March 16, 2021

Traffic Impact Study

KJS LLC Apartments 4805 Bardstown Road Louisville, KY

Prepared for

Louisville Metro Planning Commission Kentucky Transportation Cabinet



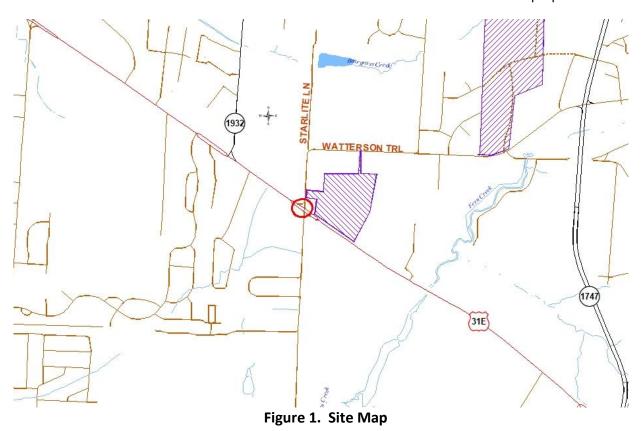


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INTRODUCTION

The development plan for 4805 Bardstown Road shows 348 apartment units. **Figure 1** displays a map of the site. Access to the development will be at an entrance on Bardstown Road and one on Watterson Trail. 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 Bardstown Road intersection with Watterson Trail and the proposed entrances.



EXISTING CONDITIONS

Watterson Trail is maintained by Louisville Metro with an estimated 2021 Average Annual Daily Traffic (AADT) volume of 9,400 vehicles per day between Hurstbourne Parkway and Bardstown Road, as estimated by the Kentucky Transportation Cabinet count station 455. The road has two lanes of eleven feet and four-foot shoulders through study area. The speed limit is 35 mph. There are no sidewalks.

Bardstown Road is a state-maintained road (US 31E) with an estimated 2021 ADT of 25,500 vehicles per day between Watterson Trail and Hurstbourne Parkway, as estimated from the Kentucky Transportation Cabinet 2019 count at station P80. The road is a four-lane highway with twelve-foot lanes, four-foot paved shoulders, and a two-way left turn lane through the study area. The speed limit is 45 mph. There are no sidewalks. The intersection with Watterson Trail is controlled with traffic signal and is part of a coordinated signal system. The intersection with Watterson Trail has left lanes and free-flow right-turn lanes to and from Watterson Trail. The Watterson Trail approach has a shared left and thru. TARC provides service along Bardstown Road.

Peak hour traffic count for the intersections were obtained on April 30, 2015. The peak hours occurred between 7:00 to 8:00 am and 4:30 to 5:30 pm. These counts were compared January 2020 counts on Bardstown Road at Breckenridge Lane and Hurstbourne Parkway. The 2020 counts were similar to the 2015, therefore no adjustment was made to the 2020. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

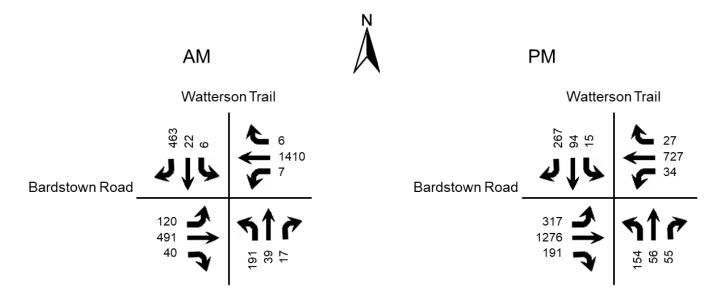


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2024. An annual growth rate of 0.5 percent was applied to the volumes. This was determined by the historical growth at KYTC station P80. Additionally, trip generation for the approved Hurstbourne Commons has been included. **Figure 3** displays the 2024 No Build peak hour volumes.

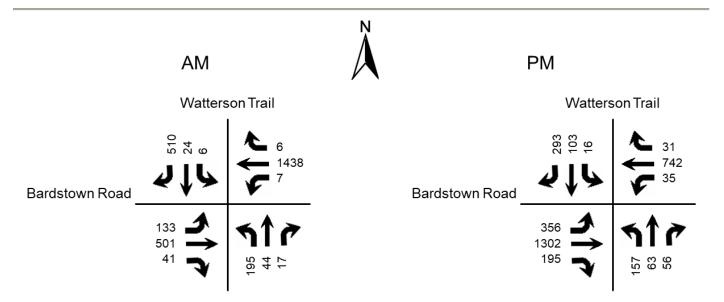


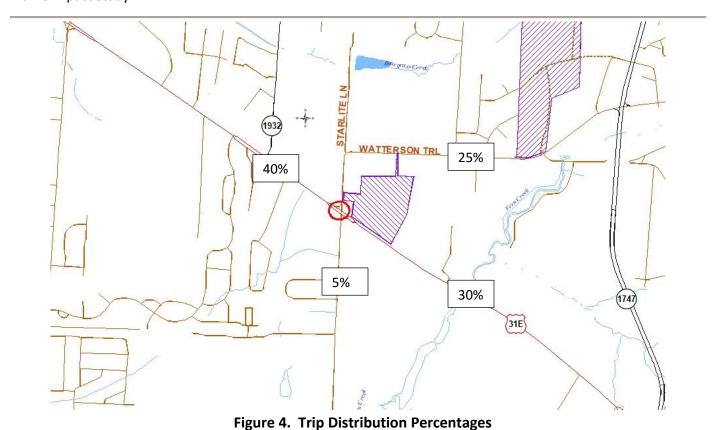
Figure 3. 2024 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers <u>Trip Generation Manual</u>, 10th Edition contains trip generation rates for a wide range of developments. The land use of "Multi-family (Mid-Rise) (221)" was 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. I	Peak	Hour	P.M. F	Peak	Hour
Land Use	Trips	In	Out	Trips	In	Out
Multi-family (Mid-Rise) 348 units	116	30	116	147	90	57



N PM

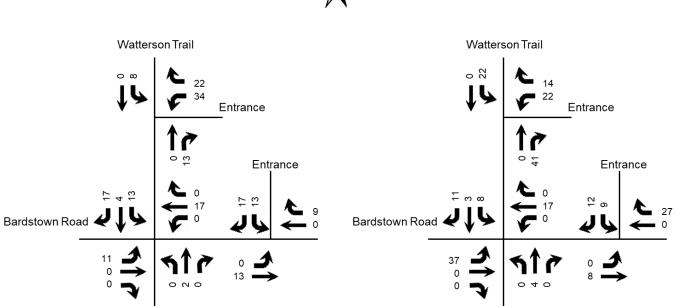


Figure 5. Peak Hour Trips Generated by Site

AM

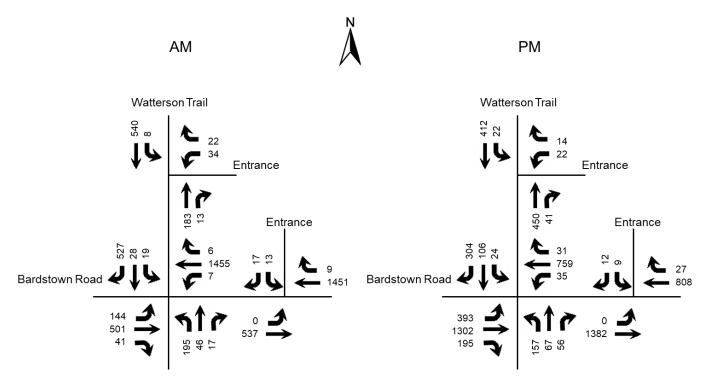


Figure 6. 2024 Build Peak Hour Volumes

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 for lanes at stop-controlled intersections.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the <u>Highway Capacity Manual</u>, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.9) software. The delays and Level of Service are summarized in **Table 2**. In the signalized intersection reports Bardstown Road is north/south, but will be shown in the tables to match the diagrams.

Table 2. Peak Hour Level of Service

		A.M.			P.M.	
Approach	2020	2024	2024	2020	2024	2024
Approach	Existing	No Build	Build	Existing	No Build	Build
Bardstown Road at Watterson Trail	Е	Е	Е	С	D	D
Baldstown Road at Watterson Trail	58.6	61.1	63.0	32.7	35.6	37.2
Bardstown Road Eastbound	D	D	D	С	С	С
Dardstown Road Eastbourid	44.8	45.3	45.9	29.0	33.3	35.4
Bardstown Road Westbound	Е	F	F	С	D	D
Dardstown Road Westbourid	78.1	84.1	88.1	35.0	37.7	39.1
Watterson Trail Northbound	F	F	F	Е	Е	E
Watterson Trail Nottinbourid	80.9	81.5	81.6	67.5	67.4	67.4
Watterson Trail Southbound	В	В	В	С	С	С
Watterson Trail Southbound	12.4	12.4	13.6	21.4	20.8	21.3
Watterson Trail at Entrance						
Entrance Westbound			В			С
Littrance Westbound			14.2			17.4
Watterson Trail Northbound (left)			Α			Α
Watterson Trail Northbound (left)			7.7			8.5
Bardstown Road at Entrance						
Bardstown Road Eastbound (left)			В			Α
Daidstowii Noad Lastbodiid (lett)			13.7			9.8
Entrance Southbound			D			С
Littance Southbound			26.4			16.5

Key: Level of Service, Delay in seconds per vehicle

The entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet <u>Highway Design Guidance Manual</u> dated July, 2020. The traffic impact policy requires using volumes for ten years beyond opening date, or 2034. The 2034 volumes were determined applying a 0.5 percent annual growth rate from 2024. Figure 7 illustrates the 2034 No Build volumes. Figure 8 illustrates the 2034 Build Volumes. Using the volumes in Figure 8, no turn lanes will be required at the entrances. **Table 3** summarizes the delay and Level of Service for 2034.

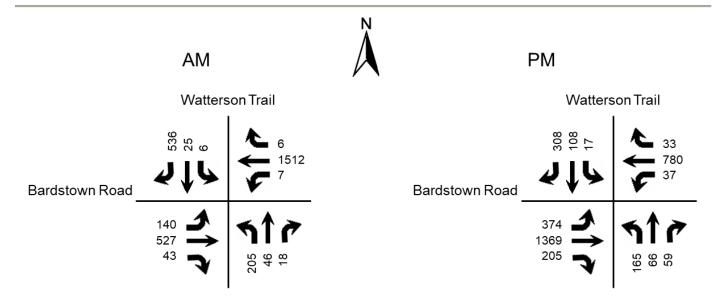


Figure 7. 2034 No Build Peak Hour Volumes

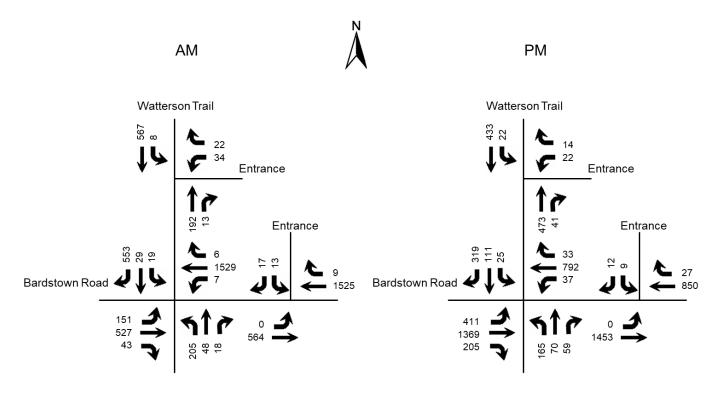


Figure 8. 2034 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service (2034)

		A.M.			P.M.	
Approach	2020	2034	2034	2020	2034	2034
Approach	Existing	No Build	Build	Existing	No Build	Build
Bardstown Road at Watterson Trail	Е	Е	Е	С	D	D
Bardstown Road at Watterson Trail	58.6	70.4	72.6	32.7	37.9	39.8
Bardstown Road Eastbound	D	D	D	С	С	C
Daidstown Road Eastboulid	44.8	45.3	45.9	29.0	36.2	38.6
Bardstown Road Westbound	Е	F	F	С	D	D
Daidstown Road Westbound	78.1	102.7	107.4	35.0	40.4	42.4
Watterson Trail Northbound	F	F	F	Е	Е	Е
Watterson Trail Nottribourid	80.9	81.9	82.0	67.5	67.4	68.2
Watterson Trail Southbound	В	В	В	С	С	C
Wallerson Trail Southbound	12.4	12.4	13.6	21.4	20.6	21.1
Watterson Trail at Entrance						
Entrance Westbound			В			С
Littratice Westbourid			14.7			18.3
Watterson Trail Northbound (left)			Α			Α
Watterson Trail Northbound (left)			7.7			8.6
Bardstown Road at Entrance	_					
Bardstown Boad Eastbound (laft)			В			Α
Bardstown Road Eastbound (left)			14.3			10.0
Entrance Southbound			D			С
			28.7			17.2

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 2024 and 2034, there will be an impact to the existing highway network. No improvements are recommended.

APPENDIX

Traffic Counts

Louisville Metro Government

Department of Public Works Traffic Engineering & Operations

File Name : Bardstown Rd & Watterson Trail

Site Code : Start Date : 4/30/2015

Page No : 4

			tterson rom No					ardstown From Ea					atterson rom So					ardstowr From We			
Start Time	Right	Thru		U-Turns	App. Total	Right	Thru		U-Turns	App. Total	Right	Thru		U-Turns	App. Total	Right	Thru		U-Turns	App. Total	Int. Total
Peak Hour Analys	is From C	7:00 AM	to 09:4	5 AM - Pe	eak 1 of 1																
Peak Hour for Ent																					
07:00 AM	99	4	1	0	104	0	362	2	0	364	7	7	39	0	53	7	111	28	0	146	667
07:15 AM	120	3	2	0	125	2	333	1	0	336	4	11	57	0	72	10	125	28	0	163	696
07:30 AM	128	12	1	0	141	0	383	2	0	385	4	12	51	0	67	17	121	33	0	171	764
07:45 AM	116	3	2	0	121	4	332	2	0	338	2	9	44	0	55	6	134	31	0	171	685
Total Volume	463	22	6	0	491	6	1410	7	0	1423	17	39	191	0	247	40	491	120	0	651	2812
% App. Total	94.3	4.5	1.2	0		0.4	99.1	0.5	0		6.9	15.8	77.3	0		6.1	75.4	18.4	0		
PHF	.904	.458	.750	.000	.871	.375	.920	.875	.000	.924	.607	.813	.838	.000	.858	.588	.916	.909	.000	.952	.920
Peak Hour Analys Peak Hour for Ent 01:00 PM 01:15 PM 01:30 PM 01:45 PM Total Volume						3 3 7 1	184 214 201 201 800	8 6 11 8	0 0 0 0	195 223 219 210	12 4 12 10 38	10 11 15 10	31 31 29 27	0 0 0 0	53 46 56 47	22 17 27 25	169 201 191 239 800	45 44 44 48 181	0 0 0 0	236 262 262 312 1072	551 601 606 645 2403
% App. Total	83.3	14.2	2.5	ő	202	1.7	94.5	3.9	0	047	18.8	22.8	58.4	0	202	8.5	74.6	16.9	0	1072	2403
PHF	.904	769	.583	.000	.928	.500	.935	.750	.000	.950	.792	.767	.952	.000	.902	.843	.837	.943	.000	.859	.931
Peak Hour Analys Peak Hour for Ent 04:30 PM 04:45 PM 05:00 PM 05:15 PM						3 8 7 9	164 218 188 157	12 9 7 6	0 0 0	179 235 202 172	17 13 16 9	11 14 17	49 26 42 37	0 0	77 53 75 60	49 40 42 60	307 312 300 357	91 79 64 83	0 0 0	447 431 406 500	797 826 762 828
			3									14		0							
Total Volume	267	94	15	0	376	27	727	34	0	788	55	56	154	0	265	191	1276	317	0	1784	3213
% App. Total	71	25	- 4	0	070	3.4	92.3	4.3	0	000	20.8	21.1	58.1	0	000	10.7	71.5	17.8	0	000	070
PHF	.834	.940	.750	.000	.879	.750	.834	.708	.000	.838	.809	.824	.786	.000	.860	.796	.894	.871	.000	.892	.970

HCS Reports

General Informati Agency Analyst Jurisdiction Urban Street Intersection			Ĭ						lts Su						
Agency Analyst Jurisdiction Urban Street Intersection															
Analyst Jurisdiction Urban Street Intersection									Interse	ction Inf	ormatio	n	L L	الميلها	
Jurisdiction Urban Street Intersection		Diane B. Zimmerma	an Traffi	c Engine	eering				Duration	n, h	0.250			Titir	٠
Urban Street Intersection		OBZ		Analys	is Date	Mar 15	, 2021		Area Ty	ре	Other		4		
Intersection				Time F	eriod	AM Pe	ak		PHF		0.95				÷
	Ē	Bardstown Rd		Analys	is Year	2020			Analysis	Period	1> 7:	15	7		
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Project Description	\rightarrow	KJS Apartments				1							"	1 TAY	2- (1
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Approach Moveme	ent			L	Т	R	L	T	R	L	T	R	L	Т	R
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Signal Information	n					1	217	R .	2		l	Ĺ			
Cycle, s 17	70.0	Reference Phase	2		N 512	7 NA		Ħ	2			>	Ψ.	. -	♣ .
Offset, s	0	Reference Point	End	Green	1.8	59.0	12.0	25.	7 37.	2 0.0		1	2	3	¥ 4
Uncoordinated N	No	Simult. Gap E/W	On	Yellow		4.3	4.3	3.6	3.6		_				→
Force Mode Fix	xed	Simult. Gap N/S	On	Red	3.0	2.7	3.0	2.8	2.8		■コ	5	6	7	- 8
Timer Results				EBL	.	EBT	WBI	L	WBT	NB	L	NBT	SBI	L	SBT
Assigned Phase						4			8	5		2	1		6
Case Number						11.0			11.0	1.2		3.0	1.3		3.0
Phase Duration, s						32.1		\neg	43.6	9.1		75.0	19.3	3	85.3
Change Period, ()	Y+R c), s				6.4			6.4	7.3		7.0	7.3		7.3
Max Allow Headwa		,,				5.1		\neg	5.4	5.0		0.0	5.0	_	0.0
Queue Clearance						24.5		\rightarrow	39.1	2.5	\rightarrow		4.8	-	
Green Extension T		, - ,				1.2		\rightarrow	0.0	0.0	-	0.0	4.1	_	0.0
Phase Call Probab		9 °), 0				1.00		\rightarrow	1.00	0.29	$\overline{}$	0.0	1.00	-	0.0
Max Out Probabilit				_	\rightarrow	0.01		_	1.00	0.03	\rightarrow		0.24	_	
Max out Frobability	•,					0.01			1.00	0.00			0.2		
Movement Group	Resu	ılts			EB			WB			NB			SB	
Approach Moveme	ent			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Moveme	ent			7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate	e (v)	, veh/h			242	18		29	487	7	1484	6	148	607	49
Adjusted Saturation	n Flov	w Rate (s), veh/h/li	n		1796			1851		1668	1795	1598	1730	1738	1610
Queue Service Tim		. ,-			22.5			2.2		0.5	69.1	0.1	2.8	22.5	3.0
Cycle Queue Clear		, .			22.5			2.2		0.5	69.1	0.1	2.8	22.5	3.0
Green Ratio (g/C)		(0.71			0.15			0.22		0.37	0.41	0.62	0.41	0.46	0.46
Capacity (c), veh/					272			404		224	1458	988	329	1595	739
Volume-to-Capacit		io (X)			0.891			0.073	3	0.033			0.451	0.380	0.067
		n (90 th percentile)			403.2			46.8	-	9.7	1108.9		134.9	364.3	52.9
		h/ln (90 th percentil			15.9			1.8		0.4	44.0	0.2	5.3	14.0	2.1
		RQ) (90 th percent			0.00			0.00		0.05	0.00	0.2	0.63	0.00	0.00
Uniform Delay (d :		, , ,	.iic)	-	70.8			52.8	_	35.7	50.5	6.9	75.1	38.0	26.2
Incremental Delay					15.7			0.1		0.1	28.2	0.0	1.3	0.6	0.2
Initial Queue Delay					0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.2
					86.5	5.0		52.9	10.0	35.8	78.6		76.4	38.6	26.3
Control Delay (d), Level of Service (L	_				66.5 F			52.9 D	_	_	76.6 F	6.9	76.4 E	30.6 D	-
,		100		90.0	_	F	40.4		A	D 70 /		_ A			C
Approach Delay, s/				80.9			12.4		В	78.		E	44.8)	D
Intersection Delay,	, s/veh	17 LUS				58	.υ						E		
Multimodal Resul	lte				EB			WB			NB			SB	
		108		2.47		В	2.62	_	С	2.16		R	1.93		B
Pedestrian LOS So	e / LOS			2.47 0.92	-	A	2.63	-	A	1.72	-	В	1.05	-	B A

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HCS™ Streets Version 7.9

		HCS	7 Sig	nalize	d Inte	ersect	ion R	Resul	ts Su	nmar	y				
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Intersection		Watterson Trail		File Na	ame	Bardst	own AN	1 24 N	B.xus					5++2	
Project Descript	tion	KJS Apartments											7	বাক্প	1- (*
Demand Inforn	nation				EB			WE	3		NB		\top	SB	
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Uncoordinated	No	Simult. Gap E/W	On	Green Yellow	1.8 4.3	59.0 4.3	12.0 4.3	3.6	36.3	0.0					→
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	2.7	3.0	2.8	2.8	0.0	7	5	6	7	
r or oo mode	Tixou	ominant out the	0		10.0		10.0		12.0	70.0					
Timer Results				EBL		EBT	WB		WBT	NBI		NBT	SBI	$\overline{}$	SBT
Assigned Phase				LUL		4	***		8	5		2	1	_	6
Case Number					_	11.0		_	11.0	1.2		3.0	1.3		3.0
				-	\rightarrow	_		-			$\overline{}$			_	
Phase Duration	nange Period, (Y+R c), s				-	33.0		-	42.7	9.1	\rightarrow	75.0	19.3		85.2
	7, 7,				-	6.4		-	6.4	7.3	\rightarrow	7.0	7.3	_	7.3
	ax Allow Headway (<i>MAH</i>), s				_	5.1		_	5.4	5.0	\rightarrow	0.0	5.0	_	0.0
Queue Clearan	ce Time	e (g s), s				25.3			38.3	2.5			5.5		
Green Extensio	n Time	(g e), S			\perp	1.3		\perp	0.0	0.0	\perp	0.0	4.1		0.0
Phase Call Prob	bability					1.00			1.00	0.29	9		1.00)	
Max Out Probat	bility					0.01			1.00	0.03	3		0.28	3	
Movement Gro	up Res	sults			EB			WB			NB			SB	
Approach Move	ment			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F), veh/h			252	18		32	537	7	1514	6	162	609	50
		ow Rate (s), veh/h/l	n		1797			1852	-	1668	1795	1598	1730	1738	1610
Queue Service					23.3			2.3		0.5	69.0	0.1	3.5	22.6	3.0
Cycle Queue Cl					23.3			2.3		0.5	69.0	0.1	3.5	22.6	3.0
Green Ratio (g.		c fille (g c), 3			0.16			0.21	-	0.37	0.41	0.62	0.41	0.46	0.46
					281			395	-	223	1458	980	329	1594	738
Capacity (c), v		atio (V)		-											-
Volume-to-Capa				-	0.894			0.080		0.033	1.038	0.006	0.492	0.382	0.067
	. ,.	/In (90 th percentile)			418.5			50.6		9.7	1160.3	4.1	145	365.1	53
		eh/ln (90 th percenti			16.5			2.0		0.4	46.0	0.2	5.7	14.0	2.1
		RQ) (90 th percent	ille)		0.00			0.00		0.05	0.00	0.01	0.67	0.00	0.00
Uniform Delay (70.3	\square		53.5		35.8	50.5	7.1	75.3	37.9	26.0
Incremental Del					16.6			0.1		0.1	34.2	0.0	1.5	0.6	0.2
	itial Queue Delay (d ₃), s/veh				0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/ve	eh			86.9	5.0		53.6	10.0	35.9	84.7	7.1	76.7	38.6	26.2
Level of Service	(LOS)				F	Α		D	Α	D	F	Α	E	D	С
Approach Delay	pproach Delay, s/veh / LOS					F	12.4	-	В	84.1	1	F	45.3	3	D
Intersection Del	tersection Delay, s/veh / LOS					61	.1						E		
Maritima1-1 F								14/5			NID			65	
Multimodal Re		/1.00		0.47	EB		0.00	WB	-	0.44	NB	D	4.00	SB	
Pedestrian LOS				2.47	$\overline{}$	В	2.63	-	С	2.16	-	В	1.93	-	В
Bicycle LOS Sc	ore / LC)5		0.93		Α	1.43	5	Α	1.75)	В	1.07		Α

HCS™ Streets Version 7.9

		HCS	7 Sig	nalize	d Int	ersect	ion R	esul	ts Sur	nmar	у				
_ ,,,														المالما	CITE CONTRACTOR
General Inform	nation	I=. = =:						\rightarrow	ntersec		_		- i		
Agency		Diane B. Zimmerma	an Traffi					$\overline{}$	Ouration		0.250		H		
Analyst		DBZ		<u> </u>		Mar 15		-	rea Typ	е	Other				
Jurisdiction				Time F		AM Pe		_	PHF		0.95				*
Urban Street		Bardstown Rd				2024 E			nalysis	Period	1> 7:	15	- T		
Intersection		Watterson Trail		File Na	ame	Bardst	own AN	1 24 B.:	xus					ጎተተለ	
Project Descrip	tion	KJS Apartments												A TAY	P (
Damand Info					ED			\A/D			ND			C.D.	
Demand Inform				L	EB	T D	L	WB	Τ.		NB T	Τ.	+ .	SB T	Т п
Approach Move				195	46	17	19	28	527	1 L	\rightarrow	R	144	501	R
Demand (v), v	en/n			195	46	17	19	26	527		1455	ט וי	144	501	41
Signal Informa	tion					JJ.			8		7	†			
Cycle, s	170.0	Reference Phase	2	1		1			月		•	`_	KD2		_Z
Offset, s	0	Reference Point	End	<u> </u>	2 M			Tá.	7			1	2	3	Y
Uncoordinated	No	Simult. Gap E/W	On	Green Yellow		59.0 4.3	12.0 4.3	26.8 3.6	36.1 3.6	0.0					4
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	2.7	3.0	2.8	2.8	0.0	コ	5	6	7	
T OIGO MIOGO	Tixou	Olimani Gap 11/6	011	1100	0.0	12.11	10.0	12.0	2.0	70.0					
Timer Results				EBI		EBT	WBI		WBT	NBI		NBT	SBI		SBT
Assigned Phase	e.					4	,,,,,		8	5		2	1		6
Case Number					+	11.0			11.0	1.2		3.0	1.3		3.0
Phase Duration	s				_	33.2			42.5	9.1	-	75.0	19.3	_	85.2
Change Period,		c) s			_	6.4			6.4	7.3	-	7.0	7.3	_	7.3
Max Allow Head	•	· · · · · · · · · · · · · · · · · · ·		_	_	5.1		_	5.3	5.0	$\overline{}$	0.0	5.0	_	0.0
Queue Clearan				_	+	25.5			38.1	2.5	\rightarrow	0.0	6.0	$\overline{}$	0.0
Green Extensio		, - ,		_	_	1.3		_	0.0	0.0	_	0.0	4.0	_	0.0
Phase Call Pro		(9 , 5		-	_	1.00		_	1.00	0.0	$\overline{}$	0.0	1.00	$\overline{}$	0.0
Max Out Probal					-	0.01		\rightarrow	1.00	0.03	_		0.30	_	
Movement Gro	up Res	sults			EB			WB			NB			SB	
Approach Move	•			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F), veh/h			254	18		49	555	7	1532	6	172	599	49
		ow Rate (s), veh/h/l	n		1798	1.0		1833		1668	1795	1598	1730	1738	1610
Queue Service		, ,,			23.5			3.7		0.5	69.0	0.1	4.0	22.3	2.9
Cycle Queue C		J ,,			23.5			3.7		0.5	69.0	0.1	4.0	22.3	2.9
Green Ratio (g		(3 -), -			0.16			0.21		0.37	0.41	0.62	0.41	0.46	0.46
Capacity (c), v					283			389		226	1457	978	329	1594	738
Volume-to-Capa		atio (X)			0.895			0.127		0.033	1.051	0.006	0.524	0.376	0.066
		/In (90 th percentile))		421.8	-		80.3		9.7	1192.9	4.1	153.2	360.5	52.4
		eh/ln (90 th percenti			16.6			3.2		0.4	47.3	0.2	6.0	13.9	2.1
	,,	RQ) (90 th percent			0.00			0.00		0.05	0.00	0.01	0.71	0.00	0.00
Uniform Delay (70.2			54.2		35.7	50.5	7.1	75.4	38.0	26.1
Incremental De	, ,,				16.8			0.2		0.1	38.2	0.0	1.7	0.6	0.2
Initial Queue De					0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (,			87.0	5.0		54.4	10.0	35.8	88.7	7.1	77.1	38.6	26.3
Level of Service					F	A		D	A	D	F	A	E	D	C
	pproach Delay, s/veh / LOS			81.6		F	13.6		В	88.1		F	45.9		D
	ntersection Delay, s/veh / LOS					63						-	E		
Multimodal Re	sulte		Multimodal Results		FR			WR			NR			SB	
Multimodal Re Pedestrian LOS		/108		2.47	EB	В	2.63	WB	С	2.16	NB	В	1.93	SB	В

HCS™ Streets Version 7.9

		HCS	7 Sig	nalize	d Inte	ersect	ion F	Resu	lts Su	mmar	у				
General Inform	ation								Interse	ction Inf	ormatio	on		1111	la lu
Agency		Diane B. Zimmerma	an Traffi	c Engin	eering				Duratio	n, h	0.250	1		****	
Analyst		DBZ		Analys	is Date	Mar 15	5, 2021		Area Ty	ре	Other				
Jurisdiction				Time F	eriod	AM Pe	ak		PHF		0.95		*	×	~ *-
Urban Street		Bardstown Rd		Analys	is Year	2034 N	lo Buil	d .	Analysi	s Period	1> 7:	15	7		
Intersection		Watterson Trail		File Na	ame	Bardst	own Al	M 34 N	B.xus					5 + + 2	
Project Descript	tion	KJS Apartments											ħ	4144	1- 1
Demand Inforn	nation				EB			WE	2		NB			SB	
Approach Move				L	T	R	L	T	_	L	T	R	L	T	R
				205	46	18	6	25	_	_	1512	_	140	527	43
Demand (v), ve	en/n			200	40	10	0	20	00	5 /	1512	. 6	140	527	43
Signal Informa						JŲ.	211	R 2		\top	Į	Ĺ			_
Cycle, s	170.0	Reference Phase	2		≥ 512	" "	•	R	2			Y	Y ,	2	↔
Offset, s	0	Reference Point	End	Green	1.8	58.9	12.0	27.	8 35	1 0.0				3	K.
Uncoordinated	No	Simult. Gap E/W	On	Yellow		4.3	4.3	3.6				\ \			→
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	2.7	3.0	2.8	2.8	0.0	1	5	6	7	
Timer Beaulte				EDI	_	грт	VA/D	1	MPT	NID		NDT	CDI		CDT
Timer Results Assigned Phase	<u> </u>			EBL	+	EBT 4	WB	-	WBT 8	NB 5	L	NBT 2	SBI 1	-	SBT 6
Case Number						11.0			11.0	1,2		3.0	1.3		3.0
Phase Duration	. S				_	34.2		\neg	41.5	9.1	_	75.0	19.3	_	85.2
Change Period,	,	c) s			-	6.4			6.4	7.3	$\overline{}$	7.0	7.3	_	7.3
		,.		_	_	5.1		_	5.4	5.0	_	0.0	5.0	_	0.0
	ix Allow Headway (<i>MAH</i>), s leue Clearance Time (<i>g</i> s), s				-	26.5			37.1	2.5	-	0.0	5.5	-	0.0
Green Extension		, - ,			—	1.3		_	0.0	0.0	-	0.0	4.1	-	0.0
Phase Call Prob		(90),0				1.00		\rightarrow	1.00	0.2	-	0.0	1.00	-	0.0
Max Out Probab					_	0.02			1.00	0.0	_		0.28	_	
Movement Gro	•	sults		<u> </u>	EB	$\overline{}$		WB		-	NB			SB	
Approach Move	ment			ㄴㄴ	T	R	L	T	R	L	T	R	L	T	R
Assigned Move	ment			7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F	Rate (v), veh/h			264	19		33	564	7	1592	6	162	609	50
Adjusted Satura	ation Flo	ow Rate (s), veh/h/l	n		1797			1852		1668	1795	1598	1730	1738	1610
Queue Service	Time (g	g s), s			24.5			2.4		0.5	69.0	0.1	3.5	22.6	3.0
Cycle Queue Cl	learanc	e Time (<i>g շ</i>), s			24.5			2.4		0.5	69.0	0.1	3.5	22.6	3.0
Green Ratio (g/	/C)				0.16			0.21		0.37	0.41	0.61	0.41	0.46	0.46
Capacity (c), v	eh/h				294			382		223	1457	969	329	1594	738
Volume-to-Capa	acity Ra	atio (X)			0.899			0.085	5	0.033	1.092	0.007	0.492	0.382	0.06
Back of Queue	(Q), ft	/In (90 th percentile))		438.8			52.9		9.7	1313. 8	4.1	145.1	365.1	52.9
Back of Queue	(Q). ve	eh/ln (90 th percenti	ile)		17.3			2.1		0.4	52.1	0.2	5.7	14.0	2.1
		RQ) (90 th percent			0.00			0.00		0.05	0.00	0.01	0.68	0.00	0.00
Uniform Delay (.,,,	,		69.7			54.5	_	35.8	50.5	7.3	75.3	37.9	26.0
Incremental Del					17.7			0.1		0.1	52.9	0.0	1.5	0.6	0.2
Initial Queue De	, ·	,.			0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (- , ,	,.			87.4	5.0		54.6	10.0	35.9	103.4	7.3	76.7	38.6	26.2
Level of Service					F	A		D	A	D	F	A	E	D	С
	Approach Delay, s/veh / LOS			81.9		F	12.4		В	102		F	45.3		D
Intersection Del						70							E		
Multimacelel	oult-				E0.			\A/D			NID			CD.	
Multimodal Res		/1.08		0.47	EB	В	2.0	WB	-	2.4	NB	D	4.00	SB	B
Pedestrian LOS				2.47	$\overline{}$	В	2.6	$\overline{}$	C	2.1	-	В	1.93	$\overline{}$	В
Bicycle LOS Sc	ore / LC	os		0.95		Α	1.4	7	Α	1.8	1	В	1.10)	Α

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	HCS	7 Sig	nalize	d Inte	ersect	ion F	Resu	lts Su	mmar	y				
General Information								Intersec	tion Inf	ormatio	on	Į.	1111	
Agency	Diane B. Zimmerma	an Traffi	c Engin	eering				Duration	i, h	0.250		D D	2 + + 2	
Analyst	DBZ		Analys	is Date	Mar 15	5, 2021		Area Ty	ре	Other		<i>3</i> .		
Jurisdiction			Time F	Period	AM Pe	eak		PHF		0.95		*		→
Urban Street	Bardstown Rd		Analys	is Year	2034 E	Build		Analysis	Period	1> 7:	15	24		
Intersection	Watterson Trail		File Na	ame	Bardst	own Al	M 34 B	.xus					5 t t r	
Project Description	KJS Apartments											ħ	4144	1-1
Demand Information				EB			W	3		NB			SB	
Approach Movement			L	Т	T R	L	T	_	L	T	R	L	T	R
Demand (v), veh/h			205	48	18	19	29	_	_	1529	$\overline{}$	151	527	43
Demand (v), ven/m			200	10	10	10	20	000		1020	0	101	021	73
Signal Information				Т	ĮĮ.	1211	~ _	2	\top		Ĺ			
Cycle, s 170.0	Reference Phase	2	1	N 542		,	K	2			~	Φ	-	4
Offset, s 0	Reference Point	End		10	" "11			2 24 (1	2	3	<u> </u>
Uncoordinated No	Simult. Gap E/W	On	Green Yellow		58.9	12.0 4.3	28. 3.6		0.0					→
Force Mode Fixed	<u> </u>	On	Red	3.0	2.7	3.0	2.8		0.0	ーコ	5	6	7	
Timer Results			EBI	-	EBT	WB	L	WBT	NB	L	NBT	SBI	-	SBT
Assigned Phase					4		_	8	5		2	1		6
Case Number					11.0			11.0	1.2		3.0	1.3		3.0
Phase Duration, s					34.4		\perp	41.3	9.1	_	75.0	19.3		85.2
Change Period, (Y+F	? c), S				6.4			6.4	7.3		7.0	7.3		7.3
Max Allow Headway (,,				5.1			5.3	5.0		0.0	5.0		0.0
Queue Clearance Tim	e (g s), s				26.7			36.9	2.5			6.0		
Green Extension Time	e (g e), s				1.3			0.0	0.0		0.0	4.0		0.0
Phase Call Probability	1				1.00			1.00	0.29	9		1.00)	
Max Out Probability					0.02			1.00	0.03	3		0.30)	
Movement Group Re	eulte			EB			WB			NB			SB	
· ·	suits		L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement			7	4	14	3	8	18	5	2	12	1	6	16
Assigned Movement	u voh/h			_		3	51	_	7			172	600	49
Adjusted Flow Rate (**	l		266	19		-	582	_	1609	6			-
Adjusted Saturation F	1 ,	ın		1798			1834	-	1668	1795	1598	1730	1738	1610
Queue Service Time (<u> </u>			24.7			3.8		0.5	69.0	0.1	4.0	22.3	2.9
Cycle Queue Clearan	ce Time (g c), s			24.7			3.8	+	0.5	69.0	0.1	4.0	22.3	2.9
Green Ratio (g/C)			_	0.16			0.21	+	0.37	0.41	0.61	0.41	0.46	0.46
Capacity (c), veh/h	-41- (34)			296			376		226	1457	967	329	1594	738
Volume-to-Capacity R	, ,			0.899			0.134	_	_	1.104			0.376	0.066
Back of Queue (Q), f	win (90 th percentile))		442.3			82.9		9.7	1352. 2	4.1	152.9	360.7	52.2
Back of Queue (Q),	veh/ln (90 th percent	ile)		17.4			3.3		0.4	53.7	0.2	6.0	13.9	2.1
Queue Storage Ratio	(RQ) (90 th percent	tile)		0.00			0.00		0.05	0.00	0.01	0.71	0.00	0.00
Uniform Delay (d 1),				69.6			55.2		35.7	50.5	7.4	75.4	38.0	26.1
Incremental Delay (d				17.9			0.2		0.1	57.6	0.0	1.7	0.6	0.2
Initial Queue Delay (0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/v				87.5	5.0		55.5	10.0	35.8	108.1	7.4	77.1	38.6	26.3
Level of Service (LOS				F	A		E	A	D	F	A	E	D	C
Approach Delay, s/veh	<u>′ </u>		82.0	_	F	13.0		В	107.		F	45.9		D
	Intersection Delay, s/veh / LOS				72							E		
Multimodal Results				EB			WB			NB			SB	
Pedestrian LOS Score			2.47	-	В	2.6	-	С	2.16	$\overline{}$	В	1.93	-	В
Bicycle LOS Score / L	.OS		0.96	6	Α	1.5	3	В	1.83	3	В	1.11		Α

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		HCS	7 Sig	nalize	d Inte	ersect	ion F	Resu	lts Sur	nmar	y				
	-41													الماراة	NIT!
General Inform	nation	I=. = =:						\rightarrow	Intersec		_		- i	JIII	
Agency		Diane B. Zimmerma	an Traffi					\rightarrow	Duration	,	0.250				1
Analyst		DBZ		-		Mar 16		\rightarrow	Area Typ	е	Other	·			
Jurisdiction				Time F		PM Pe	ak	\rightarrow	PHF		0.95		*		*
Urban Street		Bardstown Rd		Analys	is Year	$\overline{}$			Analysis	Period	1> 4:3	30	25		1
Intersection		Watterson Trail		File Na	ame	Bardst	own PN	Л 20.x	us					httr	
Project Descrip	tion	KJS Apartments											l n	4147	2 (
	41							14/5		_	NID			0.0	
Demand Infor					EB	T 5	.	WE	_	+ .	NB	T 5		SB	T 5
Approach Move				L	T	R	L	T	R	L	T 707	R	L	T	R
Demand (v), v	/eh/h		_	154	56	55	15	94	267	34	727	27	317	1276	191
Signal Informa	ation					JI.	T III		2			+			
Cycle, s	170.0	Reference Phase	2	1			1211/2	Z-12	Ħ			ͺ–	KŤZ.		7
Offset, s	0	Reference Point	End		J. 2019			R	2			1	2	3	Y 4
Uncoordinated		Simult. Gap E/W	On	Green	1112	61.7	16.1	23.							4
Force Mode	Fixed	Simult. Gap E/W	On	Yellow Red	2.4	4.3 2.4	4.3 2.4	3.6 2.8		0.0	- 7	۲ ار	L _M	7	Z.
Force Mode	Fixed	Simult. Gap N/S	On	Reu	2.4	2.4	2.4	2.0	2.0	0.0	•	5	ь	/	8
Timer Results				EBI	$\overline{}$	EBT	WB		WBT	NBI	$\overline{}$	NBT	SBI		SBT
Assigned Phas						4	****	-	8	5	_	2	1	_	6
Case Number						11.0			11.0	1.2		3.0	1.3		3.0
Phase Duration	1 8			_	_	30.1		_	37.1	11.6	_	80.0	22.8	_	91.2
Change Period	-,	c) s				6.4		-	6.4	6.7	-	6.7	6.7	-	6.7
		**		_	_	5.2		_	5.3	5.0	_	0.0	5.0	_	0.0
	x Allow Headway (<i>MAH</i>), s eue Clearance Time (<i>g</i> s), s			-		22.2		_	28.8	4.0	$\overline{}$	0.0	2.0	_	0.0
Green Extension		, <u> </u>		_		1.5		_	1.9	0.1		0.0	14.1	_	0.0
Phase Call Pro		(9 0), 3		_		1.00			1.00	0.82	,	0.0	1.00	-	0.0
Max Out Proba				_	_	0.00		+	0.09	0.02	_		0.52	_	
Movement Gro	_	ults			EB			WB	T 5		NB			SB	
Approach Move				L	T	R	L	Т	R	L	T	R	L	Т	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow				-	221	58		115	281	36	765	28	343	1380	207
		ow Rate (s), veh/h/l	n		1819			1858	•	1810	1781	1598	1730	1781	1610
Queue Service				$\overline{}$	20.2	\Box		9.2		2.0	26.2	0.6	0.0	48.5	5.8
Cycle Queue C		e Time (g ε), s			20.2			9.2		2.0	26.2	0.6	0.0	48.5	5.8
Green Ratio (g				\vdash	0.14	\blacksquare		0.18		0.40	0.44	0.62	0.45	0.50	0.50
Capacity (c),					254			335		126	1556	977	785	1770	800
Volume-to-Cap				$\overline{}$	0.871	\Box		0.342	2	0.285	0.492	0.029	0.437	0.780	0.258
	, , ,	In (90 th percentile)			363			181		43.1	401.6	15.7	214.7	560.2	78
	, ,	eh/In (90 th percenti			14.4			7.1		1.7	15.8	0.6	8.5	22.1	3.1
		RQ) (90 th percent	tile)		0.00			0.00	_	0.36	0.00	0.04	0.61	0.00	0.00
Uniform Delay	` ''				71.6			60.8		39.1	34.6	6.4	48.0	25.5	9.7
Incremental De		,.			12.2			0.9		1.8	1.1	0.1	0.2	1.5	0.3
Initial Queue D					0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (eh			83.8	5.0		61.7		40.8	35.7	6.5	48.2	27.0	10.1
	evel of Service (LOS)				F	_ A		E	A	D	D	A	D	C	B
	Approach Delay, s/veh / LOS			67.5		E	21.4	1	С	35.0)	С	29.0)	С
Intersection De	ntersection Delay, s/veh / LOS					32	.7						С		
	eulte				EB			WB			NB			SB	
Multimodal Re	ultimodal Results														
Multimodal Re Pedestrian LOS		/LOS		2.47	·	В	2.63	3	С	2.16	3	В	1.92	2	В

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		HCS	7 Sig	nalize	d Int	ersect	ion R	Resul	ts Su	nmar	у				
Conoral Inform	antion.								Intoroso	tion Inf				4.441.	s t
General Inform	iation	Diana B. Zimana anna	T 66					$\overline{}$	Intersec		_		- 1	TITIL	
Agency		Diane B. Zimmerma	ıı ıraffı			Mondo	2004	_	Duration	,	0.250				
Analyst		DBZ		<u> </u>		Mar 16		\rightarrow	Area Typ	е	Other				•
Jurisdiction		DI-I D-I		Time F		PM Pe			PHF	D ' I	0.95	20	-		*
Urban Street		Bardstown Rd				2024 N			Analysis	Period	1> 4:0	30	_		
Intersection		Watterson Trail		File Na	ame	Bardst	own PN	/I 24 N	B.xus				-	ንተተሰ	
Project Descrip	tion	KJS Apartments	_	_	_		_	_			_	_		NINT	MID
Demand Inforr	nation				EB			WE	3		NB			SB	
Approach Move				L	T	R	L	T	R	L	T	R	T L	T	R
Demand (v), v				157	63	56	16	103	\rightarrow	35	742	31	356	1302	198
Demand (v), v	CHAIT			107	00	00	10	100	200	00	772	01	000	1002	100
Signal Informa	tion					ĮĮ.		rs.	5_		П	↑			
Cycle, s	170.0	Reference Phase	2	1	N 5/10	1		\exists	\equiv		•	` _	V	-	4
Offset, s	0	Reference Point	End	Cran	<u>~ 511</u>			34	7 22 /	0.0		1	2	3	Y
Uncoordinated	No	Simult. Gap E/W	On	Green Yellow		58.2 4.3	16.0 4.3	3.6	7 33.2 3.6	0.0					→
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.4	2.4	2.4	2.8	2.8	0.0	コ	5	6	7	
Timer Results				EBI	- T	EBT	WB	L	WBT	NBI		NBT	SBI	-	SBT
Assigned Phase	e				$\neg \vdash$	4			8	5		2	1	\neg	6
Case Number						11.0			11.0	1.2		3.0	1.3		3.0
Phase Duration	1, S					31.1			39.6	11.6	3	76.5	22.7	7	87.6
Change Period	ange Period, (Y+R c), s					6.4			6.4	6.7		6.7	6.7		6.7
Max Allow Head	ax Allow Headway (<i>MAH</i>), s				\neg	5.1		\neg	5.3	5.0		0.0	5.0	\neg	0.0
	ax Allow Headway (<i>MAH</i>), s ueue Clearance Time (<i>g</i> s), s					23.2			31.5	4.2			2.0		
Green Extension		1 - 1				1.5			1.8	0.1		0.0	14.0		0.0
Phase Call Prol		, ,				1.00			1.00	0.82	2		1.00)	
Max Out Proba						0.00			0.32	0.00			0.52	2	
Movement Gro	oup Res	sults			EB			WB			NB			SB	
Approach Move	_			L	Т	R	L	Т	T R	L	Т	R	L	Т	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F), veh/h			232	59		125	308	37	781	33	371	1355	203
		ow Rate (s), veh/h/l	n		1820			1858		1810	1781	1598	1730	1781	161
Queue Service		. ,,			21.2			9.9		2.2	27.9	0.8	0.0	50.3	6.7
Cycle Queue C		J ,,			21.2			9.9		2.2	27.9	0.8	0.0	50.3	6.7
Green Ratio (g		, _ ,,			0.15			0.20		0.38	0.42	0.61	0.42	0.48	0.48
Capacity (c), v					265			363		114	1484	968	737	1695	767
Volume-to-Capa		atio (X)			0.875			0.345	5	0.323	0.526	0.034	0.503	0.800	0.26
		/In (90 th percentile)			377.2			192		46.5	425.3	20.2	247.9	594.8	88.7
		eh/ln (90 th percenti			15.0			7.6		1.9	16.7	0.8	9.8	23.4	3.5
	, , ,	RQ) (90 th percent			0.00			0.00		0.39	0.00	0.05	0.71	0.00	0.00
Uniform Delay (71.1			59.0		41.8	37.4	7.1	54.3	28.7	12.1
	· /·				12.1			0.8		2.3	1.3	0.1	0.3	1.8	0.4
	cremental Delay (d 2), s/veh itial Queue Delay (d 3), s/veh				0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
	ontrol Delay (d), s/veh				83.2	5.0		59.8	5.0	44.2	38.7	7.2	54.6	30.5	12.4
	evel of Service (LOS)				F	Α		Е	A	D	D	Α	D	С	В
	pproach Delay, s/veh / LOS			67.4		E	20.8		С	37.7		D	33.3		С
	tersection Delay, s/veh / LOS					35							D		
Multimodal Re	eulte				EB			WB			NB			SB	
Pedestrian LOS		/1.08		2.47		В	2.63	_	С	2.16		В	1.92	_	В
i cucantan LUS	30016	, 203		2.47		ט	2.03	,	0	2.10	,	<u> </u>	1.82	-	ט

HCS™ Streets Version 7.9

					G 11110				ts Su	iiiiiai	y				
General Inform	ation								Intersed	tion Inf	ormatic	n n	T U	4741	ьŲ
	iation	Diane B. Zimmerma	an Traffi	c Engin	ooring			\rightarrow	Duration		0.250		┨	1111	
Agency Analyst		DBZ	ali IIalii			Mar 16	2021	\rightarrow	Area Ty	<u>, </u>	Other				
Jurisdiction		DUZ		Time F		PM Pe		\rightarrow	PHF	<i></i>	0.95				•
Urban Street		Bardstown Rd				2024 E		_	Analysis	Dorind	1> 4:3	20	-		*
				<u> </u>		Bardst				Period	12 4:	30	- 5		
Intersection	41 a.m	Watterson Trail		File Na	ame	Bardst	own Pi	/I 24 B	.xus				- 📱	111	216
Project Descrip	uon	KJS Apartments	_	_	-	_	-	-	_	_	_	_			
Demand Inform	nation				EB			WE	3	$\overline{}$	NB			SB	
Approach Move				L	Т	R	L	ΤT	R	1	T	R	1	T	T R
Demand (v), v				157	67	56	24	106	-	_	759	31	393	1302	-
Bernaria (*), *	011111			101	01	- 00		100	3 00	- 00	700	- 01	000	1002	10
Signal Informa	tion					ĮĮ.		5	<u></u>	$\neg \neg$		t			
Cycle, s	170.0	Reference Phase	2	1	N E42		1543	\exists	\equiv			_	V	-	4
Offset, s	0	Reference Point	End	Croon	10			25.	7 24	2 00		1	2	3	Y
Uncoordinated	No	Simult. Gap E/W	On	Green Yellow		56.8	16.0 4.3	3.6	1 34.3 3.6	0.0					→
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.4	2.4	2.4	2.8	2.8	0.0	コ	5	6	7	
Timer Results				EBI	. T	EBT	WB	L	WBT	NB	L	NBT	SBI	$\overline{}$	SBT
Assigned Phase	e			\neg	4		\neg	8	5	\neg	2	1	\neg	6	
Case Number					11.0			11.0	1.2		3.0	1.3		3.0	
Phase Duration	, s					31.5		\neg	40.7	11.6	3	75.1	22.7	,	86.2
Change Period,		c). S				6.4			6.4	6.7		6.7	6.7	\rightarrow	6.7
Max Allow Head						5.1		\neg	5.3	5.0	$\overline{}$	0.0	5.0	\rightarrow	0.0
Queue Clearan						23.5			32.6	4.2	\rightarrow		2.0	\rightarrow	
Green Extensio						1.5		\neg	1.7	0.1	-	0.0	14.0	_	0.0
Phase Call Prof		(3-),-				1.00		\rightarrow	1.00	0.82	\rightarrow		1.00	\rightarrow	
Max Out Probal					\rightarrow	0.00			0.50	0.00	\rightarrow		0.52	\rightarrow	
Movement Gro	un Res	culte			EB			WB			NB			SB	
Approach Move	•	, unto		L	T	R	L	Т	T R	L	T	R	L	T	□ R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F) veh/h		<u> </u>	236	59		137	320	37	799	33	401	1329	199
		ow Rate (s), veh/h/l	ln.		1821	- 00		1853	-	1810	1781	1598	1730	1781	161
Queue Service		. ,,			21.5			10.8	_	2.2	29.1	0.8	0.0	49.9	7.0
Cycle Queue C		- ,,			21.5			10.8		2.2	29.1	0.8	0.0	49.9	7.0
Green Ratio (g		o (g c /, o			0.15			0.20		0.37	0.41	0.61	0.42	0.47	0.4
Capacity (c), v					269			373		112	1455	965	710	1665	753
Volume-to-Capa		itio (X)			0.877			0.366	3	0.328		0.034	0.565	0.798	0.26
		/In (90 th percentile))		383.1			206.3	_	47.3	442.7	21.1	268.2	597.3	91.
	. ,,	eh/In (90 th percenti			15.2			8.1		1.9	17.4	0.8	10.6	23.5	3.7
		RQ) (90 th percent			0.00			0.00		0.39	0.00	0.06	0.77	0.00	0.0
Uniform Delay (, , , ,	uic)		70.9			58.5	-	42.6	38.7	7.4	57.9	30.0	13.
Incremental De					12.1			0.9		2.4	1.5	0.1	0.4	1.8	0.4
Initial Queue De		**			0.0			0.9		0.0	0.0	0.0	0.4	0.0	0.4
		,,			83.1	5.0			5.0	45.0	40.2	7.5	_		-
Control Delay (83.1 F	-		59.4 E	-	_		_	58.3 E	31.8 C	13.
Level of Service Approach Delay				67.4		E A	21.3		C	D 30.1	D	D	_		D B
	,,			67.4		E 37		2	U	39.	' <u> </u>		35.4	1	D
Intersection Del	ay, S/VE	III LUS				37	.∠						D		
Multimodal Re	culte				EB			WB			NB			SB	
Pedestrian LOS		/1.08		2.47		В	2.63	_	С	2.16		В	1.93		В
reuesiliali LOS		OS S		0.97	\rightarrow	D	1.24	-	A	1.20	$\overline{}$	A	2.13	-	В

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		HCS	7 Sig	nalize	a inte	ersect	ion R	esui	is Su	nmar	у				
Canaral Inform	ation								Intoroo	tion Inf	a ==== a #i a			A July I	k U
General Inform	iation	Diana B. Zimmarma	on Troffi	o Engin	ooring			\rightarrow	Intersec		_		- <u>I</u> I	JIII'	
Agency		Diane B. Zimmerma	an Iraiii			Mor 10	2024	\rightarrow	Duration		0.250		- 2		
Analyst		DBZ				Mar 16		\rightarrow	Area Typ	ЭЕ	Other			. !	•
Jurisdiction		Davidatavija Dd		Time F		PM Pe		_	PHF	Dariad	0.95	20	_		*
Urban Street		Bardstown Rd		<u> </u>		2034 N			Analysis	Period	1> 4:0	30	- 5		
Intersection		Watterson Trail		File Na	ame	Bardst	own Pi	/I 34 N	B.xus				-	ጎተተሰ	
Project Descrip	tion	KJS Apartments											_	14 14 1	211
Demand Inforr	nation				EB			WE	3		NB			SB	
Approach Move					T	R	L	T	R	L	T	R	L	T	R
Demand (v), v				165	66	59	17	108	\rightarrow	_	780	-	374	1369	20
Demand (v), v	CII/II			100	00	1 38	17	100	300	37	700	33	374	1309	20
Signal Informa	tion					JĮ.	IJĮ,	150	R		П	†			
Cycle, s	170.0	Reference Phase	2	1	5. 5.40		1542	K	Ħ		•	`_	₩		
Offset, s	0	Reference Point	End		<u>~ \\\</u>			2	7	-		1	2	3	Y
Uncoordinated	No	Simult. Gap E/W	On	Green Yellow		55.7 4.3	16.0 4.3	25.8 3.6	34.5	0.0					Ð
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.4	2.4	2.4	2.8	2.8	0.0	コ	5	6	7	
Timer Results				EBI		EBT	WBI	L	WBT	NBI	L	NBT	SBI		SBT
Assigned Phase	e				\neg	4		\neg	8	5		2	1	\neg	6
Case Number					11.0			11.0	1.2		3.0	1.3		3.0	
Phase Duration	, s					32.2		\neg	40.9	11.7	,	74.1	22.7	7	85.1
Change Period,		c). S				6.4			6.4	6.7		6.7	6.7	-	6.7
Max Allow Head						5.1		\neg	5.3	5.0	-	0.0	5.0	_	0.0
Queue Clearan						24.2		\neg	33.0	4.4	\rightarrow		2.0	$\overline{}$	
Green Extension						1.6		\neg	1.5	0.1	-	0.0	14.0	_	0.0
Phase Call Prol		(3-),-				1.00		\rightarrow	1.00	0.84	$\overline{}$		1.00	_	
Max Out Proba						0.00			0.69	0.00			0.52	_	
Movement Gro	un Res	sults			EB			WB			NB			SB	
Approach Move	•			L	T	R	L	Т	T R	L	T	R	L	Т	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow I) veh/h			243	62		132	324	39	821	35	370	1356	203
		ow Rate (s), veh/h/l	ln		1820	92		1858	+	1810	1781	1598	1730	1781	161
Queue Service		. ,,,			22.2			10.3	_	2.4	30.4	0.9	0.0	52.6	7.4
Cycle Queue C		· ,,			22.2			10.3		2.4	30.4	0.9	0.0	52.6	7.4
Green Ratio (g		- 1.1.0 (30),0			0.15			0.20		0.37	0.40	0.61	0.41	0.46	0.4
Capacity (c), v					277			377		104	1433	958	686	1643	74
Volume-to-Capa		itio (X)			0.879			0.349		0.376	0.573	0.036	0.540	0.825	0.2
		In (90 th percentile))		394.7			198.7	$\overline{}$	51.1	461.8	23.2	249.7	629	96
		eh/In (90 th percenti			15.7			7.8		2.0	18.2	0.9	9.8	24.8	3.8
		RQ) (90 th percent			0.00			0.00		0.43	0.00	0.06	0.71	0.00	0.0
Uniform Delay (, , , ,			70.6			58.1		44.1	39.8	7.8	58.8	31.1	13.
Incremental De					12.8			0.8		3.2	1.7	0.1	0.4	2.2	0.4
Initial Queue De		**			0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (,,			83.3	5.0		58.9	5.0	47.2	41.4	7.8	59.2	33.3	14.
Level of Service					F	A A		50.5 E	A	D D	D	7.0 A	E	C	В
Approach Delay				67.4		E	20.6		C	40.4		D	36.2		D
Intersection De	,,			07.4		37.			U	40.5			D 30.2	-	
														67	
					L.D						NID				
Multimodal Re				2.47	EB	В	2.63	WB	С	2.16	NB	В	1.93	SB	В

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		HCS	7 Sig	nalize	d Inte	ersect	ion K	esui	ts Sur	nmar	<u>y</u>				
	4.													2121	UTE!
General Inform	nation	I::						\rightarrow	ntersec		_		- 1	7111	Į.
Agency		Diane B. Zimmerma	an Traffi			I		\rightarrow	Duration		0.250				
Analyst		DBZ				Mar 16			Area Typ	е	Other				ĸ
Jurisdiction				Time F		PM Pe		\rightarrow	PHF		0.95		÷		*
Urban Street		Bardstown Rd		Analys	is Year	2034 B	uild	/	Analysis	Period	1> 4:0	30	12 To		
Intersection		Watterson Trail		File Na	ame	Bardst	own PN	1 34 B	xus					ጎተተሰ	
Project Descrip	tion	KJS Apartments											Th.	4144	11
	4.				- FD			14/5			NID			0.0	
Demand Inform					EB	T 5		WE	_		NB	T 5		SB	
Approach Move				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), v	eh/h			165	70	59	25	111	319	37	792	33	411	1369	20
Signal Informa	tion					JI.			8		_	†			
Cycle, s	170.0	Reference Phase	2	1	5. E40			E	=			,	V		Δ
Offset, s	0	Reference Point	End		2 2U			Ď	7			1	2	3	Y
Uncoordinated	No	Simult. Gap E/W	On	Green		53.6	17.2	26.2	_	_					4
Force Mode	Fixed	Simult. Gap E/W	On	Yellow Red	4.3 2.4	2.4	2.4	3.6 2.8	3.6 2.8	0.0) 5	6	7	~
1 STOC WIDGE	1 IACU	Ciliuit. Gap 14/5	OII	Ticu	£. T			2.0	2.0	10.0					
Timer Results				EBL	.	EBT	WBI		WBT	NBI	L	NBT	SBI	-	SBT
Assigned Phase	e					4			8	5		2	1		6
Case Number					11.0			11.0	1.2		3.0	1.3		3.0	
Phase Duration	, s					32.6		\neg	41.5	11.7	,	72.0	23.9		84.1
Change Period,		c), S				6.4			6.4	6.7		6.7	6.7		6.7
Max Allow Head		,,			\neg	5.1			5.3	5.0	\neg	0.0	5.0	\neg	0.0
Queue Clearan					-	24.6			34.0	4.4	\rightarrow		4.2	-	
Green Extensio		(-)			_	1.6		-	1.1	0.1	-	0.0	13.1	_	0.0
Phase Call Prol		(90),0			-	1.00			1.00	0.84	\rightarrow	0.0	1.00	-	0.0
Max Out Proba					\rightarrow	0.01		\top	1.00	0.02	\rightarrow		0.56	_	
Movement Gro	up Res	sults			EB			WB	,		NB			SB	
Approach Move				L	T	R	L	Т	R	L	T	R	L	T	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F	Rate (v), veh/h			247	62		143	336	39	834	35	399	1330	199
Adjusted Satura	ation Flo	ow Rate (s), veh/h/l	n		1821			1853		1810	1781	1598	1730	1781	161
Queue Service					22.6			11.3		2.4	31.7	0.9	2.2	52.2	7.8
Cycle Queue C		e Time (<i>g</i> ε), s			22.6			11.3		2.4	31.7	0.9	2.2	52.2	7.8
Green Ratio (g					0.15			0.21		0.36	0.39	0.60	0.40	0.46	0.46
Capacity (c), v					281			384		100	1390	945	679	1621	733
Volume-to-Capa					0.882			0.373		0.390	0.600	0.037	0.588	0.821	0.27
		In (90 th percentile)			402.6			213.4		52.3	480	24.6	267.6	635.7	102
	,,	eh/In (90 th percenti	,		16.0			8.4		2.1	18.9	1.0	10.5	25.0	4.1
Queue Storage	Ratio (RQ) (90 th percent	ile)		0.00			0.00		0.44	0.00	0.06	0.76	0.00	0.00
Uniform Delay (d 1), s	/veh			70.4			57.9		45.0	41.6	8.4	61.5	32.8	15.
Incremental De	lay (d 2), s/veh			13.7			0.9		3.5	1.9	0.1	0.5	2.1	0.4
Initial Queue De	elay (d	з), s/ve h			0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/ve	eh			84.1	5.0		58.8	5.0	48.5	43.5	8.5	62.0	35.0	15.
Level of Service	(LOS)				F	Α		Е	Α	D	D	Α	Е	С	В
Approach Delay	, s/veh	/LOS		68.2	2	E	21.1		С	42.4	1	D	38.6	3	D
Intersection De						39.	.7						D		
					EB			WB			NB			SB	
Multimodal Re	sults			2.47		В	2.63		С	2.16		В	1.93		

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Generated: 3/17/2021 6:19:46 PM

		Н	ICS7	Two-	-Way	Sto	o-Co	ntrol	Rep	ort						
General Information							Site	Inforn	natio	n		_	_			_
Analyst	DBZ						Inters	ection			Watte	erson Tra	il at Enti	ran		_
Agency/Co.	Diane	B Zimm	nerman 1	Traffic En	gineerin	g	Jurisd	liction								
Date Performed	3/16/						East/\	Nest Stre	eet		Entra	nce				
Analysis Year	2024						North	/South S	Street		Watte	erson Tra	iil			
Time Analyzed	AM P	eak					Peak	Hour Fac	ctor		0.92					
Intersection Orientation	North	-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	nts													
Lanes																
				7 4 4 Y ↑ * C	្សាក Majo	후 숙숙약 r Street: Nor	↑ ↑ ↑ th-South	<u> </u>								
Vehicle Volumes and Ad	justme	nts														
Approach		Eastb	oound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	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		ı
	-															_
Volume (veh/h)						34		22			183	13		8	540	
						34 1		1			183	13		8 1	540	
Volume (veh/h)						_					183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%)						1	0				183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked						1	0				183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%)				Undi	vided	1	0				183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized	eadwa	ys		Undi	vided	1	0				183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided	1	0				183	13			540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided	1	0	1			183	13		1	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided	7.1	0	6.2			183	13		4.1	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	7.1	0	6.2			183	13		4.1	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	0	6.2 6.21 3.3			183	13		4.1 4.11 2.2	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	61	6.2 6.21 3.3			183	13		4.1 4.11 2.2	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5		6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5	61	6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	7.1 6.41 3.5	61 451	6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21 9 1363	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	61 451 0.13	6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21 9 1363 0.01	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Pollow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	61 451 0.13 0.5	6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21 9 1363 0.01 0.0	540	
Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Pelay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	61 451 0.13 0.5 14.2	6.2 6.21 3.3			183	13		4.1 4.11 2.2 2.21 9 1363 0.01 0.0 7.7 A	540	

HCS TM TWSC Version 7.9 Watterson Ent AM 24.xtw Generated: 3/16/2021 12:13:59 PM

		Н	CS7	Two-	-Way	Sto	J-C0	ntrol	Rep	ort						
General Information							Site	Inforr	natio	n						_
Analyst	DBZ						Inters	ection			Watte	erson Tra	il at Entr	ran		_
Agency/Co.	Diane	B Zimn	nerman ⁻	Fraffic En	gineerin	g	Jurisd	liction								
Date Performed	3/16/	2021					East/\	West Stre	eet		Entra	nce				
Analysis Year	2034						North	/South S	Street		Watte	erson Tra	nil			
Time Analyzed	AM P	eak					Peak	Hour Fac	tor		0.92					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	nts													
Lanes																
				7 4 4 7 1 7 7		† † † Y r Street: Nor	† † r th-South	74471								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	T	R	U	L	T	R	U	L	Т	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	\perp						LR					TR		LT		
Volume (veh/h)						34		22			192	13		8	567	
Percent Heavy Vehicles (%)	\perp					1		1						1		
Proportion Time Blocked	+															
Proportion Time Blocked Percent Grade (%))									
Percent Grade (%) Right Turn Channelized)									
Percent Grade (%)				Undi	vided)									
Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided)									
Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided	7.1)	6.2						4.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided			6.2						4.1 4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided	7.1										
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	7.1 6.41		6.21						4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5		6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	61	6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5		6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	7.1 6.41 3.5	61	6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	7.1 6.41 3.5	61 431	6.21 3.3						4.11 2.2 2.21 9 1352		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	61 431 0.14	6.21 3.3						4.11 2.2 2.21 9 1352 0.01		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	61 431 0.14 0.5	6.21 3.3						4.11 2.2 2.21 9 1352 0.01 0.0		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	61 431 0.14 0.5 14.7	6.21 3.3						9 1352 0.01 0.0 7.7 A	0.2	

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		الم	CS7	Two-	-Way	Stop	J-C0	ntrol	Rep	ort						
General Information							Site	Inforn	natio	1						_
Analyst	DBZ						Inters	ection			Watte	rson Tra	il at Enti	ran		_
Agency/Co.	Diane	B Zimm	nerman 1	raffic En	gineerin	g	Jurisd	liction								
Date Performed	3/16/						East/\	Nest Stre	eet		Entra	nce				
Analysis Year	2024						North	/South S	Street		Watte	rson Tra	ıil			
Time Analyzed	PM Pe	eak						Hour Fac			0.92					
Intersection Orientation	_	n-South					_	sis Time		hrs)	0.25					
Project Description	_	partmen	nts							,						
Lanes																
				74***	A T	† † Yrstreet: Nor	↑ ⊁ ↑ th-South	<u> </u>								
Vehicle Volumes and Adj	justme	nts			ividjo	- Succe (voi	ur-500ti1									
Approach	\perp	Eastb	ound			Westl	oound			North	bound			South	bound	_
Movement	U	L	Т	R	U	L	T	R	U	L	T	R	U	L	Т	F
Priority	\perp	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	C
Configuration	\bot						LR					TR		LT		
Volume (veh/h)	\bot					22		14			450	41		22	412	
Percent Heavy Vehicles (%)	\perp					1		1						1		
Proportion Time Blocked																
<u> </u>																
Percent Grade (%)	\perp					-	0									
Percent Grade (%) Right Turn Channelized						(0									
Percent Grade (%) Right Turn Channelized Median Type Storage				Undi	vided	(0									
Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided		0									
Percent Grade (%) Right Turn Channelized Median Type Storage	eadwa	ys		Undi	vided	7.1	0	6.2						4.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	ivided		0	6.2						4.1 4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	ivided	7.1	0	-								
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	7.1 6.41	0	6.21						4.11		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		ivided	7.1 6.41 3.5		6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	7.1 6.41 3.5	39	6.21 3.3						4.11 2.2		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	7.1 6.41 3.5		6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	7.1 6.41 3.5	39	6.21 3.3						4.11 2.2 2.21		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	7.1 6.41 3.5	39 329	6.21 3.3						4.11 2.2 2.21 24 1039		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	7.1 6.41 3.5	39 329 0.12	6.21 3.3						2.21 2.21 24 1039 0.02		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	7.1 6.41 3.5	39 329 0.12 0.4	6.21 3.3						2.2 2.21 24 1039 0.02 0.1		
Percent Grade (%) Right Turn Channelized Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	7.1 6.41 3.5 3.51	39 329 0.12 0.4 17.4	6.21 3.3						24 1039 0.02 0.1 8.5 A	.7	

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		Н	CS7	Two-	-Way	Stop	o-Co	ntrol	Rep	ort						
General Information	_						Site	Inforn	natio	n						_
Analyst	DBZ						Inters	ection			Watte	erson Tra	il at Entr	an		_
Agency/Co.	Diane	B Zimn	nerman 1	raffic En	gineerin	g	Jurisd	liction								
Date Performed	3/16/	2021					East/\	West Stre	eet		Entra	nce				
Analysis Year	2034						North	n/South S	Street		Watte	erson Tra	il			
Time Analyzed	PM P	eak					Peak	Hour Fac	tor		0.92					
Intersection Orientation	North	n-South					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	nts													
Lanes																
				7447177		† † † Y r Street: Nor	ተ ኮ ሶ th-South	74471								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	T	R	U	L	T	R	U	L	Т	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)	-					22		14			473	41		22	433	
Percent Heavy Vehicles (%)	_					1		1						1		
Proportion Time Blocked	_															
Percent Grade (%)						-	0									
Right Turn Channelized	-															
Median Type Storage				Undi	vided											
	eadwa	ys		Undi	vided											
Median Type Storage	eadwa	ys		Undi	vided	7.1		6.2						4.1		
Median Type Storage Critical and Follow-up H	eadwa	ys		Undi	vided	7.1 6.41		6.2						4.1 4.11		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec)	eadwa	ys		Undi	vided											
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec)	eadwa	ys		Undi	vided	6.41		6.21						4.11		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec)			ervice		vided	6.41 3.5	39	6.21 3.3						4.11 2.2		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an			ervice		vided	6.41 3.5	39	6.21 3.3						4.11 2.2 2.21		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)			ervice		vided	6.41 3.5		6.21 3.3						4.11 2.2 2.21		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)			ervice		vided	6.41 3.5	310	6.21 3.3						4.11 2.2 2.21 24 1017		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio			ervice		vided	6.41 3.5	310 0.13	6.21 3.3						2.21 2.21 24 1017 0.02		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)			ervice		vided	6.41 3.5	310 0.13 0.4	6.21 3.3						2.21 2.21 24 1017 0.02 0.1		
Median Type Storage Critical and Follow-up H Base Critical Headway (sec) Critical Headway (sec) Base Follow-Up Headway (sec) Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)			ervice		vided	6.41 3.5 3.51	310 0.13 0.4 18.3	6.21 3.3						24 1017 0.02 0.1 8.6 A	2.7	

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		Н	CS7	Two	-Way	Sto	o-Co	ntrol	Rep	ort						
General Information			_				Site	Inforr	natio	n		_	_	_		_
Analyst	DBZ						Inters	ection			Bards	stown Ro	ad at En	tranc		_
Agency/Co.	Diane	e B Zimn	nerman 1	Traffic Er	gineerin	g	Jurisd	liction								
Date Performed	3/16/	/2021					East/\	Nest Str	eet		Bards	stown Ro	ad			
Analysis Year	2024						North	/South :	Street		Entra	nce				
Time Analyzed	AM P	eak					Peak	Hour Fac	ctor		0.92					
Intersection Orientation	East-	West					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	nts													
Lanes																
				0744Y1	The Maj	or Street: Ea	st-West	1 + + C 0								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	Т				Т	TR							LR	L
Volume (veh/h)	0	0	537				1451	9						13		17
Percent Heavy Vehicles (%)	3	1												1		1
Proportion Time Blocked																
Percent Grade (%)															0	
Right Turn Channelized																
Median Type Storage				Left	Only								1			
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.12												6.82		6.92
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31
Delay, Queue Length, an	d Leve	l of S	ervice													
,,	T	0													33	
Flow Rate, v (veh/h)															201	
		415									_	_	_			
Flow Rate, v (veh/h)		415 0.00						l	l	l					0.16	ı
Flow Rate, v (veh/h) Capacity, c (veh/h)		-													0.16	
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio		0.00													_	
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)		0.00													0.6	
Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)		0.00 0.0 13.7 B	.0											26	0.6 26.4	

HCS TW TWSC Version 7.9 Bard Ent AM 24.xtw Generated: 3/16/2021 12:20:07 PM

		Н	CS7	Two-	-Way	Sto	р-Со	ntrol	Rep	ort						
General Information			_	_			Site	Inforr	natio	n						_
Analyst	DBZ						Inters	ection			Bards	town Ro	ad at En	tranc		_
Agency/Co.	Diane	B Zimm	nerman T	Traffic En	gineerin	g	Jurisd	iction								
Date Performed	3/16/	2021					East/\	West Stre	eet		Bards	town Ro	ad			
Analysis Year	2034						North	/South :	Street		Entra	nce				
Time Analyzed	AM P	eak					Peak	Hour Fac	tor		0.92					
Intersection Orientation	East-	West					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	its													
Lanes																
				9 7 4 4 Y ↑ Y ↑	Ti fi Maj	or Street: Ea	t to the state of	1 7 4 4 7 0								
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	T	R	U	L	T	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	Т				T	TR							LR	
Volume (veh/h)	0	0	564				1525	9						13		17
Percent Heavy Vehicles (%)	3	1												1		1
Proportion Time Blocked																
Percent Grade (%)	_														0	
Right Turn Channelized																
Median Type Storage				Left	Only				<u> </u>				1			
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.12												6.82		6.92
Base Follow-Up Headway (sec)		2.2												3.5		3.3
base rollow op ricadway (see)														3.51		3.31
Follow-Up Headway (sec)		2.21														
	d Leve		ervice													
Follow-Up Headway (sec)	d Leve		ervice												33	
Follow-Up Headway (sec) Delay, Queue Length, an	d Leve	l of S	ervice												33 184	
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h)	d Leve	l of So	ervice												_	
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h)	d Leve	0 386	ervice												184	
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio	d Leve	0 386 0.00	ervice												184 0.18	
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh)	d Leve	0 386 0.00 0.0	ervice												184 0.18 0.6	
Follow-Up Headway (sec) Delay, Queue Length, an Flow Rate, v (veh/h) Capacity, c (veh/h) v/c Ratio 95% Queue Length, Q ₉₅ (veh) Control Delay (s/veh)	d Leve	0 386 0.00 0.0 14.3 B	ervice											28	184 0.18 0.6 28.7	

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		Н	CS7	Two-	-Way	Sto	o-Co	ntrol	Rep	ort						
General Information	_						Site	Inforr	natio	n						
Analyst	DBZ						Inters	ection			Bards	stown Ro	ad at En	tranc		
Agency/Co.	Diane	e B Zimn	nerman T	raffic En	gineerin	g	Jurisd	liction								
Date Performed	3/16/	2021					East/\	Nest Stre	eet		Bards	stown Ro	ad			
Analysis Year	2024						North	/South :	Street		Entra	nce				
Time Analyzed	PM P	eak					Peak	Hour Fac	ctor		0.92					
Intersection Orientation	East-	West					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmer	nts													
Lanes																
				A 7 4 4 Y ↑ P C	기 기 Maj	ቀ ሃ ሳ	P C	4 + 4 + 4 0								
Vehicle Volumes and Adj	justme	nts														
Approach		Eastb	ound			West	bound			North	bound			South	bound	_
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9	_	10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration	_	L	T				T	TR							LR	╙
Volume (veh/h)	0	0	1382				808	27			-	-	_	9	_	12
Percent Heavy Vehicles (%)	3	1										_		1		1
Proportion Time Blocked	-															
Percent Grade (%)	-														0	
Right Turn Channelized	+															
Median Type Storage				Left	Only								1			_
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.12												6.82		6.9
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.3
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)	T	0									Π	Π	Π		23	
Capacity, c (veh/h)		752													337	
v/c Ratio		0.00													0.07	
95% Queue Length, Q ₉₅ (veh)		0.0													0.2	
Control Delay (s/veh)		9.8													16.5	П
Level of Service (LOS)		А													С	
Approach Delay (s/veh)		0	.0											1	6.5	
Approach belay (5) verily																

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		H	CS7	Iwo-	-Way	Stop	p-Co	ntrol	Кер	ort _						
General Information							Site	Inforr	natio	n						
Analyst	DBZ						Inters	ection			Bards	town Ro	ad at En	tranc		
Agency/Co.	Diane	B Zimm	nerman T	raffic En	gineerin	g	Jurisc	liction								
Date Performed	3/16/	2021					East/	Nest Str	eet		Bards	town Ro	ad			
Analysis Year	2034						North	/South	Street		Entra	nce				
Time Analyzed	PM P	eak					Peak	Hour Fac	tor		0.92					
Intersection Orientation	East-	West					Analy	sis Time	Period (hrs)	0.25					
Project Description	KJS A	partmen	nts													
Lanes																
				1 1 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		수 Ƴ '		1 1 4 4 7 4 4 7 4 4 7 4 4 7 4 4 7 4 4 7 4 4 7 4 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7								
Vehicle Volumes and Adj	ustme	nts														
Approach		_	ound				bound			_	bound			_	bound	_
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration	-	L	T				T	TR							LR	
Volume (veh/h)	0	0	1453				850	27						9		12
Percent Heavy Vehicles (%)	3	1												1		1
Proportion Time Blocked	-															
Percent Grade (%)	-												_		0	
Right Turn Channelized	-															
Median Type Storage				Left	Only								1			
Critical and Follow-up Ho	eadwa	ys														
Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.12												6.82		6.92
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31
Delay, Queue Length, an	d Leve	l of Se	ervice													
Flow Rate, v (veh/h)		0													23	
Capacity, c (veh/h)		723													319	
v/c Ratio		0.00													0.07	
95% Queue Length, Q ₉₅ (veh)		0.0													0.2	
Control Delay (s/veh)		10.0													17.2	
Level of Service (LOS)		А													С	
Approach Delay (s/veh)		0	.0											1	7.2	
Approach LOS															С	

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