final report

March 9, 2018
Revised March 21, 2018

Traffic Impact Study

River Pointe Apartments
12503 Dixie Highway
Louisville, KY

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet

DIANE B. ZIMMERMAN
Traffic Engineering, LLC

12803 High Meadows Pike
Prospect, KY 40059
502.648.1858
dianebzim@att.net

Table of Contents

INTRODUCTION

The detail development plan for River Pointe Apartments on Dixie Highway (US 31W), in Louisville, KY shows 256 multi-family units with two outlots for future commercial use, and a tract identified for a future assisted living facility. **Figure 1** displays a map of the site. Access to the development will be from three entrances on Dixie Highway and an entrance on Old Dixie Highway. Old Dixie Highway will terminate at the property line. The future assisted living facility would have access only from Old Dixie Highway. 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 proposed entrance on Dixie Highway.

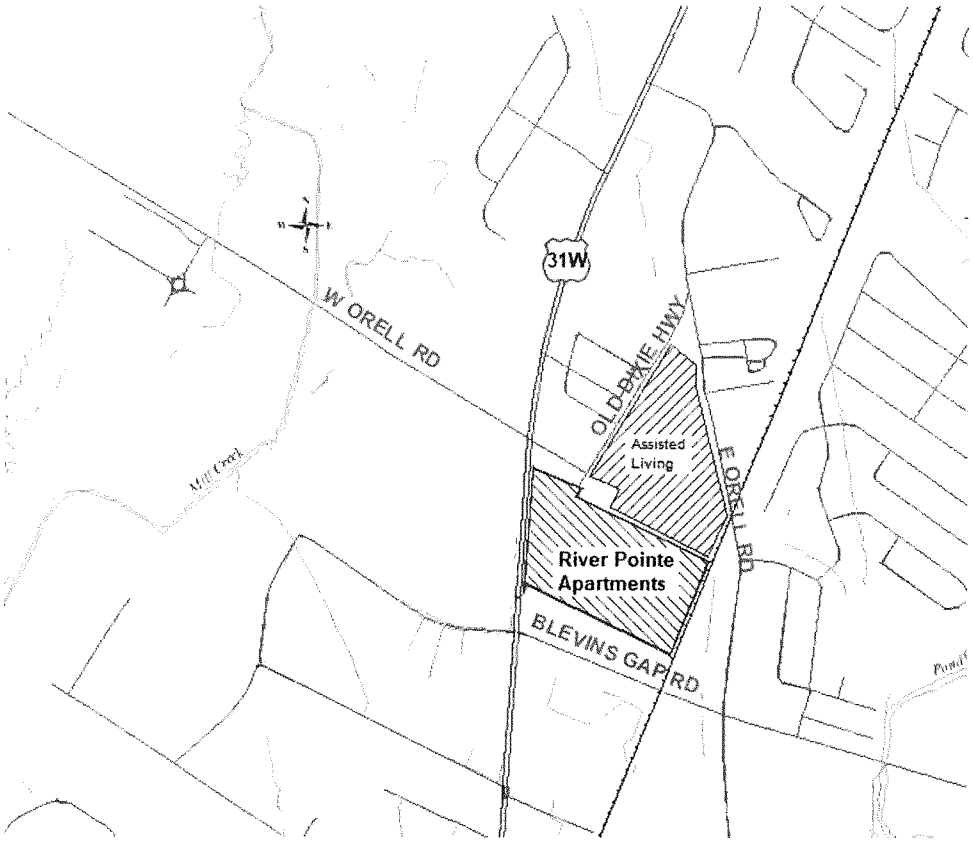


Figure 1. Site Map

EXISTING CONDITIONS

Dixie Highway, US 31W, is a state-maintained road with an estimated 2018 ADT of 29,500 vehicles per day south of E Orell Road, as provided by a 2016 Metro Public Works count. The road is a four-lane highway with eleven-foot lanes, an eleven-foot shoulder, and a two-way left turn lane. The speed limit is 50 mph. There are no sidewalks. The intersection with Old Dixie Highway has a stop sign on Old Dixie Highway.

Peak hour traffic counts for the intersections were obtained on February 20, 2018. The a.m. peak hour occurred between 7:00 and 8:00 a.m. The p.m. peak occurred between 4:45 and 5:45 p.m. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes.

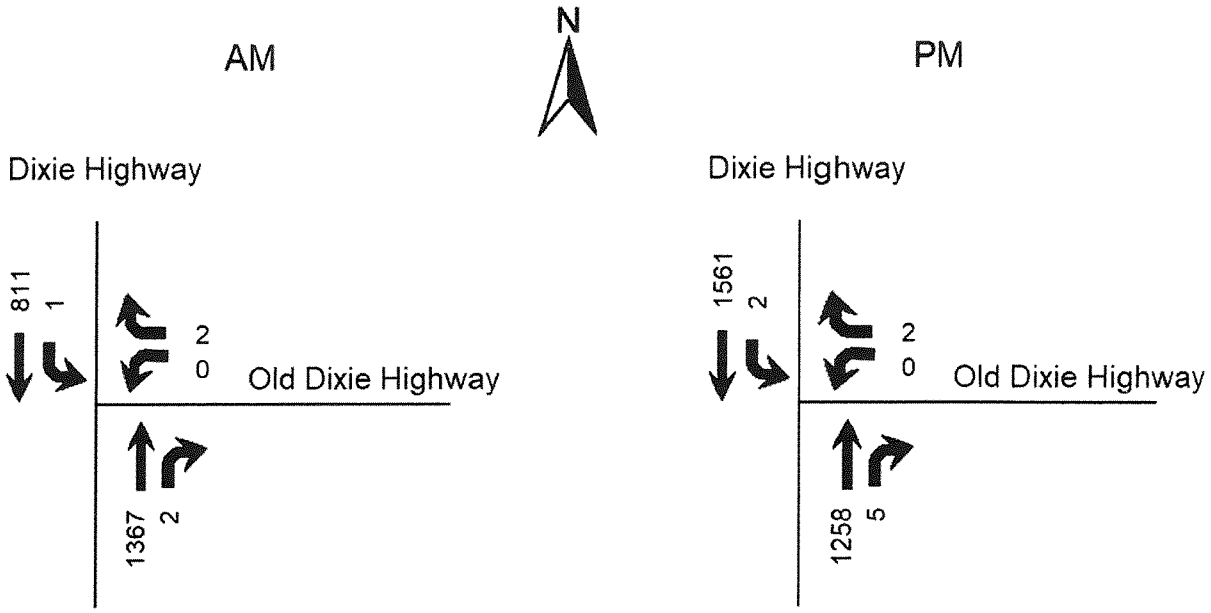


Figure 2. Existing (2018) Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2021. An annual growth rate of 1.0 percent was applied to 2018 traffic volumes. This is based upon a review of historical traffic counts at station KYTC station 512. **Figure 3** displays the 2021 No Build peak hour volumes.

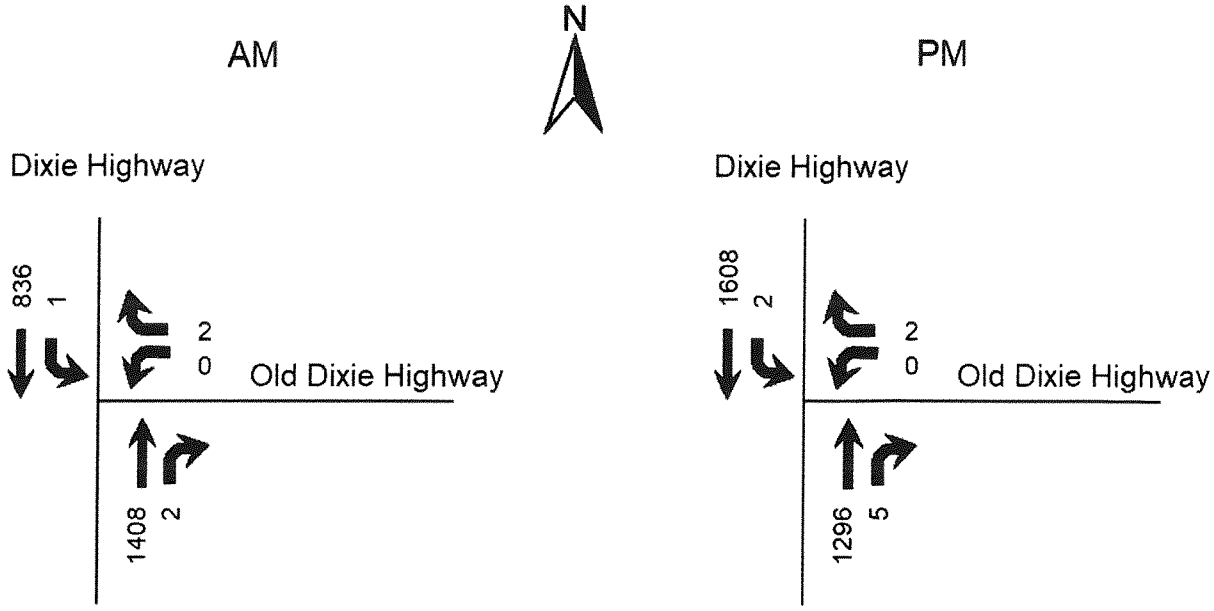


Figure 3. No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The land uses of "Multifamily Housing (Low-Rise) (220)" and "High Turnover Sit-down Restaurant (932)" were reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. 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 during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	Trips	In	Out	Trips	In	Out
Multifamily Low-Rise (256 units)	117	27	90	136	86	50
High Turnover Sit-down (10,000 sq ft)	99	54	45	98	61	37
TOTAL	**216**	**81**	**135**	**244**	**147**	**87**

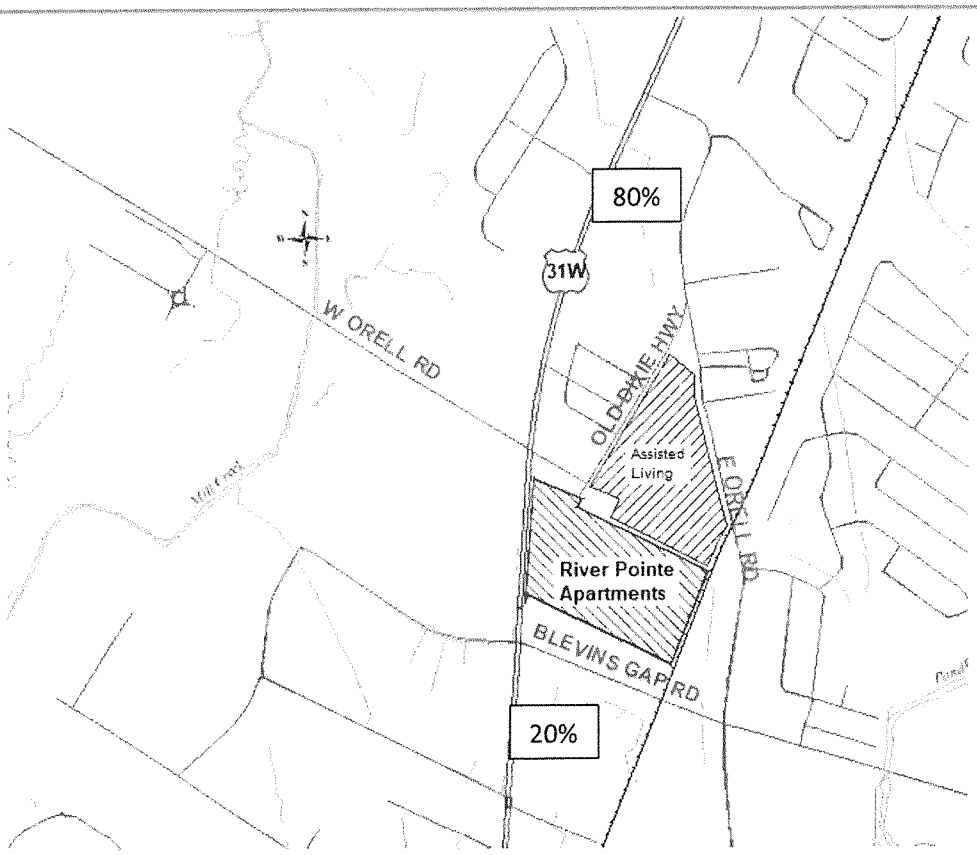


Figure 4. Trip Distribution Percentages

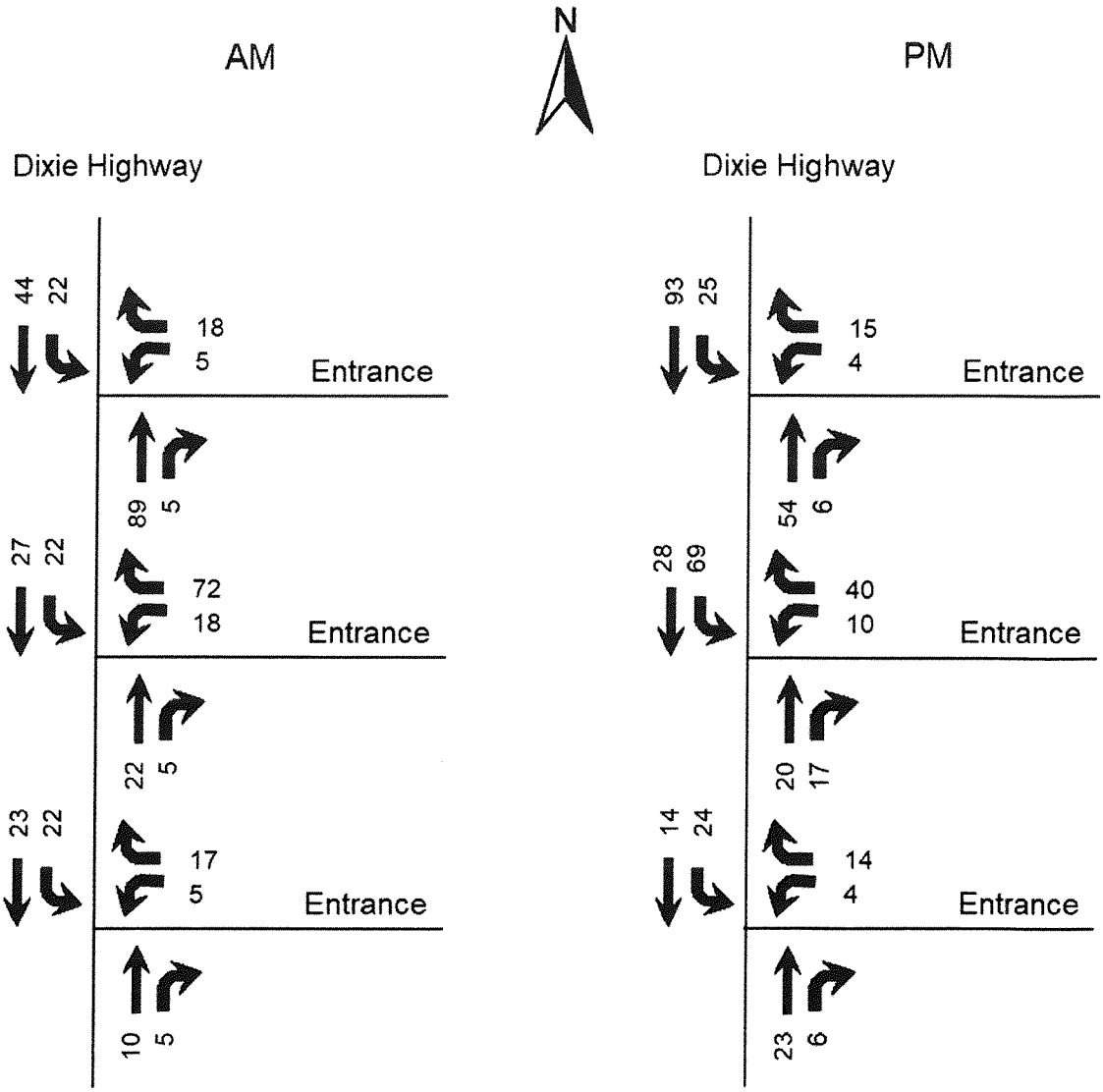


Figure 5. Peak Hour Trips Generated by Site

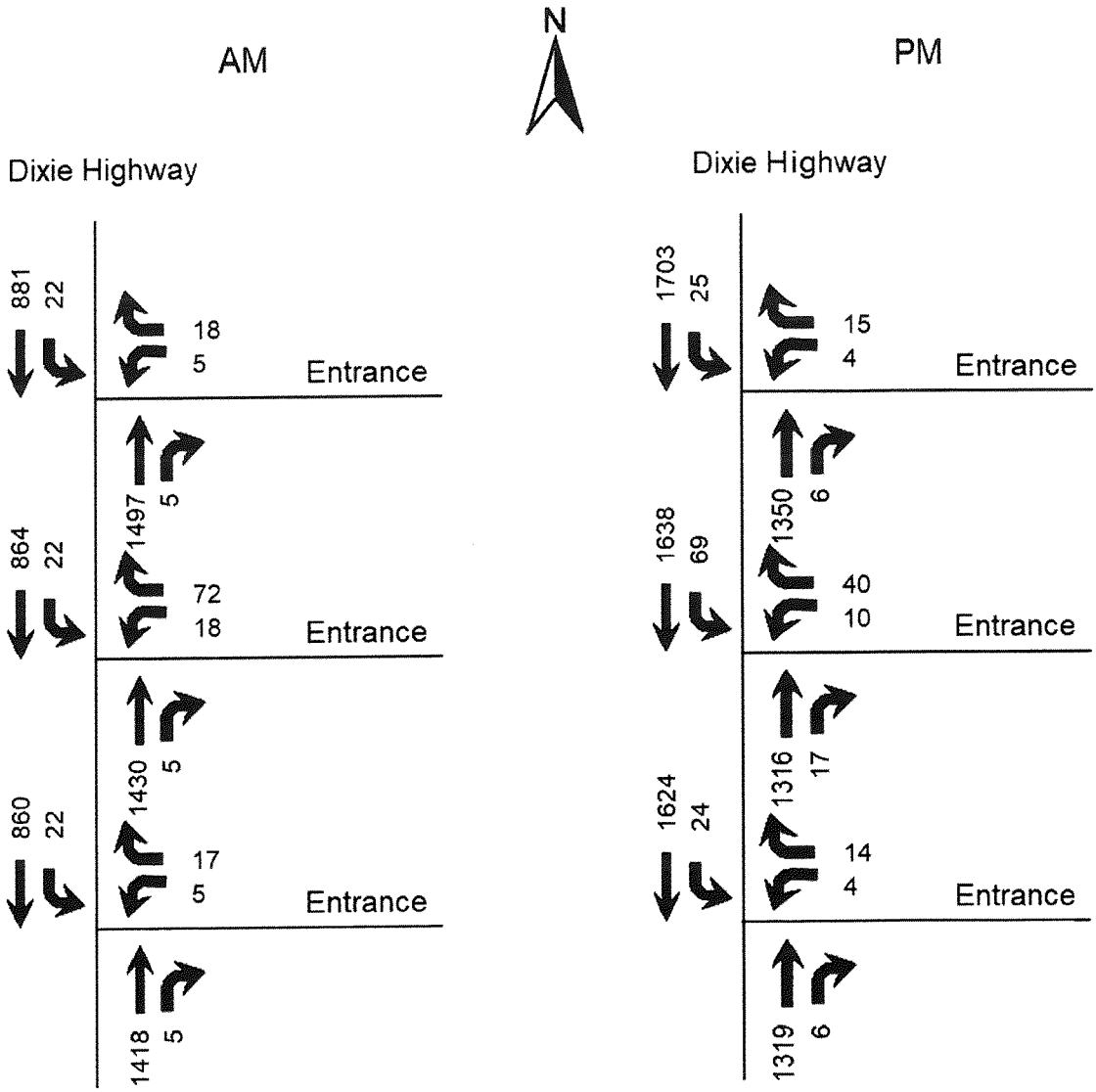


Figure 6. 2021 Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 6th edition. Future delays and Level of Service were determined

for the intersections using the HCS Streets (version 7.4) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2018 Existing	2021 No Build	2021 Build	2018 Existing	2021 No Build	2021 Build
Dixie Highway at Entrance 1						
Entrance 1 Westbound			C 21.7			C 19.2
Dixie Highway Southbound (left)			B 14.8			B 12.9
Dixie Highway at Entrance 2						
Entrance 2 Westbound			C 23.1			C 20.1
Dixie Highway Southbound (left)			B 14.1			B 13.5
Dixie Highway at Entrance 3 (existing Old Dixie)						
Entrance 3 Westbound	C 15.1	C 15.5	C 20.5	C 13.8	C 14.1	C 18.8
Dixie Highway Southbound (left)	B 13.0	B 13.3	B 14.0	B 11.8	B 12.0	B 12.6

Key: Level of Service, Delay in seconds per vehicle

The entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated March, 2017. The traffic impact policy requires using volumes for ten years beyond build-out, or 2031. The 2031 volumes were determined by applying a one percent annual growth rate from 2021. **Figure 7** illustrates the 2031 No Build volumes. **Figure 8** illustrates the 2031 Build Volumes. Using the volumes in Figure 8, left turn lanes would be required at the entrances if the two-way left turn lane was not existing. Right turn lanes will not be required. **Table 3** summarizes the delay and Level of Service for 2031.

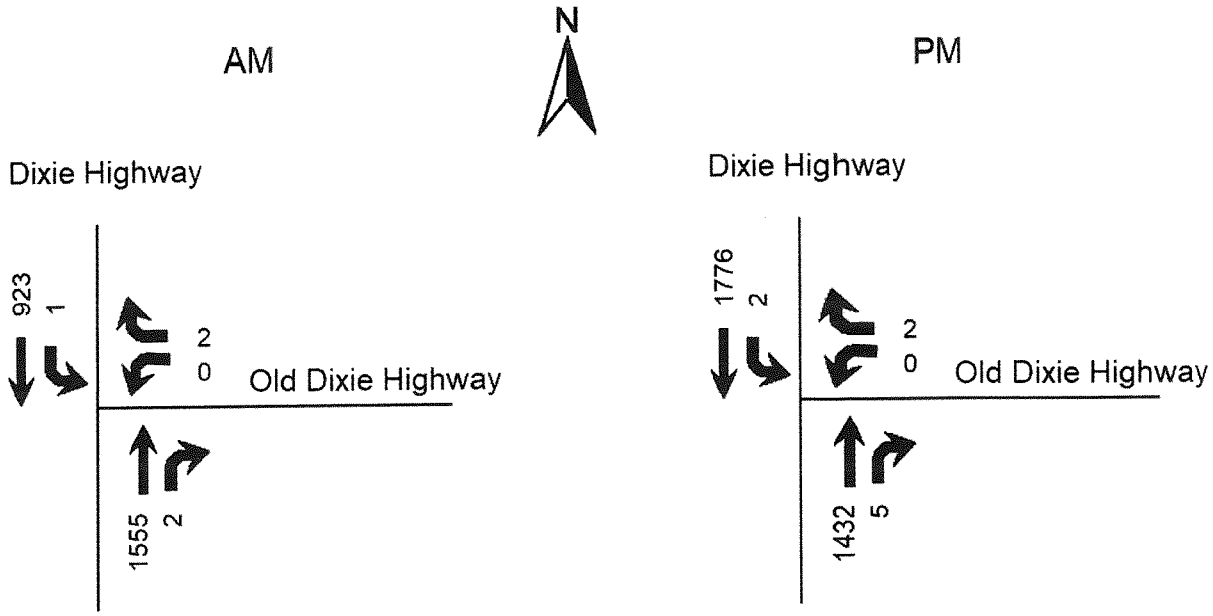


Figure 7. 2031 No Build Peak Hour Volumes

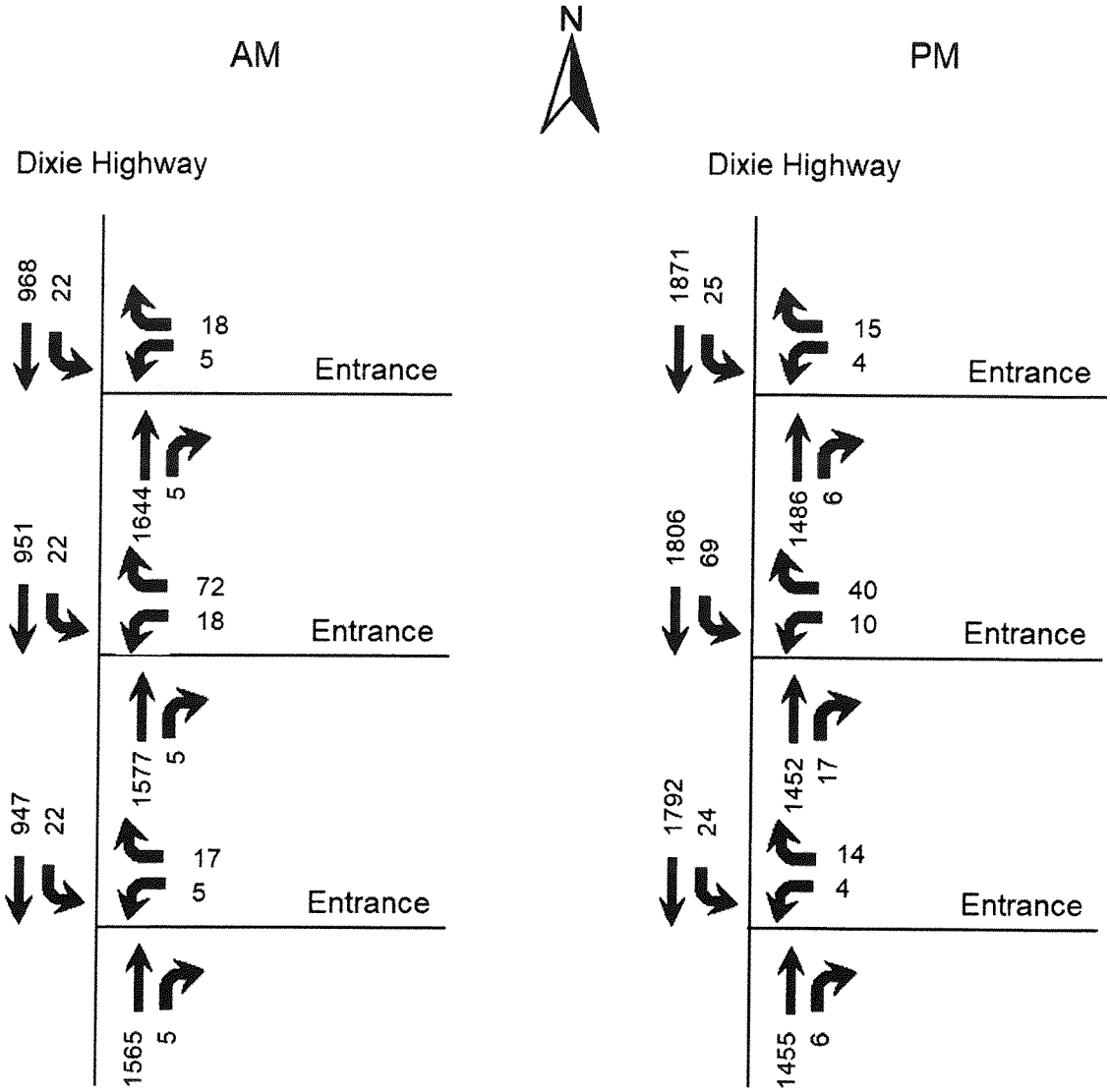


Figure 8. 2031 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2018 Existing	2031 No Build	2031 Build	2018 Existing	2031 No Build	2031 Build
Dixie Highway at Entrance1						
Entrance 1 Westbound			C 24.7			C 21.4
Dixie Highway Southbound (left)			C 16.4			B 14.0
Dixie Highway at Entrance2						
Entrance 2 Westbound			D 26.9			C 22.6
Dixie Highway Southbound (left)			C 15.6			B 14.9
Dixie Highway at Entrance 3 (existing Old Dixie)						
Entrance 3 Westbound	C 15.1	C 16.9	C 23.3	C 13.8	C 15.1	C 21.0
Dixie Highway Southbound (left)	B 13.0	B 14.6	C 15.5	B 11.8	B 13.0	C 13.7

Key: Level of Service, Delay in seconds per vehicle

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2021 and 2031, there will be an impact to the existing highway network. The delays experienced in the area will increase within acceptable limits. No improvements are required.

APPENDIX

Traffic Counts

US 31W Dixie Highway at Old Dixie Highway
2/20/2018

Groundbreaking by Design.

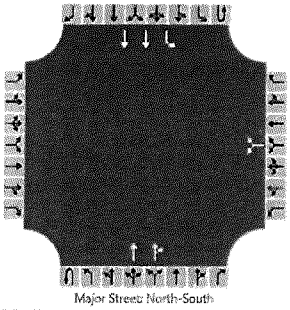
Leg	Dixie Hwy		Old Dixie Hwy		Dixie Hwy			
Direction	Southbound		Westbound		Northbound			
Start Time	Left	Thru	Left	Right	Thru	Right	U-Turn	**Int Total**
7:00:00	0	180	0	0	411	0	0	**591**
7:15:00	0	226	0	1	375	1	0	**603**
7:30:00	0	218	0	0	336	0	0	**554**
7:45:00	1	187	0	1	245	1	1	**436**
8:00:00	0	203	0	0	264	0	0	**467**
8:15:00	0	177	0	0	329	0	0	**506**
8:30:00	0	193	0	0	286	0	0	**479**
8:45:00	0	144	0	0	280	0	0	**424**
16:00:00	2	351	1	1	254	1	0	**610**
16:15:00	2	360	1	1	307	2	0	**673**
16:30:00	0	405	0	2	250	0	0	**657**
16:45:00	1	387	0	0	323	2	0	**713**
17:00:00	1	394	0	1	277	2	0	**675**
17:15:00	0	412	0	1	321	1	0	**735**
17:30:00	0	368	0	0	337	0	0	**705**
17:45:00	1	320	0	0	316	1	0	**638**
Grand Total	8	4525	2	8	4911	11	1	**9466**
% Approach	0.2%	99.8%	20.0%	80.0%	99.8%	0.2%	0.0%	
% Total	0.1%	47.8%	0.0%	0.1%	51.9%	0.1%	0.0%	
Lights and M	8	4322	2	8	4734	10	1	**9085**
% Lights and	100%	95.5%	100%	100%	96.4%	90.9%	100%	**96.0%**
Heavy	0	203	0	0	177	1	0	**381**
% Heavy	0.0%	4.5%	0.0%	0.0%	3.6%	9.1%	0.0%	**4.0%**
7:00:00	0	180	0	0	411	0	0	**591**
7:15:00	0	226	0	1	375	1	0	**603**
7:30:00	0	218	0	0	336	0	0	**554**
7:45:00	1	187	0	1	245	1	1	**436**
AM TOTAL	**1**	**811**	**0**	**2**	**1367**	**2**	**1**	**2184**
16:45:00	1	387	0	0	323	2	0	**713**
17:00:00	1	394	0	1	277	2	0	**675**
17:15:00	0	412	0	1	321	1	0	**735**
17:30:00	0	368	0	0	337	0	0	**705**
PM TOTAL	**2**	**1561**	**0**	**2**	**1258**	**5**	**0**	**2828**

HCS Reports

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2018	North/South Street	Dixie
Time Analyzed	AM Peak	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1367	2		1	811	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

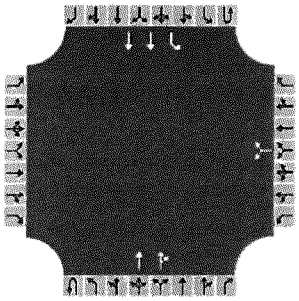
Flow Rate, v (veh/h)							2							1		
Capacity, c (veh/h)							357							451		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							15.1							13.0		
Level of Service, LOS							C							B		
Approach Delay (s/veh)						15.1								0.0		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Old Dixie 18 AM.xtw
Generated: 3/7/2018 4:02:26 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1408	2		1	836	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							1		
Capacity, c (veh/h)							345							434		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							15.5							13.3		
Level of Service, LOS							C							B		
Approach Delay (s/veh)						15.5								0.0		
Approach LOS						C										

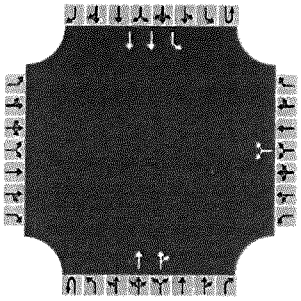
HCS7™ TWSC Version 7.4
Old Dixie 21 AM NB.xtw

Generated: 3/7/2018 4:03:53 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1555	2		1	923	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							1		
Capacity, c (veh/h)							306							376		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							16.9							14.6		
Level of Service, LOS							C							B		
Approach Delay (s/veh)						16.9								0.0		
Approach LOS						C										

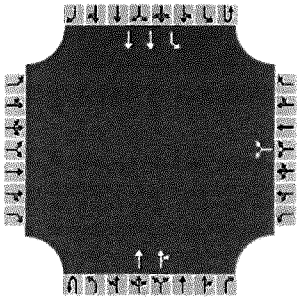
HCS7™ TWSC Version 7.4
Old Dixie 31 AM NB.xtw

Generated: 3/7/2018 4:04:50 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2018	North/South Street	Dixie
Time Analyzed	PM Peak	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1258	5		2	1561	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							2		
Capacity, c (veh/h)							412							532		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							13.8							11.8		
Level of Service, LOS							B							B		
Approach Delay (s/veh)						13.8								0.0		
Approach LOS						B										

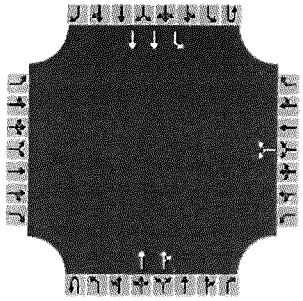
HCS7™ TWSC Version 7.4
Old Dixie 18 PM.xtw

Generated: 3/7/2018 4:10:45 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1296	5		2	1608	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							2		
Capacity, c (veh/h)							399							514		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							14.1							12.0		
Level of Service, LOS							B							B		
Approach Delay (s/veh)						14.1								0.0		
Approach LOS						B										

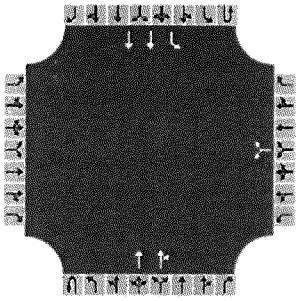
HCS7™ TWSC Version 7.4
Old Dixie 21 PM NB.xtw

Generated: 3/7/2018 4:11:42 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/7/2018	East/West Street	Old Dixie
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						0		2			1432	5		2	1776	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							2		
Capacity, c (veh/h)							359							454		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							15.1							13.0		
Level of Service, LOS							C							B		
Approach Delay (s/veh)						15.1								0.0		
Approach LOS						C										

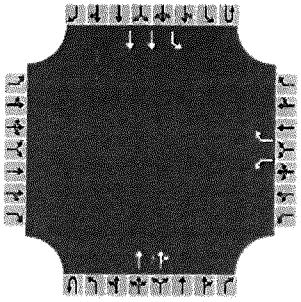
HCS7™ TWSC Version 7.4
Old Dixie 31 PM NB.xtw

Generated: 3/7/2018 4:12:47 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 1
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						5		18			1497	5		22	881	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

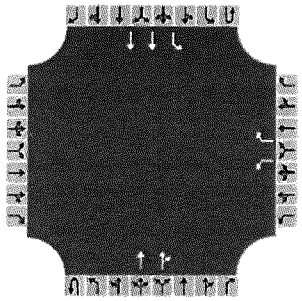
Flow Rate, v (veh/h)						5		20						24		
Capacity, c (veh/h)						114		318						392		
v/c Ratio						0.05		0.06						0.06		
95% Queue Length, Q_{95} (veh)						0.2		0.2						0.2		
Control Delay (s/veh)						38.3		17.1						14.8		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						21.7								0.4		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 1 21 AM B.xtw
Generated: 3/21/2018 4:36:16 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 2
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						18		72			1430	5		22	864	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						20		79						24		
Capacity, c (veh/h)						124		336						418		
v/c Ratio						0.16		0.24						0.06		
95% Queue Length, Q_{95} (veh)						0.5		0.9						0.2		
Control Delay (s/veh)						39.5		19.0						14.1		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						23.1								0.4		
Approach LOS						C										

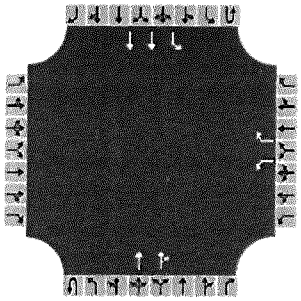
HCS7™ TWSC Version 7.4
Entrance 2 21 AM B.xtw

Generated: 3/21/2018 4:40:29 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 3
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						5		17			1418	5		22	860	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

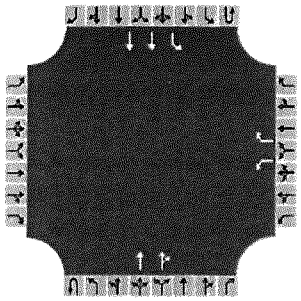
Flow Rate, v (veh/h)						5		19						24		
Capacity, c (veh/h)						126		339						423		
v/c Ratio						0.04		0.06						0.06		
95% Queue Length, Q_{95} (veh)						0.1		0.2						0.2		
Control Delay (s/veh)						35.0		16.2						14.0		
Level of Service, LOS						D		C						B		
Approach Delay (s/veh)						20.5								0.3		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 3 21 AM B.xtw
Generated: 3/21/2018 4:44:44 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 1
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						5		18			1644	5		22	968	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5		20						24		
Capacity, c (veh/h)						93		281						339		
v/c Ratio						0.06		0.07						0.07		
95% Queue Length, Q_{95} (veh)						0.2		0.2						0.2		
Control Delay (s/veh)						45.9		18.8						16.4		
Level of Service, LOS						E		C						C		
Approach Delay (s/veh)						24.7								0.4		
Approach LOS						C										

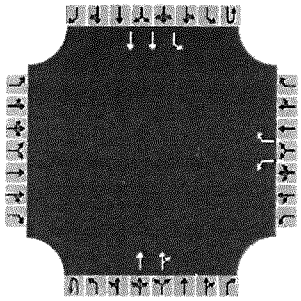
HCS7™ TWSC Version 7.4
Entrance 1 31 AM B.xtw

Generated: 3/21/2018 4:37:43 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 2
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						10		40			1316	17		69	1638	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

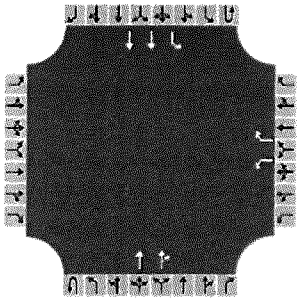
Flow Rate, v (veh/h)						10		42						72		
Capacity, c (veh/h)						117		388						494		
v/c Ratio						0.09		0.11						0.15		
95% Queue Length, Q_{95} (veh)						0.3		0.4						0.5		
Control Delay (s/veh)						38.9		15.4						13.5		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						20.1								0.5		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 2 21 PM B.xtw
Generated: 3/21/2018 4:41:19 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 3
Analysis Year	2021	North/South Street	Dixie
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						4		14			1319	6		24	1624	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

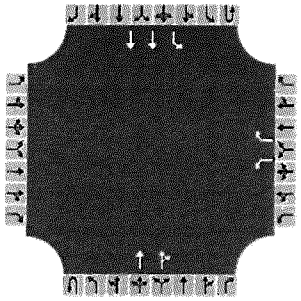
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4		15						25		
Capacity, c (veh/h)						130		390						498		
v/c Ratio						0.03		0.04						0.05		
95% Queue Length, Q_{95} (veh)						0.1		0.1						0.2		
Control Delay (s/veh)						33.7		14.6						12.6		
Level of Service, LOS						D		B						B		
Approach Delay (s/veh)						18.8								0.2		
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 1
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						5		18			1644	5		22	968	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

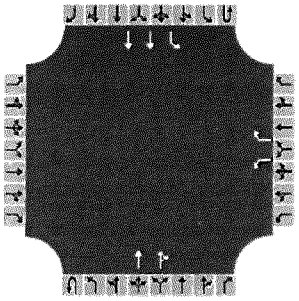
Flow Rate, v (veh/h)						5		20						24		
Capacity, c (veh/h)						93		281						339		
v/c Ratio						0.06		0.07						0.07		
95% Queue Length, Q_{95} (veh)						0.2		0.2						0.2		
Control Delay (s/veh)						45.9		18.8						16.4		
Level of Service, LOS						E		C						C		
Approach Delay (s/veh)						24.7								0.4		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 1 31 AM B.xtw
Generated: 3/21/2018 4:37:43 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 2
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						18		72			1577	5		22	951	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

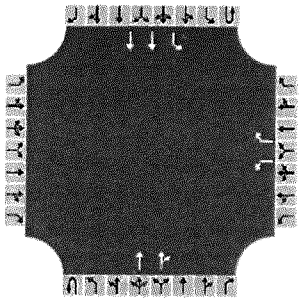
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						20		79						24		
Capacity, c (veh/h)						102		297						363		
v/c Ratio						0.19		0.27						0.07		
95% Queue Length, Q_{95} (veh)						0.7		1.0						0.2		
Control Delay (s/veh)						48.7		21.4						15.6		
Level of Service, LOS						E		C						C		
Approach Delay (s/veh)						26.9								0.4		
Approach LOS						D										

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 3
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						5		17			1565	5		22	947	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						5		19						24		
Capacity, c (veh/h)						103		300						367		
v/c Ratio						0.05		0.06						0.07		
95% Queue Length, Q_{95} (veh)						0.2		0.2						0.2		
Control Delay (s/veh)						41.8		17.8						15.5		
Level of Service, LOS						E		C						C		
Approach Delay (s/veh)						23.3								0.4		
Approach LOS						C										

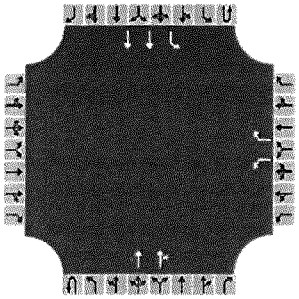
HCS7™ TWSC Version 7.4
Entrance 3 31 AM B.xtw

Generated: 3/21/2018 4:46:21 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 1
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

Lanes



Major Street: North-South

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						4		15			1486	6		25	1871	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4		16						26		
Capacity, c (veh/h)						103		342						427		
v/c Ratio						0.04		0.05						0.06		
95% Queue Length, Q_{95} (veh)						0.1		0.1						0.2		
Control Delay (s/veh)						41.3		16.0						14.0		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						21.4								0.2		
Approach LOS						C										

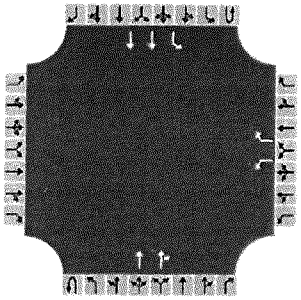
HCS7™ TWSC Version 7.4
Entrance 1 31 PM B.xtw

Generated: 3/21/2018 4:39:37 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 2
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						10		40			1452	17		69	1806	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

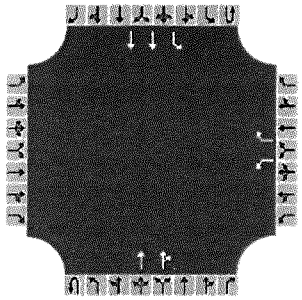
Flow Rate, v (veh/h)						10		42						72		
Capacity, c (veh/h)						98		348						436		
v/c Ratio						0.11		0.12						0.16		
95% Queue Length, Q_{95} (veh)						0.3		0.4						0.6		
Control Delay (s/veh)						46.1		16.7						14.9		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						22.6								0.5		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 2 31 PM B.xtw
Generated: 3/21/2018 4:43:51 PM

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Diane Zimmerman	Intersection	Dixie at Old Dixie
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	3/21/2018	East/West Street	Entrance 3
Analysis Year	2031	North/South Street	Dixie
Time Analyzed	PM Peak Build	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	River Pointe Apts		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume, V (veh/h)						4		14			1455	6		24	1792	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4		15						25		
Capacity, c (veh/h)						109		350						439		
v/c Ratio						0.04		0.04						0.06		
95% Queue Length, Q_{95} (veh)						0.1		0.1						0.2		
Control Delay (s/veh)						39.4		15.7						13.7		
Level of Service, LOS						E		C						B		
Approach Delay (s/veh)						21.0								0.2		
Approach LOS						C										

HCS7™ TWSC Version 7.4
Entrance 3 31 PM B.xtw
Generated: 3/21/2018 4:47:07 PM