

final report

January 26, 2015
Revised April 7, 2015

Traffic Impact Study

Ashton Park Phase II
Beulah Church Road
Louisville, KY

Prepared for

Metro Public Works

JACOBS

11940 US 42
Goshen, KY 40026
502-228-0393

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INTRODUCTION

The development plan for Ashton Park Phase II on Beulah Church Road shows 28 single family lots and 106 apartment units. **Figure 1** displays a map of the site. Access to the development will be from Beulah Church Road, Appleview Lane, and Appletree Way. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study the impact area was defined to be the Beulah Church Road intersection with Zelma Fields Avenue at the proposed entrance, Apple Valley Drive at Outerloop and Fegenbush Lane at Beulah Church Road..

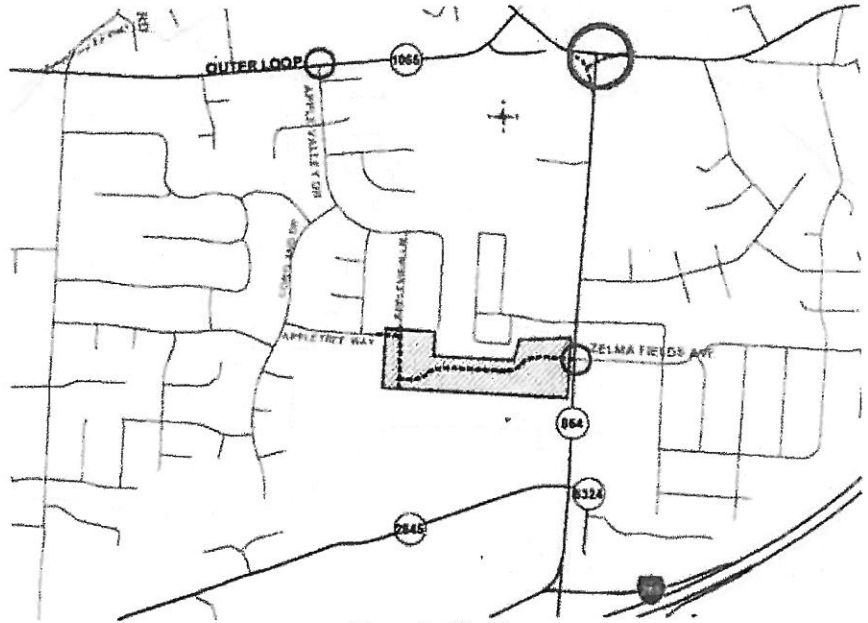


Figure 1. Site Map

EXISTING CONDITIONS

Beulah Church Road, KY 864, is a state maintained road with an estimated 2015 ADT of 15,000 vehicles per day between I 265 and the Outer Loop (KY 1065), as provided by the Kentucky Transportation Cabinet at station 296. The road is a three-lane highway with twelve-foot lanes, eight foot paved shoulders (provided by the Kentucky Transportation Cabinet). The speed limit is 45 mph. There is a sidewalk on the east side of Beulah Church Road. The intersection with Zelma Fields Road is controlled with a stop sign. There is a two-way left turn lane. TARC does not provide service along Beulah Church Road.

Jacobs Engineering Group collected a.m. and p.m. peak hour turning movement counts for the intersection of Beulah Church Road and Zelma Field Avenue, on January 13 and 14, 2015. The a.m. peak occurred between 7:00 and

**Ashton Park Phase II
Traffic Impact Study**

8:00 and the p.m. peak hour occurred between 4:30 and 5:30 p.m. For the Outerloop intersection with Apple Valley Drive a 5/28/09 count was used. The thru volumes on Outerloop were increased by two percent per year. Metro Public Works provided a count made on 5/5/10 for the intersection of Beulah Church Road and Fegenbush Lane. All volumes at the intersection were increased by two percent per year. Figure 2 illustrates the 2015 peak hour traffic volumes.

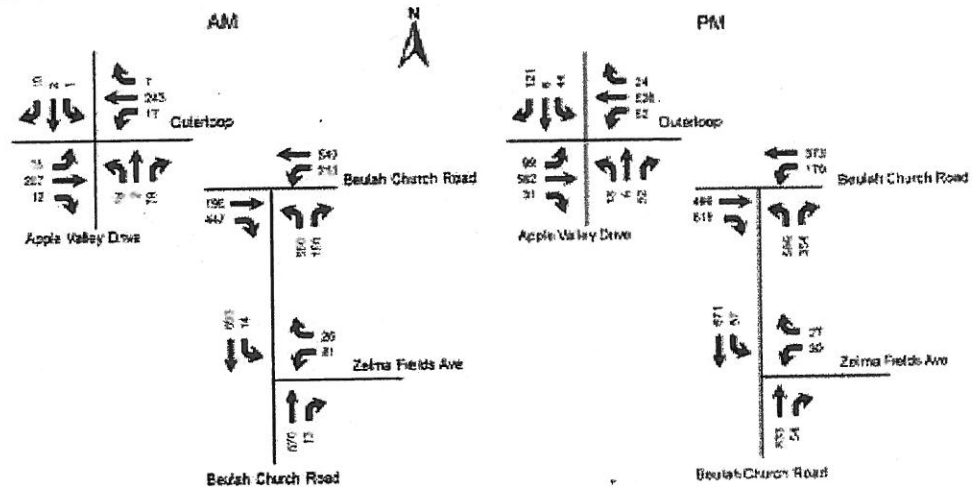


Figure 2. 2015 Peak Hour Volumes

FUTURE CONDITIONS

The projected completion year for this project is 2018, so the analysis year for this study is 2018. To predict traffic conditions in 2018, two and one third percent annual growth in traffic was added to the 2015 volumes on Beulah Church Road, Outerloop and Fegenbush Lane. This growth is Metro Louisville's standard rate. Figure 3 displays the 2018 No build volumes.

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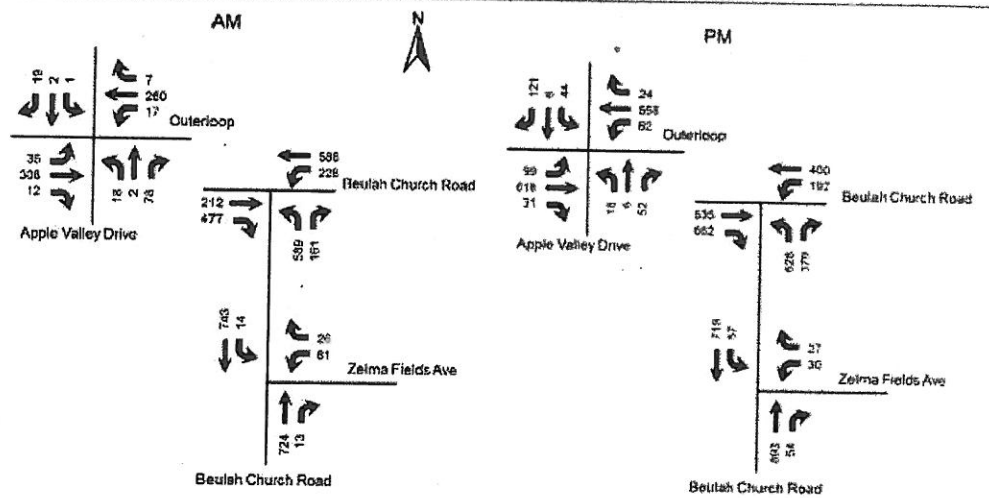


Figure 3. 2018 Peak Hour No Build

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" and "Single-Family Detached Housing" were reviewed and determined to be the best match. The trip generation results are listed in Table 1. The results of the trip generation analysis are that this development will generate 85 a.m. peak hour trips and 109 p.m. peak hour trips. The trips were assigned to the highway network with the percentages shown in Figure 4. Additionally, forty percent of the traffic to/from Apple Valley and Outerloop east was assumed to be diverted thru Ashton Park. Figure 5 shows the trips generated by this development and distributed throughout the road network for the year 2018 during the peak hours. Figure 6 displays the individual turning movements for the year 2018 for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

Land Use	A.M. Peak Hour					P.M. Peak Hour				
	Trips	% In	% OUT	IN	OUT	Trips	% In	% OUT	IN	OUT
Apartments	56	20	80	11	45	76	65	35	49	27
Single Family	29	25	75	7	22	33	63	37	21	12
TOTAL	85			18	67	109			70	39

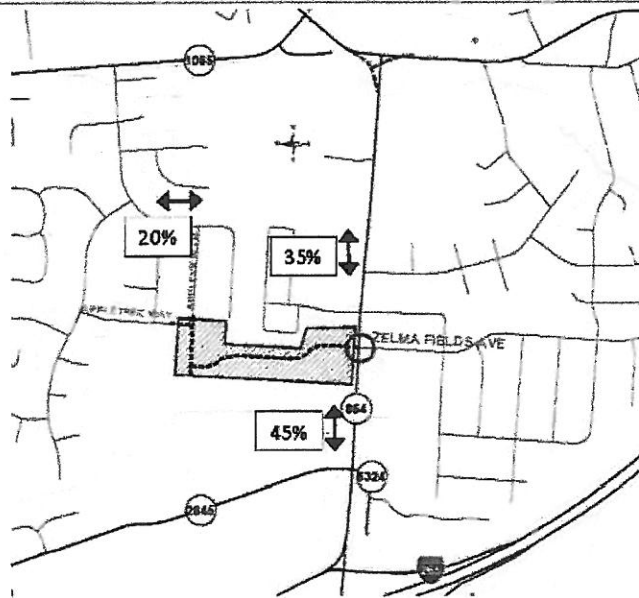


Figure 4. Trips Distribution Percentages

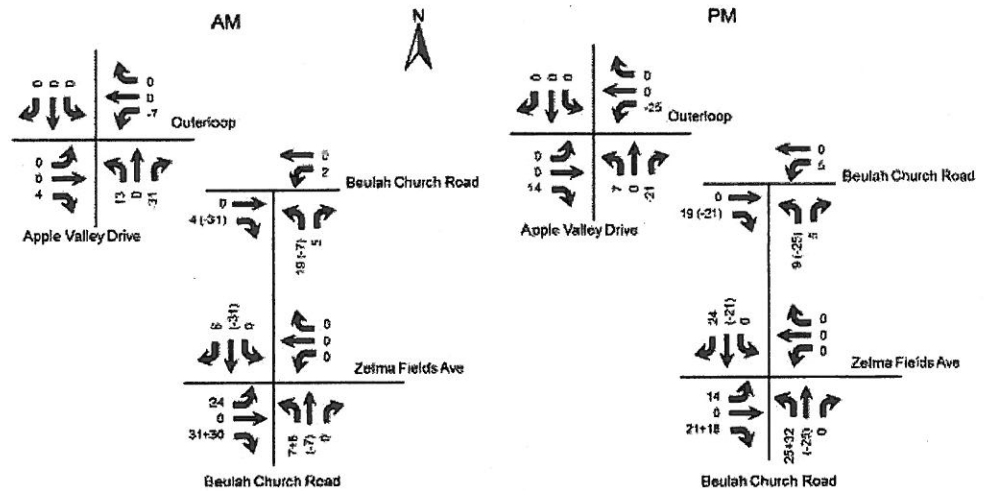


Figure 5. Peak Hour Trips Generated by Site

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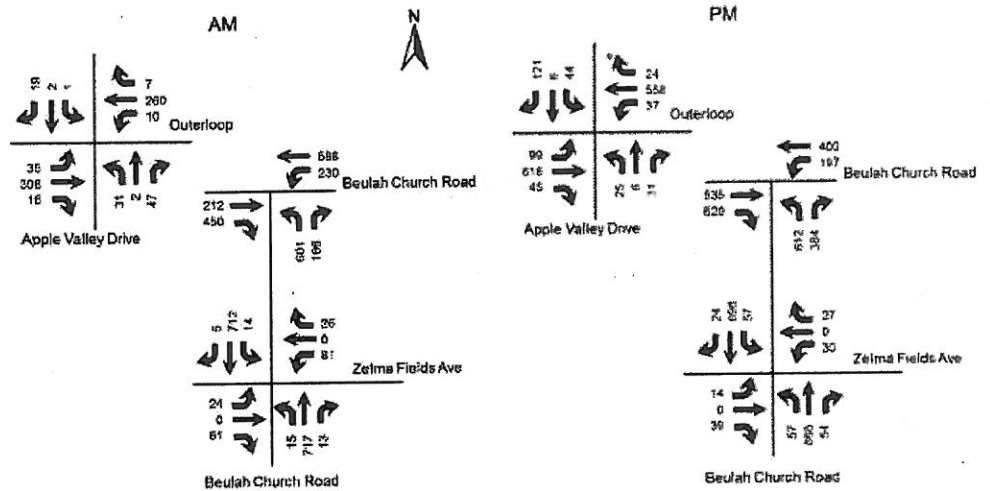


Figure 6. 2018 Peak Hour Build

ANALYSIS

The qualitative measure of traffic operations 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, "A" is the best operating condition and "F" is the worst. LOS results depend upon the facility that is analyzed. In this case, the LOS is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the average vehicle delays at the intersection were determined using procedures detailed in the Highway Capacity Manual, 2010 edition. Future delay and LOS were determined for the intersections using the Highway Capacity Software HCS 2010 Streets (version 6.65) and HCS+ (version 5.6).

Table 2. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2014 Existing	2018 No Build	2018 Build	2014 Existing	2018 No Build	2018 Build
Beulah Church Road at Zelma Fields Ave						
Beulah Church Road Northbound	NA	NA	A 9.4	NA	NA	A 9.5
Beulah Church Road Southbound	A 9.3	A 9.5	A 9.4	B 10.3	B 10.6	B 10.4
Zelma Fields Ave Westbound	D 25.6	D 28.4	E 46.9	C 22.2	C 24.1	D 34.2
Entrance Eastbound			C 22.3			C 23.0
Beulah Church Road at Fegenbush Lane	B 19.0	C 22.6	C 22.2	C 26.5	C 32.2	C 29.3
Beulah Church Road Eastbound	C 24.5	C 27.4	C 27.4	C 27.6	C 31.6	C 30.1
Fegenbush Lane Westbound	B 14.8	B 17.2	B 17.7	B 15.5	B 17.6	B 17.1
Beulah Church Road Northbound	C 20.5	C 25.7	C 24.3	C 32.1	D 41.2	D 36.1
Outerloop at Apple Valley Drive	B 15.3	B 18.0	B 18.3	B 17.2	B 18.9	B 19.6
Outerloop Eastbound	A 7.6	A 7.8	A 7.2	B 13.1	B 13.8	B 13.5
Outerloop Westbound	B 15.5	B 19.1	C 20.2	B 16.7	B 18.8	C 20.5
Apple Valley Northbound	D 35.3	D 39.7	D 40.3	C 28.4	C 31.6	C 33.1
Outerloop Plaza Southbound	C 31.4	D 35.2	D 36.8	C 32.0	D 35.6	D 36.9

Key: Level of Service, Delay in seconds per vehicle

The Kentucky Transportation Cabinet (KYTC) evaluates the need for turn lanes using Highway Design Memorandum No. 03-09 dated July 28, 2009. The volumes for the 2018 Build condition does not meet the warrants for a southbound right turn on Beulah Church Road at the entrance.

KYTC has the intersection of Beulah Church Road and Fegenbush Lane scheduled for construction beginning in 2016. The completed project should be fully operational in 2017. The project will relocate the intersection to the west and make the Fegenbush Lane to Beulah Church Road south the through movement. Beulah Church Road east will become the side road. Fegenbush Lane will be widened to four lanes through the Outerloop/Watterson Trail intersection.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2018, there will be manageable impact to the existing highway network. The delays experienced will increase, but will continue to operate at an acceptable Level of Service. Zelma Fields Avenue will experience Level of Service E during the a.m. peak. However, a review of the volume to capacity ratio indicates in both scenarios the ratio is less than 0.6, indicating an additional lane is not needed on the approach.

APPENDIX

Ashton Park Phase II
Traffic Impact Study

Traffic Counts

JACOBS
11940 Highway 42, Suite 1
Goshen, KY 40026

Counted by: Andy Wolak

File Name : Beulah ChurchAM
Site Code : 00011415
Start Date : 1/14/2015
Page No : 1

Groups Printed: Unshifted																			
Beulah Church Road From North					Zeema Fields Avenue From East					Beulah Church Road From South					From West				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total		Left	Thru	Right	Total		Left	Thru	Right	Total	In Total
07:00 AM	3	171	0	174	20	0	12	32		0	127	0	127		0	0	0	0	341
07:15 AM	1	166	0	167	13	0	9	22		0	177	0	177		0	0	0	0	370
07:30 AM	4	183	0	187	23	0	2	25		0	196	0	196		0	0	0	0	412
07:45 AM	6	173	0	179	17	0	3	20		0	191	0	191		0	0	0	0	380
Total	14	693	0	707	53	0	26	79		0	685	0	685		0	0	0	0	1503
08:00 AM	1	149	0	150	20	0	10	30		0	133	0	133		0	0	0	0	319
08:15 AM	1	111	0	112	12	0	5	17		0	105	0	105		0	0	0	0	237
08:30 AM	3	120	0	123	17	0	11	28		0	96	0	96		0	0	0	0	250
08:45 AM	2	120	0	122	9	0	4	13		0	116	0	116		0	0	0	0	238
Total	7	500	0	507	58	0	30	88		0	450	0	450		0	0	0	0	1047
Grand Total	21	1193	0	1214	110	0	56	167		0	1135	0	1135		0	0	0	0	2550
Approach %	1.7	96.3	0		10.8	0	29.4			0	97.1	0			0	0	0	0	
Total %	0.8	46.3	0		4.5	0	2.8			0	44.2	0			0	0	0	0	

Peak Hour Analysis From 07:00 AM to 08:45 AM Peak 1 of 1									
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	In Total
07:00 AM	3	171	0	174	20	0	12	32	341
07:15 AM	1	166	0	167	13	0	9	22	370
07:30 AM	4	183	0	187	23	0	2	25	412
07:45 AM	6	173	0	179	17	0	3	20	380
Total Volume	14	693	0	707	53	0	26	79	1503
% Sat	2	92	0	94	15.7	0	24.3		
Peak	563	547	0	1110	723	0	542	1265	2375

Ashton Park Phase II
Traffic Impact Study

JACOBS

11940 Highway 42, Suite 1
Goshen, KY 40026

Counted by: Andy Wolak

File Name : Beulah Church PM
Site Code : 00011315
Start Date : 1/13/2015
Page No : 1

Groups Pointed Unshifted															
Beulah Church Road				Zanna Fields Ave				Beulah Church Road				From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
04:00 PM	7	140	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	10	164	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	10	165	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	11	170	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	38	640	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	18	160	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	19	170	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	4	185	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	8	183	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	49	698	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	87	1338	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	6.7	93.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	2.7	40.9	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
04:30 PM	10	165	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	11	170	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	18	160	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	19	170	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	4	185	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	8	183	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	70	1053	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	6.7	93.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	2.7	40.9	0	0	0	0	0	0	0	0	0	0	0	0	0

JACOBS

Ashton Park Phase II
Traffic Impact Study

Louisville Metro
Traffic Engineering
601 W Jefferson St
Louisville, 40202

File Name Beulah Church Rd & Fegenbush Ln (2)
Site Code 05050234
Start Date 5/5/2010
Page No 6

Start Time	From South				Beulah Church Rd From East				Beulah Church Rd From South				Fegenbush Ln From West			
	Right	Thru	Left	Peak	Right	Thru	Left	Peak	Right	Thru	Left	Peak	Right	Thru	Left	Peak
Peak Hour Analysis From 07:00 AM to 09:00 AM - Peak 1 AM																
Peak Hour for Future Intersection Begins at 07:00 AM																
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Analysis From 03:00 PM to 05:00 PM - Peak 1 PM																
Peak Hour for Future Intersection Begins at 03:00 PM																
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Louisville Metro
Traffic Engineering
601 W Jefferson St
Louisville, 40202

File Name Beulah Church Rd & Fegenbush Ln (2)
Site Code 05050234
Start Date 5/5/2010
Page No 7

Start Time	From North				Beulah Church Rd From East				Beulah Church Rd From South				Fegenbush Ln From West			
	Right	Thru	Left	Peak	Right	Thru	Left	Peak	Right	Thru	Left	Peak	Right	Thru	Left	Peak
Peak Hour Analysis From 07:00 AM to 09:00 AM - Peak 1 AM																
Peak Hour for Future Intersection Begins at 07:00 AM																
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Analysis From 03:00 PM to 05:00 PM - Peak 1 PM																
Peak Hour for Future Intersection Begins at 03:00 PM																
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ashton Park Phase II
Traffic Impact Study

Traffic Counts
5/28/09

Interval Start Time	OuterLoop Plaza				Outer Loop				AppleValley				Outer Loop				Total	Hour
	From North				From East				From South				From West					
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right			
7:00	0	1	3		3	44	0		6	2	15		4	28	2	108		
7:15	0	2	2		3	48	0		3	0	23		6	64	3	154		
7:30	0	0	8		6	66	1		4	0	27		9	74	2	197		
7:45	0	0	4		2	57	0		6	1	13		13	60	3	159	618	
8:00	1	0	5		6	45	6		5	1	15		7	57	4	152	662	
8:15	2	0	9		1	46	4		9	0	11		16	39	3	140	648	
8:30	3	0	9		0	44	6		7	0	13		9	55	0	146	597	
8:45	3	2	15		3	55	4		6	0	7		14	49	1	159	597	
16:00	12	3	32		22	120	8		6	0	6		28	134	12	383		
16:15	11	3	37		20	107	2		5	5	13		20	87	8	318		
16:30	5	2	29		15	116	5		4	2	12		27	112	5	334		
16:45	6	1	33		14	120	5		3	0	17		24	110	7	340	1375	
17:00	11	2	39		20	108	7		3	2	7		14	105	8	326	1318	
17:15	8	0	23		15	142	9		7	1	12		34	139	5	395	1395	
17:30	20	1	23		11	109	3		4	1	18		27	143	10	370	1431	
17:45	5	3	36		16	108	5		4	2	15		24	130	8	356	1447	

AM PEAK

7:15	0	2	2	3	48	0	3	0	23	6	64	3	154	
7:30	0	0	8	6	66	1	4	0	27	9	74	2	197	
7:45	0	0	4	2	57	0	6	1	13	13	60	3	159	
8:00	1	0	5	6	45	6	5	1	15	7	57	4	152	
	1	2	19	17	216	7	18	2	78	35	255	12	662	

PM PEAK

17:00	11	2	39	20	108	7	3	2	7	14	105	8	326	
17:15	8	0	23	15	142	9	7	1	12	34	139	5	395	
17:30	20	1	23	11	109	3	4	1	18	27	143	10	370	
17:45	5	3	36	16	108	5	4	2	15	24	130	8	356	
	44	6	121	62	467	24	18	6	52	99	517	31	1447	

Ashton Park Phase II
Traffic Impact Study

HCS Reports

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/28/2015			Analysis Year	2015			
Analysis Time Period	AM Peak							
Project Description Ashton Park								
East/West Street Zelma Fields Ave				North/South Street Beulah Church Road				
Intersection Orientation North-South				Study Period (hrs) 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		676	13	14	693			
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00		
Hourly Flow Rate, HFR (veh/h)	0	742	14	15	761	0		
Percent Heavy Vehicles	0	--	--	1	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				81		26		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.91	1.00	0.91		
Hourly Flow Rate, HFR (veh/h)	0	0	0	89	0	28		
Percent Heavy Vehicles	0	0	0	1	0	1		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		15		117				
C (m) (veh/h)		859		250				
v/c		0.02		0.40				
95% queue length		0.05		1.87				
Control Delay (s/veh)		9.3		25.6				
LOS		A		D				
Approach Delay (s/veh)	--	--	25.6					
Approach LOS	--	--	D					

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HCS+1V Version 5.6

Generated: 1/28/2015 3:34 PM

Ashton Park Phase II
Traffic Impact Study

TWO-WAY STOP CONTROL SUMMARY						
General Information			Site Information			
Analyst	DBZ		Intersection			
Agency/Co.	Jacobs		Jurisdiction			
Date Performed	1/26/2015		Analysis Year			
Analysis Time Period	AM Peak		2018 No Build			
Project Description Ashton Park						
East/West Street: Zelma Fields Ave			North/South Street: Beulah Church Road			
Intersection Orientation: North-South			Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		724	13	14	743	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00
Hourly Flow Rate, HFR (veh/h)	0	795	14	15	816	0
Percent Heavy Vehicles	0	-	-	1	-	-
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	
Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				81		28
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.91	1.00	0.91
Hourly Flow Rate, HFR (veh/h)	0	0	0	89	0	28
Percent Heavy Vehicles	0	0	0	1	0	1
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	
Delay, Queue Length, and Level of Service						
Approach	Northbound	Southbound	Westbound		Eastbound	
Movement	1	4	7	8	9	10
Lane Configuration		L		LR		
v (veh/h)		15		117		
C (m) (veh/h)		821		288		
w/c		0.02		0.44		
95% queue length		0.08		2.08		
Control Delay (s/veh)		9.5		28.4		
LOS		A		D		
Approach Delay (s/veh)	-	-	28.4			
Approach LOS	-	-	D			

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Ashton Park Phase II
Traffic Impact Study

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	DBZ			Intersection			
Agency/Co.	Jacobs			Jurisdiction			
Date Performed	4/2/2015			Analysis Year	2018 Build		
Analysis Time Period	AM Peak						
Project Description: Ashton Park							
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	15	717	13	14	712	6	
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly Flow Rate, HFR (veh/h)	16	787	14	15	782	6	
Percent Heavy Vehicles	1	—	—	1	—	—	
Median Type	Two Way Left Turn Lane						
RT Channelized			0			0	
Lanes	1	1	0	1	1	0	
Configuration	L		TR	L		TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	24	0	61	81	0	28	
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly Flow Rate, HFR (veh/h)	26	0	67	89	0	28	
Percent Heavy Vehicles	1	0	1	1	0	1	
Percent Grade (%)	0			0			
Flared Approach	N			N			
Storage	0			1			
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L	L	LTR			LTR	
v (veh/h)	16	15	117			93	
C (m) (veh/h)	836	827	197			300	
w/c	0.02	0.02	0.59			0.31	
95% queue length	0.06	0.06	3.30			1.28	
Control Delay (s/veh)	9.4	9.4	46.9			22.3	
LOS	A	A	E			C	
Approach Delay (s/veh)	—	—	46.9			22.3	
Approach LOS	—	—	E			C	

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Ashton Park Phase II
Traffic Impact Study

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	DBZ			Intersection			
Agency/Co.	Jacobs			Jurisdiction			
Date Performed	1/26/2015			Analysis Year	2015		
Analysis Time Period	PM Peak						
Project Description Ashton Park							
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		833	54	57	671		
Peak-Hour Factor, PHF	1.00	0.96	0.96	0.96	0.96	1.00	
Hourly Flow Rate, HFR (veh/h)	0	867	56	59	698	0	
Percent Heavy Vehicles	0	—	—	1	—	—	
Median Type	Two Way Left Turn Lane						
RT Channelized			0			0	
Lanes	0	1	0	1	1	0	
Configuration			TR	L	T		
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				30		27	
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.96	1.00	0.96	
Hourly Flow Rate, HFR (veh/h)	0	0	0	31	0	28	
Percent Heavy Vehicles	0	0	0	1	0	1	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		L		LR			
v (veh/h)		59		59			
C (m) (veh/h)		744		268			
v/c		0.08		0.22			
95% queue length		0.26		0.82			
Control Delay (s/veh)		10.3		22.2			
LOS		B		C			
Approach Delay (s/veh)	--	--	22.2				
Approach LOS	--	--	C				

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Ashton Park Phase II
Traffic Impact Study

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year	2018 No Build			
Analysis Time Period	PM Peak							
Project Description Ashton Park								
East/West Street Zelma Fields Ave				North/South Street Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		893	54	57	719			
Peak-Hour Factor, PHF	1.00	0.96	0.96	0.96	0.96	1.00		
Hourly Flow Rate, HFR (veh/h)	0	930	56	59	748	0		
Percent Heavy Vehicles	0	--	--	1	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				30		27		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.96	1.00	0.96		
Hourly Flow Rate, HFR (veh/h)	0	0	0	31	0	28		
Percent Heavy Vehicles	0	0	0	1	0	1		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		59		59				
C (m) (veh/h)		705		247				
v/c		0.08		0.24				
95% queue length		0.27		0.91				
Control Delay (s/veh)		10.6		24.1				
LOS		B		C				
Approach Delay (s/veh)	--	--	24.1					
Approach LOS	--	--	C					

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Ashton Park Phase II
Traffic Impact Study

TWO-WAY STOP CONTROL SUMMARY

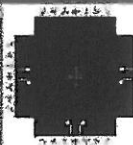
General Information			Site Information			
Analyst	DBZ		Intersection			
Agency/Co.	Jacobs		Jurisdiction			
Date Performed	4/2/2015		Analysis Year	2018 Build		
Analysis Time Period	PM Peak					
Project Description: Ashton Park						
East/West Street: Zelma Fields Ave			North/South Street: Beulah Church Road			
Intersection Orientation: North-South			Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	57	888	54	57	698	24
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	59	904	56	59	727	25
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	1	1	0
Configuration	L		TR	L		TR
Upstream Signal		0			0	
Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14	0	39	30	0	27
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	14	0	40	31	0	28
Percent Heavy Vehicles	1	0	1	1	0	1
Percent Grade (%)	0			0		
Flared Approach	N			N		
Storage	1			0		
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Delay, Queue Length, and Level of Service						
Approach	Northbound	Southbound	Westbound		Eastbound	
Movement	1	4	7	8	10	11
Lane Configuration	L	L	LTR		LTR	
v (veh/h)	59	59	59		54	
C (m) (veh/h)	867	721	181		253	
v/c	0.07	0.08	0.33		0.21	
95% queue length	0.22	0.27	1.33		0.79	
Control Delay (s/veh)	9.5	10.4	34.2		23.0	
LOS	A	B	D		C	
Approach Delay (s/veh)	—	—	34.2		23.0	
Approach LOS	—	—	D		C	

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency	Jacobs						Duration, h	0.25							
Analyst	DBZ		Analysis Date		Apr 2 2015		Area Type	Other							
Jurisdiction							Time Period	AM Peak							
Intersection	Beulah Church Road						PHF	0.02							
File Name	15 AM.xus						Analysis Period	1> 7.00							
Project Description	Ashton Park II														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h					198	447		213	549		550		150		
Signal Information															
Cycle, s	88.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	8.5	17.9	24.3	0.0	0.0	0.0					
				Yellow	3.5	3.6	3.5	0.0	0.0	0.0					
				Red	2.0	1.5	1.5	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	Off												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					2	1	6		8						
Case Number					7.3	1.0	4.0		8.0						
Phase Duration, s					23.0	13.0	36.8		29.3						
Change Period, (Y+R), s					5.6	5.6	5.6		5.0						
Max Allow Headway (1/MAH), s					6.2	4.6	5.9		3.1						
Queue Clearance Time (qc), s					13.3	7.6	18.0		22.7						
Green Extension Time (gc), s					4.0	0.7	5.9		1.5						
Phase Call Probability					1.00	0.99	1.00		1.00						
Max Out Probability					0.00	0.01	0.02		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					2	12		1	6		3		18		
Adjusted Flow Rate (v), veh/h					194	302	232	597		598		103			
Adjusted Saturation Flow Rate (s), veh/h					1900	1810	1810	1900		1810		1810			
Queue Service Time (qs), s					3.7	11.3	5.6	16.0		20.7		3.8			
Cycle Queue Clearance Time (qc), s					3.7	11.3	5.6	16.0		20.7		3.8			
Green Ratio (g/C)					0.26	0.26	0.42	0.47		0.37		0.49			
Capacity (c), veh/h					500	424	603	897		666		796			
Volume-to-Capacity Ratio (X)					0.287	0.712	0.384	0.665		0.808		0.206			
Available Capacity (ca), veh/h					1434	1215	922	1434		1092		1175			
Back of Queue (Q), veh/in (95th percentile)					2.7	7.5	3.5	9.7		12.5		1.9			
Queue Storage Ratio (RQ) (95th percentile)					0.11	0.62	0.25	0.49		0.62		0.09			
Uniform Delay (di), s/veh					19.3	22.1	13.1	13.5		19.8		9.5			
Incremental Delay (di), s/veh					0.6	4.4	0.5	1.8		3.7		0.0			
Initial Queue Delay (di), s/veh					0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh					19.9	26.5	13.6	15.3		23.5		9.5			
Level of Service (LOS)					B	C	B	B		C		A			
Approach Delay, s/veh / LOS				24.5		C	14.8		B	20.5		C	0.0		
Intersection Delay, s/veh / LOS						19.0						B			
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.3		B	0.7		A	2.3		B	2.3		B
Bicycle LOS Score / LOS				1.6		A	1.0		A			F			

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary

General Information

Agency	Jacobs	Duration, h	0.25
Analyst	DBZ	Analysis Date	Apr 3 2015
Jurisdiction		Area Type	Other
Intersection	Beulah Church Road	Time Period	AM Peak
File Name	18 AM NB.xus	PHF	0.92
Project Description	Ashton Park II	Analysis Period	1 > 7.00

Demand Information

	EB			WB			NB			SB		
Approach Movement	-	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		212	477	228	588		589		161			

Signal Information

Cycle, s	74.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	9.5	20.3	28.8	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	Off	Yellow	3.5	3.0	3.5	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		2	1	6		8		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.4	15.0	40.4		33.6		
Change Period, (Y+R), s		5.8	5.5	5.8		5.0		
Max Allow Headway (H _{MA}), s		0.2	4.6	6.9		3.1		
Queue Clearance Time (q _c), s		15.4	8.8	21.9		28.9		
Green Extension Time (g _e), s		4.3	0.8	6.2		1.5		
Phase Call Probability		1.00	0.99	1.00		1.00		
Max Out Probability		0.00	0.03	0.04		0.02		

Movement Group Results

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		142	319	248	639		640		175			
Adjusted Saturation Flow Rate (s), veh/h/s		1900	1810	1810	1900		1810		1610			
Queue Service Time (q _s), s		4.4	13.4	6.8	18.8		24.9		4.4			
Cycle Queue Clearance Time (q _c), s		4.4	13.4	6.8	18.8		24.9		4.4			
Green Ratio (g/R)		0.27	0.27	0.42	0.47		0.30		0.52			
Capacity (c), veh/h		508	431	696	894		700		830			
Volume-to-Capacity Ratio (X)		0.279	0.741	0.416	0.715		0.915		0.211			
Available Capacity (a), veh/h		1280	1084	850	1280		975		1075			
Back of Queue (Q), veh/m (95th percentile)		3.3	0.0	4.5	12.2		16.0		2.3			
Queue Storage Ratio (RQ) (95th percentile)		0.14	0.73	0.32	0.61		0.80		0.11			
Uniform Delay (d _u), s/veh		21.5	24.8	14.6	15.7		21.6		9.8			
Incremental Delay (d _i), s/veh		0.0	4.9	0.0	2.3		8.4		0.0			
Initial Queue Delay (d _i), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		22.1	29.7	15.2	10.0		30.0		9.8			
Level of Service (LOS)		C	C	B	B		C		A			
Approach Delay, s/veh / LOS		27.4	C	17.2	B		25.7		C		0.0	
Intersection Delay, s/veh / LOS		22.6						C				

Multimodal Results

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

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary																						
General Information							Intersection Information															
Agency	Jacobs						Duration, h	0.25														
Analyst	DBZ						Analysis Date	Apr 3, 2015														
Jurisdiction							Time Period	AM Peak														
Intersection	Boulah Church Road						Analysis Year	2018 Build														
File Name	18 AM B.xus						Analysis Period	1> 7.00														
Project Description	Ashton Park II																					
Demand Information							EB			WB			NB			SB						
Approach Movement							L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h								212	450		230	588		601		108						
Signal Information																						
Cycle, s	71.7	Reference Phase	2																			
Offset, s	0	Reference Point	End																			
Uncoordinated	Yes	Simult. Gap EW	On	Green	0.0	18.2	28.3	0.0	0.0	0.0	0.0											
Force Mode	Fixed	Simult. Gap NS	Off	Yellow	3.5	3.6	3.6	0.0	0.0	0.0	0.0											
				Red	2.0	1.5	1.5	0.0	0.0	0.0	0.0											
Timer Results							EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase									2		1		6				0					
Case Number									7.3		1.0		4.0				0.0					
Phase Duration, s									23.3		15.1		38.4				33.3					
Change Period, (Y+R), s									5.6		5.5		5.8				5.0					
Max Allow Headway (MAH), s									6.2		4.5		5.9				3.1					
Queue Clearance Time (qc), s									13.8		8.8		21.8				28.6					
Green Extension Time (gc), s									3.9		0.8		8.2				1.5					
Phase Call Probability									1.00		0.99		1.00				1.00					
Max Out Probability									0.00		0.03		0.04				0.02					
Movement Group Results							EB			WB			NB			SB						
Approach Movement							L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement								2	12		1	6		3	16							
Adjusted Flow Rate (v), veh/h								138	288		250	630		653	180							
Adjusted Saturation Flow Rate (s), veh/h/s								1900	1610		1810	1900		1810	1610							
Queue Service Time (qs), s								4.2	11.8		6.8	19.8		24.8	4.3							
Cycle Queue Clearance Time (qc), s								4.2	11.8		6.8	19.8		24.6	4.3							
Green Ratio (g/C)								0.25	0.25		0.41	0.46		0.30	0.63							
Capacity (c), veh/h								471	393		585	870		715	851							
Volume-to-Capacity Ratio (X)								0.286	0.722		0.427	0.735		0.914	0.212							
Available Capacity (ca), veh/h								1321	1119		846	1321		1006	1110							
Back of Queue (Q), veh/in (95th percentile)								3.2	8.0		4.5	12.2		15.8	2.1							
Queue Storage Ratio (RS) (95th percentile)								0.13	0.67		0.32	0.81		0.70	0.11							
Uniform Delay (di), s/veh								21.8	24.8		14.8	15.8		20.6	9.0							
Incremental Delay (di), s/veh								0.7	4.9		0.6	2.6		7.9	0.0							
Initial Queue Delay (di), s/veh								0.0	0.0		0.0	0.0		0.0	0.0							
Control Delay (d), s/veh								22.6	29.7		15.5	18.5		28.6	9.1							
Level of Service (LOS)								C	C		B	B		C	A							
Approach Delay, s/veh / LOS							27.4	C	C	17.7	B	B	24.3	C	C	0.0						
Intersection Delay, s/veh / LOS							22.2						C									
Multimodal Results							EB			WB			NB			SB						
Pedestrian LOS Score / LOS							2.3	B		0.7	A		2.3	B		2.3	B					
Bicycle LOS Score / LOS							1.7	A		2.0	A			F								

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency	Jacobs						Duration, h	0.25							
Analyst	DBZ		Analysis Date		Apr 3, 2015		Area Type	Other							
Jurisdiction			Time Period		PM Peak		PHF	0.84							
Intersection	Apple Valley Drive		Analysis Year		2015		Analysis Period	11/7/00							
File Name	15 PM.xus														
Project Description	Ashton Park II														
Demand Information							EB		WB		NB		SB		
Approach Movement							L	T	R	L	T	R	L	T	R
Demand (v), veh/h							99	582	31	62	526	24	10	6	62
							44	6	121						
Signal Information															
Cycle, s	76.3	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	3.7	0.3	41.9	13.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.3	3.5	0.0	0.0					
				Red	2.0	0.0	2.0	2.0	0.0	0.0					
Timer Results							EBL	EBT	WBL	WBT	NBL	NBT	SDL	SBT	
Assigned Phase							5	2	1	6		8		4	
Clear Number							11	3.0	1.1	3.0		8.0		6.0	
Phase Duration, s							9.5	48.5	9.2	48.2		10.8		10.8	
Change Period, (Y+R), s							5.5	6.3	5.5	6.3		5.6		5.6	
Max Allow Headway (MAH), s							4.0	3.9	4.0	3.9		5.2		5.2	
Queue Clearance Time (g _q), s							4.1	22.2	3.9	33.9		8.8		11.6	
Green Extension Time (g _e), s							0.2	8.7	0.2	8.1		1.4		1.3	
Phase Call Probability							0.92	1.00	0.88	1.00		1.00		1.00	
Max Out Probability							0.00	0.05	0.00	0.14		0.01		0.04	
Movement Group Results							EB		WB		NB		SB		
Approach Movement							L	T	R	L	T	R	L	T	R
Assigned Movement							5	2	12	1	6	16	3	8	18
Adjusted Flow Rate (v), veh/h							115	693	37	100	890	41	90	62	101
Adjusted Saturation Flow Rate (s), veh/h/in							1810	1883	1810	1810	1883	1810	1455	1853	1622
Queue Service Time (g _q), s							2.1	20.2	0.8	1.9	31.9	0.9	0.1	2.8	6.5
Cycle Queue Clearance Time (g _c), s							2.1	20.2	0.8	1.9	31.9	0.9	6.6	9.6	8.6
Green Ratio (g/C)							0.80	0.55	0.55	0.60	0.56	0.55	0.17	0.17	0.17
Capacity (c), veh/h							271	1030	890	390	1022	893	308	208	278
Volume-to-Capacity Ratio (X)							0.435	0.673	0.041	0.278	0.877	0.648	0.294	0.255	0.544
Available Capacity (c _a), veh/h							532	1465	1267	649	1465	1267	547	417	532
Back of Queue (Q), veh/in (95th percentile)							1.5	11.0	0.4	1.0	15.6	0.5	2.5	1.7	4.5
Queue Storage Ratio (RQ) (95th percentile)							0.08	0.20	0.07	0.21	0.39	0.03	0.83	0.52	0.57
Uniform Delay (d _u), s/veh							14.7	12.1	7.8	10.3	15.0	8.0	27.7	33.4	28.9
Incremental Delay (d _i), s/veh							1.1	0.8	0.0	0.2	2.8	0.0	0.7	0.9	2.4
Initial Queue Delay (d _i), s/veh							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d _c), s/veh							15.8	12.9	7.8	10.5	17.8	8.0	28.4	34.3	31.2
Level of Service (LOS)							B	B	A	B	B	A	C	C	C
Approach Delay, s/veh / LOS							13.1		B	10.7		B	28.4		C
Intersection Delay, s/veh / LOS							17.2						B		
Multimodal Results							EB		WB		NB		SB		
Pedestrian LOS Score / LOS							2.1		B	2.2		B	2.4		B
Bicycle LOS Score / LOS							1.9		A	1.7		A	0.6		A

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Ashton Park Phase II
Traffic Impact Study

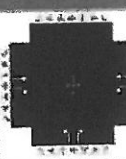
HCS 2010 Signalized Intersection Results Summary																	
General Information							Intersection Information										
Agency	Jacobs						Duration, h	0.25									
Analyst	DBZ						Analysis Date	Apr 7, 2015									
Jurisdiction							Area Type	Other									
Intersection	Apple Valley Drive						Time Period	PM Peak									
File Name	18 PM NB xus						Prt#	0.84									
Project Description	Ashton Park II						Analysis Year	2010 No Build									
							Analysis Period	1 - 7:00									
Demand Information		EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h		99	618	31	62	559	24	18	6	52	44	6	121				
Signal Information																	
Cycle, s	64.1	Reference Phase	2														
Offset, s	0	Reference Point	End														
Uncoordinated	Yes	Simult. Gap E/W	On	Greens	3.8	0.3	46.5	14.0	0.0	0.0							
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.3	3.6	0.0	0.0							
				Red	2.0	0.0	2.0	2.0	0.0	0.0							
Timer Results		EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase		5	2	1	6					8					4		
Case Number		1.1	3.0	1.1	3.0					6.0					6.0		
Phase Duration, s		9.0	55.1	9.3	54.8					18.6					19.6		
Change Period, (Y+R), s		5.5	6.3	5.5	6.3					5.6					5.6		
Max Allow Headway (MAH), s		4.0	3.5	4.0	3.5					5.2					5.2		
Queue Clearance Time (qc), s		4.2	25.1	4.0	40.5					9.4					12.7		
Green Extension Time (ge), s		0.2	9.6	0.2	8.1					1.4					1.2		
Phase Call Probability		0.94	1.00	0.92	1.00					1.00					1.00		
Max Out Probability		0.00	0.10	0.00	0.31					0.02					0.06		
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	12	1	6	16	3	6	16	7	4	14				
Adjusted Flow Rate (v), veh/h		116	736	37	106	966	42	90			52	151					
Adjusted Saturation Flow Rate (s), veh/h/s		1810	1863	1610	1810	1863	1610	1400			1359	1622					
Queue Service Time (qs), s		2.2	23.1	0.8	2.0	38.5	0.8	0.1			3.1	7.2					
Cycle Queue Clearance Time (qc), s		2.2	23.1	0.8	2.0	38.5	0.9	7.4			10.7	7.2					
Green Ratio (g/C)		0.62	0.58	0.58	0.62	0.58	0.55	0.17			0.17	0.17					
Capacity (c), veh/h		244	1076	833	374	1073	926	268			190	272					
Volume-to-Capacity Ratio (X)		0.483	0.682	0.040	0.288	0.903	0.045	0.314			0.275	0.556					
Available Capacity (ca), veh/h		479	1331	1150	814	1321	1150	488			388	483					
Back of Queue (Q), veh/h (95th percentile)		2.1	12.6	0.4	1.1	18.7	0.5	2.9			1.9	5.1					
Queue Storage Ratio (RS) (95th percentile)		0.10	0.32	0.07	0.22	0.47	0.04	0.71			0.58	0.64					
Uniform Delay (d), s/veh		17.3	12.3	7.6	10.7	15.7	7.7	30.8			37.2	32.1					
Incremental Delay (di), s/veh		1.6	1.1	0.0	0.2	4.4	0.0	0.9			1.1	2.5					
Initial Queue Delay (db), s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0					
Control Delay (di), s/veh		18.8	13.3	7.6	10.9	20.2	7.8	31.6			38.3	34.6					
Level of Service (LOS)		B	B	A	B	C	A	C			D	C					
Approach Delay, s/veh / LOS		13.5	B		16.6	B		31.6	C		35.6	D					
Intersection Delay, s/veh / LOS		16.9						35.6									
Multimodal Results		EB			WB			NB			SB						
Pedestrian LOS Score / LOS		2.1	B		2.2	B		2.4	B		2.4	B					
Bicycle LOS Score / LOS		2.0	A		1.8	A		0.8	A		0.8	A					

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Ashton Park Phase II
Traffic Impact Study

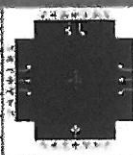
HCS 2010 Signalized Intersection Results Summary															
General Information							Intersection Information								
Agency		Jacobs					Duration, h		0.25						
Analyst		DBZ					Analysis Date		Apr 3, 2016		Area Type		Other		
Jurisdiction							Time Period		PM Peak		PHF		0.92		
Intersection		Deulah Church Road					Analysis Year		2010 Build		Analysis Period		1> 7:00		
File Name		18 PM B.xus													
Project Description		Ashton Park II													
															
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h					535	620	197	400		612		384			
Signal Information															
Cycle, s		96.3	Reference Phase	2											
Offset, s		0	Reference Point	End	Green	9.5	33.7	37.4	0.0	0.0	0.0				
Uncoordinated		Yes	Simult. Gap E/W	On	Yellow	3.5	3.6	3.5	0.0	0.0	0.0				
Force Mode		Fixed	Simult. Gap N/S	Off	Red	2.0	1.5	1.6	0.0	0.0	0.0				
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					2	1	6			8					
Case Number					7.3	1.0	4.0			9.0					
Phase Duration, s					38.8	15.0	63.8			42.4					
Change Period, [Y+R], s					5.6	5.5	5.0			5.0					
Max Allow Headway (MAH), s					6.1	4.5	5.0			3.1					
Queue Clearance Time (qc), s					25.7	0.9	16.3			36.2					
Green Extension Time (gc), s					7.5	0.6	3.9			1.1					
Phase Call Probability					1.00	1.00	1.00			1.00					
Max Out Probability					0.15	0.02	0.00			0.02					
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h					379	439	214	435		865		417			
Adjusted Saturation Flow Rate (s), veh/h/h					1900	1610	1610	1900		1910		1810			
Queue Service Time (qs), s					15.7	23.7	6.9	14.3		34.2		17.3			
Cycle Queue Clearance Time (qc), s					15.7	23.7	6.9	14.3		34.2		17.3			
Green Ratio (g/C)					0.34	0.34	0.47	0.50		0.38		0.49			
Capacity (c), veh/h					655	655	438	852		704		786			
Volume-to-Capacity Ratio (X)					0.578	0.790	0.467	0.457		0.945		0.531			
Available Capacity (ca), veh/h					885	835	636	885		751		828			
Back of Queue (Q), veh/h (95th percentile)					10.5	13.4	4.9	9.6		24.1		9.7			
Queue Storage Ratio (RSQ) (95th percentile)					0.44	1.11	0.35	0.48		1.20		0.48			
Uniform Delay (d), s/veh					25.8	28.4	17.7	15.6		28.5		17.1			
Incremental Delay (di), s/veh					1.3	4.3	1.0	0.7		19.5		0.2			
Initial Queue Delay (di), s/veh					0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh					27.1	32.7	18.7	16.3		47.9		17.3			
Level of Service (LOS)					C	C	B	B		D		B			
Approach Delay, s/veh / LOS					30.1	C	17.1	B		38.1	D	0.0			
Intersection Delay, s/veh / LOS							29.3					C			
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS					2.3	B	0.7	A		2.3	B	2.3	B		
Bicycle LOS Score / LOS					2.6	B	1.6	A			F				

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary																				
General Information							Intersection Information													
Agency	Jacobs						Duration, h	0.25												
Analyst	DBZ						Analysis Date	Apr 2 2015		Area Type	Other									
Jurisdiction							Time Period	AM Peak		PHF	0.84									
Intersection	Apple Valley Drive						Analysis Year	2015		Analysis Period	1> 7.00									
File Name	15 AM.xus																			
Project Description	Ashton Park II																			
																				
Demand Information							EB			WB			NB			SB				
Approach Movement							L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h							35	287	12	17	243	7	18	2	78	1	2	19		
Signal Information																				
Cycle, s	74.4	Reference Phase	2																	
Offset, s	0	Reference Point	End	Green	2.9	0.6	46.9	7.5	0.0	0.0										
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.5	0.0	4.3	3.6	0.0	0.0										
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	10.0	0.0										
Timer Results							EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT						
Assigned Phase							5	2	1	6		8		4						
Case Number							1.1	3.0	1.1	3.0		8.0		6.0						
Phase Duration, s							7.8	52.8	8.7	53.5		13.1		13.1						
Change Period, (Y+R), s							5.5	8.3	5.5	8.3		5.6		5.6						
Max Allow Headway (1/MAH), s							4.0	3.9	4.0	3.9		5.2		5.2						
Queue Clearance Time (qc), s							2.8	8.3	3.1	40.1		7.2		7.3						
Green Extension Time (gc), s							0.1	8.4	0.1	7.0		0.8		0.8						
Phase Call Probability							0.58	1.00	0.79	1.00		0.95		0.95						
Max Out Probability							0.00	0.01	0.00	0.20		0.00		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	12	1	6	16	3	8	18	7	4	14		
Adjusted Flow Rate (v), veh/h							42	342	14	76	1087	31		117		1	25			
Adjusted Saturation Flow Rate (s), veh/h							1810	1863	1610	1810	1863	1610		1603		1321	1634			
Queue Service Time (qs), s							0.6	6.3	0.3	1.1	38.1	0.5		2.7		0.1	1.0			
Cycle Queue Clearance Time (qc), s							0.8	6.3	0.3	1.1	38.1	0.5		5.2		5.3	1.0			
Green Ratio (g/C)							0.05	0.62	0.62	0.67	0.63	0.03		0.10		0.10	0.10			
Capacity (c), veh/h							204	1161	1003	744	1182	1022		218		137	104			
Volume-to-Capacity Ratio (X)							0.205	0.294	0.014	0.102	0.820	0.031		0.634		0.009	0.162			
Available Capacity (ca), veh/h							512	1501	1297	1032	1501	1297		588		448	549			
Back of Queue (Q), veh/h (95th percentile)							0.6	3.3	0.1	0.5	16.1	0.2		3.7		0.0	0.7			
Queue Storage Ratio (RQ) (95th percentile)							0.03	0.08	0.02	0.10	0.41	0.02		0.93		0.01	0.09			
Uniform Delay (di), s/veh							15.8	0.5	5.3	4.6	11.9	5.1		32.4		36.0	30.6			
Incremental Delay (di), s/veh							0.5	0.1	0.0	0.0	4.7	0.0		2.9		0.0	0.0			
Initial Queue Delay (ds), s/veh							0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0			
Control Delay (d), s/veh							16.3	6.6	5.3	4.6	16.6	5.1		35.3		36.0	31.2			
Level of Service (LOS)							B	A	A	A	B	A		D		D	C			
Approach Delay, s/veh / LOS							7.6 / A		16.5 / B		35.3 / D		31.4 / C							
Intersection Delay, s/veh / LOS							15.3 / B							B						
Multimodal Results							EB			WB			NB			SB				
Pedestrian LOS Score / LOS							2.1 / B			2.2 / B			2.4 / B			2.4 / B				
Bicycle LOS Score / LOS							1.1 / A			1.0 / A			0.7 / A			0.5 / A				

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Ashton Park Phase II
Traffic Impact Study

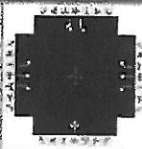
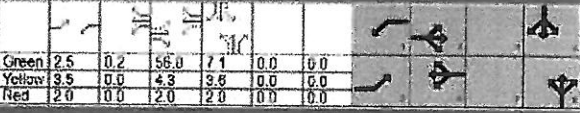
HCS 2010 Signalized Intersection Results Summary																			
General Information							Intersection Information												
Agency		Jacobs					Duration, h		0.25										
Analyst		DBZ		Analysis Date		Apr 3, 2015		Area Type		Other									
Jurisdiction				Time Period		AM Peak		PHF		0.84									
Intersection		Apple Valley Drive					Analysis Year		2018 No Build		Analysis Period			1 to 7.00					
File Name		18 AM NB.kus																	
Project Description		Ashton Park II																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				35	308	12	17	260	7	18	2	79	1	2	19				
Signal Information																			
Cycle, s		83.3	Reference Phase	2															
Offset, s		0	Reference Point	End															
Uncoordinated		Yes	Simult. Gap E/W	On		Green	2.5	0.8	54.3	8.2	0.0	0.0							
						Yellow	3.5	0.0	4.3	3.0	0.0	0.0							
Force Mode		Fixed	Simult. Gap N/S	On		Red	2.0	0.0	2.0	2.0	0.0	0.0							
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase				5		2		1		6				8				4	
Case Number				1.1		3.0		1.1		3.0				8.0				6.0	
Phase Duration, s				8.0		60.6		8.8		61.5				13.8				13.8	
Charge Period, (Y+R), s				5.5		6.3		5.5		6.3				5.8				5.8	
Max Allow Headway (MAH), s				4.0		3.9		4.0		3.9				5.2				5.2	
Queue Clearance Time (q _c), s				2.0		9.1		3.1		49.6				7.8				7.8	
Green Extension Time (p _g), s				0.1		10.0		0.1		5.0				0.6				0.6	
Phase Call Probability				0.62		1.00		0.83		1.00				0.96				0.96	
Max Out Probability				0.00		0.02		0.00		0.68				0.00				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	12	1	6	16	3	8	16	7	4	14				
Adjusted Flow Rate (v), veh/h				42	367	14	77	1171	32		117		1	25					
Adjusted Saturation Flow Rate (s), veh/h/h				1810	1883	1810	1810	1883	1810		1603		1321	1634					
Queue Service Time (q _s), s				0.6	7.1	0.3	1.1	47.6	0.6		3.1		0.1	1.2					
Cycle Queue Clearance Time (q _c), s				0.6	7.1	0.3	1.1	47.6	0.6		5.8		5.8	1.2					
Green Ratio (g/C)				0.68	0.65	0.65	0.69	0.68	0.66		0.10		0.10	0.10					
Capacity (c), veh/h				173	1216	1051	745	1234	1067		209		124	181					
Volume-to-Capacity Ratio (X)				0.240	0.302	0.014	0.103	0.949	0.030		0.558		0.010	0.155					
Available Capacity (c _a), veh/h				445	1342	1160	999	1342	1160		526		390	480					
Back of Queue (Q), veh/h (95th percentile)				0.9	3.8	0.1	0.5	26.0	0.2		4.3		0.0	0.8					
Queue Storage Ratio (RQ) (95th percentile)				0.04	0.10	0.02	0.10	0.52	0.02		1.06		0.01	0.11					
Uniform Delay (d ₁), s/veh				10.0	6.3	5.1	4.4	12.8	4.8		36.4		39.4	34.4					
Incremental Delay (d ₂), s/veh				0.7	0.1	0.0	0.0	7.7	0.0		3.3		0.0	0.8					
Initial Queue Delay (d ₃), s/veh				0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0					
Control Delay (d), s/veh				20.6	6.4	5.1	4.5	20.4	4.8		39.7		39.4	35.0					
Level of Service (LOS)				C	A	A	A	C	A		D		D	C					
Approach Delay, s/veh / LOS				7.8	A		19.1	B		39.7	D		35.2	D					
Intersection Delay, s/veh / LOS				18.0						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.1	B		2.2	B		2.6	B		2.5	B					
Bicycle LOS Score / LOS				1.2	A		1.0	A		0.7	A		0.5	A					

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary																	
General Information						Intersection Information											
Agency		Jacobs				Duration, h		0.25									
Analyst		DBZ				Analysis Date		Apr 3, 2015									
Jurisdiction						Area Type		Other									
Intersection		Apple Valley Drive				Time Period		AM Peak									
File Name		18 AM B.xus				Analysis Year		2018 Build									
Project Description		Ashton Park II				Analysis Period		1> 7.00									
Demand Information						EB			WB			NB			SB		
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h						35	308	16	10	260	7	31	2	47	1	2	19
Signal Information																	
Cycle, s	84.0	Reference Phase	2	End													
Offset, s	0	Reference Point	End	On													
Uncoordinated	Yes	Simult. Gap E/W	On	On													
Force Mode	Fixed	Simult. Gap N/S	On	On													
Timer Results						EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase						5	2	1	6		8		4				
Case Number						11	3.0	11	3.0		8.0		6.0				
Phase Duration, s						8.0	63.1	8.2	63.3		12.7		12.7				
Change Period, (Y+R), s						5.5	6.3	5.5	6.3		5.6		5.6				
Max Allow Headway (MAH), s						4.0	3.9	4.0	3.9		5.2		5.2				
Queue Clearance Time (qc), s						2.6	8.6	2.6	62.3		6.9		7.0				
Green Extension Time (ge), s						0.1	10.9	0.1	4.7		0.6		0.6				
Phase Call Probability						0.62	1.00	0.68	1.00		0.94		0.94				
Max Out Probability						0.00	0.03	0.00	0.75		0.00		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	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h						47	367	19	47	1213	33	85		1	25		
Adjusted Saturation Flow Rate (s), veh/h/s						1810	1863	1610	1810	1863	1610	1563		1366	1634		
Queue Service Time (qs), s						0.6	6.6	0.3	0.6	59.3	0.6	3.7		0.1	1.2		
Cycle Queue Clearance Time (qc), s						0.6	6.6	0.3	0.6	59.3	0.6	4.9		5.0	1.2		
Green Ratio (g/C)						0.71	0.68	0.68	0.71	0.68	0.68	0.08		0.08	0.03		
Capacity (c), veh/h						160	1261	1090	760	1265	1093	191		120	137		
Volume-to-Capacity Ratio (X)						0.251	0.291	0.017	0.061	0.959	0.030	0.409		0.010	0.182		
Available Capacity (ca), veh/h						436	1331	1150	1028	1331	1150	519		412	498		
Back of Queue (Q), veh/ln (95th percentile)						1.0	3.4	0.1	0.3	21.3	0.2	3.5		0.0	0.9		
Queue Storage Ratio (RS) (95th percentile)						0.05	0.09	0.02	0.06	0.54	0.02	0.88		0.01	0.11		
Uniform Delay (dr), s/veh						21.5	5.5	4.4	3.9	12.4	4.4	37.4		38.9	35.8		
Incremental Delay (di), s/veh						0.8	0.1	0.0	0.0	8.8	0.0	2.9		0.0	0.9		
Initial Queue Delay (ds), s/veh						0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Control Delay (d), s/veh						22.2	5.6	4.4	3.9	21.2	4.4	40.3		40.0	36.7		
Level of Service (LOS)						C	A	A	A	C	A	D		D	D		
Approach Delay, s/veh / LOS						7.2		A		20.2	C	40.3		D	36.8		D
Intersection Delay, s/veh / LOS						18.4						B					
Multimodal Results						EB			WB			NB			SB		
Pedestrian LOS Score / LOS						2.0		B	2.2		B	2.5		B	2.5		B
Bicycle LOS Score / LOS						1.2		A	1.0		A	0.8		A	0.5		A

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Ashton Park Phase II Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information				
Agency	Jacobs				Duration, h	0.25			
Analyst	DBZ		Analysis Date	Apr 3, 2015	Area Type	Other			
Jurisdiction			Time Period	PM Peak	Pt/H	0.84			
Intersection	Apple Valley Drive		Analysis Year	2015	Analysis Period	1> 7:00			
File Name	15 PM.xus								
Project Description	Ashton Park II								

Demand Information		EB			WB			NB			SB		
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R
Demand (V), veh/h		98	562	31	62	526	24	18	6	52	44	6	121

Signal Information																
Cycle, s	70.3	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	3.7	0.3	41.9	13.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.3	3.6	0.0	0.0						
				Red	2.0	0.0	2.0	2.0	0.0	0.0						

Timer Results		EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		5	2	1	6		9		4
Case Number		11	3.0	11	3.0		8.0		6.0
Phase Duration, s		9.5	40.5	8.2	40.2		18.6		18.6
Change Period, (Y+R), s		5.5	6.3	5.5	6.3		5.6		5.6
Max Allow Headway (MAH), s		4.0	3.9	4.0	3.9		5.2		5.2
Queue Clearance Time (q _c), s		41	22.2	3.9	33.9		8.6		11.6
Green Extension Time (g _e), s		0.2	8.7	0.2	8.1		1.4		1.3
Phase Call Probability		0.92	1.00	0.89	1.00		1.00		1.00
Max Out Probability		0.00	0.05	0.00	0.14		0.01		0.04

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	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v _f), veh/h		118	693	37	106	896	41	90			52		151
Adjusted Saturation Flow Rate (s _f), veh/h/s		1810	1853	1610	1810	1863	1610	1456			1353		1622
Queue Service Time (q _s), s		2.1	20.2	0.8	1.8	31.9	0.9	0.1			2.8		0.6
Cycle Queue Clearance Time (q _c), s		2.1	20.2	0.8	1.8	31.9	0.9	6.6			9.6		6.5
Green Ratio (g/C)		0.60	0.55	0.55	0.60	0.55	0.56	0.17			0.17		0.17
Capacity (c), veh/h		271	1630	890	380	1022	883	308			206		278
Volume to Capacity Ratio (X)		0.435	0.673	0.041	0.278	0.877	0.046	0.294			0.255		0.544
Available Capacity (a _v), veh/h		532	1465	1267	649	1465	1267	547			417		532
Back of Queue (Q), veh/in (95th percentile)		1.5	11.0	0.4	1.0	15.5	0.5	2.5			1.7		4.6
Queue Storage Ratio (R/Q) (95th percentile)		0.08	0.28	0.07	0.21	0.39	0.03	0.63			0.62		0.57
Uniform Delay (d ₁), s/veh		14.7	12.1	7.8	10.3	15.0	8.0	27.7			33.4		28.9
Incremental Delay (d ₂), s/veh		1.1	0.8	0.0	0.2	2.8	0.0	0.7			0.9		2.4
Initial Queue Delay (d _i), s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0
Control Delay (d), s/veh		15.8	12.9	7.8	10.5	17.8	8.0	28.4			34.3		31.2
Level of Service (LOS)		B	B	A	B	B	A	C			C		C
Approach Delay, s/veh / LOS		13.1		B	16.7		B	28.4		C	32.0		C
Intersection Delay, s/veh / LOS		17.2						B					

Multimodal Results		EB		WB		NB		SB	
Pedestrian LOS Score / LOS		2.1	B	2.2	B	2.4	B	2.4	B
Bicycle LOS Score / LOS		1.9	A	1.7	A	0.6	A	0.8	A

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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information				
Agency	Jacobs			Duration h	0.25			
Analyst	DBZ		Analysis Date	Apr 7, 2015		Area Type	Other	
Jurisdiction			Time Period	PM Peak		PHF	0.84	
Intersection	Apple Valley Drive		Analysis Year	2018 No Build		Analysis Period	1 > 7.00	
File Name	18 PM NB.xus							
Project Description	Ashton Park II							

Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				89	618	31	62	558	24	18	6	52	44	6	121

Signal Information															
Cycle, s	84.1	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												

Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase				5	2	1	6					8						4	
Case Number				1.1	3.0	1.1	3.0					8.0						6.0	
Phase Duration, s				9.8	55.1	9.3	54.8					19.6						19.6	
Change Period, (Y+R), s				5.5	6.3	5.5	6.3					5.6						5.6	
Max Allow Headway (MAH), s				4.0	3.9	4.0	3.9					5.2						5.2	
Queue Clearance Time (qc), s				4.2	25.1	4.0	40.5					9.4						12.7	
Green Extension Time (ge), s				0.2	9.0	0.2	8.1					1.4						1.2	
Phase Call Probability				0.94	1.00	0.92	1.00					1.00						1.00	
Max Out Probability				0.00	0.10	0.00	0.31					0.02						0.06	

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	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h				178	738	37	108	968	42				52		151
Adjusted Saturation Flow Rate (s), veh/h				1810	1863	1810	1810	1863	1810				1353		1622
Queue Service Time (qs), s				2.2	23.1	0.0	2.0	38.5	0.9				3.1		7.2
Cycle Queue Clearance Time (qc), s				2.2	23.1	0.0	2.0	38.5	0.9				10.7		7.2
Green Ratio (g/C)				0.62	0.58	0.58	0.67	0.58	0.58				0.17		0.17
Capacity (c), veh/h				244	1079	933	374	1073	928				288		190
Volume-to-Capacity Ratio (X)				0.483	0.682	0.040	0.283	0.002	0.045				0.314		0.275
Available Capacity (ca), veh/h				479	1331	1150	614	1331	1150				486		366
Back of Queue (Q), veh (95th percentile)				2.1	12.6	0.4	1.1	10.7	0.5				2.9		1.9
Queue Storage Ratio (RS) (95th percentile)				0.10	0.32	0.07	0.22	0.47	0.04				0.71		0.58
Uniform Delay (d), s/veh				17.3	12.3	7.6	10.7	15.7	7.7				30.8		37.2
Incremental Delay (di), s/veh				1.5	1.1	0.0	0.2	4.4	0.0				0.8		1.1
Initial Queue Delay (d0), s/veh				0.0	0.0	0.0	0.0	0.0	0.0				0.0		0.0
Control Delay (d), s/veh				18.8	13.3	7.6	10.9	20.2	7.6				31.6		38.3
Level of Service (LOS)				B	B	A	B	C	A				C		D
Approach Delay, s/veh / LOS				13.8		B	18.8		B				31.6		C
Intersection Delay, s/veh / LOS				18.9						B					

Multimodal Results				EB		WB		NB		SB	
Pedestrian LOS Score / LOS				2.1	B	2.2	B	2.4	B	2.4	B
Bicycle LOS Score / LOS				2.0	A	1.8	A	0.6	A	0.0	A

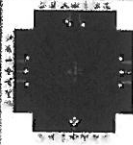
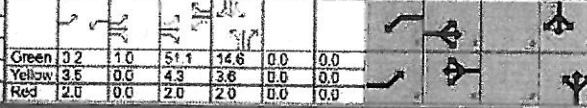
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Ashton Park Phase II
Traffic Impact Study

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information																
Agency				Jacobs	Duration, h				0.26												
Analyst				DBZ	Analysis Date				Apr 7, 2015						Area Type				Other		
Jurisdiction					Time Period				PM Peak						PHF				0.84		
Intersection				Apple Valley Drive	Analysis Year				2018 Build						Analysis Period				17-7.00		
File Name				18 PM B.xus																	
Project Description				Ashton Park II																	
Demand Information					EB			WB			NB			SB							
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R					
Demand (v) veh/h					99	618	45	37	558	24	25	6	31	44	6	121					
Signal Information																					
Cycle, s				87.3													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					3.2	1.0	51.1	14.6	0.0	0.0											
Yellow					3.5	0.0	4.3	3.6	0.0	0.0											
Red					2.0	0.0	2.0	2.0	0.0	0.0											
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT									
Assigned Phase					5	2	1	6		8		4									
Case Number					11	30	11	30		80		60									
Phase Duration, s					9.7	59.4	8.7	57.4		20.2		20.2									
Change Period (Y+R), s					5.5	6.3	5.5	6.3		5.6		5.6									
Max Allow Headway (MAH), s					4.0	3.9	4.0	3.9		5.2		5.2									
Queue Clearance Time (g _q), s					4.2	25.1	3.2	43.4		10.1		13.5									
Green Extension Time (g _e), s					0.2	10.2	0.1	7.8		1.3		1.1									
Phase Call Probability					0.04	1.00	0.80	1.00		1.00		1.00									
Max Out Probability					0.00	0.11	0.00	0.41		0.02		0.07									
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	12	1	6	16	3	8	18	7	4	14					
Adjusted Flow Rate (v), veh/h					118	730	54	86	862	43		74		52	101						
Adjusted Saturation Flow Rate (s), veh/h					1810	1803	1610	1810	1803	1610		1065		1384	1622						
Queue Service Time (g _q), s					2.2	23.1	1.2	1.2	41.4	1.0		0.6		3.2	7.5						
Cycle Queue Clearance Time (g _c), s					2.2	23.1	1.2	1.2	41.4	1.0		8.1		11.5	7.5						
Green Ratio (g/C)					0.63	0.60	0.60	0.62	0.58	0.58		0.17		0.17	0.17						
Capacity (c), veh/h					233	1109	859	373	1088	940		238		185	274						
Volume-to-Capacity Ratio (X)					0.507	0.683	0.058	0.178	0.912	0.045		0.311		0.283	0.552						
Available Capacity (ca), veh/h					457	1280	1108	818	1280	1108		410		347	464						
Back of Queue (Q) veh/h (85th percentile)					2.3	12.5	0.6	0.7	20.4	0.5		2.4		2.0	5.3						
Queue Storage Ratio (RQ) (95th percentile)					0.12	0.32	0.11	0.14	0.52	0.04		0.61		0.61	0.66						
Uniform Delay (d _u), s/veh					18.6	11.6	7.4	10.2	16.2	7.8		32.0		38.8	33.3						
Incremental Delay (d _i), s/veh					1.7	1.1	0.0	0.1	5.6	0.0		1.0		1.2	2.6						
Initial Queue Delay (d _i), s/veh					0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0						
Control Delay (d _c), s/veh					20.3	12.6	7.4	10.3	21.7	7.8		33.1		40.1	36.7						
Level of Service (LOS)					C			B			C			D							
Approach Delay, s/veh / LOS					13.5			B			20.5			C							
Intersection Delay, s/veh / LOS					19.6																
Multimodal Results					EB			WB			NB			SB							
Pedestrian LOS Score / LOS					2.1			B			2.2			B							
Bicycle LOS Score / LOS					2.0			A			1.7			A							

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final report

January 26, 2015

Traffic Impact Study

*Ashton Park Phase II
Beulah Church Road
Louisville, KY*

Prepared for

Metro Public Works

JACOBS™

11940 US 42
Goshen, KY 40026
502-228-0393

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INTRODUCTION

The development plan for Ashton Park Phase II on Beulah Church Road shows 28 single family lots and 106 apartment units. **Figure 1** displays a map of the site. Access to the development will be from Beulah Church Road, Applevue Lane, and Appletree Way. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study the impact area was defined to be the Beulah Church intersection with Zelma Fields Avenue at the proposed entrance.



Figure 1. Site Map

EXISTING CONDITIONS

Beulah Church Road, KY 864, is a state maintained road with an estimated 2015 ADT of 15,000 vehicles per day between I 265 and the Outer Loop (KY 1065), as provided by the Kentucky Transportation Cabinet at station 296. The road is a three-lane highway with twelve-foot lanes, eight foot paved shoulders (provided by the Kentucky Transportation Cabinet). The speed limit is 45 mph. There is a sidewalk on the east side of Beulah Church Road. The intersection with Zelma Fields Road is controlled with a stop sign. There is a two-way left turn lane. TARC does not provide service along Beulah Church Road.

Jacobs Engineering Group collected a.m. and p.m. peak hour turning movement counts for the intersection of Beulah Church Road and Zelma Field Avenue, on January 13 and 14, 2015. The a.m. peak occurred between 7:00 and 8:00 and the p.m. peak hour occurred between 4:30 and 5:30 p.m. **Figure 2** illustrates the 2015 peak hour traffic volumes.

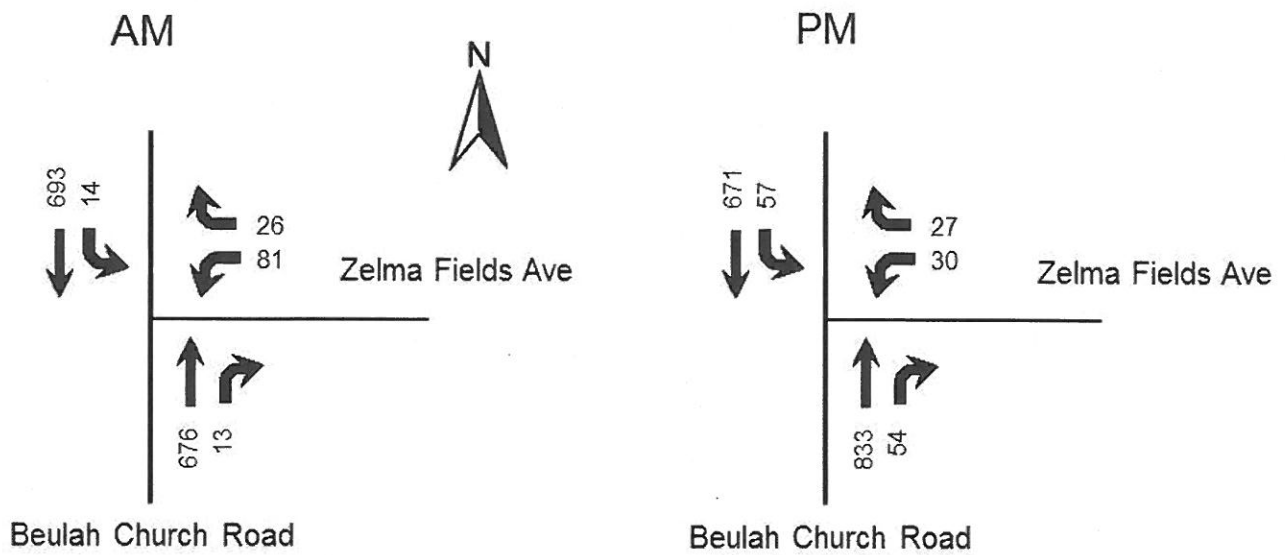


Figure 2. 2015 Peak Hour Volumes

FUTURE CONDITIONS

The projected completion year for this project is 2018, so the analysis year for this study is 2018. To predict traffic conditions in 2018, two and one third percent annual growth in traffic was added to the 2015 volumes on Beulah Church Road. This growth is Metro Louisville's standard rate. Figure 3 displays the 2018 No build volumes.

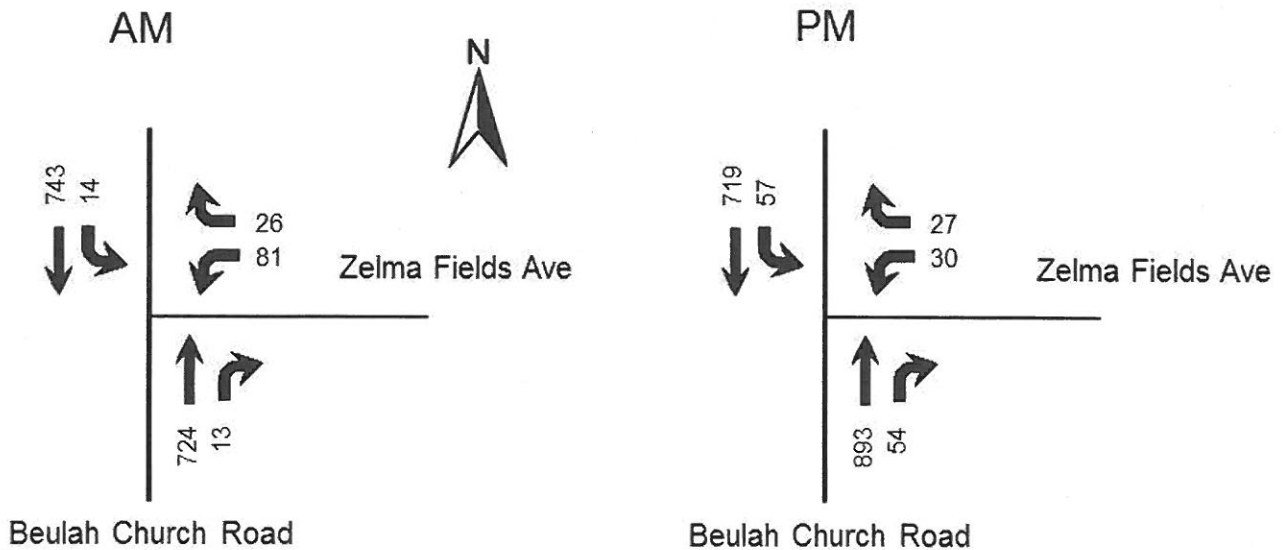


Figure 3. 2018 Peak Hour No Build

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" and "Single-Family Detached Housing" were reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The results of the trip generation analysis are that this development will generate 85 a.m. peak hour trips and 109 p.m. peak hour trips. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network for the year 2018 during the peak hours. **Figure 6** displays the individual turning movements for the year 2018 for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

Land Use	A.M. Peak Hour					P.M. Peak Hour				
	Trips	% In	% OUT	IN	OUT	Trips	% In	% OUT	IN	OUT
Apartments	56	20	80	11	45	76	65	35	49	27
Single Family	29	25	75	7	22	33	63	37	21	12
TOTAL	85			18	67	109			70	39

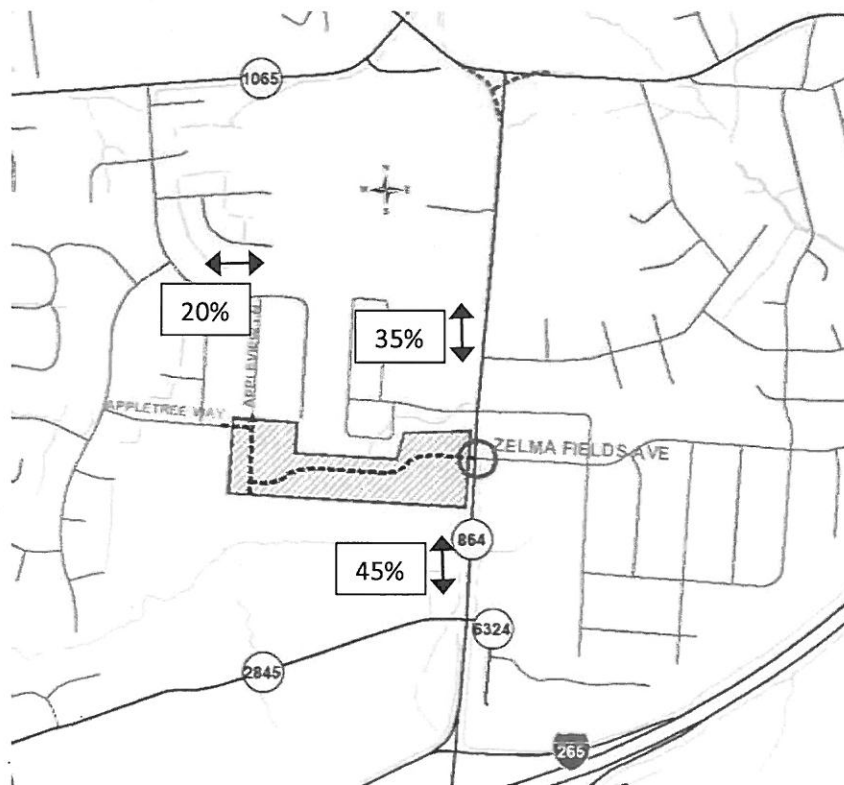


Figure 4. Trips Distribution Percentages

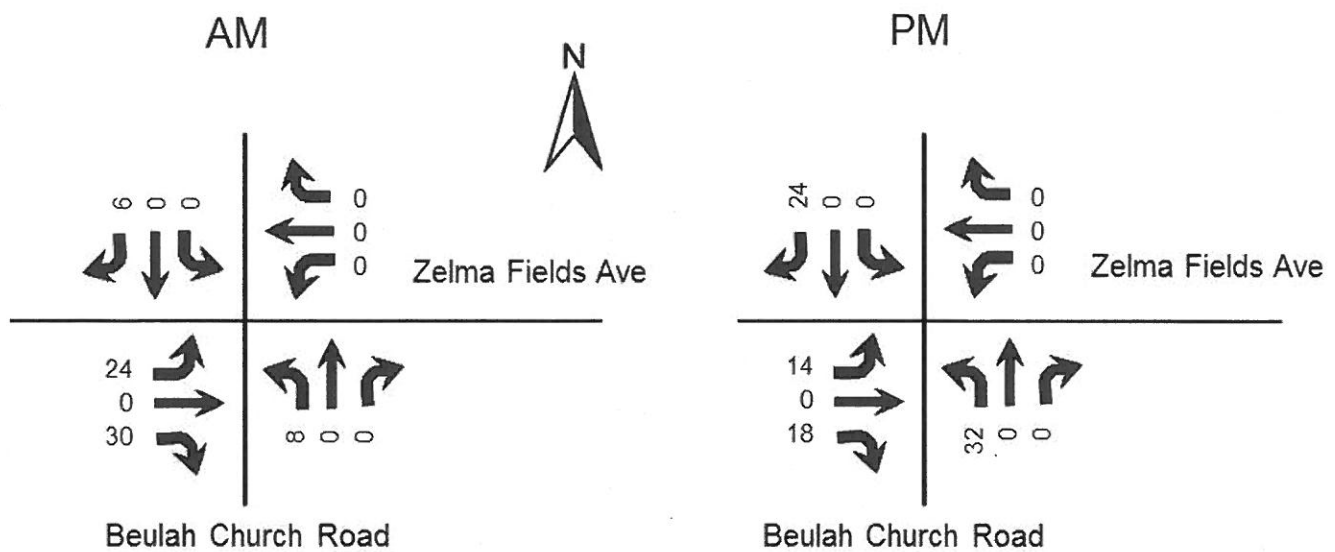


Figure 5. Peak Hour Trips Generated by Site

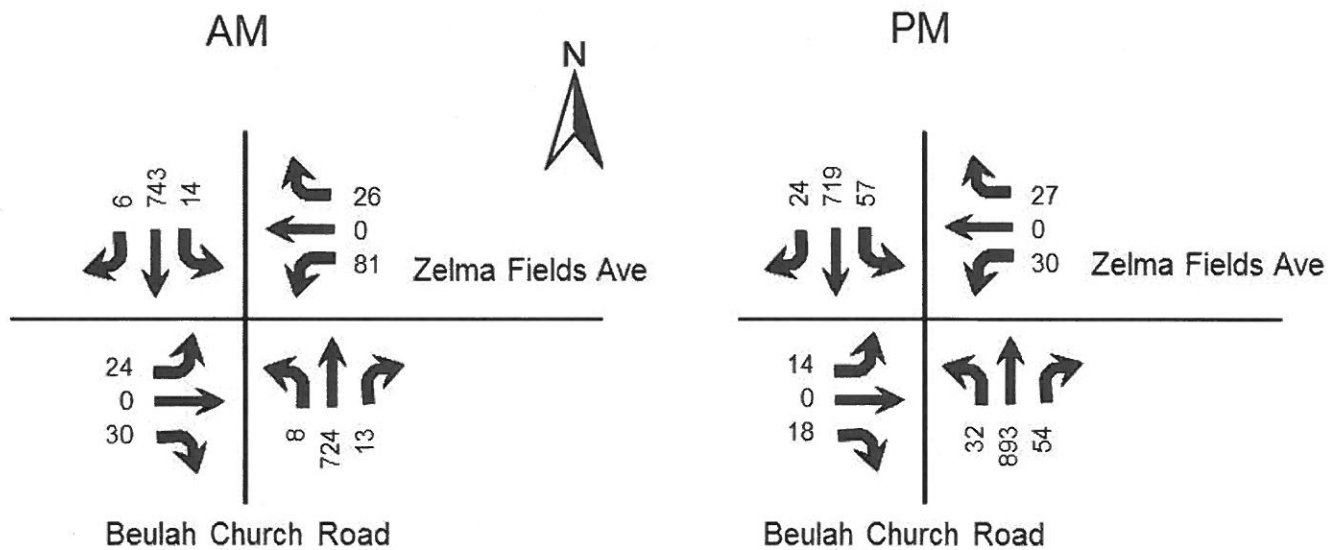


Figure 6. 2018 Peak Hour Build

ANALYSIS

The qualitative measure of traffic operations 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, "A" is the best operating condition and "F" is the worst. LOS results depend upon the facility that is analyzed. In this case, the LOS is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the average vehicle delays at the intersection were determined using procedures detailed in the Highway Capacity Manual, 2010 edition. Future delay and LOS were determined for the intersections using the Highway Capacity Software HCS 2010 Streets (version 6.65) and HCS+ (version 5.6).

Table 2. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2014 Existing	2018 No Build	2018 Build	2014 Existing	2018 No Build	2018 Build
Beulah Church Road at Zelma Fields Ave						
Beulah Church Road Northbound	NA	NA	A 9.5	NA	NA	A 9.4
Beulah Church Road Southbound	A 9.3	A 9.5	A 9.5	B 10.3	B 10.6	B 10.6
Zelma Fields Ave Westbound	D 25.6	D 28.4	E 42.1	C 22.2	C 24.1	D 32.5
Entrance Eastbound			C 23.1			F 81.6

Key: Level of Service, Delay in seconds per vehicle

The Kentucky Transportation Cabinet evaluates the need for turn lanes using Highway Design Memorandum No. 03-09 dated July 28, 2009. The volumes for the 2018 Build condition does not meet the warrants for a northbound right turn on Beulah Church Road at the entrance.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2018, there will be manageable impact to the existing highway network. The delays experienced will increase, but will continue to operate at an acceptable Level of Service. The side streets of Zelma Fields Avenue and the proposed entrance will experience Level of Service E and F. However, a review of the volume to capacity ratio indicates in both scenarios the ratio is less than 0.6, indicating additional lanes are not needed on the approaches.

Traffic Counts

JACOBS

11940 Highway 42, Suite 1
Goshen, KY 40026

Counted by: Andy Wolak

File Name : Beulah ChurchAM
Site Code : 00011415
Start Date : 1/14/2015
Page No : 1

Groups Printed: Unshifted

Start Time	Beulah Church Road From North				Zelma Fields Avenue From East				Beulah Church Road From South				From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	5	171	0	174	29	0	12	41	0	127	0	127	0	0	0	0	341
07:15 AM	1	166	0	167	13	0	9	22	0	177	4	181	0	0	0	0	370
07:30 AM	4	183	0	187	23	0	2	25	0	196	4	200	0	0	0	0	412
07:45 AM	6	173	0	179	17	0	3	20	0	176	5	181	0	0	0	0	380
Total	14	693	0	707	61	0	26	107	0	676	13	689	0	0	0	0	1503
08:00 AM	1	142	0	143	20	0	12	32	0	133	4	137	0	0	0	0	319
08:15 AM	1	111	0	112	12	0	5	17	0	105	3	108	0	0	0	0	237
08:30 AM	3	120	0	123	17	0	11	28	0	95	3	101	0	0	0	0	252
08:45 AM	2	108	0	110	0	0	4	13	0	114	2	116	0	0	0	0	236
Total	7	483	0	490	59	0	32	90	0	450	12	462	0	0	0	0	1047
Grand Total	21	1181	0	1202	139	0	58	197	0	1126	25	1151	0	0	0	0	2550
Approch %	1.7	96.3	0		70.6	0	29.4		0	97.8	2.2		0	0	0	0	
Total %	0.0	48.3	0	47.1	5.5	0	2.3	7.7	0	44.2	1	45.1	0	0	0	0	

Start Time	Beulah Church Road From North				Zelma Fields Avenue From East				Beulah Church Road From South				From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	3	171	0	174	29	0	12	41	0	127	0	127	0	0	0	0	341
07:15 AM	1	166	0	167	13	0	9	22	0	177	4	181	0	0	0	0	370
07:30 AM	4	183	0	187	23	0	2	25	0	196	4	200	0	0	0	0	412
07:45 AM	6	173	0	179	17	0	3	20	0	176	5	181	0	0	0	0	380
Total Volume	14	693	0	707	61	0	26	107	0	676	13	689	0	0	0	0	1503
% App. Total	2	96	0		75.7	0	24.3		0	98.1	1.9		0	0	0	0	
PHF	593	947	000	945	723	000	542	669	000	862	650	861	000	000	000	000	912

Ashton Park Phase II
Traffic Impact Study

JACOBS

11940 Highway 42, Suite 1
Goshen, KY 40026

Counted by: Andy Wolak

File Name : Beulah Church PM
Site Code : 00011315
Start Date : 1/13/2015
Page No : 1

Groups Printed - Unshifted

Start Time	Beulah Church Road From North				Zeima Fields Ave From East				Beulah Church Road From South				From West				In. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	7	162	0	169	7	0	10	17	0	173	13	186	0	0	0	0	356
04:15 PM	10	164	0	174	6	0	9	15	0	197	16	213	0	0	0	0	402
04:30 PM	10	165	0	175	9	0	11	20	0	201	19	220	0	0	0	0	415
04:45 PM	11	170	0	181	6	0	7	13	0	203	16	221	0	0	0	0	415
Total	38	645	0	683	28	0	37	65	0	774	66	840	0	0	0	0	1582
05:00 PM	18	160	0	178	3	0	2	5	0	215	8	223	0	0	0	0	406
05:15 PM	18	176	0	194	12	0	7	19	0	214	9	223	0	0	0	0	436
05:30 PM	4	195	0	199	10	0	5	15	0	196	14	202	0	0	0	0	406
05:45 PM	8	183	0	191	10	0	4	14	0	213	13	226	0	0	0	0	406
Total	48	681	0	729	35	0	18	53	0	839	44	874	0	0	0	0	1656
Grand Total	86	1326	0	1412	53	0	55	110	0	1594	110	1714	0	0	0	0	3244
Approach %	6.1	93.9	0		53.4	0	46.6		0	93.6	6.4		0	0	0		
Total %	2.7	43.6	0	43.6	1.9	0	1.7	3.6	0	49.4	3.4	52.6	0	0	0	0	

Beulah Church Road From North				Zeima Fields Ave From East				Beulah Church Road From South				From West				In. Total	
Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	10	165	0	175	9	0	11	20	0	201	19	220	0	0	0	415	
04:45 PM	11	170	0	181	6	0	7	13	0	203	18	221	0	0	0	415	
05:00 PM	18	160	0	178	3	0	2	5	0	215	8	223	0	0	0	406	
05:15 PM	18	176	0	194	12	0	7	19	0	214	9	223	0	0	0	436	
Total Volume	57	671	0	728	30	0	27	57	0	833	54	887	0	0	0	1672	
% App. Total	7.6	92.2	0		52.6	0	47.4		0	93.9	6.1		0	0	0		
PHF	792	953	000	938	625	000	614	713	000	968	711	994	000	000	000	959	

HCS Reports

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year				
Analysis Time Period	AM Peak			2015				
Project Description Ashton Park								
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		676	13	14	693			
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00		
Hourly Flow Rate, HFR (veh/h)	0	742	14	15	761	0		
Percent Heavy Vehicles	0	—	—	1	—	—		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				81		26		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.91	1.00	0.91		
Hourly Flow Rate, HFR (veh/h)	0	0	0	89	0	28		
Percent Heavy Vehicles	0	0	0	1	0	1		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		15		117				
C (m) (veh/h)		859		290				
v/c		0.02		0.40				
95% queue length		0.05		1.87				
Control Delay (s/veh)		9.3		25.6				
LOS		A		D				
Approach Delay (s/veh)	--	—	25.6					
Approach LOS	--	—	D					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year				
Analysis Time Period	AM Peak			2018 No Build				
Project Description Ashton Park								
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		724	13	14	743			
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00		
Hourly Flow Rate, HFR (veh/h)	0	795	14	15	816	0		
Percent Heavy Vehicles	0	—	—	1	—	—		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				81		26		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.91	1.00	0.91		
Hourly Flow Rate, HFR (veh/h)	0	0	0	89	0	28		
Percent Heavy Vehicles	0	0	0	1	0	1		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		15		117				
C (m) (veh/h)		821		268				
v/c		0.02		0.44				
95% queue length		0.06		2.09				
Control Delay (s/veh)		9.5		28.4				
LOS		A		D				
Approach Delay (s/veh)	—	—	28.4					
Approach LOS	—	—	D					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year				
Analysis Time Period	AM Peak			2018 Build				
Project Description Ashton Park								
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	8	724	13	14	743	6		
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91		
Hourly Flow Rate, HFR (veh/h)	8	795	14	15	816	6		
Percent Heavy Vehicles	1	--	--	1	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	24	0	30	81	0	26		
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91		
Hourly Flow Rate, HFR (veh/h)	26	0	32	89	0	28		
Percent Heavy Vehicles	1	0	1	1	0	1		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			1			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	8	15	117			58		
C (m) (veh/h)	812	821	209			256		
v/c	0.01	0.02	0.56			0.23		
95% queue length	0.03	0.06	3.02			0.85		
Control Delay (s/veh)	9.5	9.5	42.1			23.1		
LOS	A	A	E			C		
Approach Delay (s/veh)	--	--	42.1			23.1		
Approach LOS	--	--	E			C		

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	DBZ			Intersection			
Agency/Co.	Jacobs			Jurisdiction			
Date Performed	1/26/2015			Analysis Year			
Analysis Time Period	PM Peak			2015			
Project Description Ashton Park							
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		833	54	57	671		
Peak-Hour Factor, PHF	1.00	0.96	0.96	0.96	0.96	1.00	
Hourly Flow Rate, HFR (veh/h)	0	867	56	59	698	0	
Percent Heavy Vehicles	0	--	--	1	--	--	
Median Type	Two Way Left Turn Lane						
RT Channelized			0			0	
Lanes	0	1	0	1	1	0	
Configuration			TR	L	T		
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				30		27	
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.96	1.00	0.96	
Hourly Flow Rate, HFR (veh/h)	0	0	0	31	0	28	
Percent Heavy Vehicles	0	0	0	1	0	1	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		L		LR			
v (veh/h)		59		59			
C (m) (veh/h)		744		268			
v/c		0.08		0.22			
95% queue length		0.26		0.82			
Control Delay (s/veh)		10.3		22.2			
LOS		B		C			
Approach Delay (s/veh)	--	--	22.2				
Approach LOS	--	--	C				

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year	2018 No Build			
Analysis Time Period	PM Peak							
Project Description Ashton Park								
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		893	54	57	719			
Peak-Hour Factor, PHF	1.00	0.96	0.96	0.96	0.96	1.00		
Hourly Flow Rate, HFR (veh/h)	0	930	56	59	748	0		
Percent Heavy Vehicles	0	--	--	1	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				30		27		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.96	1.00	0.96		
Hourly Flow Rate, HFR (veh/h)	0	0	0	31	0	28		
Percent Heavy Vehicles	0	0	0	1	0	1		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		59		59				
C (m) (veh/h)		705		247				
v/c		0.08		0.24				
95% queue length		0.27		0.91				
Control Delay (s/veh)		10.6		24.1				
LOS		B		C				
Approach Delay (s/veh)	--	--	24.1					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	DBZ			Intersection				
Agency/Co.	Jacobs			Jurisdiction				
Date Performed	1/26/2015			Analysis Year	2018 Build			
Analysis Time Period	PM Peak							
Project Description Ashton Park								
East/West Street: Zelma Fields Ave				North/South Street: Beulah Church Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	32	893	54	57	719	24		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	33	930	56	59	748	25		
Percent Heavy Vehicles	0	—	—	1	—	—		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	14	18	0	30	0	27		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	14	18	0	31	0	28		
Percent Heavy Vehicles	1	0	1	1	0	1		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		1			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (veh/h)	33	59		59			32	
C (m) (veh/h)	851	705		189			77	
v/c	0.04	0.08		0.31			0.42	
95% queue length	0.12	0.27		1.26			1.65	
Control Delay (s/veh)	9.4	10.6		32.5			81.6	
LOS	A	B		D			F	
Approach Delay (s/veh)	—	—	32.5			81.6		
Approach LOS	—	—	D			F		