REPORT

11404 Taylorsville Road Apartments Louisville, KY

Traffic Impact Study

Louisville Metro Planning

May 9, 2016

Revised July 11, 2016

Revised October 18, 2016

CDM Smith

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Introduction

The proposed apartment development in Louisville, KY is located on Taylorsville Road west of Bolling Brook Drive. The revised plan shows an apartment community will have 347 units. **Figure 1** displays a map of the site. Access to the tract will be from an entrance on Taylorsville Road and a secondary access from the adjacent Sojourn Community Church campus. The purpose of this study is to examine the traffic impacts of the proposed development upon the adjacent highway system. For this study the impact area was defined to be the intersection of Taylorsville Road at the apartment community and at Blankenbaker Parkway.

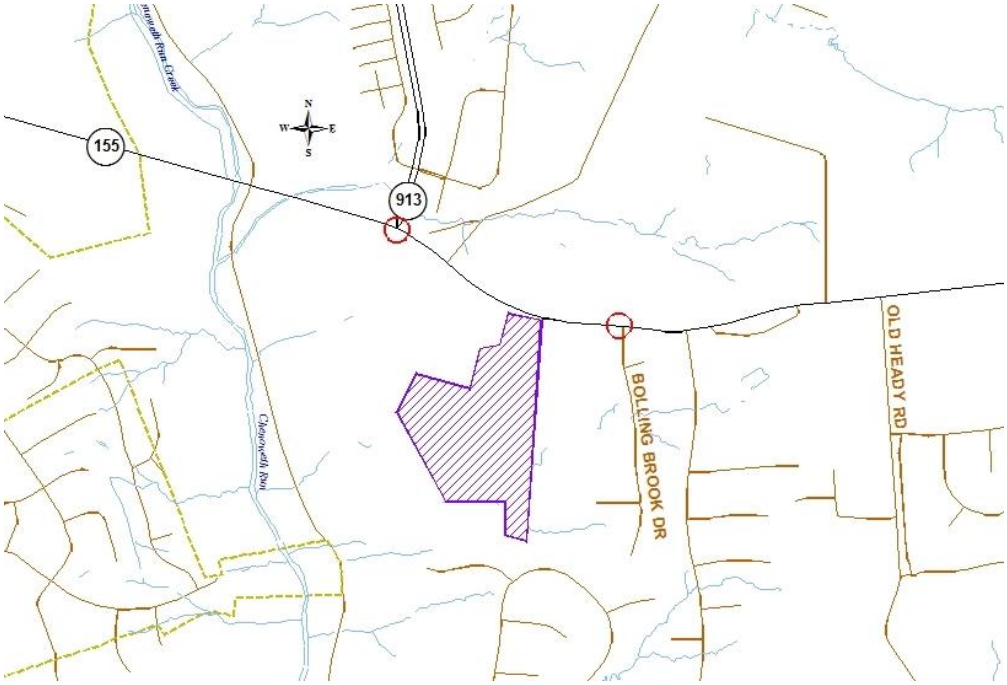


Figure 1
Site Location

Existing Conditions

Taylorsville Road is maintained by the Kentucky Transportation Cabinet with an estimated 2015 ADT of 18,500 vehicles per day east of Bolling Brook Drive, as provided by a Metro Public Works count. The road is a two lane road with eleven-foot lanes with four foot shoulders. The posted speed limit is 55 mph. There are no sidewalks.

A.m. and p.m. peak hour traffic counts were obtained at the intersection on April 26, 2016 (see Appendix A). The a.m. peak hour occurred between 7:15 and 8:15 and the p.m. peak hour occurred between 4:45 and 5:45 p.m. **Figure 2** illustrates the existing peak hour traffic volumes.

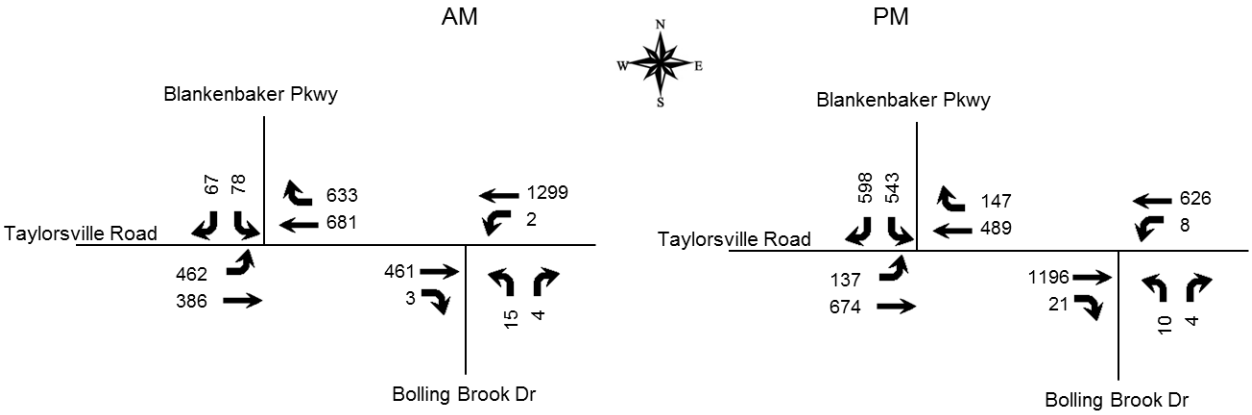


Figure 2
2016 Peak Hour Counts

Future Conditions

The projected completion year for this development is 2020, so the analysis year for this study is 2020. To predict traffic conditions in 2020, two percent annual growth in traffic was added. This growth is based upon a review of the count data along Taylorsville Road. **Figure 3** displays the 2020 No Build volumes.

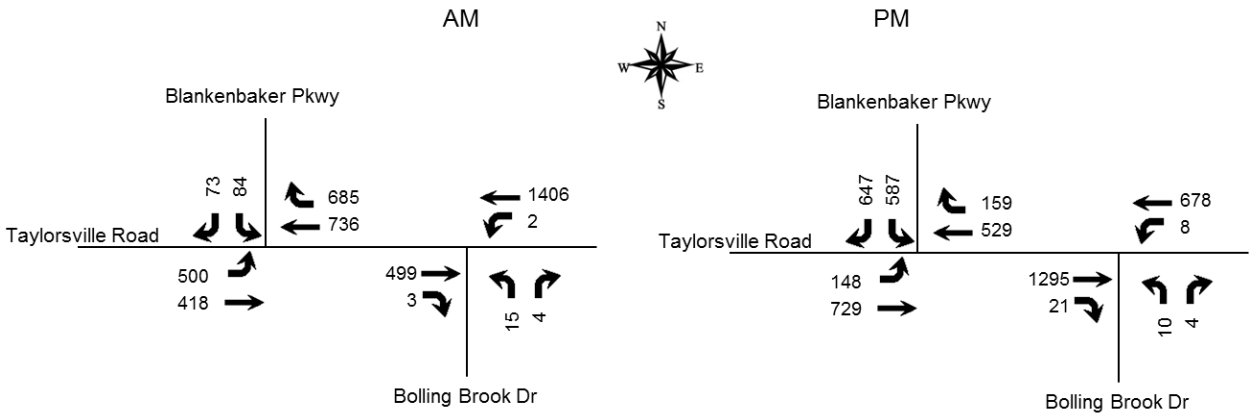


Figure 3
2020 No Build Peak Hour Volumes

Trip Generation

The Institute of Transportation Engineers Trip Generation Manual, 9th Edition contains trip generation rates for a wide range of developments. The land uses of "Apartments (220) best describes this development. The trip generation results are listed in **Table 1**. The results of the trip generation analysis are that this development will generate 174 a.m. peak hour trips and 209 p.m. peak hour trips. The trips were assigned to the highway network with 70 percent to/from the west and 30 percent to/from the east. This is based upon the existing traffic pattern on Taylorsville Road. The trips were divided between the two entrances with 60 percent using the

main entrance. **Figure 4** shows the trips generated by this development and distributed throughout the road network for the year 2020during the peak hours. **Figure 5** displays the individual turning movements for the year 2020 for the peak hours when the development is completed.

Table 1 – Trip Generation

	AM Peak Hour			PM Peak Hour		
	Total	Enter	Exit	Total	Enter	Exit
Apartments (424 units)	174	35	139	209	136	73

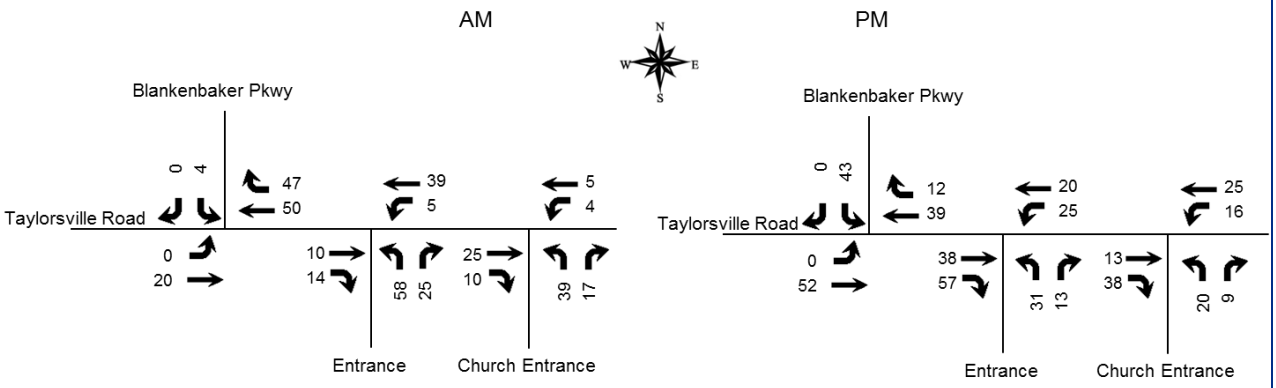


Figure 4
Trip Distribution for Site

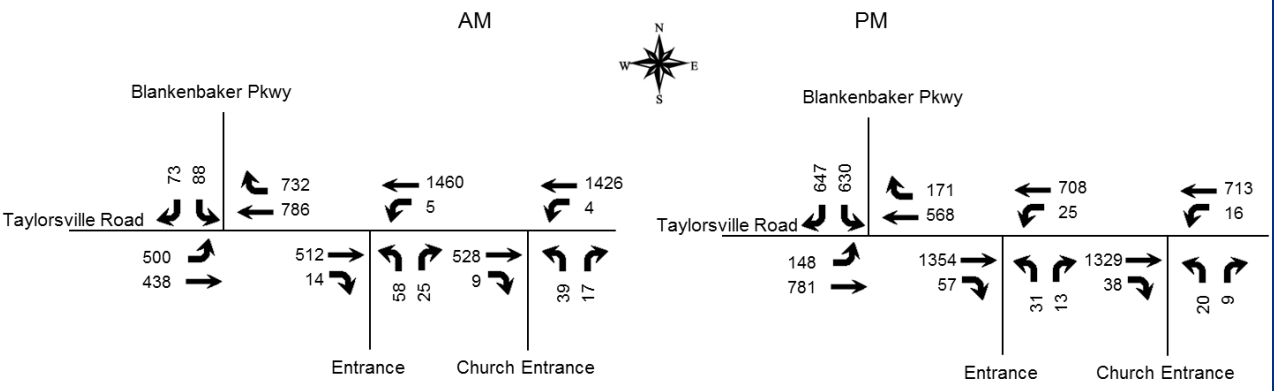


Figure 5
2020 Build Peak Hour Volumes

Analysis

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service" or LOS. Level of Service is a ranking scale from A through F with each level representing a range. LOS results depend upon the type of facility that is analyzed. In

this case, the LOS is based upon the average vehicle delay each movement experiences at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersection were determined using procedures detailed in the Highway Capacity Manual, 2010 edition. Future delay and Level of Service were determined for the intersection using HCS 2010 TWSC and Streets software (version 6.80). **Table 2** shows the results of the analysis for the three scenarios analyzed. The full printouts are included in Appendix B.

Table 2 - Level of Service Results

	AM Peak Hour			PM Peak Hour		
	2016 Existing	2020 No Build	2020 Build	2016 Existing	2020 No Build	2020 Build
Taylorsville Road at Blankenbaker Parkway	**B 17.6**	**C 26.2**	**C 31.4**	**C 31.5**	**D 44.0**	**D 49.7**
Taylorsville Road Eastbound	B 17.6	C 30.4	D 41.1	C 23.9	C 24.4	D 36.0
Taylorsville Road Westbound	B 16.0	C 22.1	C 24.2	C 25.0	C 25.1	C 28.7
Blankenbaker Parkway Southbound	C 32.1	D 39.3	D 42.8	D 40.5	E 68.6	E 71.8
Taylorsville Road at Entrance						
Taylorsville Road Westbound (left turn)			A 8.7			B 13.5
Entrance Northbound			E 42.1			D 34.7
Taylorsville Road at Church Entrance						
Taylorsville Road Westbound (left turn)			A 8.7			A 8.7
Entrance Northbound			E 35.5			D 34.0

Note: Level of Service, delay in seconds

The 2020 PM Build conditions are achieved with an increase in the southbound (Blankenbaker Parkway) phase from 40 to 55 seconds.

Using the Kentucky Transportation Cabinet Auxiliary Turn Lane Policy dated 7/20/2009 and the volumes in **Figure 5**, the volumes do meet the warrants for an eastbound right turn lane and a westbound left turn lane on Taylorsville Road.

Conclusions

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2020, there will be an impact to the existing highway network. At the main entrance to the apartment community an eastbound right turn lane and a westbound left turn lane will be constructed. The left turn lane will be extended to create a three lane section from Blankenbaker Parkway to Boiling Brook Drive. The exit will have a dedicated left and right turn lane.

Appendix A

Traffic Counts

04.26.16

Interval Start Time	*Bolling Brook Drive*			*Taylorsville Road*			*Taylorsville Road*		
	From South			From East			From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00	4		5	1	206			57	0
7:15	4		1	0	367			101	2
7:30	6		3	1	339			131	1
7:45	5		0	0	328			114	0
8:00	0		0	1	265			115	0
8:15	3		0	1	215			103	1
8:30	4		3	0	264			98	1
8:45	0		2	0	273			127	0
AM TOTALS	**26**		**14**	**4**	**2257**			**846**	**5**
16:00	1		2	1	122			172	2
16:15	0		3	1	123			227	4
16:30	3		0	5	128			266	2
16:45	3		1	2	134			313	4
17:00	0		3	0	154			310	2
17:15	2		0	3	149			275	6
17:30	5		0	3	189			298	9
17:45	2		0	0	125			304	4
PM TOTALS	**16**		**9**	**15**	**1124**			**2165**	**33**

Interval Start Time	*Bolling Brook Drive*			*Taylorsville Road*			*Taylorsville Road*		
	From South			From East			From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15	4		1	0	367			101	2
7:30	6		3	1	339			131	1
7:45	5		0	0	328			114	0
8:00	0		0	1	265			115	0
TOTAL	**15**	**0**	**4**	**2**	**1299**	**0**	**0**	**461**	**3**

16:45	3		1	2	134			313	4
17:00	0		3	0	154			310	2
17:15	2		0	3	149			275	6
17:30	5		0	3	189			298	9
TOTAL	**10**	**0**	**4**	**8**	**626**	**0**	**0**	**1196**	**21**

File Name: Taylorsville Rd & Blankenbaker Pkwy
Start Date: 2/25/2014

	Blankenbaker From North				Taylorsville Road From East				Taylorsville Road From West			
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other
7:00 AM	12	0	10	0	115	135	0	0	0	65	72	0
7:15 AM	16	0	17	0	104	144	0	0	0	85	91	0
7:30 AM	17	0	17	0	152	158	0	0	0	115	98	0
7:45 AM	13	0	15	0	151	142	0	0	0	83	136	0
8:00 AM	15	0	22	0	130	133	0	0	0	66	93	0
8:15 AM	15	0	17	0	102	134	0	0	0	61	83	0
8:30 AM	14	0	15	0	70	105	0	0	0	63	55	0
8:45 AM	29	0	20	0	60	127	0	0	0	73	49	0
4:00 PM	63	0	70	0	25	118	0	0	0	131	18	0
4:15 PM	60	0	74	0	18	129	0	0	0	132	27	0
4:30 PM	93	0	95	1	42	122	0	0	0	146	24	0
4:45 PM	89	0	103	0	24	94	0	0	0	143	24	0
5:00 PM	115	0	112	0	33	110	0	0	0	136	25	0
5:15 PM	150	0	95	0	40	107	0	0	0	113	34	0
5:30 PM	113	0	114	0	35	128	0	0	0	134	24	0
5:45 PM	71	0	93	1	31	111	0	0	0	132	29	0

	Blankenbaker From North				Taylorsville Road From East				Taylorsville Road From West			
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other
7:15 AM	16	0	17	0	104	144	0	0	0	85	91	0
7:30 AM	17	0	17	0	152	158	0	0	0	115	98	0
7:45 AM	13	0	15	0	151	142	0	0	0	83	136	0
8:00 AM	15	0	22	0	130	133	0	0	0	66	93	0
TOTAL	**61**	**0**	**71**	**0**	**537**	**577**	**0**	**0**	**0**	**349**	**418**	**0**

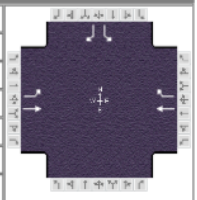
4:45 PM	89	0	103	0	24	94	0	0	0	143	24	0
5:00 PM	115	0	112	0	33	110	0	0	0	136	25	0
5:15 PM	150	0	95	0	40	107	0	0	0	113	34	0
5:30 PM	113	0	114	0	35	128	0	0	0	134	24	0
TOTAL	**467**	**0**	**424**	**0**	**132**	**439**	**0**	**0**	**0**	**526**	**107**	**0**

Appendix B

HCS Reports

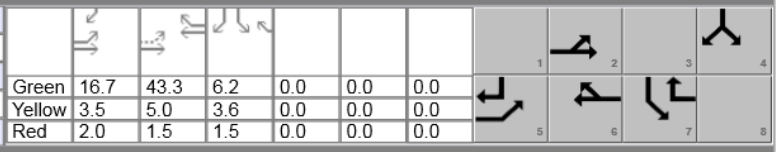
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 16.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	462	386			681	633				78		67

Signal Information			
Cycle, s	83.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	16.7	43.3	6.2	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	22.2	72.0		49.8				11.3
Change Period, (*Y+R c*), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.4		4.4				3.2
Queue Clearance Time (*g s*), s	15.1	7.4		29.9				6.0
Green Extension Time (*g e*), s	1.5	14.1		13.2				0.3
Phase Call Probability	1.00	1.00		1.00				0.98
Max Out Probability	0.12	0.01		0.11				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	513	429			757	703				87		74
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (*g s*), s	13.1	5.4			27.9	27.7				4.0		3.0
Cycle Queue Clearance Time (*g c*), s	13.1	5.4			27.9	27.7				4.0		3.0
Green Ratio (*g/C*)	0.75	0.79			0.52	0.59				0.07		0.28
Capacity (*c*), veh/h	569	1451			959	930				131		431
Volume-to-Capacity Ratio (*X*)	0.902	0.296			0.789	0.756				0.660		0.173
Available Capacity (*c s*), veh/h	740	2204			1653	1517				839		1061
Back of Queue (*Q*), veh/ln (95 th percentile)	11.1	2.0			16.1	13.2				3.2		1.9
Queue Storage Ratio (*RQ*) (95 th percentile)	0.54	0.05			0.64	0.56				0.22		0.13
Uniform Delay (*d 1*), s/veh	18.3	2.5			16.3	12.5				37.7		23.1
Incremental Delay (*d 2*), s/veh	11.9	0.1			1.6	1.4				2.1		0.1
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	30.2	2.6			18.0	13.9				39.8		23.1
Level of Service (LOS)	C	A			B	B				D		C
Approach Delay, s/veh / LOS	17.6		B	16.0		B	0.0			32.1		C
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.2	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.0	B	2.9	C				F

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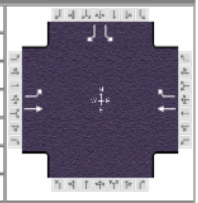
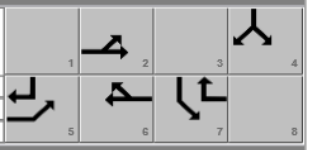
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 No Build	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 20 NB.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	500	418			736	685				84		73

Signal Information			
Cycle, s	104.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	24.5	55.5	7.7	0.0	0.0	0.0						
Yellow	3.5	5.0	3.6	0.0	0.0	0.0						
Red	2.0	1.5	1.5	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	30.0	92.1		62.0				12.8
Change Period, (*Y+R c*), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.4		4.4				3.2
Queue Clearance Time (*g s*), s	24.3	8.5		41.5				7.5
Green Extension Time (*g e*), s	0.2	16.9		14.0				0.3
Phase Call Probability	1.00	1.00		1.00				0.99
Max Out Probability	1.00	0.02		0.28				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	556	464			818	761				93		81
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (*g s*), s	22.3	6.5			39.3	39.5				5.5		4.0
Cycle Queue Clearance Time (*g c*), s	22.3	6.5			39.3	39.5				5.5		4.0
Green Ratio (*g/C*)	0.78	0.82			0.53	0.60				0.07		0.31
Capacity (*c*), veh/h	581	1505			977	943				130		481
Volume-to-Capacity Ratio (*X*)	0.956	0.309			0.837	0.807				0.719		0.169
Available Capacity (*c a*), veh/h	589	1757			1318	1232				669		961
Back of Queue (*Q*), veh/ln (95 th percentile)	24.5	2.6			23.3	19.4				4.4		2.6
Queue Storage Ratio (*RQ*) (95 th percentile)	1.19	0.07			0.92	0.83				0.30		0.18
Uniform Delay (*d 1*), s/veh	27.4	2.4			20.9	16.1				47.6		26.5
Incremental Delay (*d 2*), s/veh	26.3	0.1			3.8	3.2				2.8		0.1
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	53.7	2.5			24.7	19.3				50.3		26.6
Level of Service (LOS)	D	A			C	B				D		C
Approach Delay, s/veh / LOS	30.4	C		22.1	C		0.0			39.3	D	
Intersection Delay, s/veh / LOS	26.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	3.1	C				F

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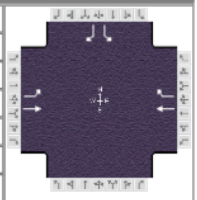
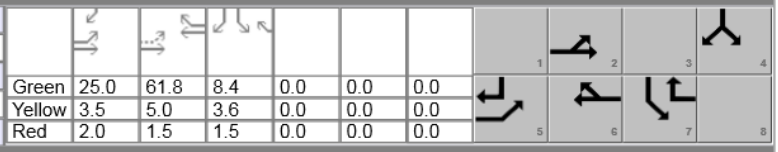
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	Oct 18, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 Build	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 20 B.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	500	438			786	732				88		73

Signal Information			
Cycle, s	112.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	25.0	61.8	8.4	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	30.5	98.8		68.3				13.5
Change Period, ($Y+R_c$), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.4		4.4				3.2
Queue Clearance Time (g_s), s	27.0	9.2		47.7				8.1
Green Extension Time (g_e), s	0.0	19.8		14.2				0.3
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	1.00	0.04		0.43				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	556	487			873	813				98		81
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g_s), s	25.0	7.2			45.4	45.7				6.1		4.3
Cycle Queue Clearance Time (g_c), s	25.0	7.2			45.4	45.7				6.1		4.3
Green Ratio (*g/C*)	0.79	0.82			0.55	0.63				0.08		0.30
Capacity (*c*), veh/h	546	1516			1015	978				132		465
Volume-to-Capacity Ratio (*X*)	1.017	0.321			0.860	0.832				0.741		0.174
Back of Queue (*Q*), ft/ln (95 th percentile)	740.1	77.3			691.2	558.4				128.1		72.8
Back of Queue (*Q*), veh/ln (95 th percentile)	28.9	3.0			27.0	22.3				5.0		2.9
Queue Storage Ratio (*RQ*) (95 th percentile)	1.41	0.08			1.06	0.95				0.34		0.20
Uniform Delay (d_1), s/veh	32.1	2.4			21.6	16.4				50.9		29.2
Incremental Delay (d_2), s/veh	42.9	0.1			5.6	4.7				3.1		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	74.9	2.6			27.2	21.1				53.9		29.3
Level of Service (LOS)	F	A			C	C				D		C
Approach Delay, s/veh / LOS	41.1		D	24.2		C	0.0			42.8		D
Intersection Delay, s/veh / LOS	31.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	3.3	C				F

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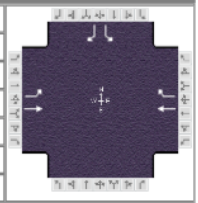
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2016	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 16.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	137	674			489	147				543		598

Signal Information					EB			WB			NB			SB		
Cycle, s	102.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	7.5	37.3	40.0	0.0	0.0	0.0						
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	5.0	3.6	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	1.5	1.5	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	13.0	56.9		43.8				45.1
Change Period, ($Y+R_c$), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.3		4.3				3.3
Queue Clearance Time (g_s), s	7.2	37.3		29.0				42.0
Green Extension Time (g_e), s	0.4	8.4		8.3				0.0
Phase Call Probability	0.99	1.00		1.00				1.00
Max Out Probability	0.00	0.00		0.02				1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	152	749			543	163				603		664
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g_s), s	5.2	35.3			27.0	2.9				32.4		40.0
Cycle Queue Clearance Time (g_c), s	5.2	35.3			27.0	2.9				32.4		40.0
Green Ratio (*g/C*)	0.46	0.49			0.37	0.76				0.39		0.47
Capacity (*c*), veh/h	287	911			675	1185				689		729
Volume-to-Capacity Ratio (*X*)	0.530	0.822			0.805	0.138				0.875		0.911
Available Capacity (c_a), veh/h	588	1809			1357	1763				689		729
Back of Queue (*Q*), veh/ln (95 th percentile)	3.9	21.0			17.6	1.3				21.6		23.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.19	0.52			0.69	0.05				1.47		1.62
Uniform Delay (d_1), s/veh	21.3	22.0			29.1	3.3				28.7		25.3
Incremental Delay (d_2), s/veh	1.5	2.1			2.5	0.1				11.7		15.4
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	22.8	24.1			31.6	3.4				40.4		40.6
Level of Service (LOS)	C	C			C	A				D		D
Approach Delay, s/veh / LOS	23.9	C		25.0	C		0.0			40.5	D	
Intersection Delay, s/veh / LOS	31.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.0	A	1.7	A				F

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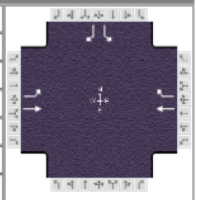
HCS 2010 Signalized Intersection Results Summary

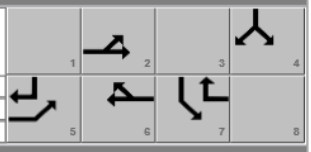
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 No Build	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 20 NB.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	148	729			529	159				587		647

Signal Information			
Cycle, s	107.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.1	42.0	40.0	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	13.6	62.1		48.5				45.1
Change Period, (*Y+R c*), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.3		4.3				3.3
Queue Clearance Time (*g s*), s	7.7	42.4		32.5				42.0
Green Extension Time (*g e*), s	0.5	9.7		9.5				0.0
Phase Call Probability	0.99	1.00		1.00				1.00
Max Out Probability	0.00	0.01		0.04				1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	164	810			588	177				652		719
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (*g s*), s	5.7	40.4			30.5	3.2				39.7		40.0
Cycle Queue Clearance Time (*g c*), s	5.7	40.4			30.5	3.2				39.7		40.0
Green Ratio (*g/C*)	0.49	0.52			0.39	0.76				0.37		0.45
Capacity (*c*), veh/h	288	956			722	1196				656		702
Volume-to-Capacity Ratio (*X*)	0.572	0.847			0.814	0.148				0.995		1.025
Available Capacity (*c a*), veh/h	565	1721			1291	1678				656		702
Back of Queue (*Q*), veh/ln (95 th percentile)	4.2	23.6			19.4	1.4				30.0		33.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.21	0.59			0.77	0.06				2.05		2.29
Uniform Delay (*d 1*), s/veh	21.8	22.1			29.1	3.3				33.5		29.5
Incremental Delay (*d 2*), s/veh	1.8	2.4			2.5	0.1				33.7		40.4
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	23.6	24.5			31.6	3.4				67.2		69.9
Level of Service (LOS)	C	C			C	A				E		F
Approach Delay, s/veh / LOS	24.4	C		25.1	C		0.0			68.6	E	
Intersection Delay, s/veh / LOS	44.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.1	B	1.7	A				F

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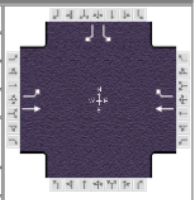
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	Oct 18, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 Build timing modified	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 20 B imp.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	148	781			568	171				630		647

Signal Information			
Cycle, s	138.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.3	60.5	55.0	0.0	0.0	0.0
Yellow	0.0	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	11.3	78.3		67.0				60.1
Change Period, (*Y+R c*), s	2.0	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.3		4.3				3.2
Queue Clearance Time (*g s*), s	8.9	61.2		42.5				57.0
Green Extension Time (*g e*), s	0.4	10.6		10.2				0.0
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.09		0.14				1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	164	868			631	190				700		719
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (*g s*), s	6.9	59.2			40.5	3.2				55.0		55.0
Cycle Queue Clearance Time (*g c*), s	6.9	59.2			40.5	3.2				55.0		55.0
Green Ratio (*g/C*)	0.52	0.52			0.44	0.83				0.40		0.46
Capacity (*c*), veh/h	283	957			806	1304				698		726
Volume-to-Capacity Ratio (*X*)	0.580	0.907			0.783	0.146				1.003		0.990
Back of Queue (*Q*), ft/ln (95 th percentile)	135.2	915.1			655.8	32.5				998.7		957.9
Back of Queue (*Q*), veh/ln (95 th percentile)	5.3	35.7			25.6	1.3				39.0		38.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.26	0.89			1.01	0.06				2.66		2.62
Uniform Delay (*d 1*), s/veh	25.9	30.3			33.3	2.2				41.7		36.7
Incremental Delay (*d 2*), s/veh	1.9	7.3			3.4	0.1				34.7		30.6
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	27.8	37.5			36.7	2.2				76.4		67.3
Level of Service (LOS)	C	D			D	A				F		E
Approach Delay, s/veh / LOS	36.0	D		28.7	C		0.0			71.8	E	
Intersection Delay, s/veh / LOS	49.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	1.8	A				F

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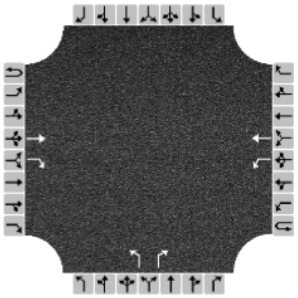
HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	10/18/16	East/West Street	Taylorsville Road
Analysis Year	2020	North/South Street	Entrance
Time Analyzed	AM Peak Build	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Taylorsville Road Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			512	14		5	1460			58		25				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						6				64		28				
Capacity						984				133		519				
v/c Ratio						0.01				0.48		0.05				
95% Queue Length						0.0				2.2		0.2				
Control Delay (s/veh)						8.7				55.1		12.3				
Level of Service (LOS)						A				F		B				
Approach Delay (s/veh)					0.0				42.1							
Approach LOS									E							

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Entrance AM 20 B.xtw
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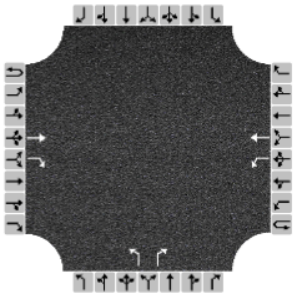
HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	10/18/16	East/West Street	Taylorsville Road
Analysis Year	2020	North/South Street	Entrance
Time Analyzed	PM Peak Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Taylorsville Road Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			1354	57		25	708			31		13				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						26				33		14				
Capacity						450				144		165				
v/c Ratio						0.06				0.23		0.08				
95% Queue Length						0.2				0.8		0.3				
Control Delay (s/veh)						13.5				37.2		28.8				
Level of Service (LOS)						B				E		D				
Approach Delay (s/veh)					0.5				34.7							
Approach LOS									D							

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Entrance PM 20 B.xtw

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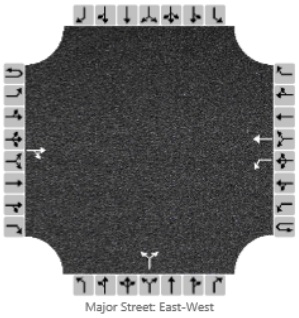
HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	DBZ	Intersection	Church Entrance
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	10/18/16	East/West Street	Taylorsville Road
Analysis Year	2020	North/South Street	Entrance
Time Analyzed	AM Peak Build	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Taylorsville Road Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	0	0		0	0	0
Configuration				TR		L	T				LR					
Volume (veh/h)			528	10		4	1426			39		17				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						4					62					
Capacity						973					179					
v/c Ratio						0.00					0.35					
95% Queue Length						0.0					1.5					
Control Delay (s/veh)						8.7					35.5					
Level of Service (LOS)						A					E					
Approach Delay (s/veh)					0.0				35.5							
Approach LOS									E							

HCS 2010™ TWSC Version 6.80
Church Entrance AM 20 B.xtw

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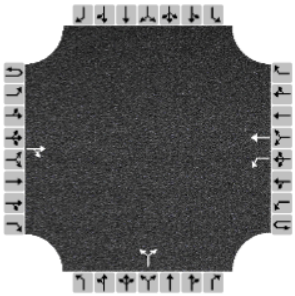
HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	DBZ	Intersection	Church Entrance
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	10/18/16	East/West Street	Taylorsville Road
Analysis Year	2020	North/South Street	Entrance
Time Analyzed	PM Peak Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Taylorsville Road Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	0	0		0	0	0
Configuration				TR		L	T				LR					
Volume (veh/h)			1329	38		16	713			20		9				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						17					30					
Capacity						468					154					
v/c Ratio						0.04					0.19					
95% Queue Length						0.1					0.7					
Control Delay (s/veh)						13.0					34.0					
Level of Service (LOS)						B					D					
Approach Delay (s/veh)					0.3				34.0							
Approach LOS									D							

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