

# final report

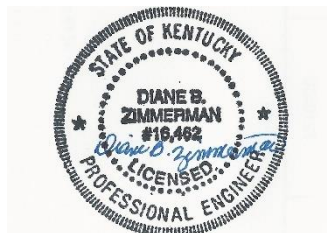
July 13, 2020

## Traffic Impact Study

1007 South English Station Road  
Louisville, KY

Prepared for

Louisville Metro Planning Commission



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## INTRODUCTION

The development plan for an apartment community and patio homes on South English Station Road in Louisville, KY shows 168 apartment units and 58 patio homes. **Figure 1** displays a map of the site. Access to the community will be from two entrances on South English Station Road. 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 entrances on South English Station Road.

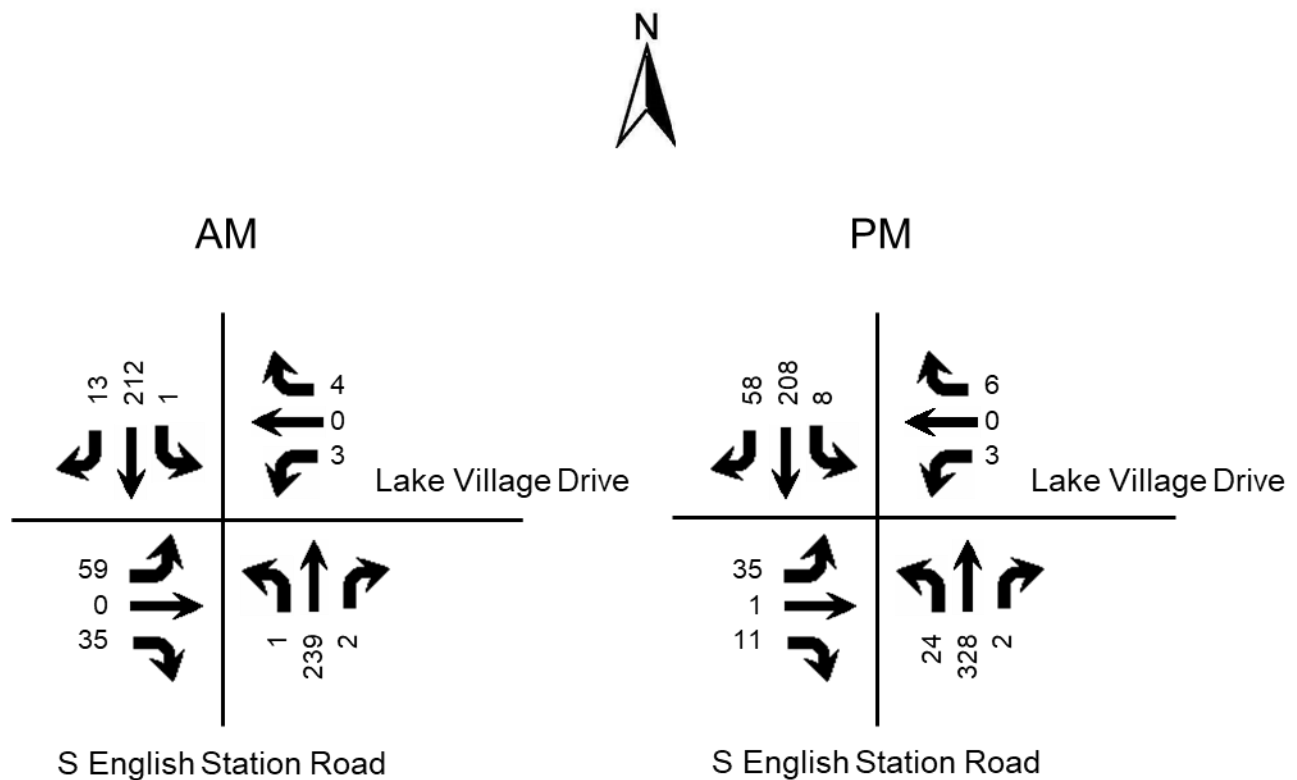


Figure 1. Site Map

## EXISTING CONDITIONS

South English Station Road is maintained by Louisville Metro with an estimated 2020 ADT of 3,100 vehicles per day south of Lake Village Drive as estimated from the turning movement count. The count was divided by 0.12, the estimated K factor for South English Station Road. The road is a two-lane road with nine-foot lanes with a one-foot shoulder. The speed limit is 35 mph. There are no sidewalks.

Peak hour traffic counts for the intersection of South English Station Road at Lake Village Drive was obtained on Tuesday, March 3, 2020. The a.m. peak hour was 7:15 to 8:15 and the p.m. peak hour was 4:45 to 5:45. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data for the intersection.



**Figure 2. Existing Peak Hour Volumes**

## FUTURE CONDITIONS

The project completion date is 2023. An annual growth rate of 2.0 percent was applied to the thru 2020 volumes. Additionally, trip generation for 72 additional single-family homes in Signature Point and 105 single family homes just south of I 64 was included on South English Station Road. **Figure 3** displays the 2023 No Build peak hour volumes.

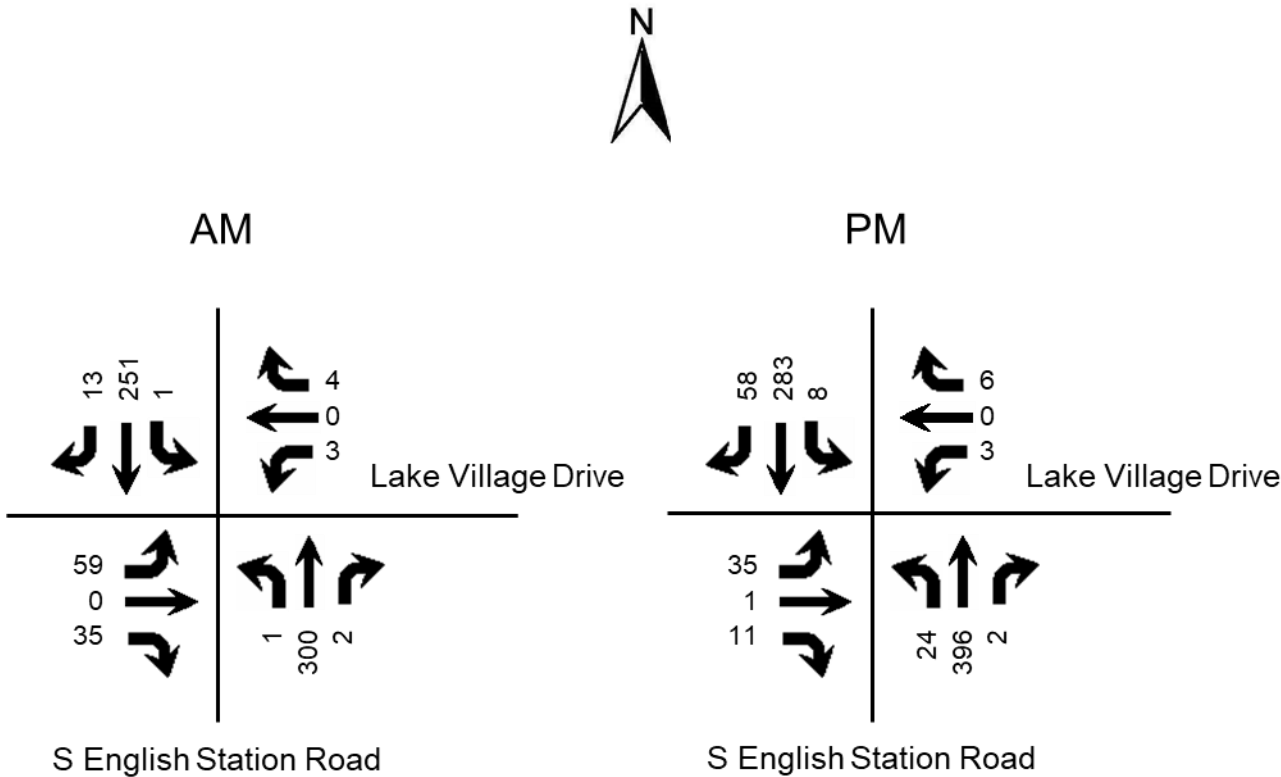


Figure 3. 2023 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10<sup>th</sup> Edition contains trip generation rates for a wide range of developments. The land uses of “Multifamily Housing Mid-Rise (221)” and “Multifamily Housing Low-Rise (220)” 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

Land Use	A.M. Peak Hour			P.M. Peak Hour		
	Trips	In	Out	Trips	In	Out
Multifamily Housing Mid-Rise (168 units)	57	15	42	73	45	28
Multifamily Housing Low-Rise (58 units)	28	6	22	36	23	13
TOTAL	85	21	64	109	68	41



**Figure 4. Trip Distribution Percentages**

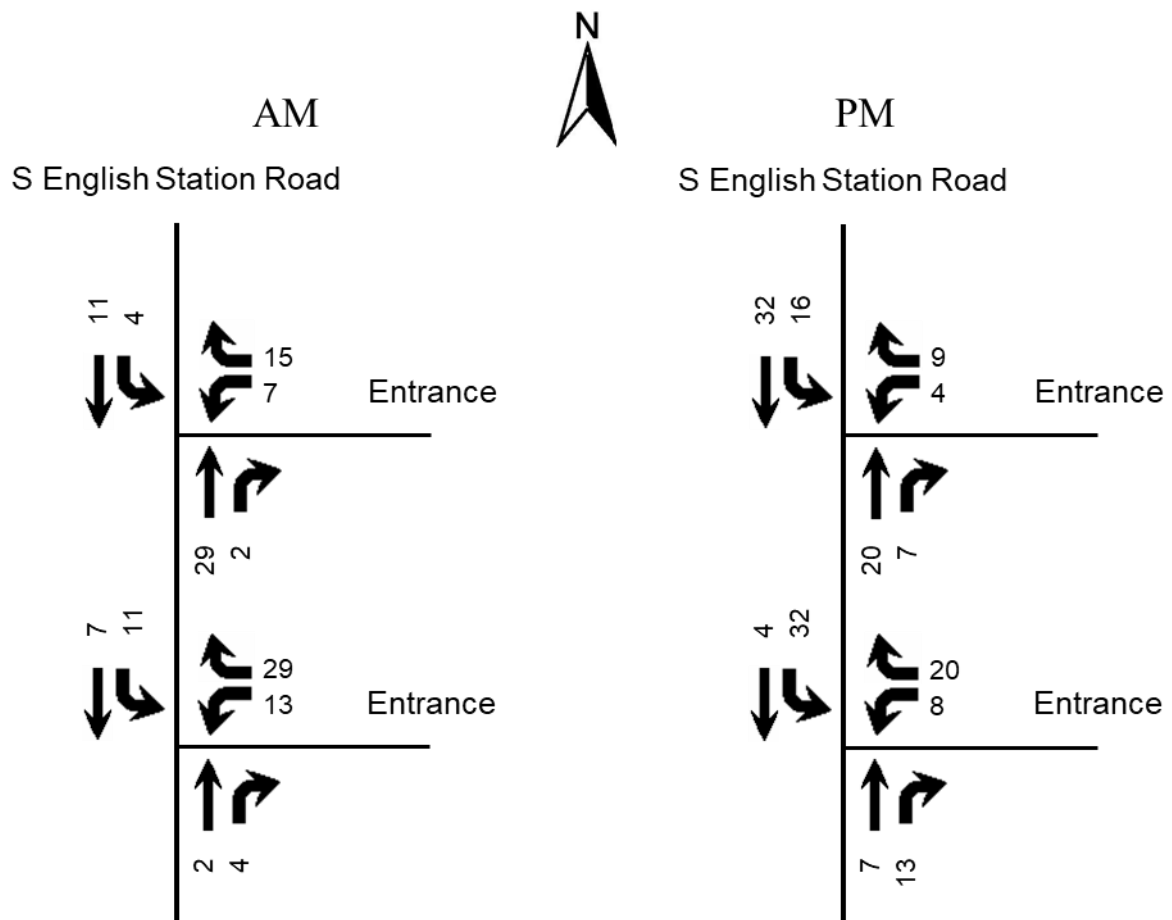


Figure 5. Peak Hour Trips Generated by Site

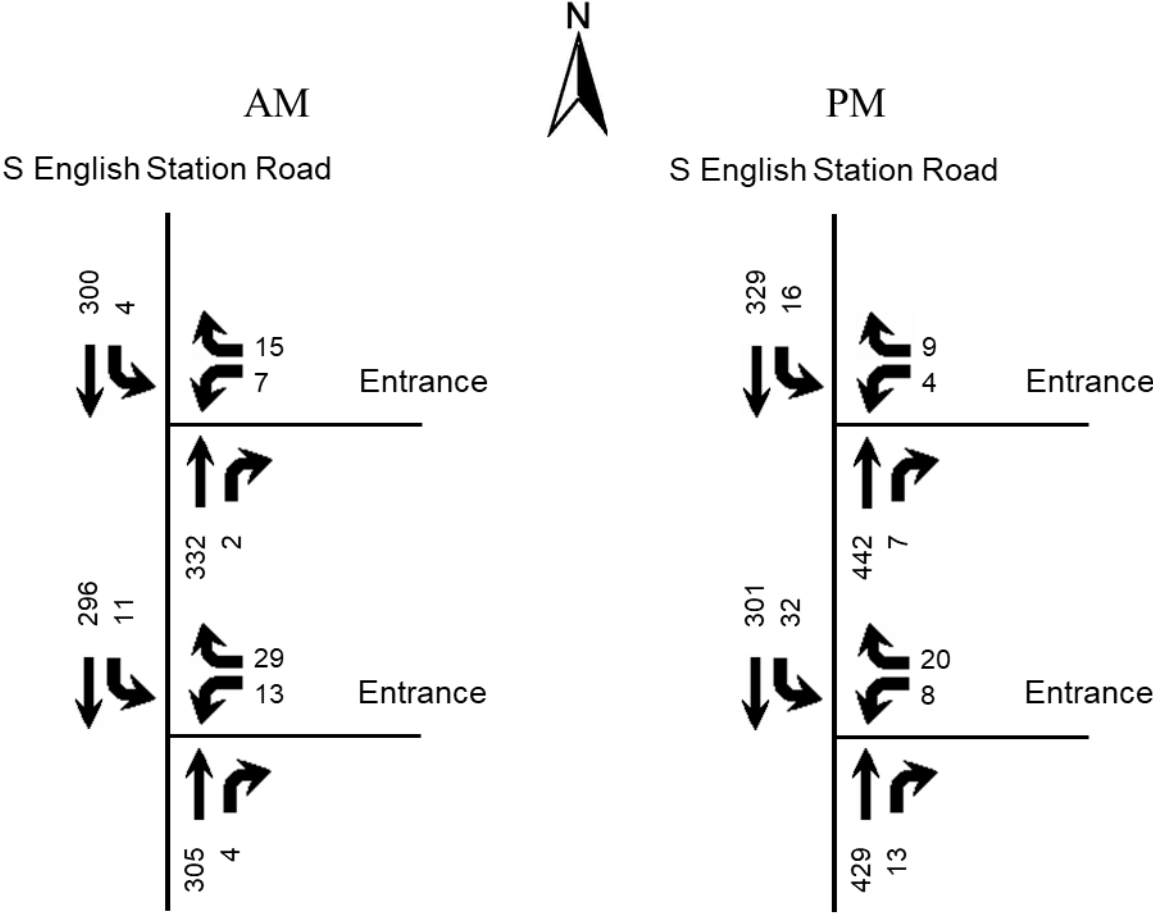


Figure 6. Build Peak Hour Volumes

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, 6<sup>th</sup> edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.8.5) software. The delays and Level of Service are summarized in **Table 2**.



**Table 2. Peak Hour Level of Service**

Approach	A.M.			P.M.		
	2020 Existing	2023 No Build	2023 Build	2020 Existing	2023 No Build	2023 Build
<b>S English Station Road at Patio Homes</b>						
Entrance Westbound			B 11.7			B 13.8
S English Station Road Southbound (left)			A 8.0			A 8.5
<b>S English Station Road at Apartment Entrance</b>						
Entrance Eastbound			B 11.7			B 14.0
S English Station Road Southbound (left)			A 8.0			A 8.6

*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. Using the volumes in Figure 6, no turn lanes are required at the entrances.

## CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2023, there will be a minimal impact to the existing highway network. No improvements are required.

## **APPENDIX**

# 1007 South English Station Road

## Traffic Impact Study

Jefferson County, KY  
Classified Turn Movement Count

Site 1 of 1  
S English Station Rd (North)  
Lake Village Dr  
S English Station Rd (South)  
English Park Cir

Lat/Long  
38.224740°, -85.494760°  
Weather  
Fair  
55°F  
Date  
Tuesday, March 3, 2020



**Marr Traffic**  
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210  
10 Glenlake Parkway, Suite 130, Atlanta, GA 30328  
555 Fayetteville Street, Suite 201, Raleigh, NC 27601  
1229 South Shelby Street, Louisville, KY 40203  
6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

hello@marrtraffic.com  
www.marrtraffic.com

1 (800) 615-3765

### Traffic Counts

	Southbound						Westbound						Northbound						Eastbound						
	S English Station Rd (North)						Lake Village Dr						S English Station Rd (South)						English Park Cir						
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	Int
0700 - 0715	0	1	22	0	0	23	0	0	0	2	0	2	0	0	22	1	0	23	1	14	0	3	0	18	66
0715 - 0730	0	0	43	1	0	44	0	1	0	3	0	4	0	0	63	1	0	64	0	22	0	7	0	29	141
0730 - 0745	0	0	53	5	0	58	0	0	0	0	0	0	0	0	71	0	0	71	0	17	0	8	0	25	154
0745 - 0800	0	0	54	3	0	57	0	1	0	1	0	2	0	0	55	1	0	56	0	12	0	12	0	24	139
0800 - 0815	0	1	62	4	0	67	0	1	0	0	0	1	0	1	50	0	0	51	0	8	0	8	0	16	135
0815 - 0830	0	0	37	1	0	38	0	0	0	3	0	3	0	1	42	0	0	43	0	15	1	7	3	26	110
0830 - 0845	0	0	24	4	0	28	0	1	0	2	0	3	0	0	42	0	0	42	0	14	0	2	0	16	89
0845 - 0900	0	0	24	3	0	27	0	0	0	0	0	0	0	1	28	2	0	31	0	18	0	0	0	18	76
1600 - 1615	0	2	29	14	0	45	0	0	0	2	0	2	0	2	32	1	0	35	0	1	0	0	0	1	83
1615 - 1630	0	4	39	13	3	59	0	0	0	1	0	1	0	3	46	0	0	49	0	6	0	0	0	6	115
1630 - 1645	0	2	43	12	0	57	0	0	0	3	0	3	0	3	53	0	0	56	0	6	0	2	0	8	124
1645 - 1700	0	1	43	15	0	59	0	0	0	1	0	1	0	5	55	0	0	60	0	12	0	1	0	13	133
1700 - 1715	0	0	46	12	0	58	0	1	0	1	0	2	0	4	86	1	0	91	0	5	1	0	0	6	157
1715 - 1730	0	3	60	13	0	76	0	0	0	1	0	1	0	10	104	0	0	114	0	11	0	2	0	13	204
1730 - 1745	0	4	59	18	0	81	0	2	0	3	0	5	0	5	83	1	0	89	0	7	0	8	0	15	190
1745 - 1800	0	2	24	15	0	41	0	0	0	2	0	2	0	4	50	1	0	55	0	6	0	2	0	8	106

0715 - 0730	0	0	43	1	0	44	0	1	0	3	0	4	0	0	63	1	0	64	0	22	0	7	0	29	141
0730 - 0745	0	0	53	5	0	58	0	0	0	0	0	0	0	0	71	0	0	71	0	17	0	8	0	25	154
0745 - 0800	0	0	54	3	0	57	0	1	0	1	0	2	0	0	55	1	0	56	0	12	0	12	0	24	139
0800 - 0815	0	1	62	4	0	67	0	1	0	0	0	1	0	1	50	0	0	51	0	8	0	8	0	16	135
AM PEAK	0	1	212	13	0	226	0	3	0	4	0	7	0	1	239	2	0	242	0	59	0	35	0	94	569
1645 - 1700	0	1	43	15	0	59	0	0	0	1	0	1	0	5	55	0	0	60	0	12	0	1	0	13	133
1700 - 1715	0	0	46	12	0	58	0	1	0	1	0	2	0	4	86	1	0	91	0	5	1	0	0	6	157
1715 - 1730	0	3	60	13	0	76	0	0	0	1	0	1	0	10	104	0	0	114	0	11	0	2	0	13	204
1730 - 1745	0	4	59	18	0	81	0	2	0	3	0	5	0	5	83	1	0	89	0	7	0	8	0	15	190
PM PEAK	0	8	208	58	0	274	0	3	0	6	0	9	0	24	328	2	0	354	0	35	1	11	0	47	684

## HCS Reports

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection				S English Station at Pati				
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/13/2020							East/West Street				Entrance				
Analysis Year	2023							North/South Street				S English Station				
Time Analyzed	AM Peak							Peak Hour Factor				0.92				
Intersection Orientation	North-South							Analysis Time Period (hrs)				0.25				
Project Description	Sunshine															
<b>Lanes</b>																
<b>Vehicle Volumes and Adjustments</b>																
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	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						7		15			332	2		4	300	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						24								4		
Capacity, c (veh/h)						563								1201		
v/c Ratio						0.04								0.00		
95% Queue Length, Q <sub>95</sub> (veh)						0.1								0.0		
Control Delay (s/veh)						11.7								8.0		
Level of Service (LOS)						B								A		
Approach Delay (s/veh)					11.7								0.1			
Approach LOS					B											

## HCS7 Two-Way Stop-Control Report

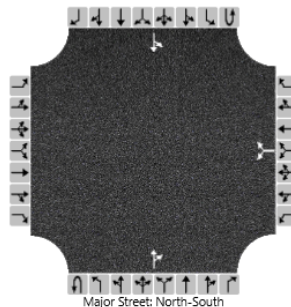
### General Information

Analyst	DBZ
Agency/Co.	Diane B Zimmerman Traffic Engineering
Date Performed	7/13/2020
Analysis Year	2023
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Sunshine

### Site Information

Intersection	S English Station at Pati
Jurisdiction	
East/West Street	Entrance
North/South Street	S English Station
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

### 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	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						4		9			442	7		16	329	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage							Undivided									

### Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							15							19		
Capacity, c (veh/h)							424							1038		
v/c Ratio							0.04							0.02		
95% Queue Length, Q <sub>95</sub> (veh)							0.1							0.1		
Control Delay (s/veh)							13.8							8.5		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)							13.8							0.6		
Approach LOS							B									

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	S English Station at Apt							
Agency/Co.	Diane B Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	7/13/2020							East/West Street	Entrance							
Analysis Year	2023							North/South Street	S English Station							
Time Analyzed	AM Peak							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	Sunshine															
<b>Lanes</b>																
<p>Major Street: North-South</p>																
<b>Vehicle Volumes and Adjustments</b>																
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	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						13		29			305	4		11	296	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type   Storage	Undivided															
<b>Critical and Follow-up Headways</b>																
Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		
<b>Delay, Queue Length, and Level of Service</b>																
Flow Rate, v (veh/h)						46								12		
Capacity, c (veh/h)						581								1229		
v/c Ratio						0.08								0.01		
95% Queue Length, Q <sub>95</sub> (veh)						0.3								0.0		
Control Delay (s/veh)						11.7								8.0		
Level of Service (LOS)						B								A		
Approach Delay (s/veh)					11.7								0.4			
Approach LOS					B											

## HCS7 Two-Way Stop-Control Report

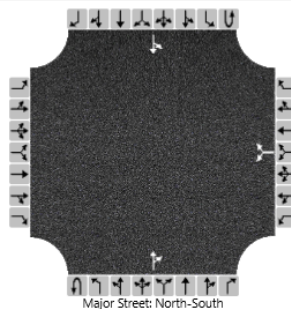
### General Information

Analyst	DBZ
Agency/Co.	Diane B Zimmerman Traffic Engineering
Date Performed	7/13/2020
Analysis Year	2023
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Sunshine

### Site Information

Intersection	S English Station at Apt
Jurisdiction	
East/West Street	Entrance
North/South Street	S English Station
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

### 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	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						8		20			429	13		32	301	
Percent Heavy Vehicles (%)						1		1						1		
Proportion Time Blocked																
Percent Grade (%)							0									
Right Turn Channelized																
Median Type   Storage							Undivided									

### Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.11		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.21		

### Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33								38		
Capacity, c (veh/h)						432								1046		
v/c Ratio						0.08								0.04		
95% Queue Length, Q <sub>95</sub> (veh)						0.2								0.1		
Control Delay (s/veh)						14.0								8.6		
Level of Service (LOS)						B								A		
Approach Delay (s/veh)						14.0								1.2		
Approach LOS						B										

