

schneider, marchant

From: Tushar Awar [tushar.awar@goroveslade.com]
Sent: Thursday, August 12, 2010 12:55 PM
To: phillips, george; Mosurak, Lou
Cc: Christopher M. Tacinelli; Sara Howard-O'Brien; schneider, marchant
Subject: Supplemental Analysis - HS-7
Attachments: Supplemental Analysis - 08 12 10.pdf

George and Lou,

As requested, the attached memo includes the supplemental analysis for the intersection of Stone Springs Blvd. and Tall Cedars Parkway. We will also mail hard copies for your file. Thanks.

-Tushar

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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: August 12, 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. A supplemental analysis memorandum dated July 22, 2010 was prepared and submitted in order to address Comments # 6 and # 11 from the OTS referral. A follow up meeting was held with OTS staff on August 10, 2010 to discuss the supplemental analysis.

At the meeting held with OTS staff on August 10, 2010, additional analysis was requested for the intersection of Stone Springs Boulevard and Tall Cedars Parkway (related to comment # 11) during the 'Commuter' peak hours. The school generated traffic during the morning peak hour overlaps with the commuter peak hour. However, in the PM, the school peak hours fall outside the commuter peak hours.

Per OTS staff's request capacity analysis was conducted for both the AM and PM commuter peak hours at the intersection of Stone Springs Boulevard and Tall Cedars Parkway. The background traffic generation and distribution was maintained consistent with the June 9, 2010 traffic impact study. The information presented in the traffic study was utilized for this analysis as well. The results are summarized in Tables 1A and 1B on the next page.

Table 1A: Intersection Capacity Analysis Results – Future Conditions with Development (2015) – AMPH

Intersection (Approach/Movement)	ES AM Peak Hour (7:00 AM - 8:00 AM)		HS AM Peak Hour (8:00 AM - 9:00 AM)		AM Commuter Peak Hour* (7:30 AM - 8:30 AM)	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Stone Springs Blvd. / Tall Cedars Pkwy. Overall (Unsignalized – All Way Stop Control)	B	11.6	A	8.8	B	14.3
Eastbound Approach	B	10.9	A	8.7	B	12.9
Westbound Approach	B	10.2	A	8.5	B	11.4
Northbound Approach	B	13.9	A	9.3	C	18.5
Southbound Approach	B	10.0	A	8.4	B	11.7

Table 1B: Intersection Capacity Analysis Results – Future Conditions with Development (2015) – PMPH

Intersection (Approach/Movement)	ES PM Peak Hour (2:15 PM - 3:15 PM)		HS PM Peak Hour (3:30 PM - 4:30 PM)		PM Commuter Peak Hour* (4:30 PM - 5:30 PM)	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Stone Springs Blvd. / Tall Cedars Pkwy. Overall (Unsignalized – All Way Stop Control)	A	7.8	A	8.7	A	8.6
Eastbound Approach	A	7.9	A	8.8	A	8.5
Westbound Approach	A	7.5	A	8.3	A	8.3
Northbound Approach	A	7.8	A	9.0	A	8.5
Southbound Approach	A	7.8	A	8.5	A	8.9

**Note: HS and ES Traffic Reduced from School Peak Hours*

CONCLUSIONS

- Per OTS staff's request, the intersection of Stone Springs Boulevard and Tall Cedars Parkway was analyzed under future conditions with development (2015) scenarios. The analysis was conducted for all relevant School and Commuter peak hours. The analysis reveals that the study intersection will operate at acceptable level of service under all peak hour scenarios.
- The school traffic % at the intersection of Stone Springs Boulevard and Tall Cedars Parkway during the commuter peak hours is:
 - 13% during the AM commuter peak hour, and
 - 11% during the PM commuter peak hour
- In addition, the proffer conditions for the Stone Ridge Commercial development reveal that a traffic signal is proffered at this intersection when warranted.

APPENDIX

APPENDIX A

Capacity Analysis Results: Total Future 2015 with Development-Elementary School Peak

HCM Unsignalized Intersection Capacity Analysis
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		TT			TT			TT			TT	
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
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015



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

APPENDIX B

Capacity Analysis Results: Total Future 2015 with Development-High School Peak

HCM Unsignalized Intersection Capacity Analysis
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015



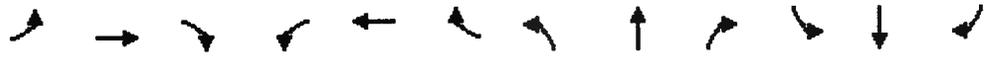
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	44	78	33	11	98	23	62	191	8	14	116	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	85	36	12	107	25	67	208	9	15	126	48

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	90	78	65	78	171	113	78	111
Volume Left (vph)	48	0	12	0	67	0	15	0
Volume Right (vph)	0	36	0	25	0	9	0	48
Hadj (s)	0.30	-0.29	0.13	-0.19	0.23	-0.02	0.13	-0.27
Departure Headway (s)	6.2	5.6	6.1	5.8	5.8	5.6	5.8	5.4
Degree Utilization, x	0.16	0.12	0.11	0.13	0.28	0.17	0.13	0.17
Capacity (veh/h)	545	601	555	586	594	617	584	628
Control Delay (s)	9.1	8.2	8.6	8.4	9.8	8.5	8.5	8.3
Approach Delay (s)	8.7		8.5		9.3		8.4	
Approach LOS	A		A		A		A	

Intersection Summary	
Delay	8.8
HCM Level of Service	A
Intersection Capacity Utilization	33.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	79	47	11	75	27	33	198	12	17	137	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)	57	86	51	12	82	29	36	215	13	18	149	37

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	99	94	53	70	143	121	93	111
Volume Left (vph)	57	0	12	0	36	0	18	0
Volume Right (vph)	0	51	0	29	0	13	0	37
Hadj (s)	0.32	-0.35	0.15	-0.26	0.16	-0.04	0.13	-0.20
Departure Headway (s)	6.2	5.5	6.1	5.7	5.8	5.6	5.8	5.5
Degree Utilization, x	0.17	0.14	0.09	0.11	0.23	0.19	0.15	0.17
Capacity (veh/h)	548	613	551	590	598	617	586	623
Control Delay (s)	9.2	8.2	8.5	8.2	9.3	8.6	8.6	8.4
Approach Delay (s)	8.8		8.3		9.0		8.5	
Approach LOS	A		A		A		A	

Intersection Summary	
Delay	8.7
HCM Level of Service	A
Intersection Capacity Utilization	34.0%
ICU Level of Service	A
Analysis Period (min)	15

APPENDIX C

Capacity Analysis Results: Total Future 2015 with Development-Commuter Peak

HCM Unsignalized Intersection Capacity Analysis
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	126	102	92	11	179	36	193	218	3	14	143	106
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)	137	111	100	12	195	39	210	237	3	15	155	115
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	192	155	109	136	328	122	93	193				
Volume Left (vph)	137	0	12	0	210	0	15	0				
Volume Right (vph)	0	100	0	39	0	3	0	115				
Hadj (s)	0.39	-0.42	0.09	-0.17	0.35	0.02	0.12	-0.38				
Departure Headway (s)	7.5	6.7	7.4	7.1	7.2	6.8	7.2	6.7				
Degree Utilization, x	0.40	0.29	0.22	0.27	0.65	0.23	0.19	0.36				
Capacity (veh/h)	458	510	458	475	486	507	471	509				
Control Delay (s)	14.2	11.2	11.3	11.5	21.4	10.6	10.7	12.3				
Approach Delay (s)	12.9		11.4		18.5		11.7					
Approach LOS	B		B		C		B					
Intersection Summary												
Delay			14.3									
HCM Level of Service			B									
Intersection Capacity Utilization			48.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 3: Tall Cedars Parkway & Stone Springs Blvd.

Dulles South HS-7 and ES
 Total Future 2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	32	53	21	18	52	44	18	171	3	45	211	43
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)	35	58	23	20	57	48	20	186	3	49	229	47
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	64	52	48	76	113	96	164	161				
Volume Left (vph)	35	0	20	0	20	0	49	0				
Volume Right (vph)	0	23	0	48	0	3	0	47				
Hadj (s)	0.31	-0.28	0.24	-0.41	0.12	0.01	0.18	-0.17				
Departure Headway (s)	6.3	5.7	6.2	5.5	5.6	5.5	5.6	5.2				
Degree Utilization, x	0.11	0.08	0.08	0.12	0.18	0.15	0.25	0.23				
Capacity (veh/h)	535	586	540	601	610	621	618	661				
Control Delay (s)	8.8	8.0	8.5	8.1	8.6	8.3	9.3	8.6				
Approach Delay (s)	8.5		8.3		8.5		8.9					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			8.6									
HCM Level of Service			A									
Intersection Capacity Utilization			32.3%		ICU Level of Service				A			
Analysis Period (min)			15									