



MEMORANDUM

TO: George Phillips Loudoun County
 Lou Mosurak Loudoun County
 Marchant Schneider Loudoun County

FROM: Anushree Goradia
 Tushar Awar, P.E.
 Christopher Tacinelli, P.E.

DATE: July 22, 2010

SUBJECT: Dulles South High School (HS-7) and Elementary School (ZMAP 2010-0001 and SPEX 2010-003)
 – Supplemental Analysis: Response to OTS Comments

INTRODUCTION

The Office of Transportation Services (OTS) reviewed the traffic study prepared for this application dated March 8, 2010. OTS staff also reviewed the revised version of the traffic study June 9, 2010, which incorporated the School Board's May 2010 adopted attendance zones/catchment areas for the proposed High School. A referral dated July 13, 2010 was issued by OTS.

OTS COMMENT AND RESPONSE

Comment #6 from the OTS referral states – ‘If not already constructed by others prior to the opening of the high school in 2012, the Applicant should construct the turn lanes recommended by the traffic study at the Gum Spring Road/Braddock Road intersection. Any necessary modifications to the existing traffic signal at this intersection should also be the responsibility of the Applicant if such modifications have not already been made by others. The Applicant should seek reimbursement for these improvements/modifications to the extent that they have been proffered as part of other developments in the area.’

At the meeting held with OTS staff on July 21, 2010, the improvements identified in the traffic study at the intersection of Gum Spring Road/Braddock Road prior to the opening of the high school in 2012 were identified. The following improvements identified in the traffic study at this intersection, although proffered by others, are not in place:

- Separate Left Turn Lane on Braddock Road EB (to NB 659) – Proffered by *Kirkpatrick Farms and Seven Hills*
- Separate Left Turn Lane on Braddock Road WB (to SB 659) - Proffered by *Seven Hills*

- Upgrade Right Turn Lane on Braddock Road EB (to SB 659) to meet VDOT Standards - Proffered by *Kirkpatrick Farms*

At the meeting with OTS staff, it was discussed that as the analysis in the traffic study accounted for traffic generated by the background developments, including the background developments listed above; there is a certain level of ambiguity with respect to the volume/capacity thresholds for these improvements. Hence, an analysis was conducted with the existing traffic, regional growth and the traffic generated by the proposed schools to evaluate exact level of impact from the school traffic at this intersection, without assuming the improvements listed above and without assuming traffic generated by approved developments in the area.

The existing volumes, inherent regional growth rates, and the school traffic distribution were maintained as presented in and consistent with the traffic study, dated June 9, 2010. Table 1 below presents the capacity analysis results.

Table 1: Intersection Capacity Analysis Results – Gum Spring Road/Braddock Road

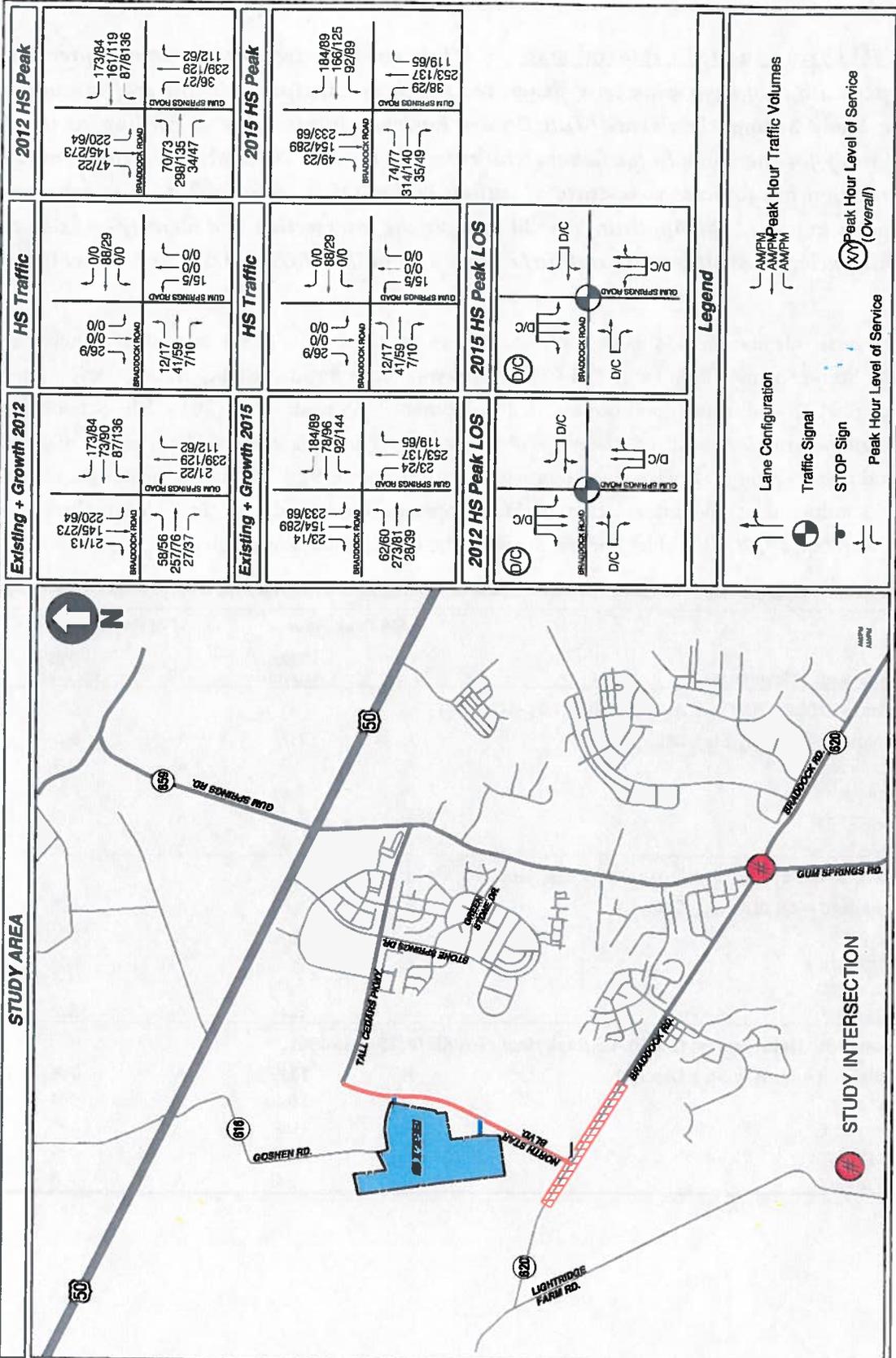
Intersection (Approach/Movement)	AM Peak Hour		PM Peak Hour	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Future Conditions with Development (2012) -HS Peak Hour (8-9 AM/3:30-4:30 PM)				
Overall (Signalized)	D	40.3	C	29.3
Eastbound Approach	D	48.5	C	30.1
Westbound Approach	D	46.0	C	28.7
Northbound Approach	D	40.4	C	29.5
Southbound Approach	C	26.5	C	29.1
Future Conditions with Development (2015) -HS Peak Hour (8-9 AM/3:30-4:30 PM)				
Overall (Unsignalized – All Way Stop Control)	D	43.2	C	30.3
Eastbound Approach	D	52.1	C	31.3
Westbound Approach	D	50.4	C	29.5
Northbound Approach	D	41.8	C	30.3
Southbound Approach	C	28.5	C	30.3

**Note: There is no traffic from the proposed Elementary School anticipated to utilize this intersection.*

Figure 1 on the next page shows the traffic volumes, capacity analysis results and lane configuration assumed for the intersection of Gum Spring Road and Braddock Road. The traffic count sheets and the capacity analysis Synchro worksheets are attached in the Appendix section.



FILE PATH: P:\2110\013.LCPS Goshen HS7\CAD
DATE LAST MODIFIED: 1/13/10



Existing + Growth 2012	HS Traffic	2012 HS Peak																		
<table border="1"> <tr> <td>173/84 73/90 220/64</td> <td>112/62 239/129 87/136</td> <td>173/84 161/119 220/64</td> </tr> <tr> <td>BRADDOCK ROAD</td> <td>GUM SPRINGS ROAD</td> <td>BRADDOCK ROAD</td> </tr> </table>	173/84 73/90 220/64	112/62 239/129 87/136	173/84 161/119 220/64	BRADDOCK ROAD	GUM SPRINGS ROAD	BRADDOCK ROAD	<table border="1"> <tr> <td>0/0 0/0 0/0</td> <td>0/0 0/0 0/0</td> <td>0/0 0/0 0/0</td> </tr> <tr> <td>BRADDOCK ROAD</td> <td>GUM SPRINGS ROAD</td> <td>GUM SPRINGS ROAD</td> </tr> </table>	0/0 0/0 0/0	0/0 0/0 0/0	0/0 0/0 0/0	BRADDOCK ROAD	GUM SPRINGS ROAD	GUM SPRINGS ROAD	<table border="1"> <tr> <td>173/84 73/90 220/64</td> <td>112/62 239/129 87/136</td> <td>173/84 161/119 220/64</td> </tr> <tr> <td>BRADDOCK ROAD</td> <td>GUM SPRINGS ROAD</td> <td>BRADDOCK ROAD</td> </tr> </table>	173/84 73/90 220/64	112/62 239/129 87/136	173/84 161/119 220/64	BRADDOCK ROAD	GUM SPRINGS ROAD	BRADDOCK ROAD
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Existing + Growth 2015	HS Traffic	2015 HS Peak																		
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2012 HS Peak LOS	2015 HS Peak LOS	Legend																		
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D/C	D/C	AWFM																		
BRADDOCK ROAD	GUM SPRINGS ROAD	AWFM																		
D/C	D/C	AWFM																		
BRADDOCK ROAD	GUM SPRINGS ROAD	AWFM																		

Figure 1
Gum Spring Road and Braddock Road

Comment #11 from the OTS referral states – ‘While not included in the scoping agreement, a significant percentage of high school site-generated traffic is anticipated by the traffic study to go through the Stone Springs Boulevard/Tall Cedars Parkway intersection. According to the June 2009 traffic study for the Stone Ridge Commercial rezoning (ZMAP 2006-0011), certain movements at this intersection are forecast to operate at failing LOS (LOS E or F) by 2015 even without the proposed schools in place. The Applicant should analyze the intersection and identify and commit to necessary mitigation measures to maintain/restore acceptable LOS (LOS D or better) at this intersection.’

In order to address this comment, this memorandum presents the results of the analysis conducted at the intersection of Stone Springs Boulevard/Tall Cedars Parkway under future conditions with development – HS Peak Hour (2012), and future conditions with development – ES Peak Hour (2015). The School Board’s adopted catchment area was utilized to evaluate the capacity analysis results. The background traffic generation and distribution was maintained consistent with the June 9, 2010 traffic impact study. Traffic counts were conducted at the intersection of Stone Springs Boulevard and Tall Cedars Parkway on Thursday, November 19, 2009. Table 2 below presents the capacity analysis results.

Table 2: Intersection Capacity Analysis Results – Stone Springs Boulevard and Tall Cedars Parkway

Intersection (Approach/Movement)	AM Peak Hour		PM Peak Hour	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Existing Conditions (2009) -HS Peak Hour (8-9 AM/3:30-4:30 PM)				
Overall (Unsignalized – All Way Stop Control)	A	7.7	A	8.0
Eastbound Approach	A	7.9	A	8.0
Westbound Approach	A	7.4	A	7.8
Northbound Approach	A	7.8	A	8.0
Southbound Approach	A	7.6	A	8.0
Future Conditions with Development (2012) -HS Peak Hour (8-9 AM/3:30-4:30 PM)				
Overall (Unsignalized – All Way Stop Control)	A	8.5	A	8.4
Eastbound Approach	A	8.4	A	8.5
Westbound Approach	A	8.2	A	8.0
Northbound Approach	A	9.0	A	8.7
Southbound Approach	A	8.1	A	8.2
Future Conditions with Development (2015) -ES Peak Hour (7-8 AM/2:15-3:15 PM)				
Overall (Unsignalized – All Way Stop Control)	B	11.6	A	7.8
Eastbound Approach	B	10.9	A	7.9
Westbound Approach	B	10.2	A	7.5
Northbound Approach	B	13.9	A	7.5
Southbound Approach	B	10.0	A	7.8

Figure 2 on the next page shows the traffic volumes, capacity analysis results and lane configuration for the intersection of Stone Springs Boulevard and Tall Cedars Parkway. The traffic count sheets and the capacity analysis Synchro worksheets are attached in the Appendix section.

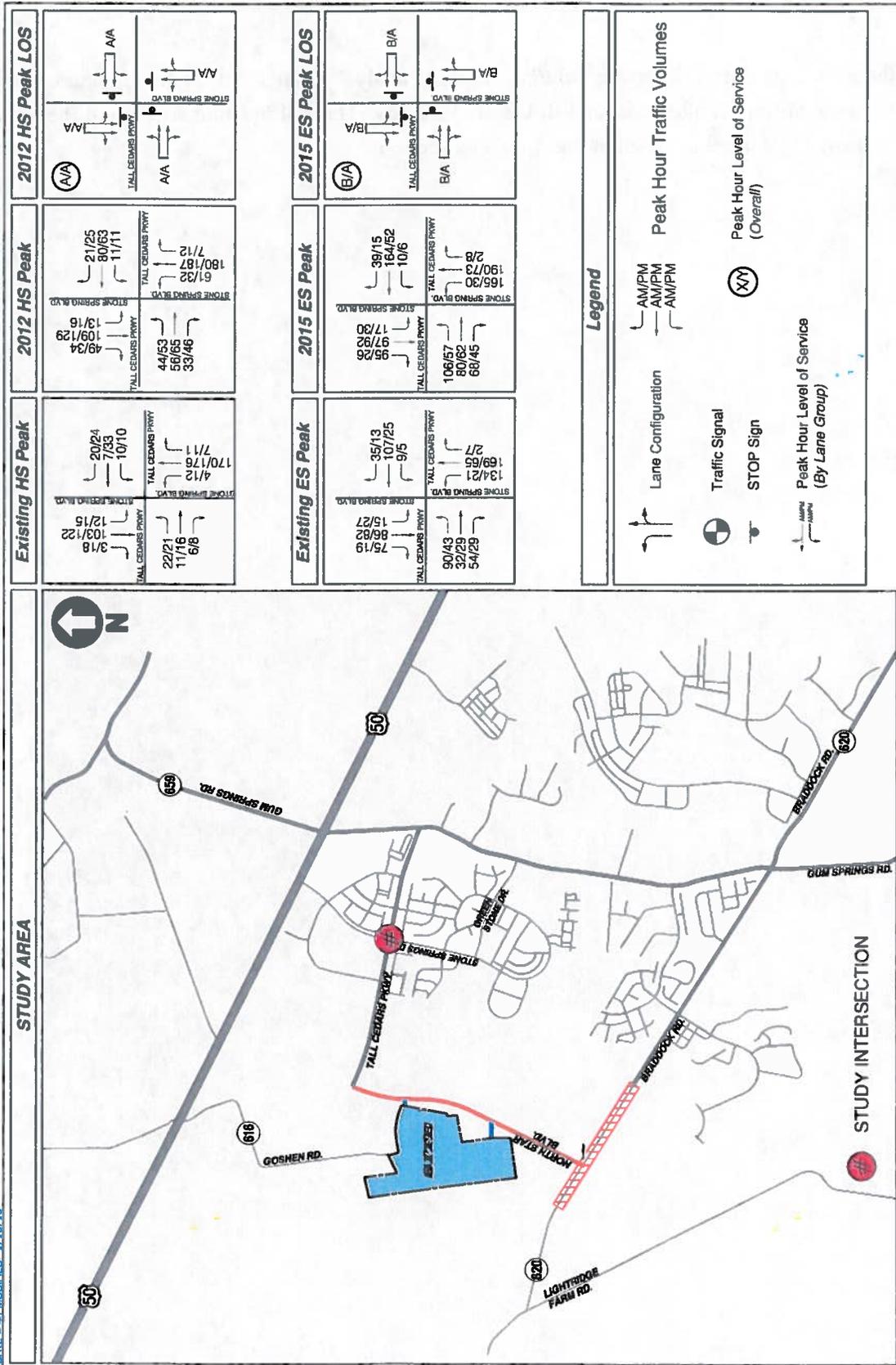


Figure 2 Stone Springs Boulevard and Tall Cedars Parkway

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CONCLUSIONS

- A meeting was held with OTS staff to discuss the referral dated July 13, 2010 provided by OTS for the proposed Dulles South High School (HS-7) and Elementary School. This memorandum presents the supplemental analysis as requested in the referral, and discussed at the meeting.
- An analysis was conducted at the intersection of Gum Spring Road and Braddock Road with just the existing traffic, regional growth and the traffic generated by the proposed schools to evaluate the exact level of impact from the school traffic at this intersection. The turn lane improvements proffered by other approved developments in the area and the traffic generated by approved developments in the area was not incorporated.
- The supplemental analysis presented in this memorandum as outlined above for the intersection of Gum Spring Road and Braddock Road shows that the intersection will operate at acceptable levels of service under future conditions (2012 and 2015). Hence, this analysis shows that the minimal addition of school traffic can be accommodated by the improvements that are already in place at this intersection. With the addition of traffic generated by background developments, the turn lane improvements identified in the traffic study are triggered.
- Per OTS staff's request, the intersection of Stone Springs Boulevard and Tall Cedars Parkway was analyzed under future conditions with development (2012 and 2015) scenarios. The capacity analysis results presented in this memorandum show that the intersection operates at acceptable levels of service conditions under existing conditions as an all way stop control intersection and will continue to operate at acceptable level of service conditions under future conditions with the High School (2012) and Elementary School (2015) in place.
- Based on these findings, we conclude that the intersection of Stone Springs Boulevard and Tall Cedars Parkway will operate at acceptable levels of Service under future conditions during the school peak hours.

APPENDIX



APPENDIX A (Response to Comment #6)

GUM SPRING ROAD AND BRADDOCK ROAD: EXISTING TRAFFIC
VOLUMES COUNT SHEETS AND INTERSECTION CAPACITY ANALYSIS

Goreve/Slade Associates
 Project Name
 2110.013
 Location
 Loudoun County, VA
 Data Source
 Goreve/Slade Associates

HS-7
 2110.013
 Loudoun County, VA
 Goreve/Slade Associates

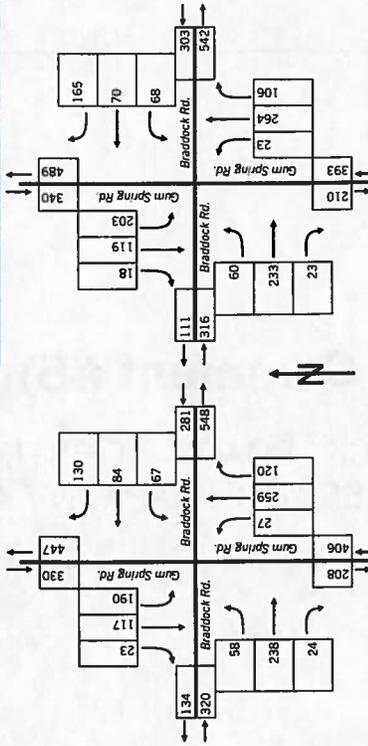
Braddock Road at Gum Spring Road

Direction: Roadway: Movement:	Southbound Gum Spring Rd.			Westbound Braddock Rd.			Northbound Gum Spring Rd.			Eastbound Braddock Rd.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM to 6:15 AM	3	20	10	0	13	4	7	0	31	62	0	0
6:15 AM to 6:30 AM	1	25	10	0	4	7	8	0	43	63	1	0
6:30 AM to 6:45 AM	6	32	27	0	12	5	10	0	50	89	7	0
6:45 AM to 7:00 AM	9	34	33	0	9	7	9	0	47	79	5	0
7:00 AM to 7:15 AM	6	32	42	0	11	18	11	0	43	67	12	0
7:15 AM to 7:30 AM	9	25	50	0	24	27	17	0	42	52	6	0
7:30 AM to 7:45 AM	3	35	51	0	24	25	19	0	14	69	8	0
7:45 AM to 8:00 AM	8	28	39	0	31	15	17	0	36	70	7	0
8:00 AM to 8:15 AM	3	29	50	0	51	17	14	0	28	88	6	0
8:15 AM to 8:30 AM	4	27	63	0	56	13	18	0	28	57	2	0
8:30 AM to 8:45 AM	6	37	51	0	29	13	35	0	18	50	6	0
8:45 AM to 9:00 AM	7	44	43	0	24	26	15	0	32	50	6	0
9:00 AM to 9:15 AM	3	28	13	0	24	21	19	1	27	48	6	0
9:15 AM to 9:30 AM	4	26	15	0	14	14	12	0	21	28	3	0
9:30 AM to 9:45 AM												
9:45 AM to 10:00 AM												
10:00 AM to 10:15 AM												
10:15 AM to 10:30 AM												
10:30 AM to 10:45 AM												
10:45 AM to 11:00 AM												

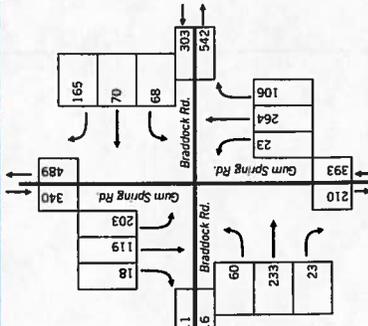
Direction: Roadway: Movement:	Southbound Gum Spring Rd.			Westbound Braddock Rd.			Northbound Gum Spring Rd.			Eastbound Braddock Rd.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
7:45 AM to 8:45 AM	23	117	190	0	130	84	67	0	120	259	27	0
AM INTERSECTION PEAK HOUR	18	119	203	0	165	70	68	0	106	264	23	0
AM SYSTEM PEAK HOUR												
7:30 AM to 8:30 AM												
PEAK HOUR												
FACTORS												
AM PEAK HOUR	0.72	0.79	0.75	N/A	0.55	1.24	0.48	N/A	0.83	0.93	0.96	N/A
SCHOOL PEAK HOUR												
7:00 AM to 8:00 AM												
ES AM SCHOOL PEAK HOUR												
7:00 AM to 8:00 AM												
PEAK HOUR												
FACTORS												
ES AM SCHOOL PEAK HOUR	0.72	0.86	0.89	0.92	0.73	0.79	0.84	0.88	0.78	0.92	0.69	0.87
8:00 AM to 9:00 AM	0.71	0.78	0.82	0.87	0.69	0.66	0.59	0.67	0.83	0.83	0.83	0.88

Date of Counts: Thursday, November 19, 2009
 Weather Conditions: Light Rain

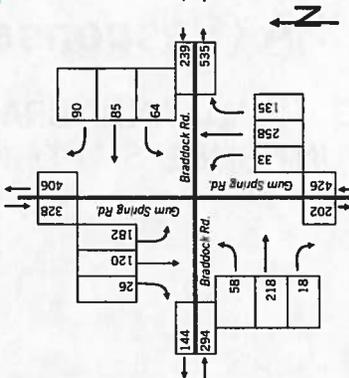
AM INTERSECTION PEAK VOLUMES



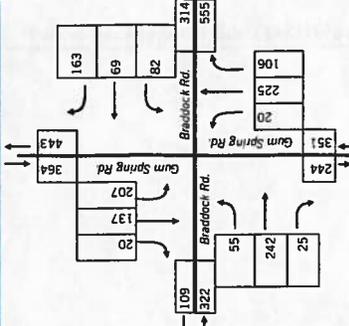
AM SYSTEM PEAK VOLUMES



ES AM PEAK HOUR VOLUMES



HS AM PEAK HOUR VOLUMES

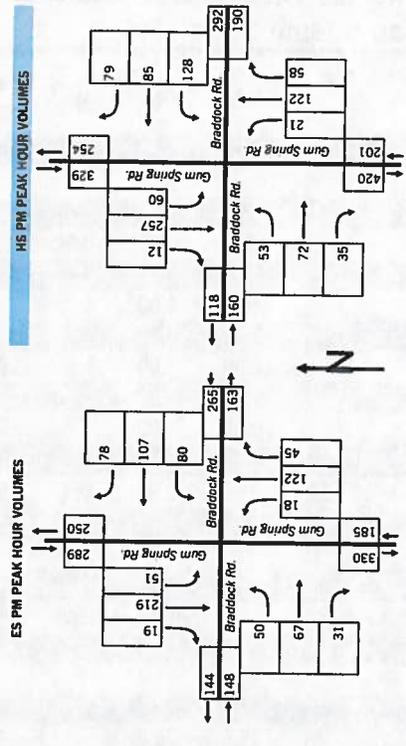
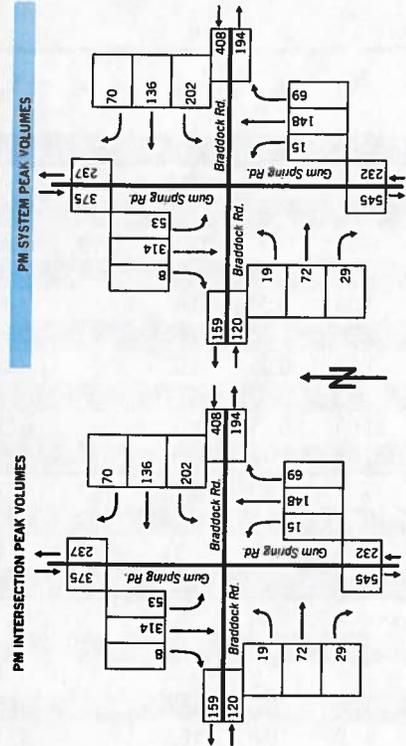


Garove/Slide Associates
 Project Name : HS-7
 Project # : 2110-013
 Location : Loudoun County, VA
 Data Source : Garove/Slide Associates

Braddock Road at Gum Spring Road

Direction: Roadway: Movement:	Southbound Gum Spring Rd.			Westbound Braddock Rd.			Northbound Gum Spring Rd.			Eastbound Braddock Rd.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
PM PEAK												
2:00 PM to 2:15 PM	9	55	15	15	13	20	3	10	29	3	8	20
2:15 PM to 2:30 PM	6	74	11	21	20	9	9	11	29	7	0	10
2:30 PM to 2:45 PM	3	49	18	1	33	18	4	13	27	5	0	14
2:45 PM to 3:00 PM	2	47	13	0	23	38	16	1	30	4	0	29
3:00 PM to 3:15 PM	8	49	9	0	11	18	26	0	36	2	0	14
3:15 PM to 3:30 PM	2	42	8	0	12	16	24	0	30	3	0	17
3:30 PM to 3:45 PM	2	49	17	0	10	18	17	4	33	4	0	16
3:45 PM to 4:00 PM	3	66	22	0	24	22	26	2	29	6	0	31
4:00 PM to 4:15 PM	4	63	17	0	25	24	33	2	17	22	5	14
4:15 PM to 4:30 PM	3	79	4	0	20	21	52	0	14	38	6	10
4:30 PM to 4:45 PM	2	85	19	0	10	22	68	1	18	46	5	18
4:45 PM to 5:00 PM	3	90	5	0	21	49	52	3	17	35	5	10
5:00 PM to 5:15 PM	1	72	13	0	23	34	35	2	15	37	3	5
5:15 PM to 5:30 PM	2	87	16	0	16	31	47	1	19	30	2	26
5:30 PM to 5:45 PM	5	58	42	0	17	20	31	0	23	37	3	4
5:45 PM to 6:00 PM	6	84	17	0	30	58	40	0	15	28	3	16
6:00 PM to 6:15 PM	3	45	13	0	20	28	32	8	19	33	5	17
6:15 PM to 6:30 PM	1	48	16	0	29	30	38	16	12	17	6	0
6:30 PM to 6:45 PM	6	85	17	0	35	50	47	0	14	18	3	15
6:45 PM to 7:00 PM	5	40	12	0	24	27	25	6	11	21	1	0
COMPUTER PEAK HOUR												
4:30 PM to 5:30 PM	8	314	53	0	70	136	202	7	69	148	15	0
PM INTERSECTION PEAK HOUR	Right	0.67	0.87	0.70	N/A	0.69	0.74	N/A	0.91	0.80	0.75	N/A
PM SYSTEM PEAK HOUR	Right	0.67	0.87	0.70	0.76	0.69	0.74	N/A	0.91	0.80	0.75	N/A
PEAK HOUR FACTORS												
4:30 PM to 5:30 PM	Right	0.67	0.87	0.70	0.76	0.69	0.74	N/A	0.91	0.80	0.75	N/A
SCHOOL PEAK HOUR												
2:15 PM to 3:15 PM	Right	0.59	0.74	0.71	0.85	0.70	0.77	0.88	0.87	0.85	0.64	0.94
3:30 PM to 4:30 PM	Right	0.75	0.81	0.68	0.79	0.89	0.62	0.78	0.85	0.80	0.88	0.87
ES PM SCHOOL PEAK HOUR	Right	0.59	0.74	0.71	0.85	0.70	0.77	0.88	0.87	0.85	0.64	0.94
2:15 PM to 3:15 PM	Right	0.59	0.74	0.71	0.85	0.70	0.77	0.88	0.87	0.85	0.64	0.94
3:30 PM to 4:30 PM	Right	0.75	0.81	0.68	0.79	0.89	0.62	0.78	0.85	0.80	0.88	0.87
HS PM SCHOOL PEAK HOUR	Right	0.75	0.81	0.68	0.79	0.89	0.62	0.78	0.85	0.80	0.88	0.87
2:15 PM to 3:15 PM	Right	0.59	0.74	0.71	0.85	0.70	0.77	0.88	0.87	0.85	0.64	0.94
3:30 PM to 4:30 PM	Right	0.75	0.81	0.68	0.79	0.89	0.62	0.78	0.85	0.80	0.88	0.87

Date of Counts: Thursday, November 19, 2009
 Weather Conditions: Light Rain



HCM Signalized Intersection Capacity Analysis
300: Braddock Road & Gum Spring Road

LCPS (HS 7)
2012 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗		↕	↗	↘	↕↗		↘	↕↗	↘	
Volume (vph)	70	298	34	87	161	173	36	239	112	220	145	47	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85	
Flt Protected		0.99	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1845	1583		1831	1583	1770	3370		1770	3539	1583	
Flt Permitted		0.99	1.00		0.98	1.00	0.65	1.00		0.29	1.00	1.00	
Satd. Flow (perm)		1845	1583		1831	1583	1214	3370		536	3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	76	324	37	95	175	188	39	260	122	239	158	51	
RTOR Reduction (vph)	0	0	10	0	0	130	0	51	0	0	0	24	
Lane Group Flow (vph)	0	400	27	0	270	58	39	331	0	239	158	27	
Turn Type	Split		pm+ov	Split		pm+ov	pm+pt			pm+pt		pm+ov	
Protected Phases	4	4	5	8	8	1	5	2		1	6	4	
Permitted Phases			4			8	2			6		6	
Actuated Green, G (s)		25.5	28.6		17.4	31.0	19.6	16.5		37.1	27.0	52.5	
Effective Green, g (s)		25.5	28.6		17.4	31.0	19.6	16.5		37.1	27.0	52.5	
Actuated g/C Ratio		0.25	0.28		0.17	0.31	0.19	0.16		0.37	0.27	0.52	
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		466	448		315	596	253	551		363	946	933	
v/s Ratio Prot		c0.22	0.00		c0.15	0.01	0.00	0.10		c0.09	0.04	0.01	
v/s Ratio Perm			0.02			0.02	0.03			c0.15		0.01	
v/c Ratio		0.86	0.06		0.86	0.10	0.15	0.60		0.66	0.17	0.03	
Uniform Delay, d1		36.0	26.4		40.6	25.0	33.5	39.2		24.1	28.4	11.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		14.5	0.1		19.9	0.1	0.3	1.8		4.3	0.1	0.0	
Delay (s)		50.5	26.5		60.5	25.1	33.8	41.0		28.4	28.5	11.8	
Level of Service		D	C		E	C	C	D		C	C	B	
Approach Delay (s)		48.5			46.0			40.4			26.5		
Approach LOS		D			D			D			C		
Intersection Summary													
HCM Average Control Delay			40.3									HCM Level of Service	D
HCM Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			101.0									Sum of lost time (s)	21.0
Intersection Capacity Utilization			78.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 300: Braddock Road & Gum Spring Road

LCPS (HS 7)
 2012 Total Future

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖	↗		↖	↗	↘	↕	↘	↘	↕	↗	
Volume (vph)	73	135	47	136	119	84	27	129	62	64	273	22	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1831	1583		1814	1583	1770	3367		1770	3539	1583	
Flt Permitted		0.98	1.00		0.97	1.00	0.57	1.00		0.58	1.00	1.00	
Satd. Flow (perm)		1831	1583		1814	1583	1063	3367		1085	3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	79	147	51	148	129	91	29	140	67	70	297	24	
RTOR Reduction (vph)	0	0	25	0	0	64	0	55	0	0	0	15	
Lane Group Flow (vph)	0	226	26	0	277	27	29	152	0	70	297	9	
Turn Type	Split		pm+ov	Split		pm+ov	pm+pt			pm+pt		pm+ov	
Protected Phases	4	4	5	8	8	1	5	2		1	6	4	
Permitted Phases			4			8	2			6		6	
Actuated Green, G (s)		15.7	20.1		18.0	23.2	16.2	11.8		17.8	12.6	28.3	
Effective Green, g (s)		15.7	20.1		18.0	23.2	16.2	11.8		17.8	12.6	28.3	
Actuated g/C Ratio		0.20	0.26		0.23	0.29	0.21	0.15		0.23	0.16	0.36	
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		365	404		415	607	258	505		291	567	710	
v/s Ratio Prot		c0.12	0.00		c0.15	0.00	0.01	0.05		c0.02	c0.08	0.00	
v/s Ratio Perm			0.01			0.01	0.02			0.04		0.00	
v/c Ratio		0.62	0.07		0.67	0.04	0.11	0.30		0.24	0.52	0.01	
Uniform Delay, d1		28.8	22.2		27.6	19.8	25.2	29.8		24.5	30.3	16.2	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		3.1	0.1		4.0	0.0	0.2	0.3		0.4	0.9	0.0	
Delay (s)		31.9	22.3		31.7	19.9	25.4	30.1		25.0	31.2	16.2	
Level of Service		C	C		C	B	C	C		C	C	B	
Approach Delay (s)		30.1			28.7			29.5			29.1		
Approach LOS		C			C			C			C		
Intersection Summary													
HCM Average Control Delay			29.3									HCM Level of Service	C
HCM Volume to Capacity ratio			0.51										
Actuated Cycle Length (s)			78.7									Sum of lost time (s)	21.0
Intersection Capacity Utilization			59.1%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
300: Braddock Road & Gum Spring Road

LCPS (HS 7)
2015 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↘	↖↗		↘	↖↗	↘
Volume (vph)	74	314	35	92	166	184	38	253	119	233	154	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Flt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1845	1583		1830	1583	1770	3370		1770	3539	1583
Flt Permitted		0.99	1.00		0.98	1.00	0.65	1.00		0.27	1.00	1.00
Satd. Flow (perm)		1845	1583		1830	1583	1204	3370		500	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	341	38	100	180	200	41	275	129	253	167	53
RTOR Reduction (vph)	0	0	10	0	0	139	0	51	0	0	0	25
Lane Group Flow (vph)	0	421	28	0	280	61	41	353	0	253	167	28
Turn Type	Split		pm+ov	Split		pm+ov	pm+pt			pm+pt		pm+ov
Protected Phases	4	4	5	8	8	1	5	2		1	6	4
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)		26.7	29.8		17.7	31.6	20.3	17.2		38.1	28.0	54.7
Effective Green, g (s)		26.7	29.8		17.7	31.6	20.3	17.2		38.1	28.0	54.7
Actuated g/C Ratio		0.26	0.29		0.17	0.31	0.20	0.17		0.37	0.27	0.53
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		476	456		313	590	253	560		355	957	944
v/s Ratio Prot		c0.23	0.00		c0.15	0.01	0.00	0.10		c0.10	0.05	0.01
v/s Ratio Perm			0.02			0.02	0.03			c0.17		0.01
v/c Ratio		0.88	0.06		0.89	0.10	0.16	0.63		0.71	0.17	0.03
Uniform Delay, d1		36.9	26.7		42.0	25.8	34.2	40.2		25.0	28.9	11.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		17.5	0.1		26.0	0.1	0.3	2.3		6.6	0.1	0.0
Delay (s)		54.4	26.8		68.0	25.9	34.5	42.5		31.6	29.0	11.7
Level of Service		D	C		E	C	C	D		C	C	B
Approach Delay (s)		52.1			50.4			41.8			28.5	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	43.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	103.5	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
300: Braddock Road & Gum Spring Road

LCPS (HS 7)
2015 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖	↗		↖	↗	↖	↕		↖	↕	↗	
Volume (vph)	77	140	49	144	125	89	29	137	65	68	289	23	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00	
Flt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1830	1583		1814	1583	1770	3368		1770	3539	1583	
Flt Permitted		0.98	1.00		0.97	1.00	0.56	1.00		0.58	1.00	1.00	
Satd. Flow (perm)		1830	1583		1814	1583	1045	3368		1083	3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	84	152	53	157	136	97	32	149	71	74	314	25	
RTOR Reduction (vph)	0	0	25	0	0	68	0	54	0	0	0	16	
Lane Group Flow (vph)	0	236	28	0	293	29	32	166	0	74	314	9	
Turn Type	Split		pm+ov	Split		pm+ov	pm+pt			pm+pt		pm+ov	
Protected Phases	4	4	5	8	8	1	5	2		1	6	4	
Permitted Phases			4			8	2			6		6	
Actuated Green, G (s)		16.3	20.8		19.1	24.3	16.8	12.3		18.2	13.0	29.3	
Effective Green, g (s)		16.3	20.8		19.1	24.3	16.8	12.3		18.2	13.0	29.3	
Actuated g/C Ratio		0.20	0.26		0.24	0.30	0.21	0.15		0.22	0.16	0.36	
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	7.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		369	407		428	612	257	512		288	569	710	
v/s Ratio Prot		c0.13	0.00		c0.16	0.00	0.01	0.05		c0.02	c0.09	0.00	
v/s Ratio Perm			0.01			0.02	0.02			0.04		0.00	
v/c Ratio		0.64	0.07		0.68	0.05	0.12	0.32		0.26	0.55	0.01	
Uniform Delay, d1		29.6	22.7		28.2	20.1	25.9	30.6		25.4	31.3	16.5	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		3.6	0.1		4.5	0.0	0.2	0.4		0.5	1.2	0.0	
Delay (s)		33.2	22.8		32.6	20.1	26.1	31.0		25.8	32.4	16.5	
Level of Service		C	C		C	C	C	C		C	C	B	
Approach Delay (s)		31.3			29.5			30.3			30.3		
Approach LOS		C			C			C			C		
Intersection Summary													
HCM Average Control Delay			30.3									HCM Level of Service	C
HCM Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			80.9									Sum of lost time (s)	21.0
Intersection Capacity Utilization			60.8%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												



APPENDIX B (Response to Comment #11)

TALL CEDARS PARKWAY AND STONE SPRINGS BOULEVARD: EXISTING TRAFFIC VOLUMES COUNT SHEETS AND INTERSECTION CAPACITY ANALYSIS

Gorson/Slade Associates
 Project Name : HS-7
 Project # : 2110-013
 Location : Loudoun County, VA
 Data Source : Gorson/Slade Associates

Intersection
 Tail Cedars Parkway at Stone Springs Boulevard

Direction: Southbound
Approach: Stone Springs Blvd.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Northbound
Approach: Stone Springs Blvd.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Southbound
Approach: Tail Cedars Pky.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Northbound
Approach: Tail Cedars Pky.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Southbound
Approach: Stone Springs Blvd.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Northbound
Approach: Stone Springs Blvd.
Movement: Right, Thru, Left, Peds

Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0	23	3	0

Direction: Southbound
Approach: Tail Cedars Pky.
Movement: Right, Thru, Left, Peds

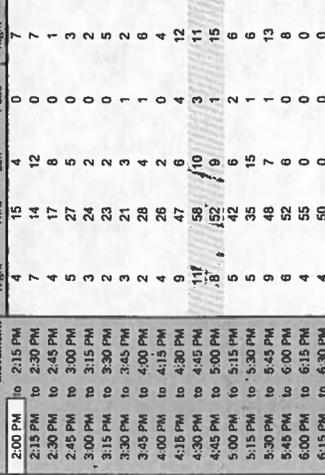
Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:00 AM	1	3	1	0	2	0	0	22	1	0	4	5
6:15 AM	1	5	0	2	7	2	0	23	0	0	1	0
6:30 AM	0	8	2	1	9	4	0	2	27	1	0	0
6:45 AM	2	22	0	0	12	6	0	1	37	2	0	0
7:00 AM	9	9	4	3	8	9	0	1	38	2	0	0
7:15 AM	15	21	6	4	8	22	6	2	0	28	13	0
7:30 AM	28	24	1	3	8	36	2	3	1	56	64	1
7:45 AM	25	32	4	2	11	37	1	0	0	47	55	0
8:00 AM	2	35	5	0	9	3	4	0	0	43	1	0
8:15 AM	0	36	2	1	4	0	3	2	48	1	0	4
8:30 AM	1	13	1	0	5	3	2	5	51	2	0	2
8:45 AM	0	19	4	0	2	1	0	1	0	28	0	1
9:00 AM	2	11	4	0	6	2	4	1	1	26	2	0
9:15 AM	1	18	3	0	5	5	1	0	0			

Goroux/Slade Associates
 Project Name : HS-7
 Project # : 2110-013
 Location : Loudoun County, VA
 Date Source : Goroux/Slade Associates

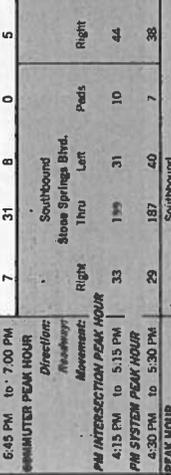
Intersection: Tail Cedars Parkway at Stone Springs Boulevard

Weather Conditions: Thursday, November 19, 2009
 Light Rain

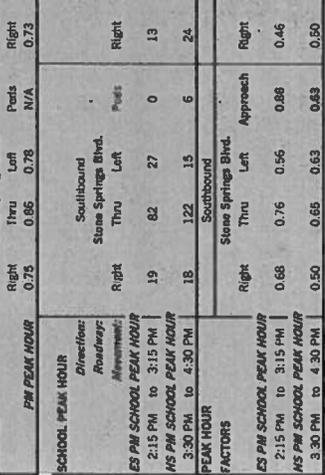
PM SYSTEM PEAK VOLUMES



ES PM INTERSECTION PEAK VOLUMES



HS PM SYSTEM PEAK VOLUMES



Direction / Movement	Southbound Stone Springs Blvd.			Westbound Tail Cedars Pky.			Northbound Stone Springs Blvd.			Eastbound Tail Cedars Pky.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2:00 PM to 2:15 PM	4	15	4	0	7	5	0	13	3	0	3	7
2:15 PM to 2:30 PM	7	14	12	0	7	12	0	13	9	0	1	2
2:30 PM to 2:45 PM	4	17	8	0	1	10	1	18	7	0	13	8
2:45 PM to 3:00 PM	5	27	5	0	3	2	2	15	5	0	13	16
3:00 PM to 3:15 PM	3	24	2	0	2	1	2	4	21	0	2	3
3:15 PM to 3:30 PM	2	23	2	0	5	6	3	0	11	4	0	2
3:30 PM to 3:45 PM	3	21	3	1	2	10	1	4	5	0	2	4
3:45 PM to 4:00 PM	2	28	4	1	6	8	2	0	3	39	2	0
4:00 PM to 4:15 PM	4	26	2	0	4	9	3	0	41	3	0	3
4:15 PM to 4:30 PM	9	47	6	4	12	6	4	1	4	48	2	0
4:30 PM to 4:45 PM	11	58	10	3	11	5	3	0	2	49	0	1
4:45 PM to 5:00 PM	8	52	9	1	15	7	5	2	1	44	1	0
5:00 PM to 5:15 PM	5	42	6	2	6	3	4	0	0	27	3	0
5:15 PM to 5:30 PM	5	35	15	1	6	4	4	0	3	2	1	4
5:30 PM to 5:45 PM	9	48	7	1	13	8	6	0	3	21	0	2
5:45 PM to 6:00 PM	6	52	6	0	8	6	9	1	5	38	4	0
6:00 PM to 6:15 PM	4	55	0	0	0	0	0	0	0	0	0	0
6:15 PM to 6:30 PM	4	50	0	0	0	0	0	0	0	0	0	0
6:30 PM to 6:45 PM	5	53	8	2	9	4	1	2	0	16	1	0
6:45 PM to 7:00 PM	7	31	8	0	5	7	2	0	0	21	5	0

COMMUTER PEAK HOUR

Direction / Movement	Southbound Stone Springs Blvd.			Westbound Tail Cedars Pky.			Northbound Stone Springs Blvd.			Eastbound Tail Cedars Pky.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
4:15 PM to 5:15 PM	33	199	31	10	44	21	16	3	7	171	6	0
4:30 PM to 5:30 PM	29	187	40	7	38	19	16	5	3	152	1	0

PM INTERSECTION PEAK HOUR

PM SYSTEM PEAK HOUR

PEAK HOUR FACTORS

Direction / Movement	Southbound Stone Springs Blvd.			Westbound Tail Cedars Pky.			Northbound Stone Springs Blvd.			Eastbound Tail Cedars Pky.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
PM PEAK HOUR	0.75	0.85	0.78	N/A	0.73	0.75	0.80	N/A	0.44	0.87	0.50	N/A

SCHOOL PEAK HOUR

Direction / Movement	Southbound Stone Springs Blvd.			Westbound Tail Cedars Pky.			Northbound Stone Springs Blvd.			Eastbound Tail Cedars Pky.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2:15 PM to 3:15 PM	19	82	27	0	13	25	5	0	7	65	21	0
3:30 PM to 4:30 PM	18	122	15	6	24	33	10	1	11	176	12	0

ES PM SCHOOL PEAK HOUR

ES PM SCHOOL PEAK HOUR

ES PM SCHOOL PEAK HOUR

Direction / Movement	Southbound Stone Springs Blvd.			Westbound Tail Cedars Pky.			Northbound Stone Springs Blvd.			Eastbound Tail Cedars Pky.		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2:15 PM to 3:15 PM	0.68	0.76	0.56	0.88	0.46	0.57	0.63	0.57	0.44	0.77	0.53	0.93
3:30 PM to 4:30 PM	0.50	0.65	0.63	0.63	0.50	0.83	0.63	0.76	0.69	0.88	0.60	0.84

HCM Unsignalized Intersection Capacity Analysis
 2: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2009 Existing Mitigated



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	22	11	6	10	7	20	4	170	7	12	103	3
Peak Hour Factor	0.65	0.65	0.65	0.58	0.58	0.58	0.78	0.78	0.78	0.70	0.70	0.70
Hourly flow rate (vph)	34	17	9	17	12	34	5	218	9	17	147	4
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	42	18	23	41	114	118	91	78				
Volume Left (vph)	34	0	17	0	5	0	17	0				
Volume Right (vph)	0	9	0	34	0	9	0	4				
Hadj (s)	0.43	-0.33	0.40	-0.56	0.06	-0.02	0.13	0.00				
Departure Headway (s)	5.9	5.2	5.9	4.9	5.0	5.0	5.2	5.0				
Degree Utilization, x	0.07	0.03	0.04	0.06	0.16	0.16	0.13	0.11				
Capacity (veh/h)	566	648	569	677	692	702	670	690				
Control Delay (s)	8.2	7.1	7.9	7.0	7.8	7.7	7.7	7.4				
Approach Delay (s)	7.9		7.4		7.8		7.6					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			7.7									
HCM Level of Service			A									
Intersection Capacity Utilization			26.3%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2009 Existing Mitigated



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	21	16	8	10	33	24	12	176	11	15	122	18
Peak Hour Factor	0.75	0.75	0.75	0.76	0.76	0.76	0.84	0.84	0.84	0.63	0.63	0.63
Hourly flow rate (vph)	28	21	11	13	43	32	14	210	13	24	194	29
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	39	21	35	53	119	118	121	125				
Volume Left (vph)	28	0	13	0	14	0	24	0				
Volume Right (vph)	0	11	0	32	0	13	0	29				
Hadj (s)	0.40	-0.32	0.22	-0.38	0.09	-0.04	0.13	-0.13				
Departure Headway (s)	6.1	5.4	5.9	5.3	5.2	5.1	5.3	5.0				
Degree Utilization, x	0.07	0.03	0.06	0.08	0.17	0.17	0.18	0.17				
Capacity (veh/h)	546	615	565	628	664	681	658	693				
Control Delay (s)	8.4	7.4	8.1	7.6	8.1	7.9	8.2	7.9				
Approach Delay (s)	8.0		7.8		8.0		8.0					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			8.0									
HCM Level of Service			A									
Intersection Capacity Utilization			27.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 13: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2012 Total Future

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	44	56	33	11	80	21	61	180	7	13	109	49	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	48	61	36	12	87	23	66	196	8	14	118	53	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2					
Volume Total (vph)	78	66	55	66	164	105	73	113					
Volume Left (vph)	48	0	12	0	66	0	14	0					
Volume Right (vph)	0	36	0	23	0	8	0	53					
Hadj (s)	0.34	-0.34	0.14	-0.21	0.24	-0.02	0.13	-0.30					
Departure Headway (s)	6.1	5.4	6.0	5.6	5.7	5.4	5.7	5.2					
Degree Utilization, x	0.13	0.10	0.09	0.10	0.26	0.16	0.12	0.16					
Capacity (veh/h)	550	617	563	598	611	635	603	653					
Control Delay (s)	8.9	7.8	8.4	8.1	9.4	8.2	8.2	8.0					
Approach Delay (s)	8.4		8.2		9.0		8.1						
Approach LOS	A		A		A		A						
Intersection Summary													
Delay			8.5										
HCM Level of Service			A										
Intersection Capacity Utilization			31.0%		ICU Level of Service				A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis
 13: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2012 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	53	65	46	11	53	25	32	187	12	16	129	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	71	50	12	58	27	35	203	13	17	140	37
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	93	85	41	56	136	115	88	107				
Volume Left (vph)	58	0	12	0	35	0	17	0				
Volume Right (vph)	0	50	0	27	0	13	0	37				
Hadj (s)	0.34	-0.38	0.18	-0.31	0.16	-0.05	0.13	-0.21				
Departure Headway (s)	6.1	5.4	6.0	5.5	5.6	5.4	5.7	5.3				
Degree Utilization, x	0.16	0.13	0.07	0.09	0.21	0.17	0.14	0.16				
Capacity (veh/h)	557	630	557	605	614	635	604	643				
Control Delay (s)	9.0	7.9	8.3	7.8	8.9	8.3	8.4	8.1				
Approach Delay (s)	8.5		8.0		8.7		8.2					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			8.4									
HCM Level of Service			A									
Intersection Capacity Utilization			31.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 17: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2015 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	106	80	68	10	164	39	165	190	2	17	97	95
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	115	87	74	11	178	42	179	207	2	18	105	103
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	159	117	100	132	283	105	71	156				
Volume Left (vph)	115	0	11	0	179	0	18	0				
Volume Right (vph)	0	74	0	42	0	2	0	103				
Hadj (s)	0.40	-0.41	0.09	-0.19	0.35	0.02	0.16	-0.43				
Departure Headway (s)	7.0	6.2	6.8	6.5	6.7	6.3	6.8	6.2				
Degree Utilization, x	0.31	0.20	0.19	0.24	0.52	0.19	0.13	0.27				
Capacity (veh/h)	484	544	496	518	513	540	499	548				
Control Delay (s)	11.9	9.6	10.2	10.3	15.6	9.6	9.6	10.2				
Approach Delay (s)	10.9		10.2		13.9		10.0					
Approach LOS	B		B		B		B					
Intersection Summary												
Delay		11.6										
HCM Level of Service		B										
Intersection Capacity Utilization		43.2%		ICU Level of Service	A							
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 17: Tall Cedars Pkwy & Stone Springs Blvd.

LCPS (HS 7)
 2015 Total Future



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	57	62	45	6	52	15	30	73	8	30	92	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	67	49	7	57	16	33	79	9	33	100	28
Direction Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	96	83	35	45	72	48	83	78				
Volume Left (vph)	62	0	7	0	33	0	33	0				
Volume Right (vph)	0	49	0	16	0	9	0	28				
Hadj (s)	0.36	-0.38	0.13	-0.22	0.26	-0.09	0.23	-0.22				
Departure Headway (s)	5.7	4.9	5.5	5.2	5.6	5.2	5.5	5.1				
Degree Utilization, x	0.15	0.11	0.05	0.06	0.11	0.07	0.13	0.11				
Capacity (veh/h)	604	695	613	655	615	653	621	676				
Control Delay (s)	8.5	7.3	7.6	7.3	8.1	7.4	8.1	7.5				
Approach Delay (s)	7.9		7.5		7.8		7.8					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			7.8									
HCM Level of Service			A									
Intersection Capacity Utilization			24.8%		ICU Level of Service				A			
Analysis Period (min)			15									