

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

Kevin P. McDonough (1953-1994)
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May 19, 2020

Montgomery Township Planning Board
2761 Route 206
Bellemead, NJ 08502

Re: Haven at Princeton
Lot 7 in Block 37003
Montgomery Township, Somerset County
MRA File No. 19-143

Dear Board Members:

McDonough & Rea Associates (MRA) has been asked to provide the Planning Board with a *Traffic Impact Analysis* for *Haven at Princeton*, 154 multi-family dwellings that includes 122 townhomes and 32 apartments, proposed for the noted property. Specifically, plans prepared by D.S. Engineering PC (DSE) show the following elements of the plan:

- *Haven at Princeton*
 - 122 townhomes
 - 32 apartments
 - Full movement access to River Road
 - Full access to Blue Spring Road via Salisbury Road Extension

The subject property is located west of River Road and north of Blue Spring Road, as shown on *Figure 1, a Site Location Map* in the *Appendix*.

SCOPE OF STUDY

In order to prepare a thorough *Traffic Impact Analysis* for the *Haven at Princeton* project, MRA conducted the following tasks:

1. Made field visits to the site to establish existing roadway and traffic conditions in the area.
2. Conducted manual turning movement traffic counts during the critical AM and PM peak hours at the following intersections:

Please reply to:

- ☒ 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
- ☐ 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181



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Montgomery Township Planning Board

-2-

May 19, 2020

- Blue Spring Road and River Road
 - Blue Spring Road and Salisbury Road/Hoover Avenue
3. Installed an automatic traffic recording device on River Road adjacent to the site to record hourly and daily traffic volumes.
 4. Conducted trip generation estimates during critical AM and PM peak hours for the residential dwellings based upon data published by the Institute of Transportation Engineers (ITE).
 5. Distributed site generated traffic to the adjacent roadway network in accordance with existing travel patterns in the area and access to higher order roadways such as Route 206, Route 27, Route 518, etc.
 6. Projected traffic volumes to a design year of 2025 in consideration of historical growth rate data published by the New Jersey Department of Transportation (NJDOT) and the future site generated traffic volumes.
 7. Conducted level of service capacity analyses for the River Road and Blue Spring Road study locations.
 8. Reviewed the *Site Plan* with respect to adherence to New Jersey Residential Site Improvement Standards (RSIS) and conformance to proper traffic engineering principles.

The following report sets forth the database accumulated and the conclusions reached with respect to *Haven at Princeton*.

EXISTING CONDITIONS

The subject property previously contained the *Trap Rock* corporate offices and is bounded to the east by River Road and to the west/south by the multi-family development *Montgomery Woods*. Salisbury Road is a 2 lane, 30 MPH residential collector roadway which terminates at the westerly property line of the subject property. Salisbury Road will be extended in an easterly direction through the subject property to intersect River Road to form a “T” shaped intersection.

Blue Spring Road is a 2-lane median divided collector roadway with an east/west orientation connecting to River Road to the east and to Princeton Avenue to the west through the *Montgomery Woods* development. Blue Spring Road has a posted speed limit of 35 MPH, along with bike lanes in both directions.



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Montgomery Township Planning Board

-3-

May 19, 2020

River Road, in the vicinity of the proposed site access is a 2-lane north/south County Route 605 roadway with sporadic shoulders and a posted speed limit of 45 MPH south of the site and a posted speed limit of 35 MPH north of the site.

Blue Spring Road intersects River Road from the west and is controlled by a stop sign on the Blue Spring Road approach. Each approach to the intersection provides a single lane to accommodate all movements.

The Blue Spring Road and Salisbury Road/Hoover Avenue intersection is a 4-way unsignalized intersection controlled by stop signs on the Salisbury Road and Hoover Avenue approaches.

EXISTING TRAFFIC VOLUMES

Traffic volume data was collected by conducting peak hour traffic manual turning movement counts at the following 2 locations during the critical AM and PM peak hours. The counts were conducted in April and May 2019 on multiple dates when schools were in session and weather conditions did not impact routine traffic flow.

- Blue Spring Road and River Road
- Blue Spring Road and Salisbury Road/Hoover Avenue

An automatic traffic recording device was installed on River Road north of Blue Spring Road in April 2019 to record the hourly and daily traffic volumes.

Figure 2, Existing Peak Hour Traffic Volumes, is attached to the *Appendix* and details the AM and PM weekday peak hour volumes which were balanced based on the manual and automatic traffic counts collected.

TRIP GENERATION/DISTRIBUTION

Estimates of traffic to be generated by the 154 multi-family residential units were made after consulting the 10th Edition of the ITE *Trip Generation* manual. ITE Land Use Code 220, *Multifamily Housing*, was utilized for the analysis herein. *Table I* illustrates AM and PM peak street hour traffic generation.



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-4-

May 19, 2020

TABLE I
TRIP GENERATION
154 MULTI-FAMILY RESIDENTIAL UNITS

AM PSH			PMPSH		
IN	OUT	TOTAL	IN	OUT	TOTAL
18	57	75	55	35	90

Estimates of traffic distribution were made after reviewing the adjacent roadway network, access to higher order roadways such as Route 1, Route 206, Route 27 and Route 518 and existing traffic volume patterns in the area. Based upon this review, site traffic was distributed as follows:

TABLE II
TRAFFIC DISTRIBUTION

TO/FROM	PERCENTAGE
River Road-South	60%
River Road-North	20%
Blue Spring Road-West	20%

Figure 3 in the *Appendix* illustrates site generated and distributed traffic volumes.

ANALYSIS OF FUTURE TRAFFIC

A design year of 2025 was established as an appropriate time frame to obtain approval, construct the dwellings and occupy the development. The NJDOT's *Background Growth Rate* data for the area was consulted and a 1.0-1.75 percent growth rate was recommended. The analysis herein considered a background traffic growth rate of 2.0 percent per year for 3 years and 0.50 percent for 3 years or approximately 10 percent was added to base traffic volumes in order to arrive at year 2025 *no-build* traffic volumes in accordance with the NJDOT methodology. *Figure 4* in the *Appendix* illustrates design year pre-development traffic volumes including background traffic growth. *Figure 5* in the *Appendix* illustrates design year 2025 post-development traffic volumes including traffic generated from the *Havens at Princeton* project. In addition, a portion of the traffic from the *Montgomery Woods* dwellings located along Salisbury Road were assigned to Salisbury Road Extension and are included in the 2025 post-development traffic volumes.



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-5-

May 19, 2020

Traffic engineers calculate levels of service of unsignalized intersections which relate to the quality of traffic flow. Level of service is a measure of average control delay. Average control delay is the time lost due to deceleration and the amount of time from when a vehicle is stopped for a traffic control device (or at the end of the queue) to when the vehicle departs the intersection. Delay is a relative quantity of driver discomfort, frustration, fuel consumption, and loss in travel time.

Levels of service range from “A” to “F” with “A” being the highest or best attainable level of service. Level of service “E” with average control delays of not more than 50 seconds per vehicle at an unsignalized intersection indicates near to or at capacity conditions and is generally considered the limit of acceptable level of service and delay.

Full definitions of levels of service for unsignalized intersections as well as level of service summaries are included in the *Appendix*. The intersections studied by this report were analyzed according to the procedures set forth in the *Highway Capacity Manual 2010*, using the *Highway Capacity Software (HCS)*, release 7.5.

BLUE SPRING ROAD AND SALISBURY ROAD/HOOVER AVENUE

Findings were that this unsignalized 4-way intersection currently operates at level of service “B” and will continue to operate at level of service “B” for both peak hours analyzed under 2025 future traffic volumes. Both levels of service are considered to be well within acceptable traffic engineering parameters.

RIVER ROAD AND BLUE SPRING ROAD

The Blue Spring Road approach to River Road currently operates at level of service “C” and “B” for the AM and PM peak hours respectively. Under the 2025 pre and post-development conditions, the eastbound approach will continue to operate at level of service “C” and “B” for the AM and PM peak hours respectively. The River Road northbound approach currently operates at level of service “A” for both the AM and PM peak hours and will continue to operate at level of service “A” under 2025 pre and post-development conditions.



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Montgomery Township Planning Board

-6-

May 19, 2020

RIVER ROAD AND SALISBURY ROAD EXTENSION (SITE ACCESS)

At the River Road access which will serve *Montgomery Woods* traffic and the *Haven at Princeton* project, findings were that exiting movements would do so at level of service "B" during the AM peak street hour and level of service "D" during the PM peak street hour. The northbound left turn movement is projected to operate at level of service "A" for the post-development condition for both peak hours analyzed. Therefore, this intersection will operate within acceptable traffic engineering parameters.

SITE PLAN & PARKING

The *Site Plan*, prepared by DSE shows the residential component of *Haven at Princeton* being designed to conform to New Jersey RSIS with 24 foot wide roadways serving the townhomes and apartments. The plan complies with the RSIS *Horizontal Roadway Design and Accessibility* standards. According to the RSIS, 2.4 spaces per unit are required for the 122 three-bedroom townhome units or 293 parking spaces. A total of 305 parking spaces are proposed to support the 122 townhomes consisting of 122 garage spaces, 122 driveway spaces and 61 *on-street* parking spaces. The apartment buildings will be served by 65 parking spaces where 64 parking spaces are required by RSIS. The parking supply provided meets and exceeds the RSIS requirement and will be more than adequate to support the community.

The extension of Salisbury Road from its terminus in *Montgomery Woods* through the subject property to River Road will provide a more complete street system from Blue Spring Road to River Road to better accommodate Municipal emergency services, public works and the school district.

CONCLUSIONS

It is concluded, based on the analysis set forth in this report, that plans to construct *Haven at Princeton*, consisting of 122 townhomes and 32 apartments on the noted property, can be approved and operate compatibly with future traffic conditions in the area.



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Montgomery Township Planning Board

-7-

May 19, 2020

An extension of Salisbury Road, in an easterly direction, will serve the *Haven at Princeton* project as well as the adjoining *Montgomery Woods* multi-family project. Therefore, the *Haven at Princeton* project will have direct access to both Blue Spring Road and to River Road. The Salisbury Road extension will provide direct access to River Road for the existing dwellings west of the project to River Road. In addition, the Salisbury Road extension will provide a complete roadway network from Blue Spring Road to River Road to better accommodate Township services such as emergency services, public works and the school system.

Levels of service at the River Road and Blue Spring Road intersection and at the site access to River Road will operate within acceptable traffic engineering parameters for the 2025 design year. The *Site Plan* itself has been designed in accordance with New Jersey RSIS, with regard to parking and circulation, thereby ensuring safe and efficient internal circulation.

A representative from MRA will be in attendance at an upcoming Montgomery Township Planning Board meeting to provide expert testimony and to answer any questions Board members, Board experts or the public may have.

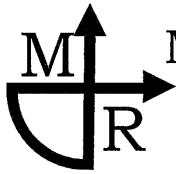
Very truly yours,

Jay S. Troutman, Jr., PE
Principal

Scott T. Kennel
Sr. Associate

cc: David Schmidt, P.E
Trip Brooks

APPENDIX



McDONOUGH & REA ASSOCIATES

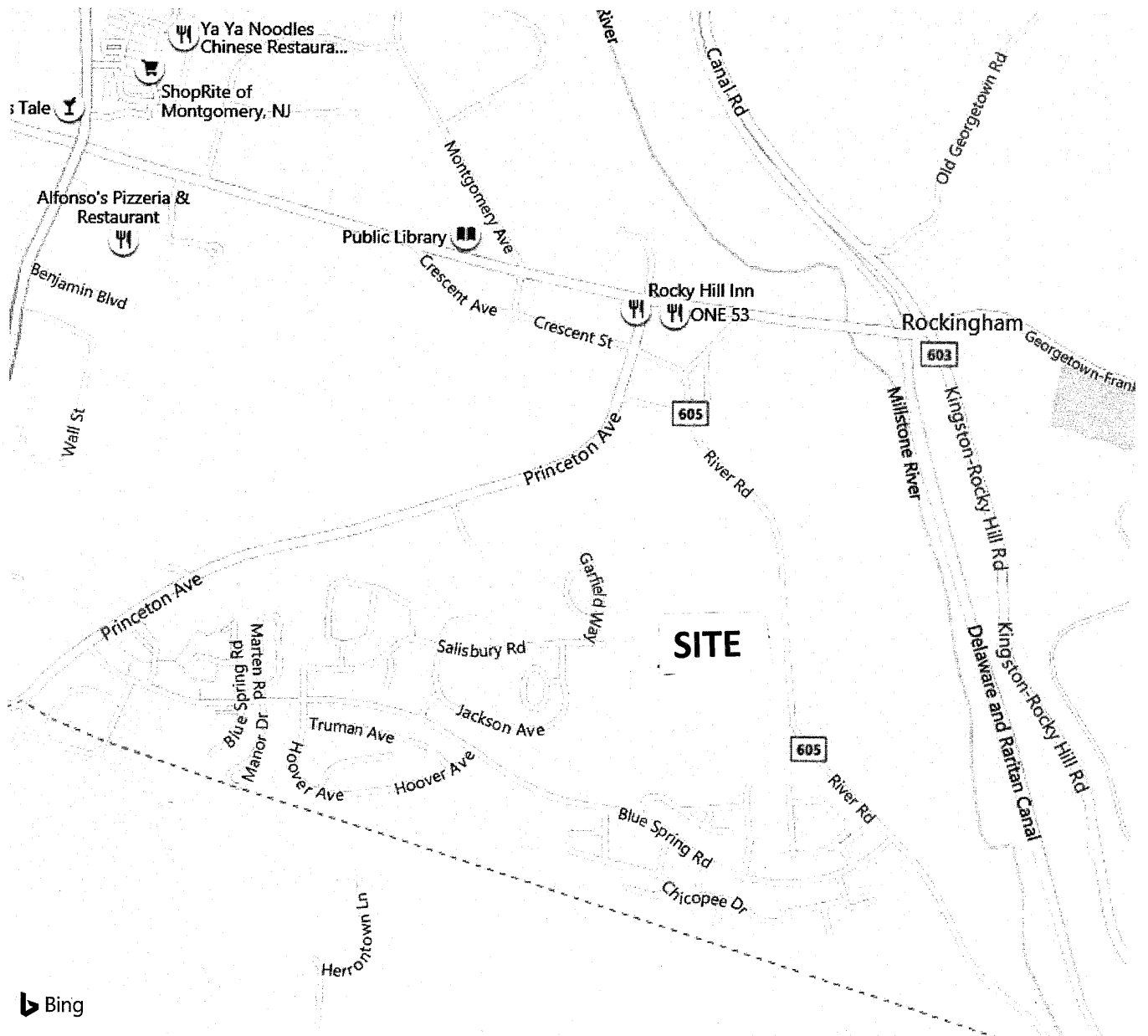
TRAFFIC AND TRANSPORTATION CONSULTING

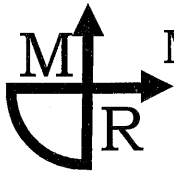
FIGURE 1

JOB NO.
19-143

DATE:
MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.
SITE LOCATION MAP





McDONOUGH & REA ASSOCIATES

TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 2

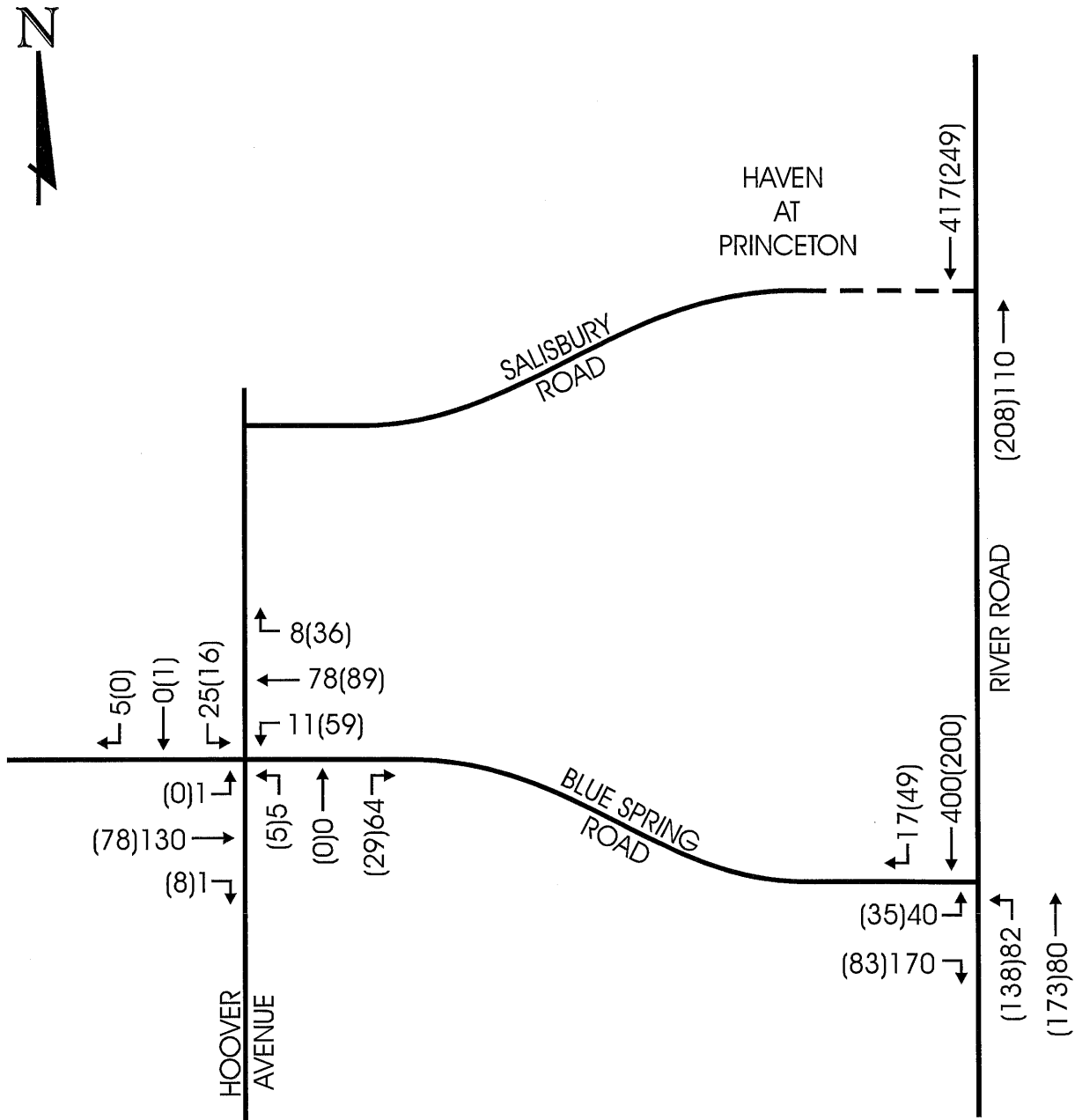
JOB NO.

19-143

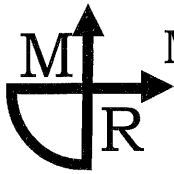
DATE:

MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.
2019 EXISTING PEAK HOUR TRAFFIC VOLUMES



LEGEND: ← AM PSH(PM PSH)



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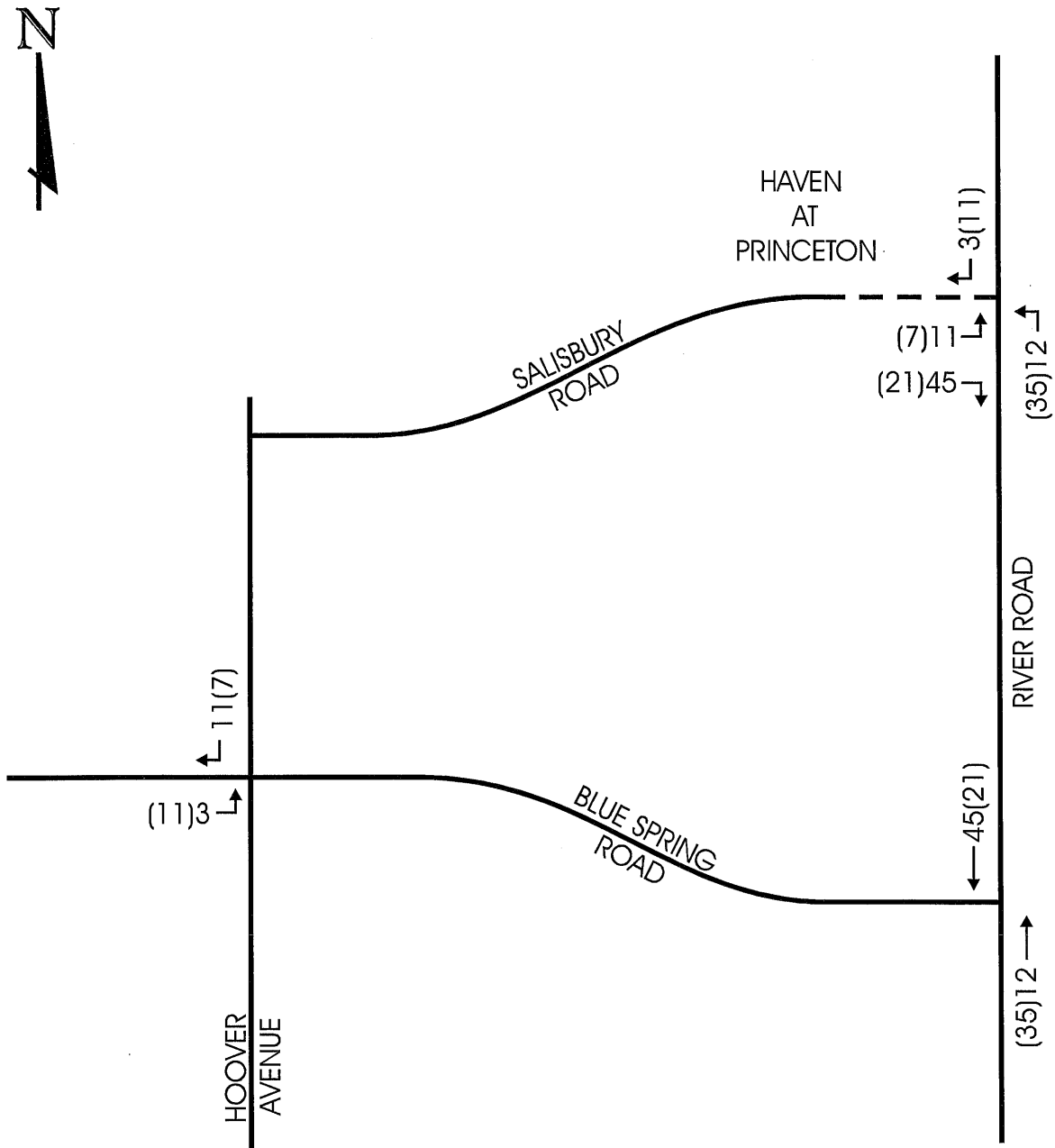
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 3

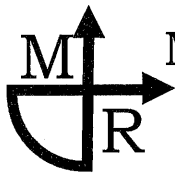
JOB NO.
19-143

DATE:
MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.
SITE GENERATED TRAFFIC VOLUMES



LEGEND: ← AM PSH(PM PSH)



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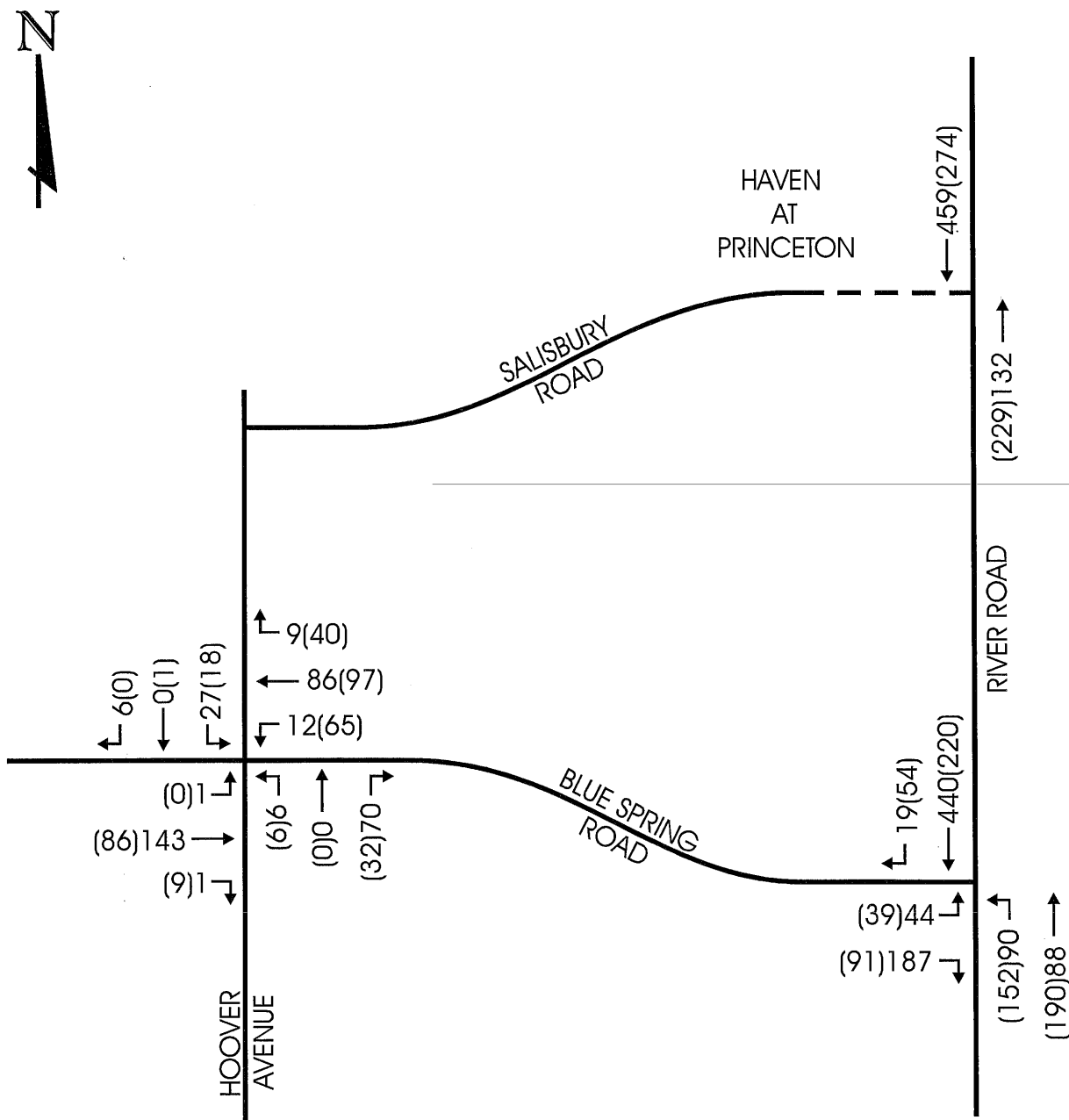
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FIGURE 4

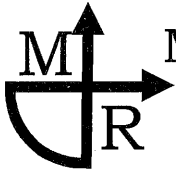
JOB NO.
19-143

DATE:
MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.
2025 FUTURE PRE - DEVELOPMENT TRAFFIC VOLUMES



LEGEND: ← AM PSH(PM PSH)



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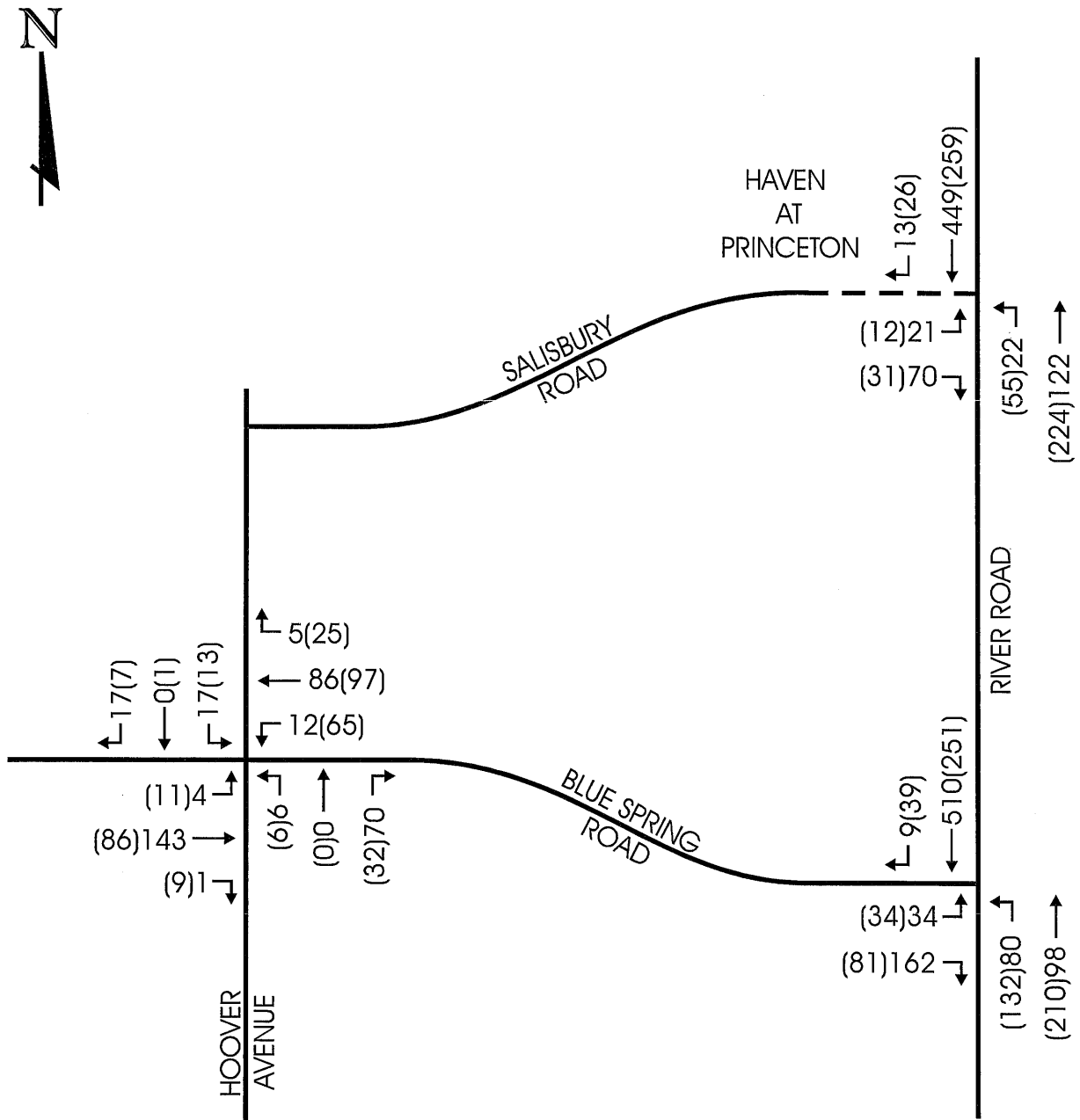
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 5

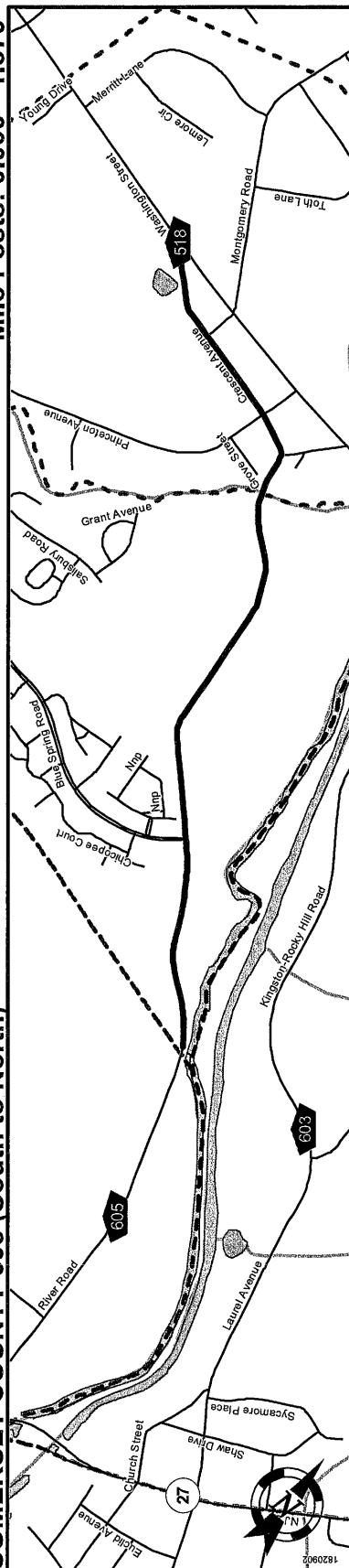
JOB NO.
19-143

DATE:
MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.
2025 FUTURE POST - DEVELOPMENT TRAFFIC VOLUMES



LEGEND: ← AM PSH(PM PSH)



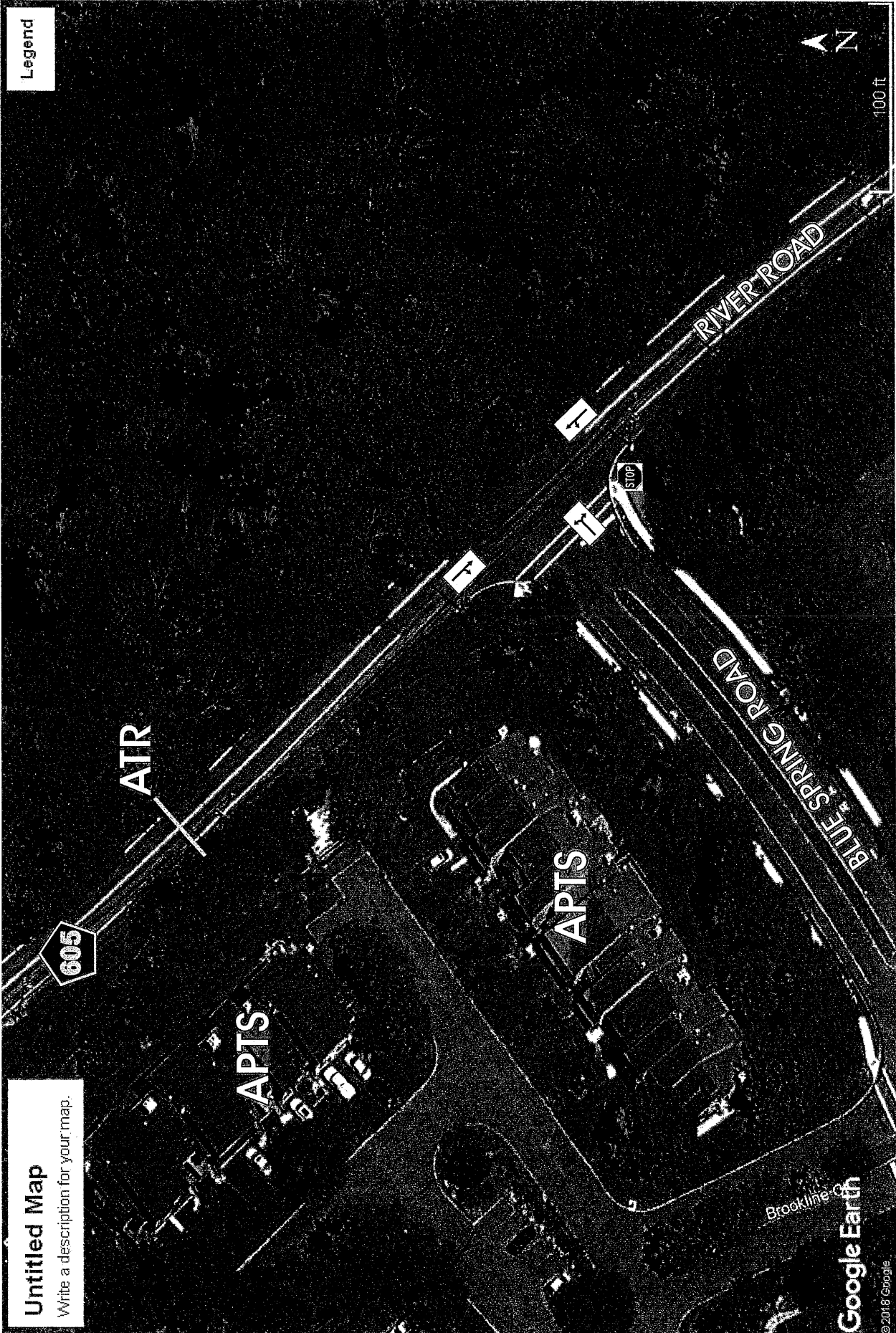
Pavement	Shoulder	Number of Lanes	Speed Limit
Secondary Direction			
Primary Direction			
Interstate Route 287	US Route 22	NJ Route 33	County Road 689
Interchange Number 2	Grade Separated Interchange	Traffic Signal	Traffic Monitoring Sites WIM AVC VOL
Road Underpass	Road Overpass		
Street Name			
Jurisdiction	Functional Class	Federal Aid - NHS Sy	Control Section
Speed Limit	Number of Lanes	Med. Type	Med. Width
Pavement	Shoulder	Traffic Volume	Traffic Sta. ID
Structure No.	Enlarged Views		

19143 RIVER RD MONTGOMERY ATR COUNT1
 Site Code: 19143
 Located on River Road (CR 605)
 North of Blue Spring Road
 Station ID: 16293

[illegible]

Site Code: 19143
19143 RIVER RD MONTGOMERY ATR COUNT1
Located on River Road (CR 605)
North of Blue Spring Road
Station ID: 16293

Start Time	15-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)	SB(A)	NB(B)
12:00 AM	0	0	2	3	4	1	5	5	8	4	6	2	*	*	4	2
01:00	2	2	0	1	1	1	5	3	3	0	3	6	*	*	2	2
02:00	2	0	1	2	2	2	0	0	3	2	1	1	*	*	2	1
03:00	1	2	0	0	0	1	2	2	3	1	3	1	*	*	2	1
04:00	2	9	4	7	0	7	4	7	3	3	1	2	*	*	2	1
05:00	16	16	13	17	17	24	10	23	7	10	6	4	*	*	12	6
06:00	94	59	100	60	90	53	97	56	60	32	12	9	*	*	76	16
07:00	297	94	327	108	338	117	290	107	155	72	25	22	*	*	239	45
08:00	435	101	426	106	423	99	397	105	231	72	44	34	*	*	326	87
09:00	247	95	285	112	203	112	188	91	160	83	87	61	*	*	195	86
10:00	112	62	90	120	111	70	103	64	105	75	75	79	*	*	99	92
11:00	111	76	103	130	117	85	90	71	122	73	121	73	*	*	111	85
12:00 PM	117	80	123	114	104	76	130	84	117	97	114	79	*	*	118	88
01:00	99	63	93	85	103	77	104	76	152	121	109	67	*	*	110	82
02:00	109	80	123	71	127	85	116	80	113	96	103	61	*	*	115	79
03:00	151	110	178	123	153	126	178	119	112	91	86	66	*	*	143	106
04:00	210	163	201	170	180	178	230	155	145	114	91	74	*	*	176	142
05:00	257	202	257	198	226	207	235	195	186	120	72	49	*	*	206	162
06:00	194	130	289	144	196	111	182	133	107	59	*	*	*	*	194	115
07:00	95	75	110	61	110	63	127	59	78	67	*	*	*	*	104	65
08:00	79	36	69	46	78	40	80	47	50	37	*	*	*	*	71	41
09:00	43	21	50	15	65	24	47	27	54	22	*	*	*	*	52	22
10:00	14	13	22	11	17	12	32	15	29	24	*	*	*	*	23	15
11:00	10	4	14	2	10	9	17	6	14	11	*	*	*	*	13	6
Lane	2697	1493	2880	1706	2675	1579	2669	1530	2017	1294	959	690	0	0	2395	1426
Day	4190	4586	4254	4199	4199	3311	1649	3821	3821	3821	3821	3821	3821	3821	3821	3821
AM Peak	08:00	08:00	08:00	07:00	08:00	07:00	08:00	07:00	08:00	09:00	11:00	10:00	-	-	08:00	09:00
Vol.	435	101	426	130	423	117	397	107	231	83	121	79	-	-	326	92
PM Peak	17:00	17:00	18:00	17:00	17:00	17:00	17:00	17:00	17:00	13:00	12:00	12:00	-	-	17:00	17:00
Vol.	257	202	289	198	226	207	235	195	186	121	114	79	-	-	206	162



MRA JOB 19-143 RIVER ROAD & BLUE SPRING ROAD
MONTGOMERY TOWNSHIP, SOMERSET COUNTY

HAVENS AT PRINCETON
 RIVER ROAD & BLUE SPRING ROAD
 MONTGOMERY TOWNSHIP, SOMERSET COUNTY
 MRA JOB 19-143 WEDNESDAY AM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 19143 river & blue spring am1
 Site Code : 00019143
 Start Date : 5/1/2019
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	River Road (CR 605)				River Road (CR 605)				Blue Spring Road			
	Southbound				Northbound				Eastbound			
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	Left	Right	App. Total	Int. Total
07:00 AM	58	2	60	11	19	30	5	30	35		35	125
07:15 AM	63	4	67	13	23	36	7	31	38		38	141
07:30 AM	78	3	81	13	14	27	10	36	46		46	154
07:45 AM	93	2	95	26	17	43	11	42	53		53	191
Total	292	11	303	63	73	136	33	139	172		172	611
08:00 AM	77	6	83	18	13	31	6	36	42		42	156
08:15 AM	105	7	112	19	23	42	7	39	46		46	200
08:30 AM	75	2	77	19	27	46	6	33	39		39	162
08:45 AM	48	2	50	33	12	45	9	30	39		39	134
Total	305	17	322	89	75	164	28	138	166		166	652
Grand Total	597	28	625	152	148	300	61	277	338		338	1263
Approch %	95.5	4.5		50.7	49.3		18.0	82.0				
Total %	47.3	2.2	49.5	12.0	11.7	23.8	4.8	21.9	26.8			

Start Time	River Road (CR 605)				River Road (CR 605)				Blue Spring Road			
	Southbound				Northbound				Eastbound			
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	Left	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1												
Intersection												
Volume	350	17	367	82	80	162	30	150	180		180	709
Percent	95.4	4.6		50.6	49.4		16.7	83.3				
08:15 Volume	105	7	112	19	23	42	7	39	46		46	200
Peak Factor												
High Int. Volume	105	7		08:30 AM	27		07:45 AM	42	53		0.886	
Peak Factor			0.819	19		0.880	11		0.849			

HAVENS AT PRINCETON
 RIVER ROAD & BLUE SPRING ROAD
 MONTGOMERY TOWNSHIP, SOMERSET COUNTY
 MRA JOB 19-143 THURSDAY PM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 19143 river & blue spring pm1
 Site Code : 00019143
 Start Date : 4/18/2019
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	River Road (CR 605) Southbound			River Road (CR 605) Northbound			Blue Spring Road Eastbound		
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total
04:00 PM	34	18	52	32	20	52	6	15	21
04:15 PM	47	13	60	28	39	67	5	16	21
04:30 PM	44	12	56	28	38	66	6	18	24
04:45 PM	34	13	47	35	31	66	9	22	31
Total	159	56	215	123	128	251	26	71	97
05:00 PM	37	15	52	32	51	83	6	17	23
05:15 PM	42	9	51	33	44	77	8	15	23
05:30 PM	47	12	59	38	47	85	12	29	41
05:45 PM	32	17	49	38	23	61	5	12	17
Total	158	53	211	141	165	306	31	73	104
Grand Total	317	109	426	264	293	557	57	144	201
Apprch %	74.4	25.6		47.4	52.6		28.4	71.6	
Total %	26.8	9.2	36.0	22.3	24.7	47.0	4.8	12.2	17.0

Start Time	River Road (CR 605) Southbound			River Road (CR 605) Northbound			Blue Spring Road Eastbound		
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total
04:00 PM to 05:45 PM - Peak 1 of 1									
Intersection Volume	160	49	209	138	173	311	35	83	118
Percent	76.6	23.4		44.4	55.6		29.7	70.3	
05:30 Volume	47	12	59	38	47	85	12	29	41
Peak Factor									0.862
High Int. Volume	05:30 PM		05:30 PM	05:30 PM	05:30 PM	05:30 PM	05:30 PM		
Peak Factor	47	12	59	38	47	85	12	29	41
			0.886			0.915			0.720

McDonough & Rea Associates
1431 Lakewood Road Suite C
Manasquan NJ 08736
(732) 528-7076

File Name : 19143 salisbury & blue spring am1
Site Code : 00019143
Start Date : 5/2/2019
Page No : 1

HAVENS AT PRINCETON
SALISBURY ROAD & BLUE SPRING ROAD
MONTGOMERY TOWNSHIP, SOMERSET COUNTY
MRA JOB 19-143 THURSDAY AM COUNT

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Salisbury Road Southbound					Blue Spring Road Westbound					Hoover Avenue Northbound					Blue Spring Road Eastbound				
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	0	4	8		3	16	0	19		3	0	8	11		0	23	3	26	64
07:15 AM	9	0	4	13		4	12	6	22		1	0	13	14		2	22	2	26	75
07:30 AM	6	1	3	10		4	16	0	20		2	1	19	22		0	18	1	19	71
07:45 AM	7	0	2	9		3	13	0	16		0	0	16	16		0	34	0	34	75
Total	26	1	13	40		14	57	6	77		6	1	56	63		2	97	6	105	285
08:00 AM	5	0	1	6		4	17	4	25		0	0	19	19		0	41	0	41	91
08:15 AM	7	0	2	9		3	22	2	27		2	0	16	18		0	31	0	31	85
08:30 AM	6	0	1	7		1	20	1	22		3	0	9	12		1	29	1	31	72
08:45 AM	7	0	1	8		3	19	1	23		0	0	20	20		0	29	0	29	80
Total	25	0	5	30		11	78	8	97		5	0	64	69		1	130	1	132	328
Grand Total	51	1	18	70		25	135	14	174		11	1	120	132		3	227	7	237	613
Approch %	72.9	1.4	25.7			14.4	77.6	8.0			8.3	0.8	90.9			1.3	95.8	3.0		
Total %	8.3	0.2	2.9	11.4		4.1	22.0	2.3	28.4		1.8	0.2	19.6	21.5		-0.5	37.0	1.1	38.7	

Start Time	Salisbury Road Southbound					Blue Spring Road Westbound					Hoover Avenue Northbound					Blue Spring Road Eastbound				
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																				
Intersection 08:00 AM	25	0	5	30		11	78	8	97		5	0	64	69		1	130	1	132	328
Volume	25	0	5	30		11	78	8	97		5	0	64	69		1	130	1	132	328
Percent	83.3	0.0	16.7			11.3	80.4	8.2			7.2	0.0	92.8			0.8	98.5	0.8		
08:00 Volume	5	0	1	6		4	17	4	25		0	0	19	19		0	41	0	41	91
Peak Factor																				0.901
High Int. 08:15 AM	7	0	2	9		3	22	2	27		0	0	20	20		0	41	0	41	
Volume	7	0	2	9		3	22	2	27		0	0	20	20		0	41	0	41	
Peak Factor,				0.833					0.898					0.863					0.805	

HAVENS AT PRINCETON
SALISBURY ROAD & BLUE SPRING ROAD
MONTGOMERY TOWNSHIP, SOMERSET COUNTY
MRA JOB 19-143 THURSDAY PM COUNT

McDonough & Rea Associates
1431 Lakewood Road Suite C
Manasquan NJ 08736
(732) 528-7076

File Name : 19143 salisbury & blue spring pm1
Site Code : 00019143
Start Date : 5/2/2019
Page No : 1

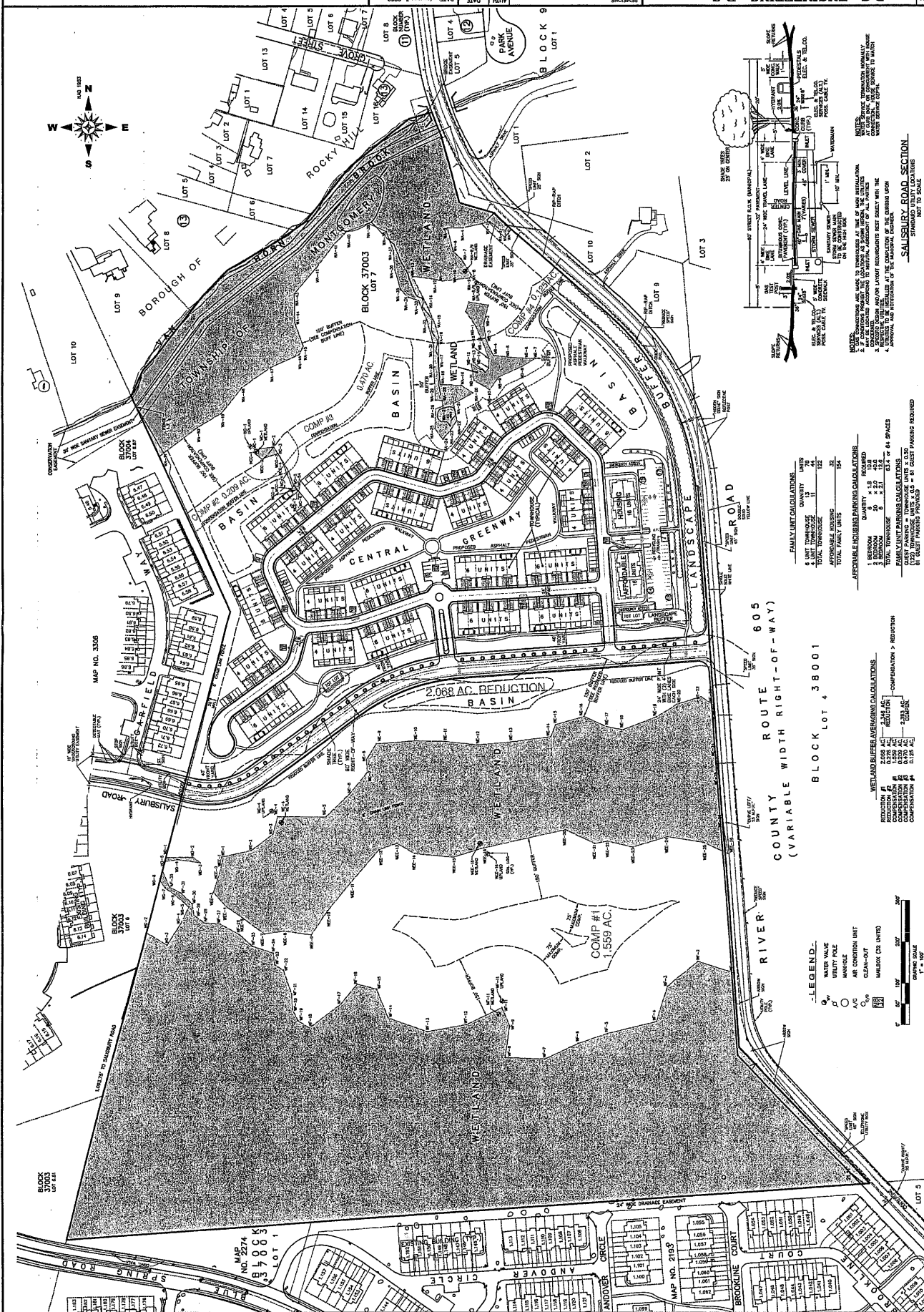
Groups Printed- CARS - TRUCKS - SCHOOL BUS

	Salisbury Road Southbound					Blue Spring Road Westbound					Hoover Avenue Northbound					Blue Spring Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total			
04:00 PM	2	0	0	2	7	22	5	34	1	0	8	9	1	11	1	13	58			
04:15 PM	2	0	0	2	10	17	9	36	0	0	2	2	1	22	5	28	68			
04:30 PM	3	0	1	4	12	16	5	33	0	0	5	5	1	7	1	9	51			
04:45 PM	2	1	1	4	9	22	7	38	0	1	3	4	0	16	3	19	65			
Total	9	1	2	12	38	77	26	141	1	1	18	20	3	56	10	69	242			
05:00 PM	3	1	0	4	10	15	10	35	0	0	4	4	0	7	3	10	53			
05:15 PM	4	0	0	4	12	25	10	47	0	0	6	6	0	24	3	27	84			
05:30 PM	3	0	0	3	19	27	7	53	2	0	12	14	0	22	2	24	94			
05:45 PM	6	0	0	6	18	22	9	49	3	0	7	10	0	25	0	25	90			
Total	16	1	0	17	59	89	36	184	5	0	29	34	0	78	8	86	321			
Grand Total	25	2	2	29	97	166	62	325	6	1	47	54	3	134	18	155	563			
Approch %	86.2	6.9	6.9		29.8	51.1	19.1		11.1	1.9	87.0		1.9	86.5	11.6					
Total %	4.4	0.4	0.4	5.2	17.2	29.5	11.0	57.7	1.1	0.2	8.3	9.6	0.5	23.8	3.2	27.5				

	Salisbury Road Southbound					Blue Spring Road Westbound					Hoover Avenue Northbound					Blue Spring Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total			
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																				
Intersection 05:00 PM	16	1	0	17	59	89	36	184	5	0	29	34	0	78	8	86	321			
Volume																				
Percent	94.1	5.9	0.0		32.1	48.4	19.6		14.7	0.0	85.3		0.0	90.7	9.3					
05:30 Volume	3	0	0	3	19	27	7	53	2	0	12	14	0	22	2	24	94			
Peak Factor																	0.854			
High Int. 05:45 PM					05:30 PM				05:30 PM				05:15 PM							
Volume	6	0	0	6	19	27	7	53	2	0	12	14	0	24	3	27				
Peak Factor				0.708				0.868				0.607				0.796				

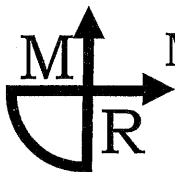
D.S. ENGINEERING, P.C.
ENGINEERS AND DESIGN PROFESSIONALS
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Rocky Hill, New Jersey, 08653
(908)-359-0889 Fax (908)-359-4118

Conceptual Layout 9a
Prepared For
Lot 7 in Block 37003
Situated in
Township of Montgomery
Somerset County ~
New Jersey



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McDONOUGH & REA ASSOCIATES

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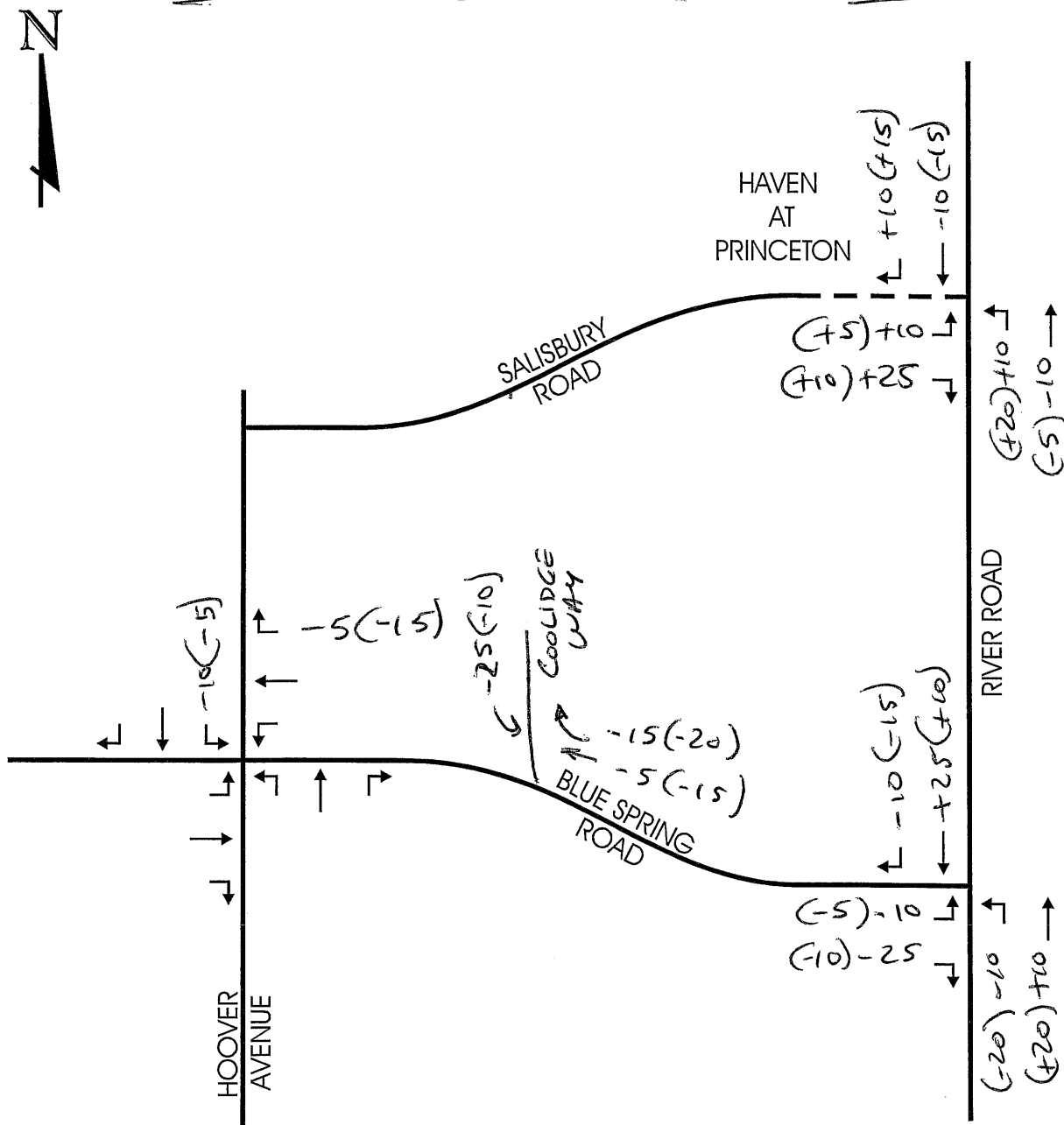
FIGURE

JOB NO.
19-143

DATE:
MAR 2020

SUBJECT: HAVEN AT PRINCETON - MONTGOMERY TWP., SOMERSET CO.

MONTGOMERY HILLS RE-ROUTED TRAFFIC



LEGEND: ← AM PSH(PM PSH)

**LEVEL OF SERVICE CRITERIA
FOR
TWO-WAY STOP-CONTROLLED INTERSECTIONS¹**

<u>Level of Service</u>	<u>Average Control Delay</u>
A	≤ 10.0 Seconds Per Vehicle
B	> 10.0 and ≤ 15.0 Seconds Per Vehicle
C	> 15.0 and ≤ 25.0 Seconds Per Vehicle
D	> 25.0 and ≤ 35.0 Seconds Per Vehicle
E	> 35.0 and ≤ 50.0 Seconds Per Vehicle
F	> 50.0 Seconds Per Vehicle

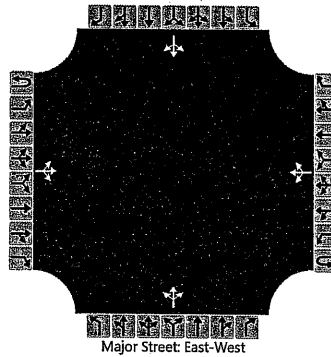
¹ Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

HCS7 Two-Way Stop-Control Report

General Information

Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2019	North/South Street	SALISBURY-HOOVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143AE-2 EXIST		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	130	1		11	78	8		5	0	64		25	0	5
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

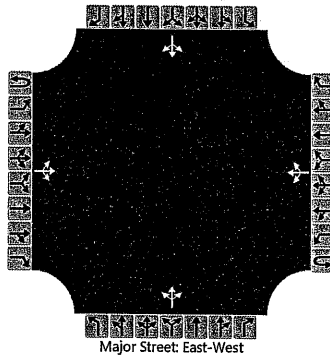
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		1				12					77				33	
Capacity, c (veh/h)		1492				1430					879				636	
v/c Ratio		0.00				0.01					0.09				0.05	
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					0.3				0.2	
Control Delay (s/veh)		7.4		0.0		7.5		0.1			9.5				11.0	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.1				0.9				9.5				11.0			
Approach LOS	A								A				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2019	North/South Street	SALISBURY-HOOVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143PE-2 EXIST		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	78	8		59	89	36		5	0	29		16	1	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

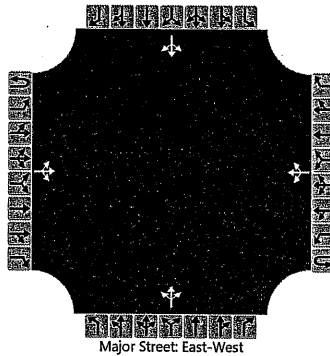
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				66					38				19	
Capacity, c (veh/h)		1438				1492					881				555	
v/c Ratio		0.00				0.04					0.04				0.03	
95% Queue Length, Q ₉₅ (veh)		0.0				0.1					0.1				0.1	
Control Delay (s/veh)		7.5		0.0		7.5		0.4			9.3				11.7	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.0				2.7				9.3				11.7			
Approach LOS									A				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	SALISBURY-HOOVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143ANB-2 NOBUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	143	1		12	86	9		6	0	70		27	0	6
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

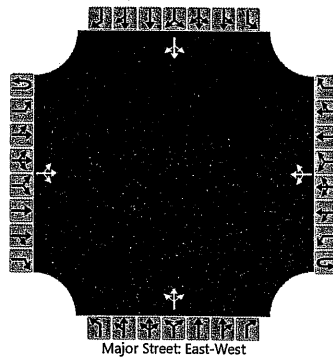
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		1				13					84				37	
Capacity, c (veh/h)		1479				1413					859				609	
v/c Ratio		0.00				0.01					0.10				0.06	
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					0.3				0.2	
Control Delay (s/veh)		7.4		0.0		7.6		0.1			9.7				11.3	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.1				0.9				9.7				11.3			
Approach LOS	A								A				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	SALISBURY-HOOVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143PNB-2 NO BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	86	9		65	97	40		6	0	32		18	1	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

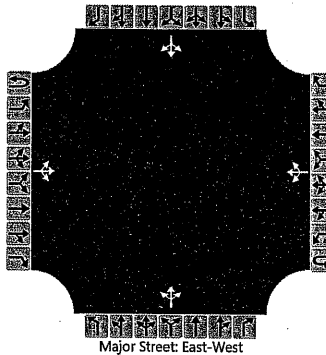
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				72					42				21	
Capacity, c (veh/h)		1422				1479					856				521	
v/c Ratio		0.00				0.05					0.05				0.04	
95% Queue Length, Q ₉₅ (veh)		0.0				0.2					0.2				0.1	
Control Delay (s/veh)		7.5		0.0		7.6		0.4			9.4				12.2	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.0				2.7				9.4				12.2			
Approach LOS									A				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	SALISBURY-HOOVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143AFB-2 BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	143	1		12	86	9		6	0	70		17	0	17
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

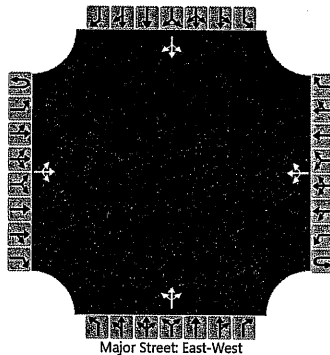
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4				13					84				38	
Capacity, c (veh/h)		1479				1413					855				703	
v/c Ratio		0.00				0.01					0.10				0.05	
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					0.3				0.2	
Control Delay (s/veh)		7.4		0.0		7.6		0.1			9.7				10.4	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.2				0.9				9.7				10.4			
Approach LOS	A								A				B			

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	SALISBURY-HOOV & BLUE SPR
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	SALISBURY-HOOVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	19-143PFB-2 BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		11	86	9		65	97	25		6	0	32		13	1	7
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		12				72					42				23	
Capacity, c (veh/h)		1443				1479					846				596	
v/c Ratio		0.01				0.05					0.05				0.04	
95% Queue Length, Q ₉₅ (veh)		0.0				0.2					0.2				0.1	
Control Delay (s/veh)		7.5		0.1		7.6		0.4			9.5				11.3	
Level of Service (LOS)		A		A		A		A			A				B	
Approach Delay (s/veh)	0.8				2.9				9.5				11.3			
Approach LOS									A				B			

HCS7 Two-Way Stop-Control Report

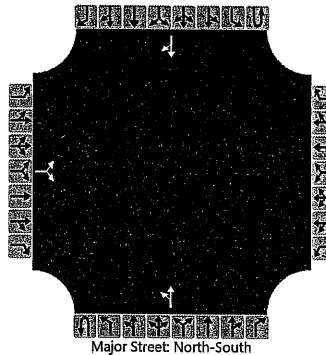
General Information

Analyst	STK
Agency/Co	MRA
Date Performed	4/21/2020
Analysis Year	2019
Time Analyzed	AM
Intersection Orientation	North-South
Project Description	19-143AE-1 EXIST

Site Information

Intersection	RIVER & BLUE SPRING
Jurisdiction	
East/West Street	BLUE SPRING
North/South Street	RIVER
Peak Hour Factor	0.90
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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		40		170						82	80				350	17
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

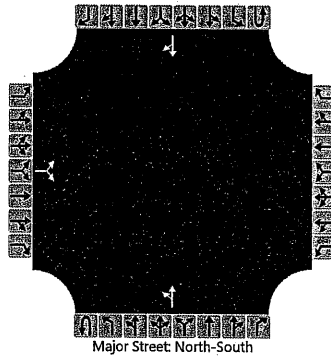
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			233							91						
Capacity, c (veh/h)			575							1146						
v/c Ratio			0.41							0.08						
95% Queue Length, Q ₉₅ (veh)			2.0							0.3						
Control Delay (s/veh)			15.5							8.4						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	15.5								4.6							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RIVER & BLUE SPRING
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2019	North/South Street	RIVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143PE-1 EXIST		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		35		83						138	173				200	49
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

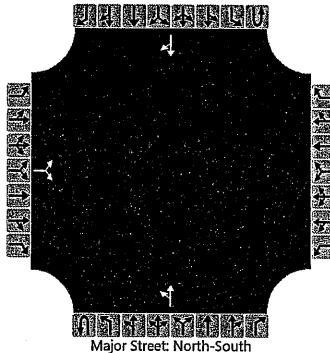
Flow Rate, v (veh/h)			131							153						
Capacity, c (veh/h)			560							1280						
v/c Ratio			0.23							0.12						
95% Queue Length, Q ₉₅ (veh)			0.9							0.4						
Control Delay (s/veh)			13.4							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.4								4.2							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	STK	Intersection	RIVER & BLUE SPRING
Agency/Co.	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	RIVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143ANB-1 NO-BUILD		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		44		187						90	88				440	19
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

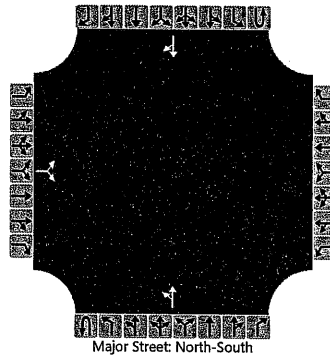
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			257							100						
Capacity, c (veh/h)			496							1050						
v/c Ratio			0.52							0.10						
95% Queue Length, Q ₉₅ (veh)			2.9							0.3						
Control Delay (s/veh)			19.8							8.8						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	19.8								4.9							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RIVER & BLUE SPRING
Agency/Co	MRA	Jurisdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	RIVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143PNB-1 NO-BUILD		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		39		91						152	190				220	54
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

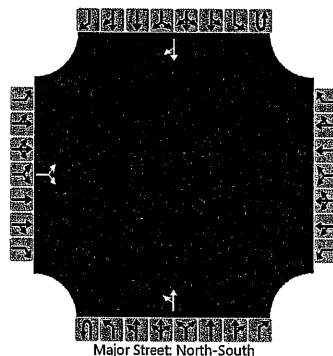
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			144							169						
Capacity, c (veh/h)			517							1251						
v/c Ratio			0.28							0.14						
95% Queue Length, Q ₉₅ (veh)			1.1							0.5						
Control Delay (s/veh)			14.6							8.3						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.6								4.4							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RIVER & BLUE SPRING
Agency/Co.	MRA	Junsdiction	
Date Performed	4/21/2020	East/West Street	BLUE SPRING
Analysis Year	2025	North/South Street	RIVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143AFB-1 BUILD		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		34		162						80	98				510	9
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			218							89						
Capacity, c (veh/h)			459							992						
v/c Ratio			0.47							0.09						
95% Queue Length, Q ₉₅ (veh)			2.5							0.3						
Control Delay (s/veh)			19.7							9.0						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	19.7								4.5							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

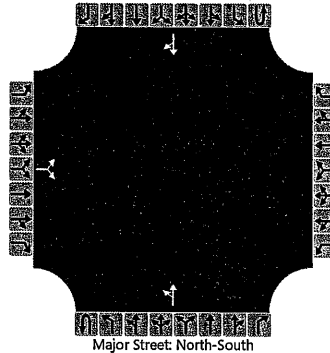
General Information

Analyst	STK
Agency/Co	MRA
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	PM
Intersection Orientation	North-South
Project Description	19-143PFB-1 BUILD

Site Information

Intersection	RIVER & BLUE SPRING
Jurisdiction	
East/West Street	BLUE SPRING
North/South Street	RIVER
Peak Hour Factor	0.90
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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		34		81						132	210				251	39
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

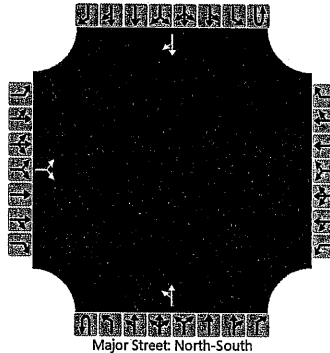
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			128							147						
Capacity, c (veh/h)			515							1232						
v/c Ratio			0.25							0.12						
95% Queue Length, Q ₉₅ (veh)			1.0							0.4						
Control Delay (s/veh)			14.3							8.3						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.3								3.9							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RIVER & SALISBURY EXT
Agency/Co	MRA	Junsdiction	
Date Performed	4/21/2020	East/West Street	SALISBURY EXT
Analysis Year	2025	North/South Street	RIVER
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143AFB-3 BUILD		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		21		70						22	122				449	13
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

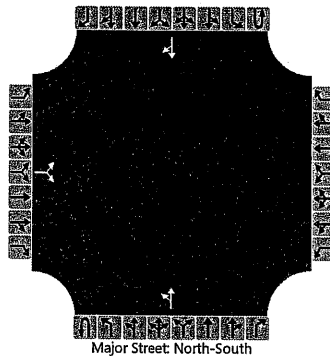
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			101							24						
Capacity, c (veh/h)			515							1047						
v/c Ratio			0.20							0.02						
95% Queue Length, Q ₉₅ (veh)			0.7							0.1						
Control Delay (s/veh)			13.7							8.5						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.7								1.5							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RIVER & SALISBURY EXT
Agency/Co.	MRA	Junsdiction	
Date Performed	4/21/2020	East/West Street	SALISBURY EXT
Analysis Year	2025	North/South Street	RIVER
Time Analyzed	PM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	19-143PFB-3 BUILD		

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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		12		31						55	224				259	26
Percent Heavy Vehicles (%)		3		3						3						
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)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			48							61						
Capacity, c (veh/h)			595							1238						
v/c Ratio			0.08							0.05						
95% Queue Length, Q ₉₅ (veh)			0.3							0.2						
Control Delay (s/veh)			11.6							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	11.6								2.0							
Approach LOS	B															