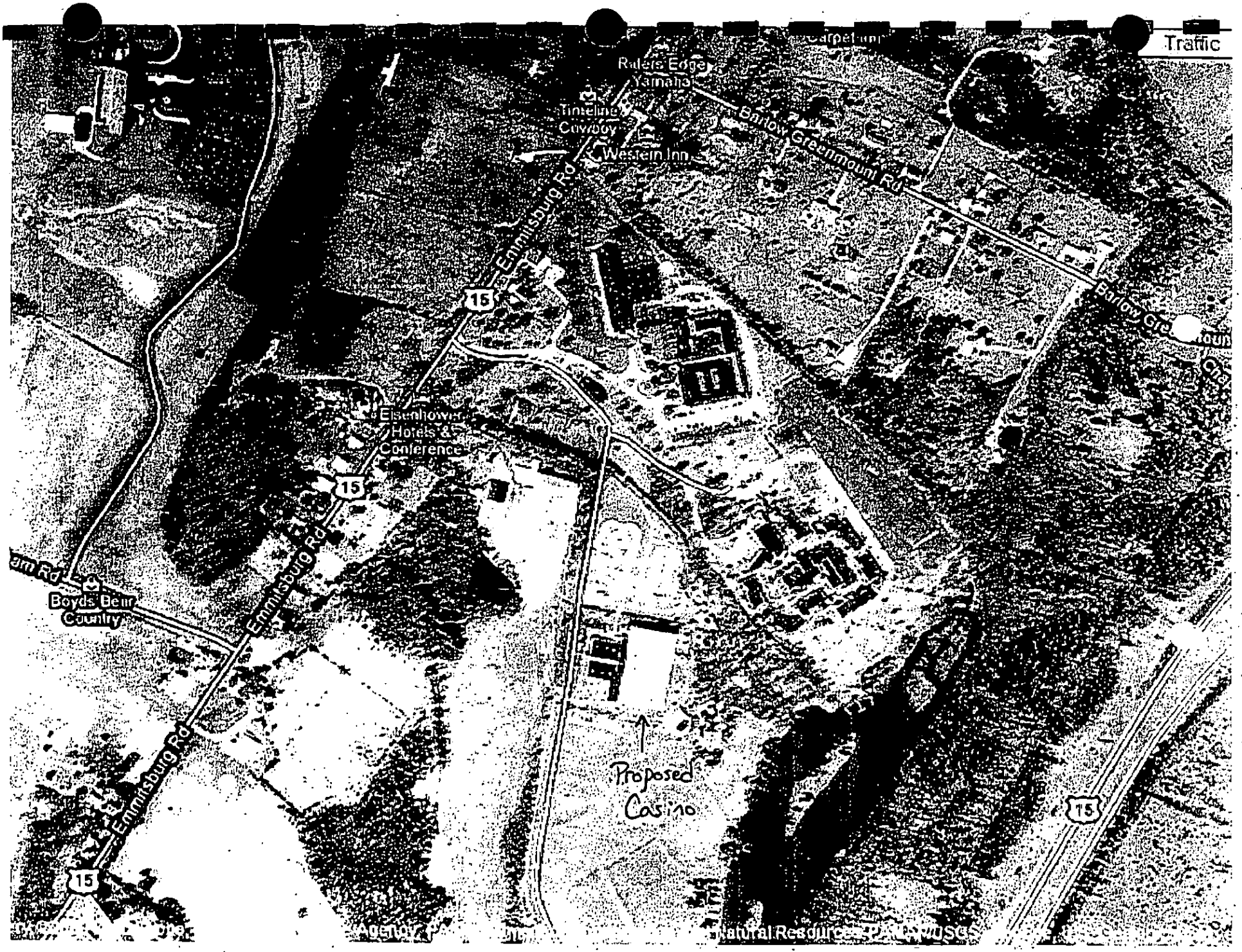
If you have any questions, please feel free to give me a call.

Very truly yours,
Transportation Resource Group, Inc.

Daniel J. Thornton, P.E.
Senior Associate

DJT/vaw
Attachments

cc: David LeVan, Mason-Dixon Resorts, LLC
Bernard A. Yannetti, Jr., Esquire, Hartman & Yannetti
Timothy R. Knoebel, P.E., KPI Technology
Jodie Evans, P.E., PTOE, McMahon Associates, Inc.


Traffic
Rulers Edge
Yamaha
Timeline
Cowboy
Western Inn
Emmitsburg Rd
Barlow Greenmount Rd
15
Eisenhower
Hotels &
Conference
Boyds Bear
Country
Proposed
Casino

Trip Generation Characteristics of Small to Medium Sized Casinos

Michael Trueblood, Tara Gude

OVERVIEW

This paper focuses on trip generation for small to medium sized casinos that are not part of a cluster of casinos. The data collection for this paper included three casinos located in Council Bluffs, Iowa. Two of the casinos are riverboat casinos and are located along the Missouri River, while the other casino includes an existing dog racetrack that later added slot machines.

In addition to the casinos located in Council Bluffs, the calculated trip generation rates were compared to rates included in a March 1998 ITE Journal article entitled *Gaming Casino Traffic*. The article calculated trip generation rates for two casinos in the St. Louis metropolitan area, the Casino Queen and the St. Charles Casino.

There is not an overwhelming amount of trip generation information available for casinos located outside of the typical Las Vegas or Atlantic City stereotype. The trip generation characteristics of casinos found in large clusters, like those in Las Vegas for example, are not similar to the casinos that will be covered in this article. For comparison purposes the MGM Grand Casino in Las Vegas has over 5,000 hotel rooms with over 3,500 slot machines, while the Treasure Island Casino has over 2,900 hotel rooms with over 2,000 slot machines. The trip generation characteristics of these casinos are quite different than the five covered in this paper due to their immense size and popularity. Another reason these casinos have different trip generation characteristics is because they are accessible by foot. In Las Vegas people tend to walk to and from the casinos or drive to one and then walk to several others throughout the course of a day.

It should be noted that each state has different rules and regulations that govern the actual type of establishment that can be used for gambling. Recent regulations have changed or have been modified in order to allow gambling facilities to be established beyond the typical riverboat casinos. Examples of these casinos are those operated by Indian Tribes. There are several casinos operated by Indian Tribes across the country. These casinos range in size, but they are good examples of the types of casinos this paper addresses.

LOCATION OF CASINOS

This section will provide a brief overview of the location of the three Council Bluffs casinos and the two casinos located in the St. Louis metropolitan area. The casino locations are shown in Figure 1. The three casinos in Council Bluffs, Iowa are located near the Missouri River in the Omaha metropolitan area. The Ameristar Casino and Harvey's Casino are located along the river within one mile of each other in the northwest quadrant of the I-29/I-80 interchange. Bluffs Run Casino is located about two miles east of these casinos along I-80. For comparison purposes to other casino locations, the 1998 average daily traffic (ADT) along I-29 was 40,500 vehicles, while the 1998 ADT along I-80 was 67,400 vehicles. The estimated 1999 population is 1,040,000 people within a 50-mile radius of the casinos.

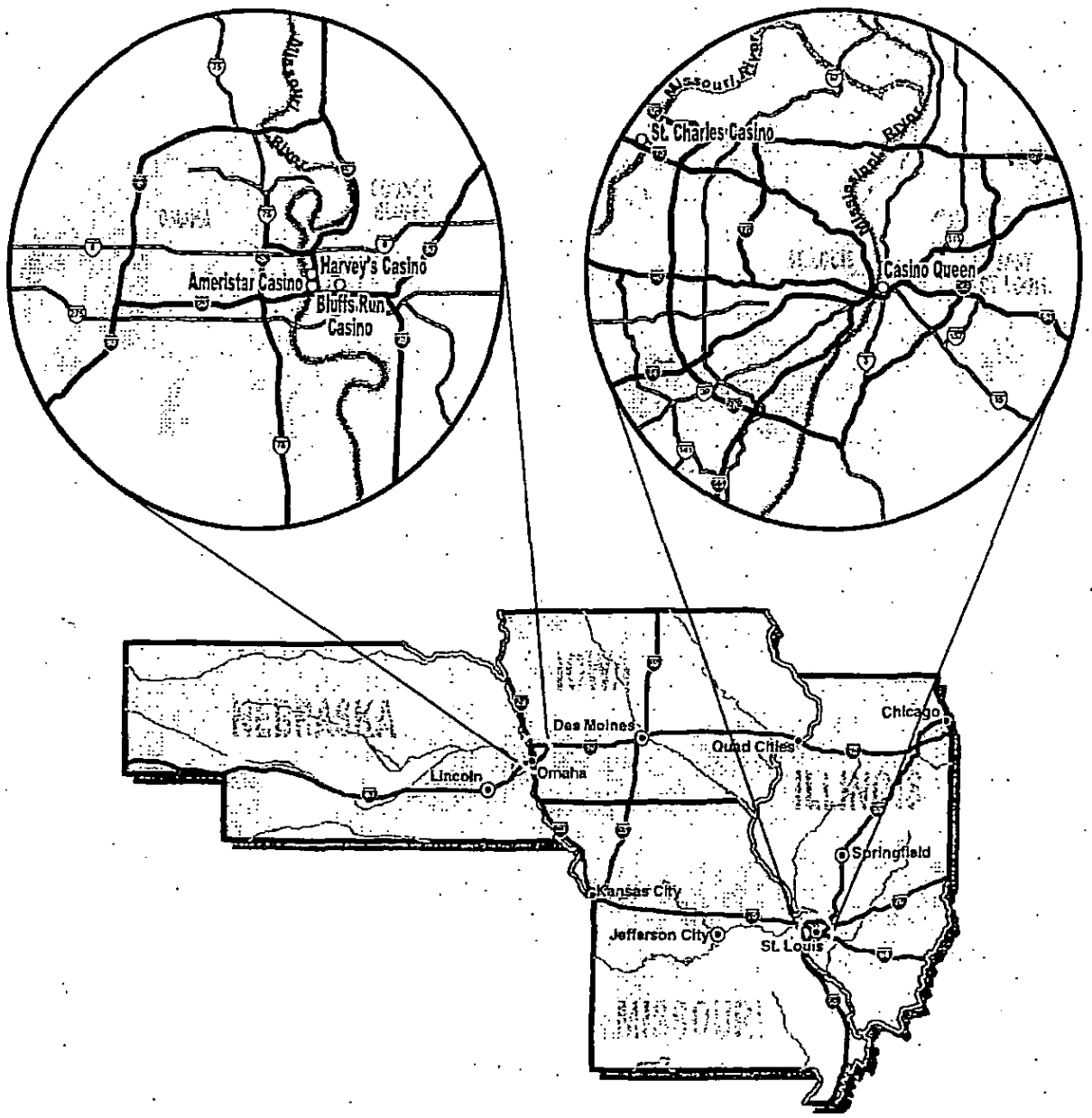


Figure 1 – Casino Location Map

The two St. Louis area casinos are also depicted in Figure 1. The St. Charles Casino is located along the Missouri River immediately north of I-70/Missouri River junction and about five miles to the west of I-270/I-70 junction in the City of St. Charles. The 1998 ADT along I-70 was 188,000 vehicles. The Casino Queen is located along the Mississippi River immediately east of the Gateway Arch and immediately north of the I-70/I-64/I-55 junction in the City of East St. Louis, Illinois. The ADT of these three interstates are 117,300 vehicles. The estimated 1999 population is 2,637,000 people within a 50-mile radius of the St. Louis area casinos.

GAMING REVENUES OF STUDY CASINOS

This section discusses the gaming revenues of the tri-state region where the five casinos presented in this paper are located. Between the years 1994-1999, St. Charles Casino had the second highest attendance of the eleven riverboat casinos within the state of Missouri. During the fiscal year 2000 the eleven riverboat casinos made over $1.0 billion in adjusted gross revenues (AGRs). In Illinois, the nine riverboat casinos made over $1.66 billion AGRs in 2000, with the Casino Queen ranked fifth out of the nine riverboats. In Iowa, Harvey's Casino and Ameristar Casino ranked one and two of out ten casinos in AGRs, respectively. The ten casinos in Iowa combined for over $575 million in AGRs. Casinos within the State of Iowa that also have pari-mutuel wagering are accounted for separately in terms of their AGRs. Bluffs Run Casino was ranked two out of three casinos in AGRs. The three racetrack casinos, as they are called in Iowa, combined for over $300 million in AGRs in 2000.

TRIP GENERATION CHARACTERISTICS OF STUDY CASINOS

Most of the available information concerning trip generation of casinos is related to large casinos or clusters of several casinos, such as those in Las Vegas. In order to determine the trip generation characteristics of small to medium sized casinos, HDR collected traffic information at three casinos in Council Bluffs, Iowa. Once the trip generation rates were computed, they were compared to trip generation rates of two St. Louis area casinos documented in a March 1998 issue of the ITE Journal.

Table 1 documents the five casinos' characteristics. It should be noted that the information for the Council Bluffs casinos is for the year 2000, while the information for the St. Louis casinos was collected in 1998.

Table 1 – General Casino Information

Amenities	Council Bluffs, Iowa			St. Louis Metro Area	
	Harvey's	Ameristar	Bluffs Run	St. Charles	Casino Queen
Slots	1169	1446	1479	1847	1020
Total Tables	53	51	0	90	51
Gaming sq. ft.	28,250	38,000	34,280	50,000	27,500
Hotel Rooms	251	356	0	*Not Applicable*	*Not Applicable*
Employees	1257	1329	1046	*Not Available*	1079
Pari-mutuel Wagering	No	No	Yes	No	No
Convention Center (seats)	900	170	No	*Not Available*	*Not Available*

The data collection for the Council Bluffs casinos was conducted during the following times:

- Ameristar – Saturday, July 15th to Tuesday, July 25th, 2000.
- Harvey's – Thursday, July 20th to Sunday, July 30th, 2000.
- Bluffs Run – Wednesday, July 19th to Saturday, July 29th and Saturday August 19th to Monday August 28th, 2000.

Automatic tube recorders were placed at all entrances and exits to the casinos. Data was collected in fifteen-minute intervals, 24-hours a day for each of the casinos. All five casinos operated on a 24-hour basis. As will be discussed later, the hourly information was unique when compared to other land uses. The following sections provide detailed information on the trip generation characteristics of the three Council Bluffs casinos. These rates were compared to the two St. Louis casinos and since the rates for all five casinos were similar, an average trip generation rate was computed.

Peak Hour Trip Generation Rates

A trip generation rate was calculated based on the number of slot machines that were located at each casino. Generation rates were calculated for both weekdays and weekends. Weekday trip generation rates were calculated for both the peak of facility and peak of adjacent street traffic. Traffic studies for new developments generally analyze the weekday peak hour of adjacent street traffic. However, several types of developments generate higher traffic levels during times other than the adjacent street traffic peak hour. Data from the casinos indicate that their peak trip generation rates are different than the peak hour of adjacent street traffic. Table 2 depicts the average PM peak hour trip generation rates of the five casinos for the peak hour of facility, while Table 3 depicts the average PM peak hour trip generation rate for the adjacent street traffic. The PM peak hour was chosen for purposes of calculating trip generation rates because they were generally higher than the AM peak hour. Tables A1, A2, and A3 located at the end of the paper document the three Iowa casinos daily raw peak hour and time of day data.

Table 2 – Facility Peak Hour Trip Generation

	PM Peak Hour										Average PM Peak Hour Trips	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	502	380	423	477	537	491	725	625	348	336	507	462
Saturday/Sunday	482	375	624	471	553	579	850	750	*Not Available*		627	544
	PM Peak Hour Per Slot										Average PM Peak Hour Trips Per Slot	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	0.43	0.33	0.29	0.33	0.36	0.33	0.39	0.34	0.34	0.33	0.36	0.33
Saturday/Sunday	0.41	0.32	0.43	0.33	0.37	0.39	0.46	0.41	*Not Available*		0.42	0.36

Note: St. Charles weekday rate is for Friday only.

Table 3 – Adjacent Street Peak Hour Trip Generation

	PM Peak Hour										Average PM Peak Hour Trips	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	453	340	427	378	442	373	475	600	*Not Available*		449	423
Saturday/Sunday	423	334	491	413	490	467	*Not Available*		*Not Available*		468	404
	PM Peak Hour Per Slot										Average PM Peak Hour Trips Per Slot	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	0.39	0.29	0.29	0.26	0.30	0.25	0.26	0.32	*Not Available*		0.31	0.28
Saturday/Sunday	0.36	0.29	0.34	0.29	0.33	0.32	*Not Available*		*Not Available*		0.34	0.30

Note: St. Charles weekday rate is for Friday only.

The PM peak hour trip generation rates were similar for each of the three Council Bluffs casinos. These rates were found to be comparable to the two St. Louis area casinos' trip generation rates. As shown above in Table 3, there is a correlation between the number of slot machines and the traffic generated by the casinos. For example, the two St. Louis area casinos have a difference in the number of trips generated by the facility. However when the trip generation rates were developed on a per slot machine basis, the rates are quite similar. Even though the St. Charles Casino has 800 slot machines more than the Casino Queen, their trip generation rates are comparable.

HDR's analysis of the five casinos in St. Louis and Council Bluffs found that their average weekday PM peak hour of adjacent street traffic trip generation rate was 0.59 trips per slot machine, while the average weekend PM peak hour trip generation rate was 0.64 trips per slot machine. These rates were close to the weekday and weekend PM peak hour of generator, which were 0.69 trips and 0.78 trips per slot machine, respectively.

The original trip generation rates calculated for the St. Louis area casinos were based on gaming positions. For purposes of this paper the rates provided in the March ITE Journal article were converted to trips per slot machine. This was done in order to directly compare the Council Bluffs and St. Louis trip generation rates. Gaming positions are calculated based on each type of game and are a percentage of the number of slot machines. Thus, calculating the number of gaming positions can get cumbersome. The other reason slot machines were used to calculate trip generation rates was because Bluffs Run Casino does not have table games.

Daily Trip Generation Rates

Table 4 shows the ADTs that were collected for the three Iowa casinos. An average daily trip rate was developed based on information from the three Iowa casinos and from the St. Charles Casino. Not enough information was available in order to include the Casino Queen in these calculations. Table 5 shows the weekday and weekend daily trip rates for each of the four casinos in addition to an average daily trip rate.

Table 4 – Average Daily Traffic (ADT)

Day	*Harvey's Daily Volume*			*Ameristar Daily Volume*			*Bluffs Run Daily Volume*		
	Inbound Volume	Outbound Volume	ADT	Inbound Volume	Outbound Volume	ADT	Inbound Volume	Outbound Volume	ADT
Sunday	7,038	6,749	13,787	7,438	8,175	15,613	8,871	8,887	17,758
Monday	5,402	4,745	10,147	5,378	5,394	10,771	6,665	6,741	13,406
Tuesday	9,334	8,496	17,830	6,903	6,761	13,663	7,702	7,180	14,882
Wednesday	6,401	5,221	11,622	5,823	5,730	11,553	7,499	6,827	14,326
Thursday	6,944	5,462	12,406	5,845	5,703	11,548	8,494	7,867	16,361
Friday	8,230	5,938	14,168	8,043	7,460	15,503	9,211	8,441	17,652
Saturday	8,075	7,025	15,100	8,311	8,129	16,440	9,957	9,392	19,349

Table 5 – Average Daily Traffic Rates

	ADT				*ADT per slot*				Average ADT per slot
	Harvey's	Ameristar	Bluffs Run	St. Charles	Harvey's	Ameristar	Bluffs Run	St. Charles	
Monday - Friday	13,249	12,496	15,325	17,362	11.33	8.64	10.36	9.40	9.93
Saturday/Sunday	14,443	16,026	18,554	19,959	12.36	11.08	12.54	10.81	11.70

Note: St. Charles weekday rate is for Friday only.

The ADT was higher on weekend days compared to weekdays. As shown in Table 4 there was more than a 50% increase in the ADT on weekends at some of the casinos. Another interesting factor that made relatively large increases in ADT was the special promotions that the casinos offer. For example, Harvey's Casino had double points for slot club members on Tuesdays, which generated more traffic than a typical weekend day. Double points allow slot club members to earn extra points that can be redeemed for cash.

Another finding of interest was the amount of traffic that occurs during the late night hours. It was assumed that this was related to the fact that all five casinos evaluated in this paper were located within a metropolitan area and relatively close to an interstate. Table 6 documents the time variation of trips at the three Council Bluffs casinos and the St. Charles Casino. Again, data was not available for Casino Queen.

Table 6 – Casino Related Time Variations of Trips

	Percentage of Traffic during each time period									
	Harvey's		Ameristar		Bluffs Run		St. Charles		Average	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
9 AM - 9 PM	64.6	58.4	69.0	61.9	66.1	59.5	65.7	69.5	66.3	62.3
9 PM - 9 AM	35.4	41.6	31.0	38.1	33.9	40.5	34.3	30.5	33.6	37.7
12 AM - 6 AM	10.9	17.9	9.2	16.2	10.9	17.4	13.8	9.0	11.2	15.1
6 AM - 12 PM	21.0	19.6	20.7	17.3	23.1	20.8	15.8	19.0	20.1	19.2
12 PM - 6 PM	34.3	31.2	37.9	32.3	34.7	31.7	34.6	33.6	35.4	32.2
6 PM - 12 AM	33.8	31.3	32.3	34.1	31.3	30.1	35.8	38.4	33.3	33.5

Generally, most land uses do not operate on a 24-hour basis. As a result, roadways located near these casinos tend to have more traffic on them during the late night hours. The daily trip information is important because it captures some of the impacts related to off-peak traffic levels. This could lead to potential concerns of nearby residents or business owners. If the location of a potential casino was proposed near a neighborhood, the future casino could cause lighting, noise, or other environmental concerns. Our data shows some justification to these concerns over late-night traffic. Typically between the hours of 12:00 AM and 6:00 AM most land uses are not in operation and thus do not generate trips. These four casinos, on the other hand, averaged over 15% of their daily trips during these same hours. This could lead to potential complaints by nearby residents or businesses.

SUMMARY

This paper included the trip generation rates of three Iowa casinos and compared their rates to that of two St. Louis casinos included in a March 1998 ITE Journal article. In general, the five casinos had comparable trip generation rates for both weekdays and weekends. These rates could be used when determining the viability of a proposed casino or the expansion of an existing casino. As always, data collected at or near the actual casino site should be used, but if this is not possible, these rates could provide for a relative comparison of whether the nearby roadways could handle the increase in traffic due to the casino.

HDR's analysis of the five casinos found that their average weekday PM peak hour of adjacent street traffic trip generation rate was 0.59 trips per slot machine, while the average weekend PM peak hour trip generation rate was 0.64 trips per slot machine. These rates were close to the weekday and weekend PM peak hour of generator, which were 0.69 trips and 0.78 trips per slot machine, respectively. The average weekday ADT was 9.93 trips per slot, while the weekend average ADT was 11.70 trips per slot.

It should also be noted that these casinos could be considered isolated in terms of walking from one to another. The generation rates of casinos that are found in clusters (Las Vegas) have different characteristics than the casinos studied in this paper. This can be related to the large number and size of casinos located within the clusters and the fact that they are generally located very close to each other. Another important piece of information that should be reviewed is a market analysis. A market analysis could give an estimate of the daily admissions expected at the casino. This could give an indication if these rates are applicable to the proposed casino. As with all land uses, variations in trip generation rates will exist, but knowing what the potential traffic impact could be is better than not having any comparative information.

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7. Treasure Island Casino Website, www.treasureisland.com.

Table A1 – Harvey's Peak Hour Raw Data

		AM Peak Hour			PM Peak Hour		
Day	Date	Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Thursday	7/20/00	11:00	358	209	6:00	458	317
Friday	7/21/00	10:45	323	252	5:00	548	387
Saturday	7/22/00	10:00	285	273	5:30	591	380
Sunday	7/23/00	11:00	433	265	3:30	409	462
Monday	7/24/00	10:45	280	208	4:30	347	279
Tuesday	7/25/00	11:00	562	469	6:00	715	606
Wednesday	7/26/00	10:45	320	203	5:00	440	352
Thursday	7/27/00	11:00	362	263	6:00	493	319
Friday	7/28/00	10:45	412	179	5:30	512	403
Saturday	7/29/00	11:00	304	256	5:00	518	317
Sunday	7/30/00	11:00	345	271	3:15	410	342

Table A2 – Ameristar Peak Hour Raw Data

Day	Date	AM Peak Hour			PM Peak Hour		
		Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Saturday	7/15/00	10:30	363	240	5:30	596	420
Sunday	7/16/00	11:00	379	388	6:00	609	543
Monday	7/17/00	10:45	248	282	3:15	314	435
Tuesday	7/18/00	11:00	430	287	3:00	463	637
Wednesday	7/19/00	10:45	340	230	5:30	429	334
Thursday	7/20/00	10:45	356	228	3:00	349	471
Friday	7/21/00	11:00	364	283	5:45	662	441
Saturday	7/22/00	11:00	370	265	5:45	700	461
Sunday	7/23/00	11:00	409	351	5:45	592	461
Monday	7/24/00	10:45	299	289	3:15	319	462
Tuesday	7/25/00	11:00	458	343	3:00	427	557

Table A3 – Bluffs Run Peak Hour Raw Data

Day	AM Peak Hour			PM Peak Hour		
	Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Monday	11:00	348	420	15:00	443	416
Tuesday	10:45	436	393	15:00	549	513
Wednesday	11:00	417	310	15:00	542	474
Thursday	10:45	425	370	15:30	571	507
Friday	11:00	406	379	15:30	580	544
Saturday	11:00	478	361	16:00	486	635
Sunday	10:15	423	378	15:00	620	523

Table 1
Estimated Trip Generation
(Mason-Dixon Resort and Casino)

Land Use (Code)	Type	PM Peak Hour (Thursday)			PM Peak Hour (Friday)			Saturday Peak Hour			Average Weekday Daily Traffic
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	
Casino (600 slots)	New	182	165	347	212	194	406	247	212	459	5958
	Internalization 2%	4	3	7	4	4	8	5	4	9	
	Total	186	168	354	216	198	414	252	216	468	

Transportation Resource Group, Inc.
204 North George Street Suite 110
York, PA 17401
(717) 846-4660

Location:Emmitsburg Rd / Eisenhower Drwy
Municipality: Cumberland Twp.
Day: Thursday
Counter: Steve

File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
15:00	19	2	0	4	1	15	41
15:15	21	1	3	1	2	20	48
15:30	16	3	6	2	0	23	50
15:45	23	1	11	5	1	16	57
Total	79	7	20	12	4	74	196
16:00	19	3	2	3	4	17	48
16:15	11	4	2	4	1	20	42
16:30	17	3	1	1	4	15	41
16:45	27	2	1	2	0	29	61
Total	74	12	6	10	9	81	192
17:00	21	3	1	0	1	25	51
17:15	23	1	1	2	1	23	51
17:30	24	3	2	1	4	21	55
17:45	14	2	0	1	10	19	46
Total	82	9	4	4	16	88	203
Grand Total	235	28	30	26	29	243	591
Apprch %	89.4	10.6	53.6	46.4	10.7	89.3	
Total %	39.8	4.7	5.1	4.4	4.9	41.1	
Passenger Vehicles	233	28	30	26	29	241	587
% Passenger Vehicles	99.1	100	100	100	100	99.2	99.3
Trucks, Buses	2	0	0	0	0	2	4
% Trucks, Buses	0.9	0	0	0	0	0.8	0.7
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

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Location:Emmitsburg Rd / Eisenhower Drwy
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Day: Thursday
Counter: Steve

File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 1

Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
15:00	0	0	0	0	0	1	1
15:30	1	0	0	0	0	0	1
Total	1	0	0	0	0	1	2
16:00	0	0	0	0	0	1	1
16:45	1	0	0	0	0	0	1
Total	1	0	0	0	0	1	2
Grand Total	2	0	0	0	0	2	4
Apprch %	100	0	0	0	0	100	
Total %	50	0	0	0	0	50	
Trucks, Buses	2	0	0	0	0	2	4
% Trucks, Buses	100	0	0	0	0	100	100
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

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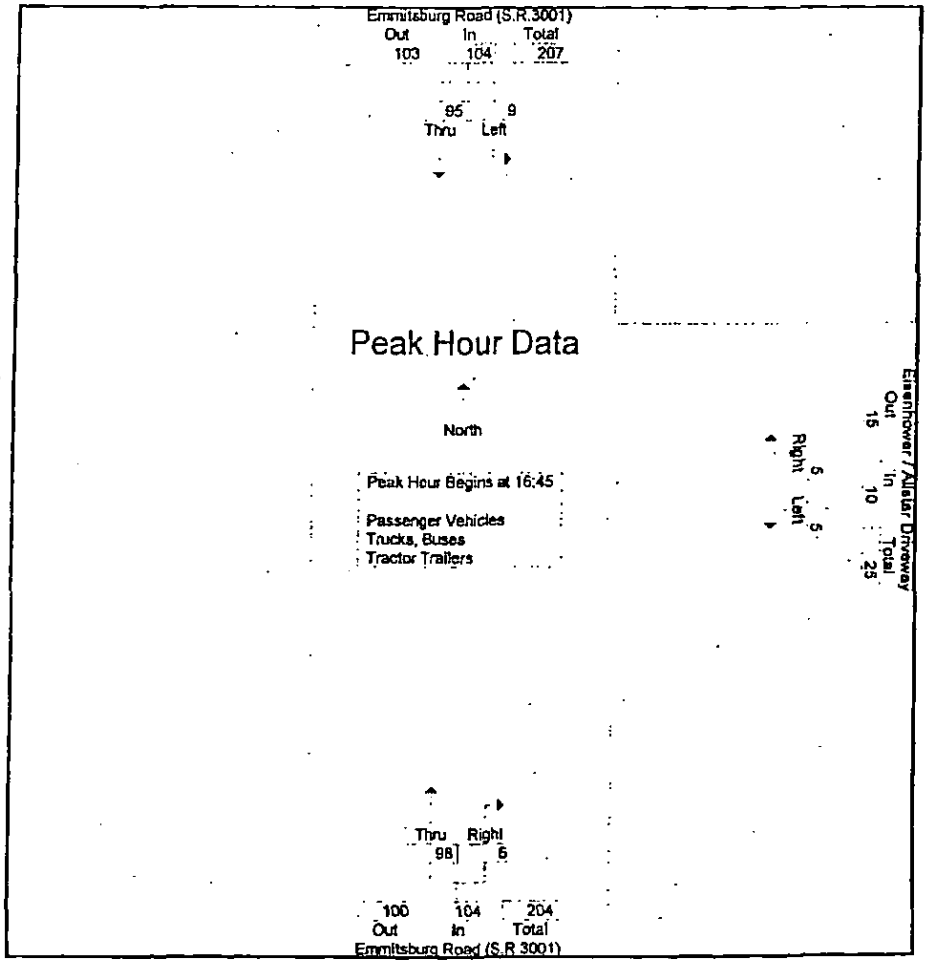
File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 15:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:45										
16:45	27	2	29	1	2	3	0	29	29	61
17:00	21	3	24	1	0	1	1	25	26	51
17:15	23	1	24	1	2	3	1	23	24	51
17:30	24	3	27	2	1	3	4	21	25	55
Total Volume	95	9	104	5	5	10	6	98	104	218
% App. Total	91.3	8.7		50	50		5.8	94.2		
PHF	.880	.750	.897	.625	.625	.833	.375	.845	.897	.893



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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Friday
Counter: Steve

File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
16:00	18	3	1	1	5	31	59
16:15	23	3	4	1	8	31	70
16:30	30	2	1	0	8	33	74
16:45	32	8	2	1	4	23	70
Total	103	16	8	3	25	118	273
17:00	20	4	3	2	5	23	57
17:15	21	6	4	2	7	22	62
17:30	23	1	2	0	4	29	59
17:45	23	7	0	1	6	27	64
Total	87	18	9	5	22	101	242
18:00	21	4	2	2	7	16	52
18:15	13	2	1	2	1	15	34
18:30	21	3	3	1	8	24	60
18:45	14	2	1	0	8	12	37
Total	69	11	7	5	24	67	183
Grand Total	259	45	24	13	71	286	698
Apprch %	85.2	14.8	64.9	35.1	19.9	80.1	
Total %	37.1	6.4	3.4	1.9	10.2	41	
Passenger Vehicles	258	45	24	13	71	285	696
% Passenger Vehicles	99.6	100	100	100	100	99.7	99.7
Trucks, Buses	0	0	0	0	0	1	1
% Trucks, Buses	0	0	0	0	0	0.3	0.1
Tractor Trailers	1	0	0	0	0	0	1
% Tractor Trailers	0.4	0	0	0	0	0	0.1

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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Friday
Counter: Steve

File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 1

Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
16:00	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	1
17:15	1	0	0	0	0	0	1
Total	1	0	0	0	0	0	1
Grand Total	1	0	0	0	0	1	2
Apprch %	100	0	0	0	0	100	
Total %	50	0	0	0	0	50	
Trucks, Buses	0	0	0	0	0	1	1
% Trucks, Buses	0	0	0	0	0	100	50
Tractor Trailers	1	0	0	0	0	0	1
% Tractor Trailers	100	0	0	0	0	0	50

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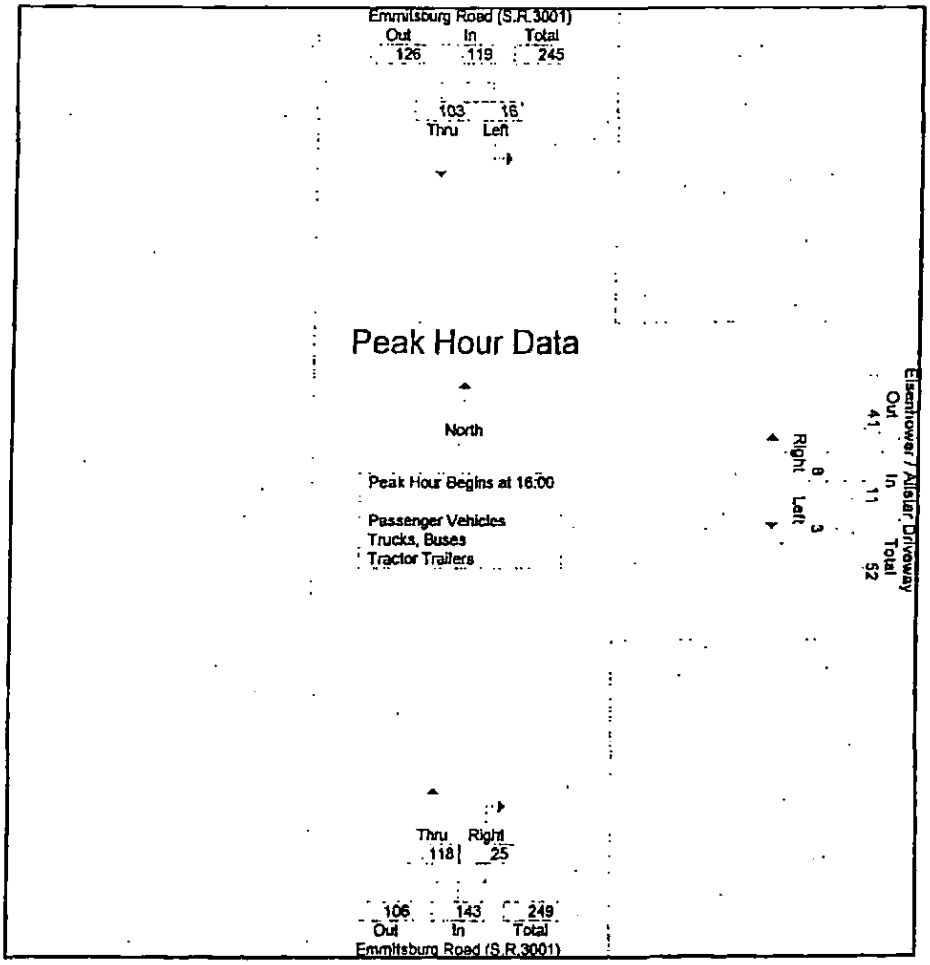
File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:00										
16:00	18	3	21	1	1	2	5	31	36	59
16:15	23	3	26	4	1	5	8	31	39	70
16:30	30	2	32	1	0	1	8	33	41	74
16:45	32	8	40	2	1	3	4	23	27	70
Total Volume	103	16	119	8	3	11	25	118	143	273
% App. Total	86.6	13.4		72.7	27.3		17.5	82.5		
PHF	.805	.500	.744	.500	.750	.550	.781	.894	.872	.922



Transportation Resource Group, Inc.
204 North George Street Suite 110
York, PA 17401
(717) 846-4660

Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Saturday
Counter: Steve

File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
12:00	19	2	4	3	3	17	48
12:15	18	5	6	4	1	27	61
12:30	28	0	3	2	1	24	58
12:45	17	3	4	1	0	18	43
Total	82	10	17	10	5	86	210
13:00	35	3	2	6	2	23	71
13:15	27	3	2	2	2	17	53
13:30	33	0	4	0	3	14	54
13:45	22	5	2	1	1	32	63
Total	117	11	10	9	8	86	241
14:00	24	3	5	1	4	16	53
14:15	27	2	0	1	3	17	50
14:30	20	1	5	0	1	31	58
14:45	23	2	1	0	2	11	39
Total	94	8	11	2	10	75	200
Grand Total	293	29	38	21	23	247	651
Apprch %	91	9	64.4	35.6	8.5	91.5	
Total %	45	4.5	5.8	3.2	3.5	37.9	
Passenger Vehicles	292	29	38	21	23	247	650
% Passenger Vehicles	99.7	100	100	100	100	100	99.8
Trucks, Buses	1	0	0	0	0	0	1
% Trucks, Buses	0.3	0	0	0	0	0	0.2
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

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Location: Emmitsburg Rd / Eisenhower Drw
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File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 1

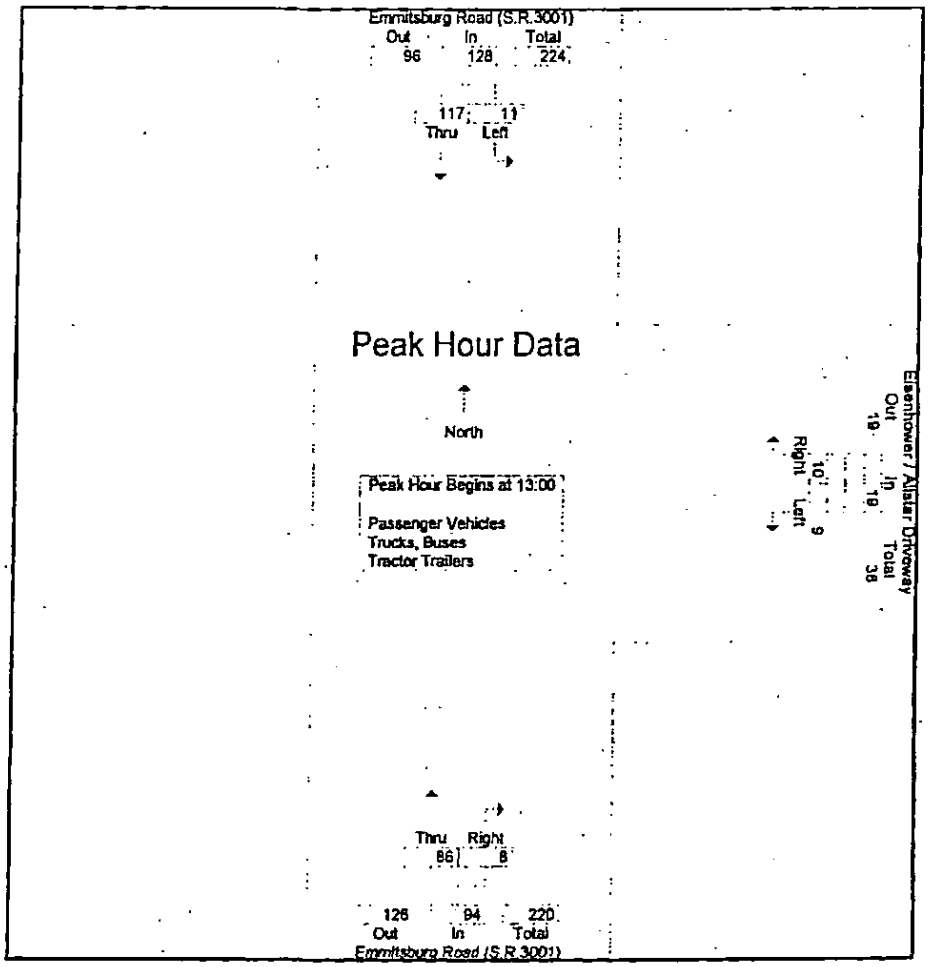
Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
13:00	1	0	0	0	0	0	1
Total	1	0	0	0	0	0	1
Grand Total	1	0	0	0	0	0	1
Apprch %	100	0	0	0	0	0	
Total %	100	0	0	0	0	0	
Trucks, Buses	1	0	0	0	0	0	1
% Trucks, Buses	100	0	0	0	0	0	100
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

Transportation Resource Group, Inc.
204 North George Street Suite 110
York, PA 17401
(717) 846-4660

File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 14:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 13:00										
13:00	35	3	38	2	6	8	2	23	25	71
13:15	27	3	30	2	2	4	2	17	19	53
13:30	33	0	33	4	0	4	3	14	17	54
13:45	22	5	27	2	1	3	1	32	33	63
Total Volume	117	11	128	10	9	19	8	86	94	241
% App. Total	91.4	8.6		52.6	47.4		8.5	91.5		
PHF	.836	.550	.842	.625	.375	.594	.667	.672	.712	.849



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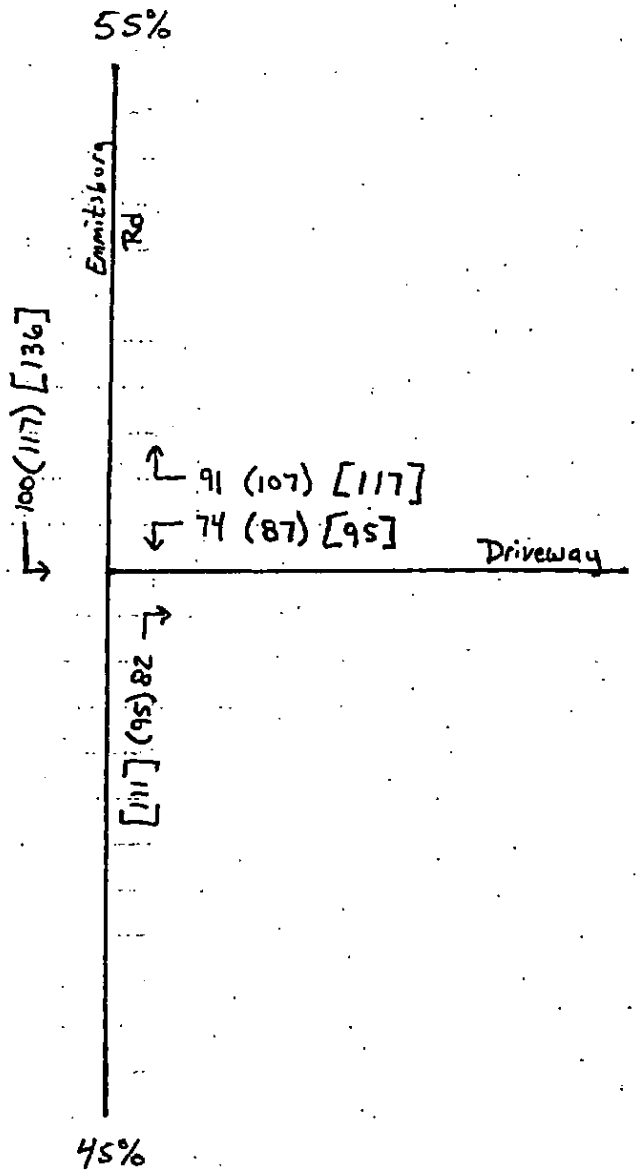
ject: Mason-Dixon Resort and Ca

Subject: Trip Distribution and Assignment Job No. 388.01

Sheet No. 1 of 1

Computed By DJT Date 1/27 Checked By _____ Date _____



000 (000) [000] PM peak Thursday (PM peak Friday) [Saturday peak]

Table 355
Average Day of Week by Month Factors Compiled for Total Vehicles

The following 12 tables show average day of week factors by month compiled for total vehicles for the year 2008. Current year Automatic Traffic Recorder (ATR) traffic data is assembled and the data is placed in the respective TPG. Annual Average Daily Traffic (AADT) is tabulated individually for each of the 57 ATR stations. A factor is calculated for each day from each station and a list is tabulated by month and day of the week. This data is assembled by day and TPG for each station. The result is a group factor, which can be applied to a 24-hour raw traffic count taken during any day of the year to develop an AADT volume.

Seasonal Factor

January 2008

DAY	TPG 1	TPG 2	TPG 3	TPG 4	TPG 5	TPG 6	TPG 7	TPG 8	TPG 9	TPG 10
Monday	1.130	1.289	1.102	1.167	1.142	1.264	1.151	1.231	1.155	1.288
Tuesday	1.093	1.297	0.989	1.125	1.078	1.229	1.112	1.191	1.083	1.243
Wednesday	1.060	1.316	0.987	1.120	1.072	1.205	1.076	1.196	1.080	1.330
Thursday	1.030	1.257	0.961	1.075	1.055	1.166	1.054	1.176	1.061	1.224
Friday	0.964	1.125	0.925	0.987	1.008	1.062	0.991	1.068	1.002	1.111
Saturday	1.320	1.429	1.284	1.311	1.208	1.443	1.219	1.299	1.275	1.216
Sunday	1.468	1.367	1.698	1.498	1.377	1.649	1.461	1.520	1.492	1.344
DAY OF MONTH	1.152	1.297	1.135	1.183	1.134	1.288	1.152	1.240	1.164	1.251

February 2008

DAY	TPG 1	TPG 2	TPG 3	TPG 4	TPG 5	TPG 6	TPG 7	TPG 8	TPG 9	TPG 10
Monday	1.072	1.261	1.016	1.117	1.125	1.190	1.102	1.203	1.114	1.290
Tuesday	1.072	1.349	0.982	1.118	1.089	1.183	1.095	1.169	1.082	1.235
Wednesday	1.035	1.267	0.961	1.084	1.056	1.158	1.019	1.189	1.131	1.201
Thursday	0.992	1.194	0.927	1.035	1.039	1.089	1.029	1.108	1.042	1.192
Friday	0.946	1.094	0.899	0.952	1.010	1.005	0.975	1.052	1.029	0.910
Saturday	1.238	1.384	1.224	1.227	1.171	1.312	1.187	1.252	1.239	1.158
Sunday	1.349	1.324	1.543	1.491	1.348	1.523	1.389	1.501	1.488	1.476
DAY OF MONTH	1.101	1.267	1.079	1.146	1.120	1.209	1.114	1.210	1.160	1.209

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William T. Steffens
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John J. Mitchell, P.E.
Christopher J. Williams, P.E.
John F. Yacapsin, P.E.

February 10, 2010

Timothy Knoebel, P.E.
KPI Technology
1370 Fairfield Road
Gettysburg, PA 17325

RE: **Traffic Engineering Review # 1**
Mason-Dixon Resort and Casino – Traffic Impact Study Scope
Cumberland Township, Adams County
McMahon Project No. 905066.22

Dear Mr. Knoebel:

We have reviewed the scoping letter regarding the traffic impact study for the proposed development of the Mason-Dixon Resort and Casino. It is our understanding that the development will consist of the redevelopment of the Eisenhower Inn and Convention Center and the conversion of the All-Star Family Fun & Sports Complex into a casino and resort with 600 slots and 50 table games. The development is located to the east of Emmitsburg Road (S.R. 3001) between Cunningham Road (S.R. 3008) and Barlow Road (S.R. 3006). Access to the site is proposed to continue to be provided by the existing driveway on Emmitsburg Road (S.R. 3001).

The following document was referenced in preparation of this traffic review letter:

1) Proposed Mason-Dixon Resort and Casino Traffic Impact Study Scoping Letter prepared by TRG, Inc., dated January 27, 2010.

A copy of this letter will be provided to PennDOT as documentation of Cumberland Township's knowledge of the project, and brief discussions were recently held with a representative of the PennDOT District 8-0's Traffic Unit indicating that they will also require a traffic study be submitted to them for review. Based on the information submitted, we offer the following input:

1. Since this development will access a State Road, we recommend that a scoping letter be submitted to PennDOT as well for their review. Although not located within our Township, we expect this development to have a potentially significant impact to the nearest interchange with Route 15 to the south of the site and therefore recommend these intersections be evaluated as well. We recommend the additional study intersections within the Township, beyond the site access, as follows:
   - Emmitsburg Road (S.R. 3001)/ Cunningham Road (S.R. 3008)
   - Emmitsburg Road (S.R. 3001)/ Barlow Road (S.R. 3006)

2. Regarding the traffic count data, it is unclear whether you are proposing to add the new trip generation onto the count data, and if the Eisenhower Inn and Convention Center was in full operation (convention or event scheduled) at the time of the counts. Based on the tourist season, the traffic volumes are expected to be significantly higher in the summer months, with more "typical" traffic during the months of May and September when both school is in session and tourist season tends to begin/wind down. We understand that it may not be feasible to wait until May to count, but we recommend that the Township request an agreement from the developer to conduct a recount and re-evaluation of the study intersections when counts can be obtained during these times of the year. Also, regarding internal capture, the 2% reduction should be taken from the lower traffic-generating land use, which may be the hotel portion of the site – please verify and revise accordingly.

3. Regarding trip generation, we understand that limited trip generation data is available regarding this particular land use, and assumptions must be made for preliminary evaluation of the traffic. That being said, although the specific sites in the study had a similar amount of table games, the trip generation was established based on number of slots and your development will have significantly less slots, therefore it may be underestimating the trip generation for the site if the table games actually generate more traffic per gaming position than the slots. It is recommended that the Township request an agreement with the developer to conduct a trip generation post-development study of the site after full build-out while in full operation to re-evaluate the need for additional improvements and traffic impact fee re-assessment.

4. Regarding trip distribution, it is our understanding that this type of development typically conducts a "marketing study", which indicates their general anticipated trip distribution. Based on the location of this proposed casino compared to other regional casinos, we anticipate a more significant portion of the traffic to travel to/from Route 15 to the south of the site. Please request and review any marketing studies available by the developer and revise your distribution, as applicable.

5. We concur with the proposed analysis scenarios and general background growth rate as outlined in your scoping letter.

6. In addition to the general background growth rate, there are no specific nearby developments within the Township that should be considered for inclusion in the background traffic. Due to the close proximity to the Township limits, PennDOT may be aware of other specific developments in Freedom Township.

A copy of all future Traffic Impact Studies, Land Development Plans, and Highway Occupancy Permit Plans should be submitted to McMahon for review. Please feel free to contact me with any questions or if you need anything else.

Sincerely,

Jodie L. Evans

Jodie L. Evans, P.E., PTOE
Project Manager

cc: Ms. Florence Ford - Cumberland Township Manager
Mr. Dan Thorton –TRG, Inc.

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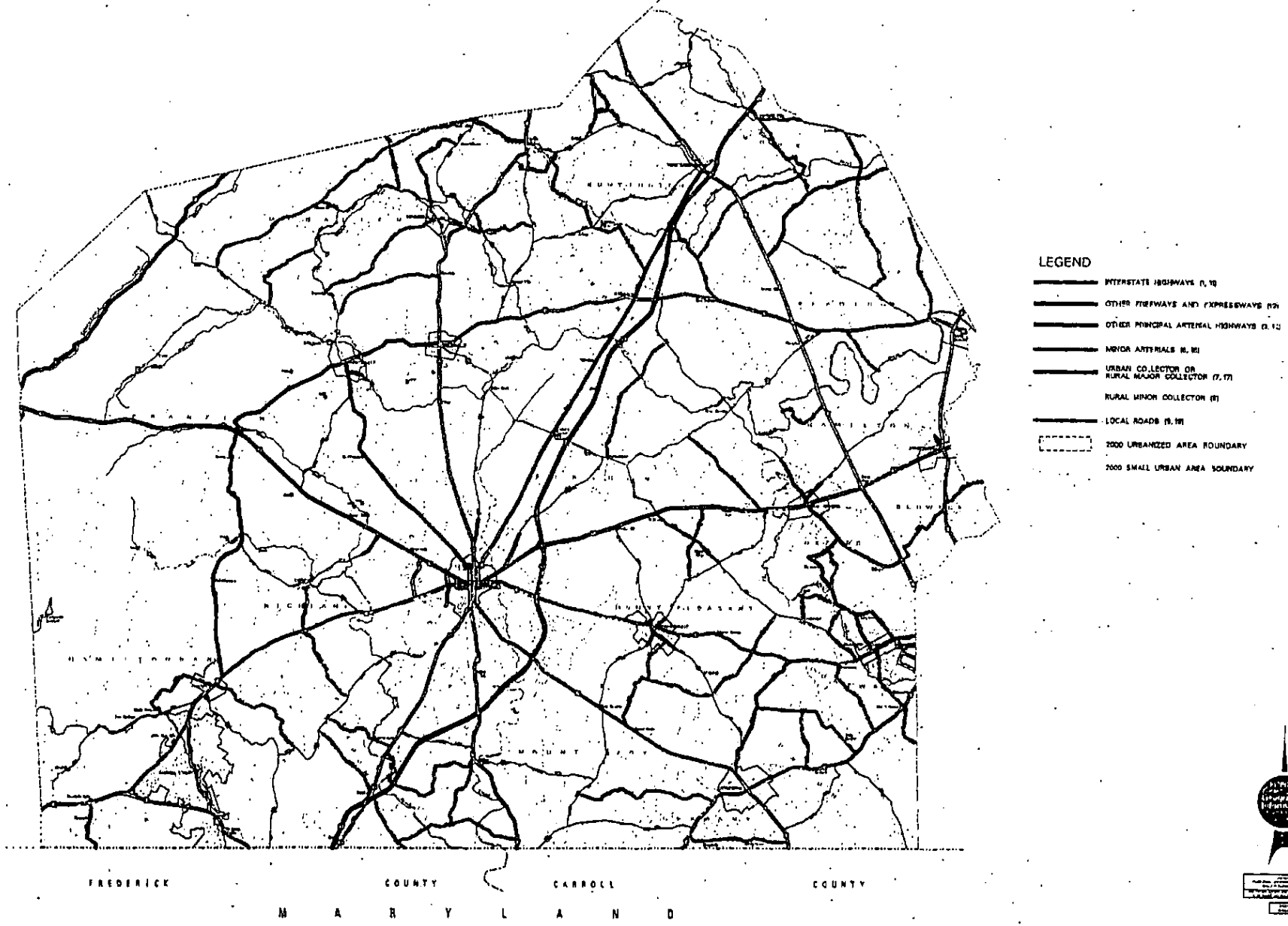
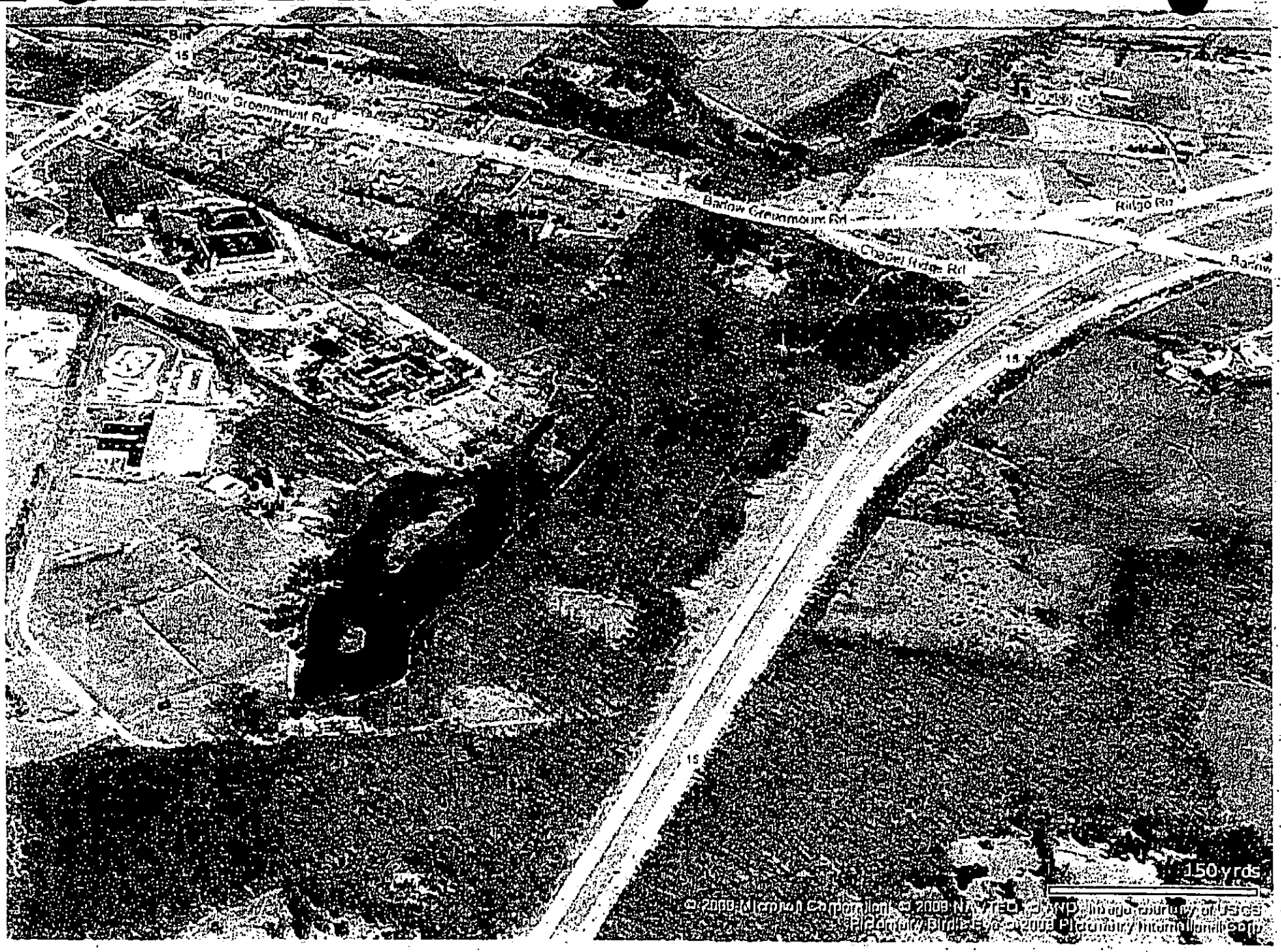
FEDERAL FUNCTIONAL CLASS
ADAMS COUNTY




Emmitsburg Rd
Barlow Greenmount Rd
Barlow Greenmount Rd
Chapel Ridge Rd
Ridge Rd
150 yrds

Dan Thornton

From: Evans, Jodie [jodie.evans@mcmtrans.com]
Sent: Tuesday, February 23, 2010 3:51 PM
To: Dan Thornton
Cc: Kinard, Eric W
Subject: Mason Dixon Casino and Resort, Cumberland Twp, Adams Co.- change in scope for TIS
Attachments: image001.jpg

Dan,

As discussed earlier, it has been brought to our attention that the bridge is currently closed on Cunningham Road and not anticipated to be open again until 2013. Also, once the bridge re-opens minimal traffic is expected to use this route to travel to/from the Mason-Dixon Resort and Casino, therefore we concur that the Cunningham Road and Emmittsburg Road intersection can be removed from the Traffic Impact Study scope from the Cumberland Township perspective.

Thanks,

Jodie Evans, P.E., PTOE
Project Manager

McMahon Associates, Inc.
3903 Hartzdale Drive, Suite 301
Camp Hill, Pennsylvania 17011
p: 717.975.0295
f: 717.975.0294
jodie.evans@mcmtrans.com

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February 10, 2010

Timothy Knoebel, P.E.
KPI Technology
1370 Fairfield Road
Gettysburg, PA 17325

RE: **Traffic Engineering Review # 1**
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Cumberland Township, Adams County
McMahon Project No. 905066.22

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   - Emmitsburg Road (S.R. 3001)/ Barlow Road (S.R. 3006)

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5. We concur with the proposed analysis scenarios and general background growth rate as outlined in your scoping letter.

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A copy of all future Traffic Impact Studies, Land Development Plans, and Highway Occupancy Permit Plans should be submitted to McMahon for review. Please feel free to contact me with any questions or if you need anything else.

Sincerely,

Jodie L. Evans

Jodie L. Evans, P.E., PTOE
Project Manager

cc: Ms. Florence Ford - Cumberland Township Manager
Mr. Dan Thorton –TRG, Inc.

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January 27, 2010

Ms. Florence Ford, Manager
Cumberland Township
1370 Fairfield Road
Gettysburg, PA 17325

Re: Mason-Dixon Resorts, LLC
Mason-Dixon Resort and Casino
Traffic Impact Study Scoping Letter
Cumberland Township, Adams County
TRG Project No. 388.01

Dear Ms. Ford:

This letter summarizes the proposed traffic impact study scope for the proposed Mason-Dixon Resort and Casino located to the east of Emmitsburg Road (S.R.3001) in Cumberland Township, Adams County. Currently on site is the Eisenhower Inn and Conference Center and the All-Star Family Fun & Sports Complex. Access to the existing facilities is provided by an existing full movement driveway on Emmitsburg Road (S.R.3001) to the south of Barlow Greenmount Road.

As part of the proposed development, the All-Star Family Fun building is proposed to be converted to a casino. The size of the building will not change but will be renovated to accommodate the casino's need. The casino is proposed to have 600 slots and 50 table games at this time. Access to the proposed casino will continue to be provided by the full movement driveway on Emmitsburg Road (S.R.3001). An aerial of the tract of land is attached for your reference.

As part of the traffic impact study, we are proposing the following study scope:

Study Intersections

- Emmitsburg Road (S.R.3001)/Existing Driveway

Trip Generation

The trip generation for the site was determined based on an ITE article "Trip Generation Characteristics of Small to Medium Sized Casinos". A copy of the ITE article is attached. The article describes the trip generation for five small to medium casinos that had slots and tables. The casinos in the article had more slots than the proposed Mason-Dixon Resorts and Casino will have but the total number of tables are comparative. Therefore, the trip generation rates

included in the article will be utilized to determine the anticipated traffic for the proposed casino. Based on the information in the article, the Adjacent Street Peak Hour Trip Generation table will be utilized for the PM peak hour (Thursday) and the Facility Peak Hour Trip Generation table will be utilized for the PM peak hour (Friday) and for the Saturday peak hour. A table is attached that summarizes the anticipated trip generation.

Due to the existing Eisenhower Inn and Conference Center located on the site as well, an internal capture will be assumed from the hotel to the proposed casino. While ITE Trip Generation Handbook does not have an internal capture percentage between lodging and recreational, it was assumed that 2% of the trips to/from the proposed casino will be from the existing Eisenhower Hotel and will never leave the site. The attached trip generation table shows the proposed internal capture for the proposed casino.

Trip Distribution

Trip distribution will be determined based on the existing turning movement counts (TMC) conducted at the site access intersection. Copies of the existing traffic counts are attached. The anticipated trip distribution will be assumed as follows:

- 55% oriented to/from the north on Emmitsburg Road (S.R.3001)
- 45% oriented to/from the south on Emmitsburg Road (S.R.3001)

A sketch is attached that shows the anticipated trip distribution and assignment for the proposed casino.

Study Time Periods

The study periods for analysis are proposed as follows:

- Weekday Thursday PM Peak Hour 3:00 – 6:00 PM
- Weekday Friday PM Peak Hour 4:00 – 7:00 PM
- Saturday Peak Hour 12:00 – 3:00 PM

The traffic counts were conducted in January 2010 and will be seasonally factored using guidelines from PennDOT Traffic Data. Copies of the seasonal factors are attached. Automatic traffic recorder (ATR) counts will also be conducted on Emmitsburg Road (S.R.3001) and the existing driveway.

Analysis Scenarios

The following analysis scenarios are proposed based on an opening year of 2011 and a 5 year design period:

- Existing traffic volumes
- 2011 traffic volumes without development
- 2011 traffic volumes with development
- 2016 traffic volumes without development
- 2016 traffic volumes with development

The background growth rate factor will be determined based on PennDOT's Growth Factors for July 2009 to July 2010. For this development, the growth rate factor is 0.86% per year.

Please review the attached information and respond in writing with your required scope of work. We are also requesting any developments and/or committed roadway improvements within our study area that the Township will require to be included in the Traffic Impact Analysis for the proposed development.

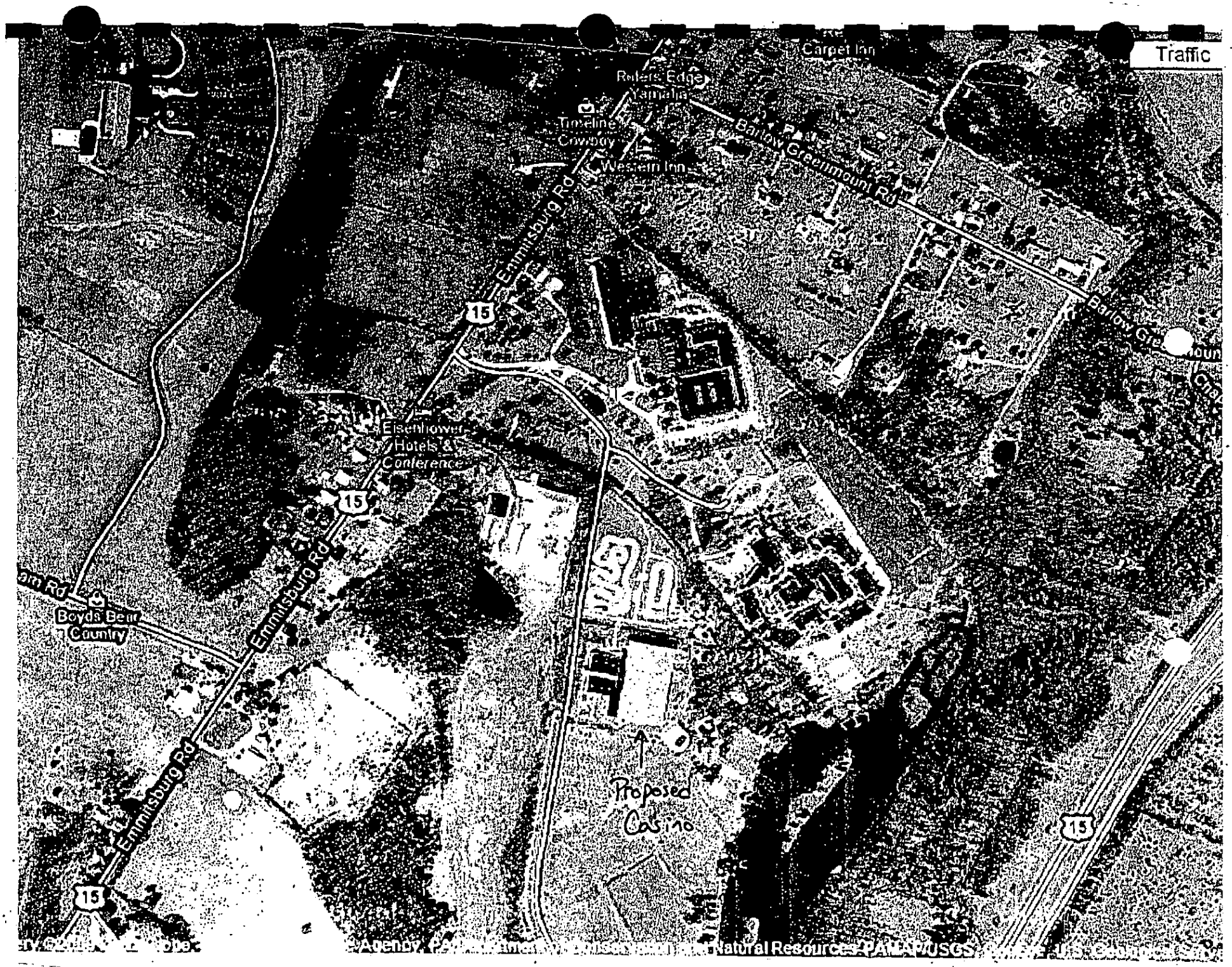
If you have any questions, please feel free to give me a call.

Very truly yours,
Transportation Resource Group, Inc.

Daniel J. Thornton, P.E.
Senior Associate

DJT/vaw
Attachments

cc: David LeVan, Mason-Dixon Resorts, LLC
Bernard A. Yannetti, Jr., Esquire, Hartman & Yannetti
Timothy R. Knoebel, P.E., KPI Technology
Jodie Evans, P.E., PTOE, McMahon Associates, Inc.


Traffic
Carpet Inn
Rulers Edge
Timeline
Cowboy
Western Inn
Ballow Greenmount Rd
Emmitsburg Rd
15
Eisenhower
Hotels &
Conference
Boyds Bear
Country
Proposed
Casino
Natural Resources

Trip Generation Characteristics of Small to Medium Sized Casinos

Michael Trueblood, Tara Gude

OVERVIEW

This paper focuses on trip generation for small to medium sized casinos that are not part of a cluster of casinos. The data collection for this paper included three casinos located in Council Bluffs, Iowa. Two of the casinos are riverboat casinos and are located along the Missouri River, while the other casino includes an existing dog racetrack that later added slot machines.

In addition to the casinos located in Council Bluffs, the calculated trip generation rates were compared to rates included in a March 1998 ITE Journal article entitled *Gaming Casino Traffic*. The article calculated trip generation rates for two casinos in the St. Louis metropolitan area, the Casino Queen and the St. Charles Casino.

There is not an overwhelming amount of trip generation information available for casinos located outside of the typical Las Vegas or Atlantic City stereotype. The trip generation characteristics of casinos found in large clusters, like those in Las Vegas for example, are not similar to the casinos that will be covered in this article. For comparison purposes the MGM Grand Casino in Las Vegas has over 5,000 hotel rooms with over 3,500 slot machines, while the Treasure Island Casino has over 2,900 hotel rooms with over 2,000 slot machines. The trip generation characteristics of these casinos are quite different than the five covered in this paper due to their immense size and popularity. Another reason these casinos have different trip generation characteristics is because they are accessible by foot. In Las Vegas people tend to walk to and from the casinos or drive to one and then walk to several others throughout the course of a day.

It should be noted that each state has different rules and regulations that govern the actual type of establishment that can be used for gambling. Recent regulations have changed or have been modified in order to allow gambling facilities to be established beyond the typical riverboat casinos. Examples of these casinos are those operated by Indian Tribes. There are several casinos operated by Indian Tribes across the country. These casinos range in size, but they are good examples of the types of casinos this paper addresses.

LOCATION OF CASINOS

This section will provide a brief overview of the location of the three Council Bluffs casinos and the two casinos located in the St. Louis metropolitan area. The casino locations are shown in Figure 1. The three casinos in Council Bluffs, Iowa are located near the Missouri River in the Omaha metropolitan area. The Ameristar Casino and Harvey's Casino are located along the river within one mile of each other in the northwest quadrant of the I-29/I-80 interchange. Bluffs Run Casino is located about two miles east of these casinos along I-80. For comparison purposes to other casino locations, the 1998 average daily traffic (ADT) along I-29 was 40,500 vehicles, while the 1998 ADT along I-80 was 67,400 vehicles. The estimated 1999 population is 1,040,000 people within a 50-mile radius of the casinos.

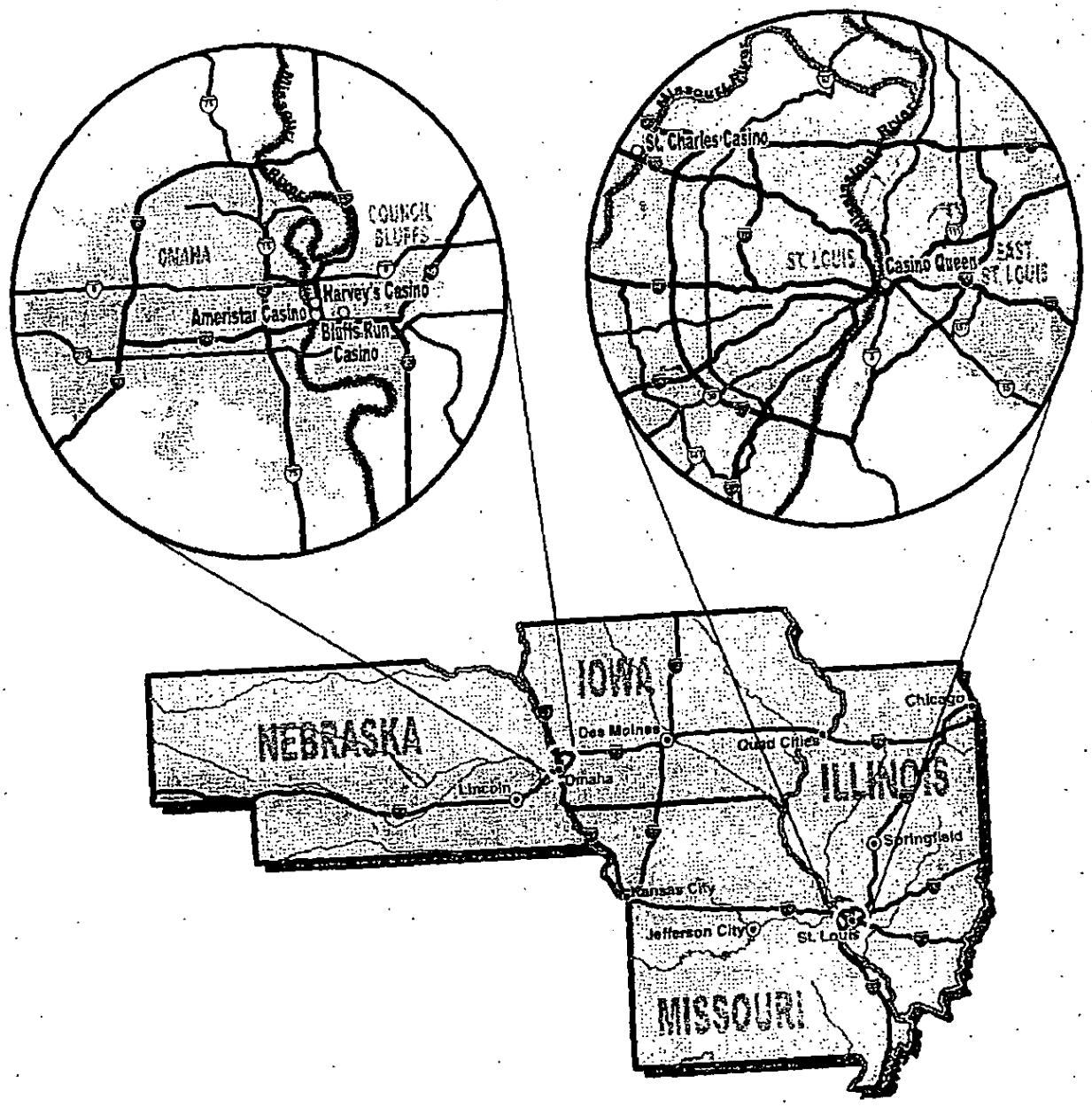


Figure 1 – Casino Location Map

The two St. Louis area casinos are also depicted in Figure 1. The St. Charles Casino is located along the Missouri River immediately north of I-70/Missouri River junction and about five miles to the west of I-270/I-70 junction in the City of St. Charles. The 1998 ADT along I-70 was 188,000 vehicles. The Casino Queen is located along the Mississippi River immediately east of the Gateway Arch and immediately north of the I-70/I-64/I-55 junction in the City of East St. Louis, Illinois. The ADT of these three interstates are 117,300 vehicles. The estimated 1999 population is 2,637,000 people within a 50-mile radius of the St. Louis area casinos.

GAMING REVENUES OF STUDY CASINOS

This section discusses the gaming revenues of the tri-state region where the five casinos presented in this paper are located. Between the years 1994-1999, St. Charles Casino had the second highest attendance of the eleven riverboat casinos within the state of Missouri. During the fiscal year 2000 the eleven riverboat casinos made over $1.0 billion in adjusted gross revenues (AGRs). In Illinois, the nine riverboat casinos made over $1.66 billion AGRs in 2000, with the Casino Queen ranked fifth out of the nine riverboats. In Iowa, Harvey's Casino and Ameristar Casino ranked one and two of out ten casinos in AGRs, respectively. The ten casinos in Iowa combined for over $575 million in AGRs. Casinos within the State of Iowa that also have pari-mutuel wagering are accounted for separately in terms of their AGRs. Bluffs Run Casino was ranked two out of three casinos in AGRs. The three racetrack casinos, as they are called in Iowa, combined for over $300 million in AGRs in 2000.

TRIP GENERATION CHARACTERISTICS OF STUDY CASINOS

Most of the available information concerning trip generation of casinos is related to large casinos or clusters of several casinos, such as those in Las Vegas. In order to determine the trip generation characteristics of small to medium sized casinos, HDR collected traffic information at three casinos in Council Bluffs, Iowa. Once the trip generation rates were computed, they were compared to trip generation rates of two St. Louis area casinos documented in a March 1998 issue of the ITE Journal.

Table 1 documents the five casinos' characteristics. It should be noted that the information for the Council Bluffs casinos is for the year 2000, while the information for the St. Louis casinos was collected in 1998.

Table 1 – General Casino Information

Amenities	Council Bluffs, Iowa			St. Louis Metro Area	
	Harvey's	Ameristar	Bluffs Run	St. Charles	Casino Queen
Slots	1169	1446	1479	1847	1020
Total Tables	53	51	0	90	51
Gaming sq. ft.	28,250	38,000	34,280	50,000	27,500
Hotel Rooms	251	356	0	*Not Applicable*	*Not Applicable*
Employees	1257	1329	1046	*Not Available*	1079
Pari-mutuel Wagering	No	No	Yes	No	No
Convention Center (seats)	900	170	No	*Not Available*	*Not Available*

The data collection for the Council Bluffs casinos was conducted during the following times:

- Ameristar – Saturday, July 15th to Tuesday, July 25th, 2000.
- Harvey's – Thursday, July 20th to Sunday, July 30th, 2000.
- Bluffs Run – Wednesday, July 19th to Saturday, July 29th and Saturday August 19th to Monday August 28th, 2000.

Automatic tube recorders were placed at all entrances and exits to the casinos. Data was collected in fifteen-minute intervals, 24-hours a day for each of the casinos. All five casinos operated on a 24-hour basis. As will be discussed later, the hourly information was unique when compared to other land uses. The following sections provide detailed information on the trip generation characteristics of the three Council Bluffs casinos. These rates were compared to the two St. Louis casinos and since the rates for all five casinos were similar, an average trip generation rate was computed.

Peak Hour Trip Generation Rates

A trip generation rate was calculated based on the number of slot machines that were located at each casino. Generation rates were calculated for both weekdays and weekends. Weekday trip generation rates were calculated for both the peak of facility and peak of adjacent street traffic. Traffic studies for new developments generally analyze the weekday peak hour of adjacent street traffic. However, several types of developments generate higher traffic levels during times other than the adjacent street traffic peak hour. Data from the casinos indicate that their peak trip generation rates are different than the peak hour of adjacent street traffic. Table 2 depicts the average PM peak hour trip generation rates of the five casinos for the peak hour of facility, while Table 3 depicts the average PM peak hour trip generation rate for the adjacent street traffic. The PM peak hour was chosen for purposes of calculating trip generation rates because they were generally higher than the AM peak hour. Tables A1, A2, and A3 located at the end of the paper document the three Iowa casinos daily raw peak hour and time of day data.

Table 2 – Facility Peak Hour Trip Generation

	PM Peak Hour										Average PM Peak Hour Trips	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	502	380	423	477	537	491	725	625	348	336	507	462
Saturday/Sunday	482	375	624	471	553	579	850	750	*Not Available*		627	544
	PM Peak Hour Per Slot										Average PM Peak Hour Trips Per Slot	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	0.43	0.33	0.29	0.33	0.36	0.33	0.39	0.34	0.34	0.33	0.36	0.33
Saturday/Sunday	0.41	0.32	0.43	0.33	0.37	0.39	0.46	0.41	*Not Available*		0.42	0.36

Note: St. Charles weekday rate is for Friday only.

Table 3 – Adjacent Street Peak Hour Trip Generation

	PM Peak Hour										Average PM Peak Hour Trips	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	453	340	427	378	442	373	475	600	*Not Available*		449	423
Saturday/Sunday	423	334	491	413	490	467	*Not Available*		*Not Available*		468	404
	PM Peak Hour Per Slot										Average PM Peak Hour Trips Per Slot	
	Harvey's		Ameristar		Bluffs Run		St. Charles		Casino Queen			
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Monday - Friday	0.39	0.29	0.29	0.26	0.30	0.25	0.26	0.32	*Not Available*		0.31	0.28
Saturday/Sunday	0.36	0.29	0.34	0.29	0.33	0.32	*Not Available*		*Not Available*		0.34	0.30

Note: St. Charles weekday rate is for Friday only.

The PM peak hour trip generation rates were similar for each of the three Council Bluffs casinos. These rates were found to be comparable to the two St. Louis area casinos' trip generation rates. As shown above in Table 3, there is a correlation between the number of slot machines and the traffic generated by the casinos. For example, the two St. Louis area casinos have a difference in the number of trips generated by the facility. However when the trip generation rates were developed on a per slot machine basis, the rates are quite similar. Even though the St. Charles Casino has 800 slot machines more than the Casino Queen, their trip generation rates are comparable.

HDR's analysis of the five casinos in St. Louis and Council Bluffs found that their average weekday PM peak hour of adjacent street traffic trip generation rate was 0.59 trips per slot machine, while the average weekend PM peak hour trip generation rate was 0.64 trips per slot machine. These rates were close to the weekday and weekend PM peak hour of generator, which were 0.69 trips and 0.78 trips per slot machine, respectively.

The original trip generation rates calculated for the St. Louis area casinos were based on gaming positions. For purposes of this paper the rates provided in the March ITE Journal article were converted to trips per slot machine. This was done in order to directly compare the Council Bluffs and St. Louis trip generation rates. Gaming positions are calculated based on each type of game and are a percentage of the number of slot machines. Thus, calculating the number of gaming positions can get cumbersome. The other reason slot machines were used to calculate trip generation rates was because Bluffs Run Casino does not have table games.

Daily Trip Generation Rates

Table 4 shows the ADTs that were collected for the three Iowa casinos. An average daily trip rate was developed based on information from the three Iowa casinos and from the St. Charles Casino. Not enough information was available in order to include the Casino Queen in these calculations. Table 5 shows the weekday and weekend daily trip rates for each of the four casinos in addition to an average daily trip rate.

Table 4 – Average Daily Traffic (ADT)

Day	*Harvey's Daily Volume*			*Ameristar Daily Volume*			*Bluffs Run Daily Volume*		
	Inbound Volume	Outbound Volume	ADT	Inbound Volume	Outbound Volume	ADT	Inbound Volume	Outbound Volume	ADT
Sunday	7,038	6,749	13,787	7,438	8,175	15,613	8,871	8,887	17,758
Monday	5,402	4,745	10,147	5,378	5,394	10,771	6,665	6,741	13,406
Tuesday	9,334	8,496	17,830	6,903	6,761	13,663	7,702	7,180	14,882
Wednesday	6,401	5,221	11,622	5,823	5,730	11,553	7,499	6,827	14,326
Thursday	6,944	5,462	12,406	5,845	5,703	11,548	8,494	7,867	16,361
Friday	8,230	5,938	14,168	8,043	7,460	15,503	9,211	8,441	17,652
Saturday	8,075	7,025	15,100	8,311	8,129	16,440	9,957	9,392	19,349

Table 5 – Average Daily Traffic Rates

	ADT				ADT per slot				Average ADT per slot
	Harvey's	Ameristar	Bluffs Run	St. Charles	Harvey's	Ameristar	Bluffs Run	St. Charles	
Monday - Friday	13,249	12,496	15,325	17,362	11.33	8.64	10.36	9.40	**9.93**
Saturday/Sunday	14,443	16,026	18,554	19,959	12.36	11.08	12.54	10.81	**11.70**

Note: St. Charles weekday rate is for Friday only.

The ADT was higher on weekend days compared to weekdays. As shown in Table 4 there was more than a 50% increase in the ADT on weekends at some of the casinos. Another interesting factor that made relatively large increases in ADT was the special promotions that the casinos offer. For example, Harvey's Casino had double points for slot club members on Tuesdays, which generated more traffic than a typical weekend day. Double points allow slot club members to earn extra points that can be redeemed for cash.

Another finding of interest was the amount of traffic that occurs during the late night hours. It was assumed that this was related to the fact that all five casinos evaluated in this paper were located within a metropolitan area and relatively close to an interstate. Table 6 documents the time variation of trips at the three Council Bluffs casinos and the St. Charles Casino. Again, data was not available for Casino Queen.

Table 6 – Casino Related Time Variations of Trips

	Percentage of Traffic during each time period									
	Harvey's		Ameristar		Bluffs Run		St. Charles		Average	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
9 AM - 9 PM	64.6	58.4	69.0	61.9	66.1	59.5	65.7	69.5	66.3	62.3
9 PM - 9 AM	35.4	41.6	31.0	38.1	33.9	40.5	34.3	30.5	33.6	37.7
12 AM - 6 AM	10.9	17.9	9.2	16.2	10.9	17.4	13.8	9.0	11.2	15.1
6 AM - 12 PM	21.0	19.6	20.7	17.3	23.1	20.8	15.8	19.0	20.1	19.2
12 PM - 6 PM	34.3	31.2	37.9	32.3	34.7	31.7	34.6	33.6	35.4	32.2
6 PM - 12 AM	33.8	31.3	32.3	34.1	31.3	30.1	35.8	38.4	33.3	33.5

Generally, most land uses do not operate on a 24-hour basis. As a result, roadways located near these casinos tend to have more traffic on them during the late night hours. The daily trip information is important because it captures some of the impacts related to off-peak traffic levels. This could lead to potential concerns of nearby residents or business owners. If the location of a potential casino was proposed near a neighborhood, the future casino could cause lighting, noise, or other environmental concerns. Our data shows some justification to these concerns over late-night traffic. Typically between the hours of 12:00 AM and 6:00 AM most land uses are not in operation and thus do not generate trips. These four casinos, on the other hand, averaged over 15% of their daily trips during these same hours. This could lead to potential complaints by nearby residents or businesses.

SUMMARY

This paper included the trip generation rates of three Iowa casinos and compared their rates to that of two St. Louis casinos included in a March 1998 ITE Journal article. In general, the five casinos had comparable trip generation rates for both weekdays and weekends. These rates could be used when determining the viability of a proposed casino or the expansion of an existing casino. As always, data collected at or near the actual casino site should be used, but if this is not possible, these rates could provide for a relative comparison of whether the nearby roadways could handle the increase in traffic due to the casino.

HDR's analysis of the five casinos found that their average weekday PM peak hour of adjacent street traffic trip generation rate was 0.59 trips per slot machine, while the average weekend PM peak hour trip generation rate was 0.64 trips per slot machine. These rates were close to the weekday and weekend PM peak hour of generator, which were 0.69 trips and 0.78 trips per slot machine, respectively. The average weekday ADT was 9.93 trips per slot, while the weekend average ADT was 11.70 trips per slot.

It should also be noted that these casinos could be considered isolated in terms of walking from one to another. The generation rates of casinos that are found in clusters (Las Vegas) have different characteristics than the casinos studied in this paper. This can be related to the large number and size of casinos located within the clusters and the fact that they are generally located very close to each other. Another important piece of information that should be reviewed is a market analysis. A market analysis could give an estimate of the daily admissions expected at the casino. This could give an indication if these rates are applicable to the proposed casino. As with all land uses, variations in trip generation rates will exist, but knowing what the potential traffic impact could be is better than not having any comparative information.

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6. MGM Grand Casino Website, www.mgmgrand.com.

7. Treasure Island Casino Website, www.treasureisland.com.

Table A1 – Harvey's Peak Hour Raw Data

		AM Peak Hour			PM Peak Hour		
Day	Date	Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Thursday	7/20/00	11:00	358	209	6:00	458	317
Friday	7/21/00	10:45	323	252	5:00	548	387
Saturday	7/22/00	10:00	285	273	5:30	591	380
Sunday	7/23/00	11:00	433	265	3:30	409	462
Monday	7/24/00	10:45	280	208	4:30	347	279
Tuesday	7/25/00	11:00	562	469	6:00	715	606
Wednesday	7/26/00	10:45	320	203	5:00	440	352
Thursday	7/27/00	11:00	362	263	6:00	493	319
Friday	7/28/00	10:45	412	179	5:30	512	403
Saturday	7/29/00	11:00	304	256	5:00	518	317
Sunday	7/30/00	11:00	345	271	3:15	410	342

Table A2 – Ameristar Peak Hour Raw Data

Day	Date	AM Peak Hour			PM Peak Hour		
		Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Saturday	7/15/00	10:30	363	240	5:30	596	420
Sunday	7/16/00	11:00	379	388	6:00	609	543
Monday	7/17/00	10:45	248	282	3:15	314	435
Tuesday	7/18/00	11:00	430	287	3:00	463	637
Wednesday	7/19/00	10:45	340	230	5:30	429	334
Thursday	7/20/00	10:45	356	228	3:00	349	471
Friday	7/21/00	11:00	364	283	5:45	662	441
Saturday	7/22/00	11:00	370	265	5:45	700	461
Sunday	7/23/00	11:00	409	351	5:45	592	461
Monday	7/24/00	10:45	299	289	3:15	319	462
Tuesday	7/25/00	11:00	458	343	3:00	427	557

Table A3 – Bluffs Run Peak Hour Raw Data

Day	AM Peak Hour			PM Peak Hour		
	Time	Inbound Volume	Outbound Volume	Time	Inbound Volume	Outbound Volume
Monday	11:00	348	420	15:00	443	416
Tuesday	10:45	436	393	15:00	549	513
Wednesday	11:00	417	310	15:00	542	474
Thursday	10:45	425	370	15:30	571	507
Friday	11:00	406	379	15:30	580	544
Saturday	11:00	478	361	16:00	486	635
Sunday	10:15	423	378	15:00	620	523

Table 1
Estimated Trip Generation
(Mason-Dixon Resort and Casino)

Land Use (Code)	Type	PM Peak Hour (Thursday)			PM Peak Hour (Friday)			Saturday Peak Hour			Average Weekday Daily Traffic
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	
Casino (600 slots)	New	182	165	347	212	194	406	247	212	459	5958
	Internalization 2%	4	3	7	4	4	8	5	4	9	
	Total	186	168	354	216	198	414	252	216	468	

Transportation Resource Group, Inc.
204 North George Street Suite 110
York, PA 17401
(717) 846-4660

Location: Emmitsburg Rd / Eisenhower Drwy
Municipality: Cumberland Twp.
Day: Thursday
Counter: Steve

File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
15:00	19	2	0	4	1	15	41
15:15	21	1	3	1	2	20	48
15:30	16	3	6	2	0	23	50
15:45	23	1	11	5	1	16	57
Total	79	7	20	12	4	74	196
16:00	19	3	2	3	4	17	48
16:15	11	4	2	4	1	20	42
16:30	17	3	1	1	4	15	41
16:45	27	2	1	2	0	29	61
Total	74	12	6	10	9	81	192
17:00	21	3	1	0	1	25	51
17:15	23	1	1	2	1	23	51
17:30	24	3	2	1	4	21	55
17:45	14	2	0	1	10	19	46
Total	82	9	4	4	16	88	203
Grand Total	235	28	30	26	29	243	591
Apprch %	89.4	10.6	53.6	46.4	10.7	89.3	
Total %	39.8	4.7	5.1	4.4	4.9	41.1	
Passenger Vehicles	233	28	30	26	29	241	587
% Passenger Vehicles	99.1	100	100	100	100	99.2	99.3
Trucks, Buses	2	0	0	0	0	2	4
% Trucks, Buses	0.9	0	0	0	0	0.8	0.7
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

Transportation Resource Group, Inc.
204 North George Street Suite 110
York, PA 17401
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Location:Emmitsburg Rd / Eisenhower Drwy
Municipality: Cumberland Twp.
Day: Thursday
Counter: Steve

File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 1

Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
15:00	0	0	0	0	0	1	1
15:30	1	0	0	0	0	0	1
Total	1	0	0	0	0	1	2
16:00	0	0	0	0	0	1	1
16:45	1	0	0	0	0	0	1
Total	1	0	0	0	0	1	2
Grand Total	2	0	0	0	0	2	4
Apprch %	100	0	0	0	0	100	
Total %	50	0	0	0	0	50	
Trucks, Buses	2	0	0	0	0	2	4
% Trucks, Buses	100	0	0	0	0	100	100
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

Transportation Resource Group, Inc.
204 North George Street Suite 110
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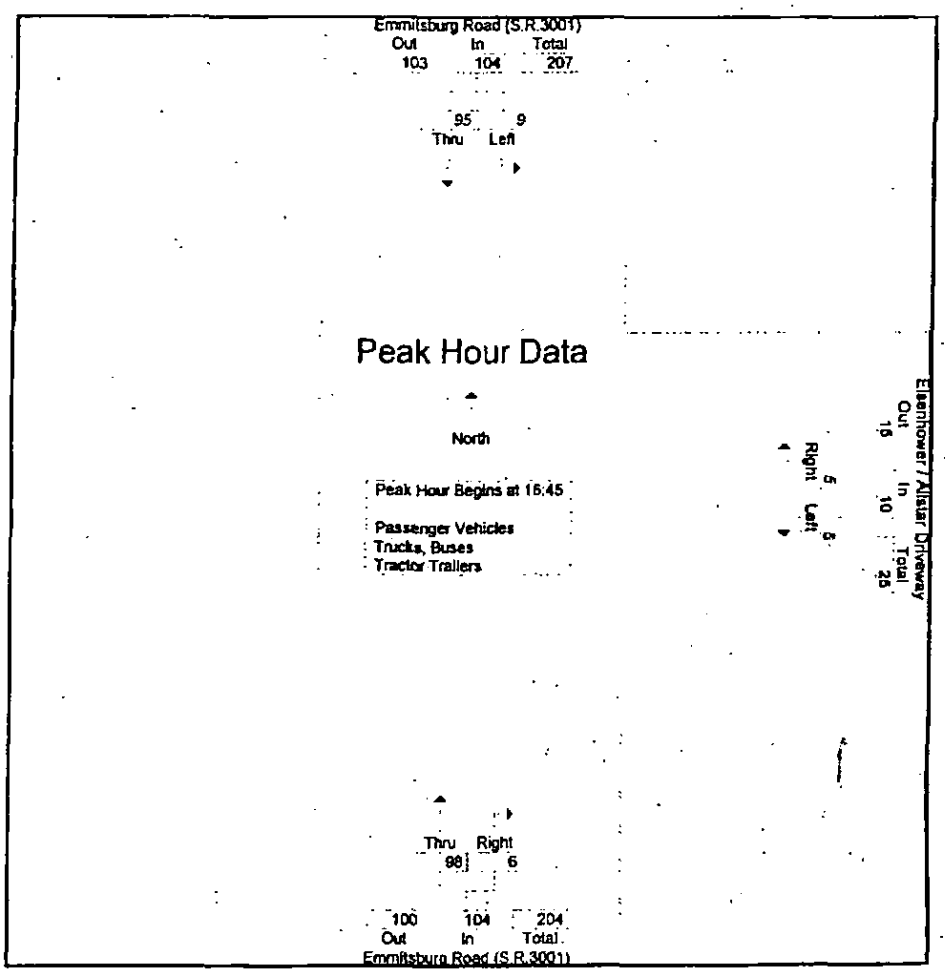
(717) 846-4660

File Name : 3880111
Site Code : 03880101
Start Date : 1/14/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 15:00 to 17:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:45										
16:45	27	2	29	1	2	3	0	29	29	61
17:00	21	3	24	1	0	1	1	25	26	51
17:15	23	1	24	1	2	3	1	23	24	51
17:30	24	3	27	2	1	3	4	21	25	55
Total Volume	95	9	104	5	5	10	6	98	104	218
% App. Total	91.3	8.7		50	50		5.8	94.2		
PHF	.880	.750	.897	.625	.625	.833	.375	.845	.897	.893



Transportation Resource Group, Inc.
204 North George Street Suite 110
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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Friday
Counter: Steve

File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
16:00	18	3	1	1	5	31	59
16:15	23	3	4	1	8	31	70
16:30	30	2	1	0	8	33	74
16:45	32	8	2	1	4	23	70
Total	103	16	8	3	25	118	273
17:00	20	4	3	2	5	23	57
17:15	21	6	4	2	7	22	62
17:30	23	1	2	0	4	29	59
17:45	23	7	0	1	6	27	64
Total	87	18	9	5	22	101	242
18:00	21	4	2	2	7	16	52
18:15	13	2	1	2	1	15	34
18:30	21	3	3	1	8	24	60
18:45	14	2	1	0	8	12	37
Total	69	11	7	5	24	67	183
Grand Total	259	45	24	13	71	286	698
Apprch %	85.2	14.8	64.9	35.1	19.9	80.1	
Total %	37.1	6.4	3.4	1.9	10.2	41	
Passenger Vehicles	258	45	24	13	71	285	696
% Passenger Vehicles	99.6	100	100	100	100	99.7	99.7
Trucks, Buses	0	0	0	0	0	1	1
% Trucks, Buses	0	0	0	0	0	0.3	0.1
Tractor Trailers	1	0	0	0	0	0	1
% Tractor Trailers	0.4	0	0	0	0	0	0.1

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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Friday
Counter: Steve

File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 1

Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
16:00	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	1
17:15	1	0	0	0	0	0	1
Total	1	0	0	0	0	0	1
Grand Total	1	0	0	0	0	1	2
Apprch %	100	0	0	0	0	100	
Total %	50	0	0	0	0	50	
Trucks, Buses	0	0	0	0	0	1	1
% Trucks, Buses	0	0	0	0	0	100	50
Tractor Trailers	1	0	0	0	0	0	1
% Tractor Trailers	100	0	0	0	0	0	50

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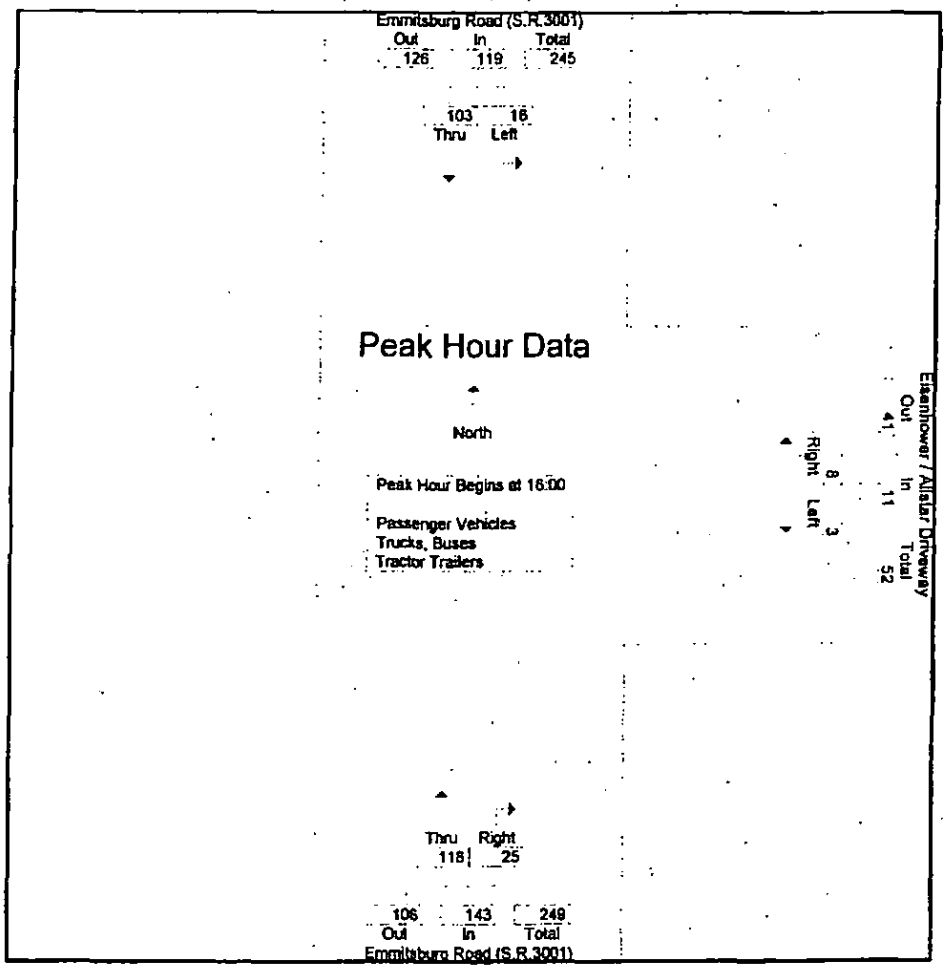
File Name : 3880112
Site Code : 03880102
Start Date : 1/15/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 18:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 16:00										
16:00	18	3	21	1	1	2	5	31	36	59
16:15	23	3	26	4	1	5	8	31	39	70
16:30	30	2	32	1	0	1	8	33	41	74
16:45	32	8	40	2	1	3	4	23	27	70
Total Volume	103	16	119	8	3	11	25	118	143	273
% App. Total	86.6	13.4		72.7	27.3		17.5	82.5		
PHF	.805	.500	.744	.500	.750	.550	.781	.894	.872	.922



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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Saturday
Counter: Steve

File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 1

Groups Printed- Passenger Vehicles - Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
12:00	19	2	4	3	3	17	48
12:15	18	5	6	4	1	27	61
12:30	28	0	3	2	1	24	58
12:45	17	3	4	1	0	18	43
Total	82	10	17	10	5	86	210
13:00	35	3	2	6	2	23	71
13:15	27	3	2	2	2	17	53
13:30	33	0	4	0	3	14	54
13:45	22	5	2	1	1	32	63
Total	117	11	10	9	8	86	241
14:00	24	3	5	1	4	16	53
14:15	27	2	0	1	3	17	50
14:30	20	1	5	0	1	31	58
14:45	23	2	1	0	2	11	39
Total	94	8	11	2	10	75	200
Grand Total	293	29	38	21	23	247	651
Apprch %	91	9	64.4	35.6	8.5	91.5	
Total %	45	4.5	5.8	3.2	3.5	37.9	
Passenger Vehicles	292	29	38	21	23	247	650
% Passenger Vehicles	99.7	100	100	100	100	100	99.8
Trucks, Buses	1	0	0	0	0	0	1
% Trucks, Buses	0.3	0	0	0	0	0	0.2
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

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Location: Emmitsburg Rd / Eisenhower Drw
Municipality: Cumberland Twp.
Day: Saturday
Counter: Steve

File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 1

Groups Printed- Trucks, Buses - Tractor Trailers

	Emmitsburg Road (S.R.3001) Southbound		Eisenhower / Allstar Driveway Westbound		Emmitsburg Road (S.R.3001) Northbound		
Start Time	Thru	Left	Right	Left	Right	Thru	Int. Total
13:00	1	0	0	0	0	0	1
Total	1	0	0	0	0	0	1
Grand Total	1	0	0	0	0	0	1
Apprch %	100	0	0	0	0	0	
Total %	100	0	0	0	0	0	
Trucks, Buses	1	0	0	0	0	0	1
% Trucks, Buses	100	0	0	0	0	0	100
Tractor Trailers	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0

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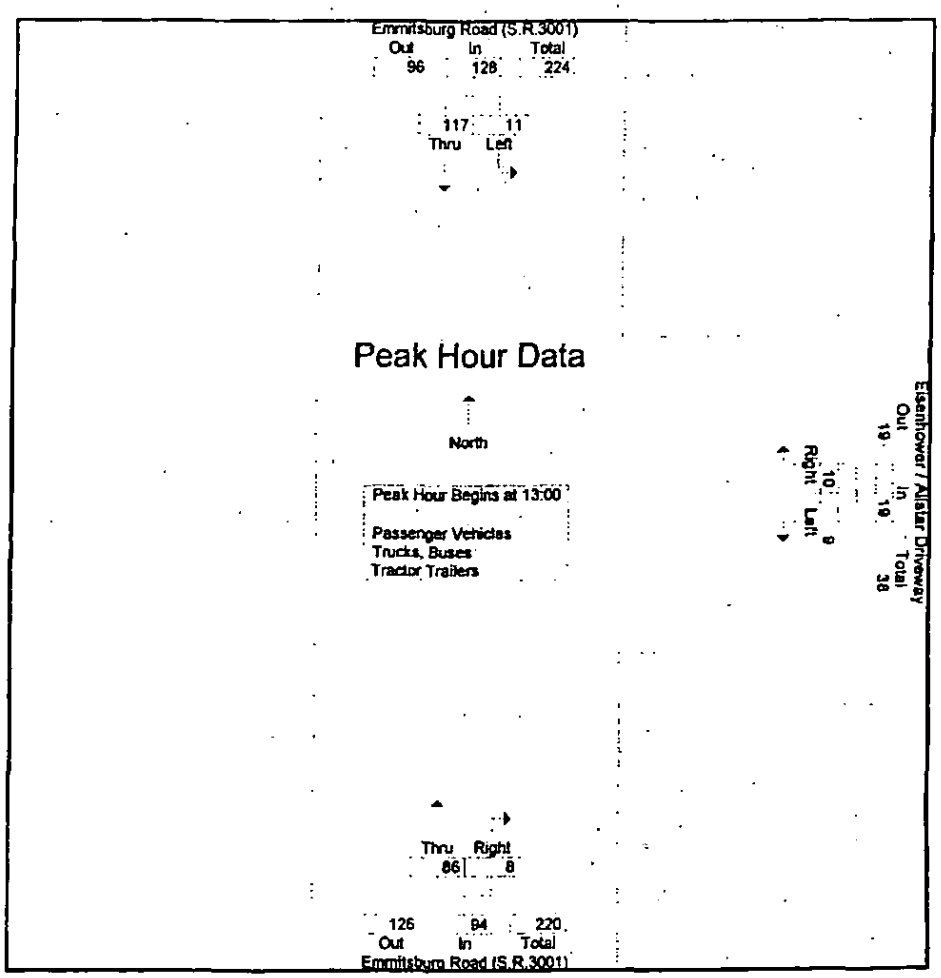
File Name : 3880113
Site Code : 03880103
Start Date : 1/16/2010
Page No : 2

	Emmitsburg Road (S.R.3001) Southbound			Eisenhower / Allstar Driveway Westbound			Emmitsburg Road (S.R.3001) Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 14:45 - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 13:00										
13:00	35	3	38	2	6	8	2	23	25	71
13:15	27	3	30	2	2	4	2	17	19	53
13:30	33	0	33	4	0	4	3	14	17	54
13:45	22	5	27	2	1	3	1	32	33	63
Total Volume	117	11	128	10	9	19	8	86	94	241
% App. Total	91.4	8.6		52.6	47.4		8.5	91.5		
PHF	.836	.550	.842	.625	.375	.594	.667	.672	.712	.849



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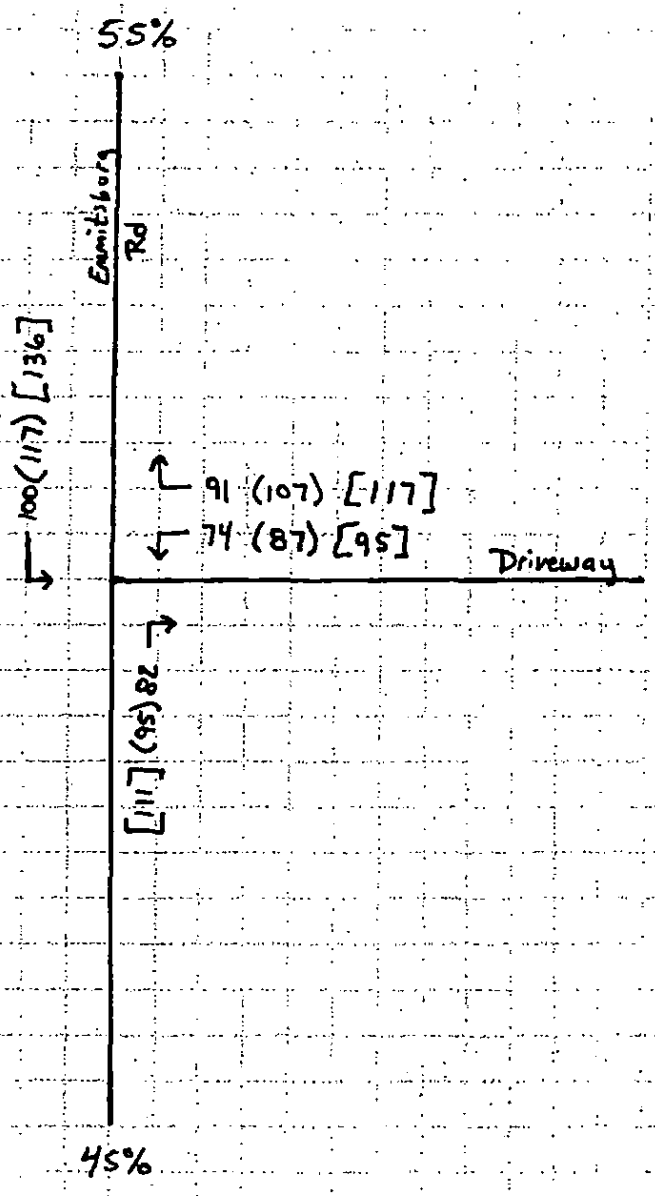
Project: Mason-Dixon Resort and Ca

Subject: Trip Distribution and Assignment Job No. 388.01

Sheet No. 1 of 1

Computed By DJT Date 1/27 Checked By _____ Date _____



000 (000) [000] PM peak Thursday (PM peak Friday) [Saturday peak]

Table 355
Average Day of Week by Month Factors Compiled for Total Vehicles

The following 12 tables show average day of week factors by month compiled for total vehicles for the year 2008. Current year Automatic Traffic Recorder (ATR) traffic data is assembled and the data is placed in the respective TPG. Annual Average Daily Traffic (AADT) is tabulated individually for each of the 57 ATR stations. A factor is calculated for each day from each station and a list is tabulated by month and day of the week. This data is assembled by day and TPG for each station. The result is a group factor, which can be applied to a 24-hour raw traffic count taken during any day of the year to develop an AADT volume.

Seasonal Factor

January 2008										
DAY	TPG 1	TPG 2	TPG 3	TPG 4	TPG 5	TPG 6	TPG 7	TPG 8	TPG 9	TPG 10
Monday	1.130	1.289	1.102	1.167	1.142	1.264	1.151	1.231	1.155	1.288
Tuesday	1.093	1.297	0.989	1.125	1.078	1.229	1.112	1.191	1.083	1.243
Wednesday	1.060	1.316	0.987	1.120	1.072	1.205	1.076	1.196	1.080	1.330
Thursday	1.030	1.257	0.961	1.075	1.055	1.166	1.054	1.176	1.061	1.224
Friday	0.964	1.125	0.925	0.987	1.008	1.062	0.991	1.068	1.002	1.111
Saturday	1.320	1.429	1.284	1.311	1.208	1.443	1.219	1.299	1.275	1.216
Sunday	1.468	1.367	1.698	1.498	1.377	1.649	1.461	1.520	1.492	1.344
DAY OF MONTH	1.152	1.297	1.135	1.183	1.134	1.288	1.152	1.240	1.164	1.251

February 2008										
DAY	TPG 1	TPG 2	TPG 3	TPG 4	TPG 5	TPG 6	TPG 7	TPG 8	TPG 9	TPG 10
Monday	1.072	1.261	1.016	1.117	1.125	1.190	1.102	1.203	1.114	1.290
Tuesday	1.072	1.349	0.982	1.118	1.089	1.183	1.095	1.169	1.082	1.235
Wednesday	1.035	1.267	0.961	1.084	1.056	1.158	1.019	1.189	1.131	1.201
Thursday	0.992	1.194	0.927	1.035	1.039	1.089	1.029	1.108	1.042	1.192
Friday	0.946	1.094	0.899	0.952	1.010	1.005	0.975	1.052	1.029	0.910
Saturday	1.238	1.384	1.224	1.227	1.171	1.312	1.187	1.252	1.239	1.158
Sunday	1.349	1.324	1.543	1.491	1.348	1.523	1.389	1.501	1.488	1.476
DAY OF MONTH	1.101	1.267	1.079	1.146	1.120	1.209	1.114	1.210	1.160	1.209

TRAFFIC SIGNAL WARRANT ANALYSIS

WARRANT 9, ADT VOLUME WARRANT EVALUATION

PennDOT Publication 212.302.b (3) (ii)

CONDITION A – ADT VOLUME WARRANT					
Number of Lanes for Moving Traffic on Each Approach		Estimated ADT*			
Major Street	Minor Street	Major Street (Both Approaches)		Higher Volume Minor Street (One Direction Only)	
		100%	70%**	100%	70%**
1	1	10,000	7,000	3,000	2,100
2 or more	1	12,000	8,400	3,000	2,100
2 or more	2 or more	12,000	8,400	4,000	2,800
1	2 or more	10,000	7,000	4,000	2,800

CONDITION B – ADT VOLUME WARRANT					
Number of Lanes for Moving Traffic on Each Approach		Estimated ADT*			
Major Street	Minor Street	Major Street (Both Approaches)		Higher Volume Minor Street (One Direction Only)	
		100%	70%**	100%	70%**
1	1	15,000	10,500	1,500	1,050
2 or more	1	18,000	12,600	1,500	1,050
2 or more	2 or more	18,000	12,600	2,000	1,400
1	2 or more	15,000	10,500	2,000	1,400

* Based on the volume projected to be present within 6 months of the opening of the development or within 2 years of the opening of the highway.

** May be used if the 85th percentile speed of the major street traffic exceeds 40 miles per hour or the intersection lies within the built-up area of an isolated community having a population of less than 10,000.

Proposed Site Traffic for Proposed Casino:

ADT for entire development assuming full-build out: 7020
Exiting ADT for proposed casino: 7020 / 2 = 3510 exiting
Existing exiting ADT on driveway: 212 trips
Total ADT exiting driveway: 3510 + 212 = 3722 trips

ADT on Emmitsburg Road:

ADT on Emmitsburg Road: 2171
ADT entering from proposed casino: 3510
Total ADT on Emmitsburg Road: 5681

Based on the minimum ADT volumes shown in the Table for Condition A, the minimum ADT volumes are not met to satisfy Traffic Signal Warrant 9.

Based on the minimum ADT volumes shown in the Table for Condition B, the minimum ADT volumes are not met to satisfy Traffic Signal Warrant 9.

Peak Hour Signal Warrant

MUTCD Warrant 3 - Peak Hour (70% Factor)

Based on MUTCD Sect. 4C.04 Signal Warrants and PENNDOT Publication 212

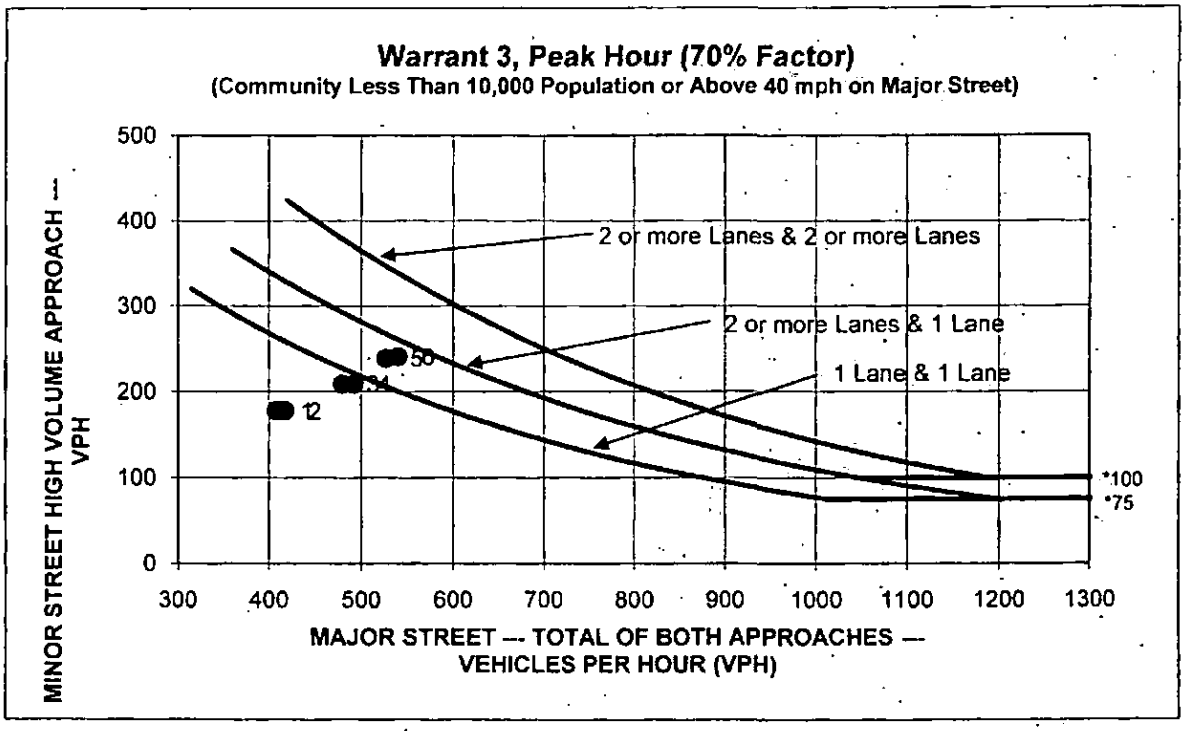
General Information

Project Number: 388.01
Location: Emmitsburg Rd / Complex Driveway
Performed By: DJT

# of Major Street Lanes: 1 Lane # of Minor Street Lanes: 1 Lane

Analysis Details

	Scenario / Peak Hour	PHV Major Street	PHV Minor Street	Warrant Met?
1	2012 Traffic Volumes w/ Dev - PM (Thurs)	408	178	No
2	2017 Traffic Volumes w/ Dev - PM (Thurs)	417	178	No
3	2012 Traffic Volumes w/ Dev - PM (Fri)	480	209	No
4	2017 Traffic Volumes w/ Dev - PM (Fri)	492	209	No
5	2012 Traffic Volumes w/ Dev - Sat	527	239	Yes
6	2017 traffic Volumes w/ Dev - Sat	540	241	Yes



* Note

100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane

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