

## **APPENDIX VI**

### **SIGNAL WARRANT ANALYSIS – MD 159 AT SPESUTIA RD**

## TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION:** MD 159 AT SPESUTIA ROAD

**COUNT BY:** CAMERA

**WEATHER:** CLEAR

**COUNTY:** HARFORD

**DATE:** SEPTEMBER 15, 2022

**DAY:** THURSDAY

TIME	MD 159 NORTHBOUND			MD 159 SOUTHBOUND			SPESUTIA EASTBOUND			ACCESS WESTBOUND			TOTAL
	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	
HOURLY													
6:00-7:00	161	126	0	26	237	24	52	12	529			14	1181
7:00-8:00	102	102	0	16	71	14	25	13	106			20	469
8:00-9:00	96	109	0	11	93	7	21	13	105			19	474
9:00-10:00	97	111	2	18	102	9	7	6	117			18	487
10:00-11:00	113	93	1	17	87	11	12	4	89			22	449
11:00-12:00	124	130	0	18	100	17	12	5	77			24	507
12:00-1:00	102	115	0	16	112	14	10	7	121			20	517
1:00-2:00	172	124	0	14	101	26	11	7	113			20	588
2:00-3:00	175	142	0	19	120	26	28	1	110			17	638
3:00-4:00	328	184	3	10	122	53	5	0	132			20	857
4:00-5:00	249	179	0	8	137	29	9	3	167			20	801
5:00-6:00	189	161	2	25	118	22	12	19	203			18	769
6:00-7:00	114	88	8	15	113	20	12	4	250			18	642
<b>13-HOUR TOTALS</b>	<b>2022</b>	<b>1664</b>	<b>16</b>	<b>213</b>	<b>1513</b>	<b>272</b>	<b>216</b>	<b>94</b>	<b>2119</b>	<b>0</b>	<b>0</b>	<b>250</b>	<b>8379</b>

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M:\3762

# TRAFFIC VOLUMES

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND			
	MD 159				MD 159				SPESUTIA RD				ACCESS			
TIME	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL
6-7 AM	161	126	0	287	26	237	24	287	52	12	529	593			14	14
7-8	102	102	0	204	16	71	14	101	25	13	106	144			20	20
8-9	96	109	0	205	11	93	7	111	21	13	105	139			19	19
9-10	97	111	2	210	18	102	9	129	7	6	117	130			18	18
10-11	113	93	1	207	17	87	11	115	12	4	89	105			22	22
11-12 PM	124	130	0	254	18	100	17	135	12	5	77	94			24	24
12-1	102	115	0	217	16	112	14	142	10	7	121	138			20	20
1-2	172	124	0	296	14	101	26	141	11	7	113	131			20	20
2-3	175	142	0	317	19	120	26	165	28	1	110	139			17	17
3-4	328	184	3	515	10	122	53	185	5	0	132	137			20	20
4-5	249	179	0	428	8	137	29	174	5	0	132	137			20	20
5-6	189	161	2	352	25	118	22	165	9	3	167	179			18	18
6-7	114	88	8	210	15	113	20	148	12	19	203	234			18	18
TOTAL	2022	1664	16	3702	213	1513	272	1998	209	90	2001	2300	0	0	250	250

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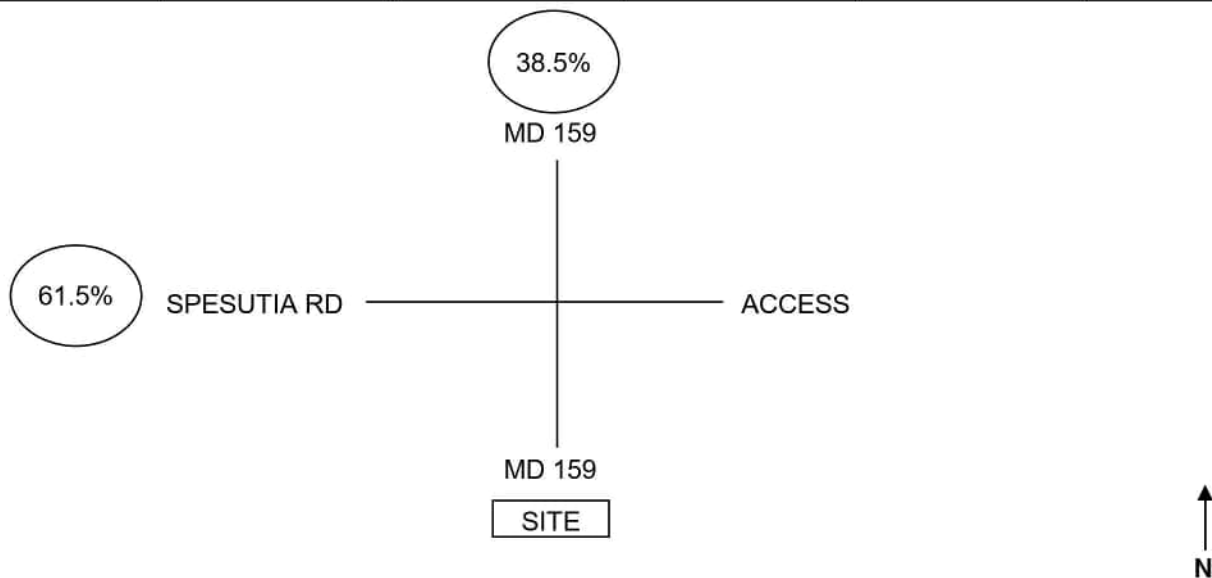
EXISTING TRAFFIC VOLUMES  
  
 MD 159 @ SPESUTIA ROAD

# SITE PASSENGER CAR TRIPS

WAREHOUSING (LUC 154) - 5,200,000 SF

ADT - 7158

TIME	TOTAL	IN	OUT	IN	OUT
6-7 AM	6.2%	5.10%	1.10%	365	79
7-8	4.8%	3.65%	1.15%	261	82
8-9	3.9%	2.50%	1.40%	179	100
9-10	7.2%	4.40%	2.80%	315	200
10-11	6.2%	4.75%	1.45%	340	104
11-12 PM	3.7%	1.90%	3.80%	136	272
12-1	6.0%	2.55%	3.45%	183	247
1-2	5.9%	2.95%	2.95%	211	211
2-3	5.2%	3.00%	2.20%	215	157
3-4	7.6%	2.60%	5.00%	186	358
4-5	4.7%	1.60%	3.10%	115	222
5-6	5.0%	1.10%	3.90%	79	279
6-7	5.7%	1.30%	4.40%	93	315



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**HOURLY IMPACT**  
**WAREHOUSING (LUC 154)**

## TRAFFIC VOLUMES

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND			
	MD 159				MD 159				SPESUTIA RD				ACCESS			
TIME	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL
6-7 AM	49	30		79		141		141			224	224				0
7-8	50	32		82		100		100			161	161				0
8-9	62	38		100		69		69			110	110				0
9-10	123	77		200		121		121			194	194				0
10-11	64	40		104		131		131			209	209				0
11-12 PM	167	105		272		52		52			84	84				0
12-1	152	95		247		70		70			113	113				0
1-2	130	81		211		81		81			130	130				0
2-3	97	60		157		83		83			132	132				0
3-4	220	138		358		72		72			114	114				0
4-5	137	85		222		44		44			71	71				0
5-6	172	107		279		30		30			46	46				0
6-7	194	121		315		36		36			57	57				0
TOTAL	1617	1009	0	2626	0	1030	0	1030	0	0	1645	1645	0	0	0	0

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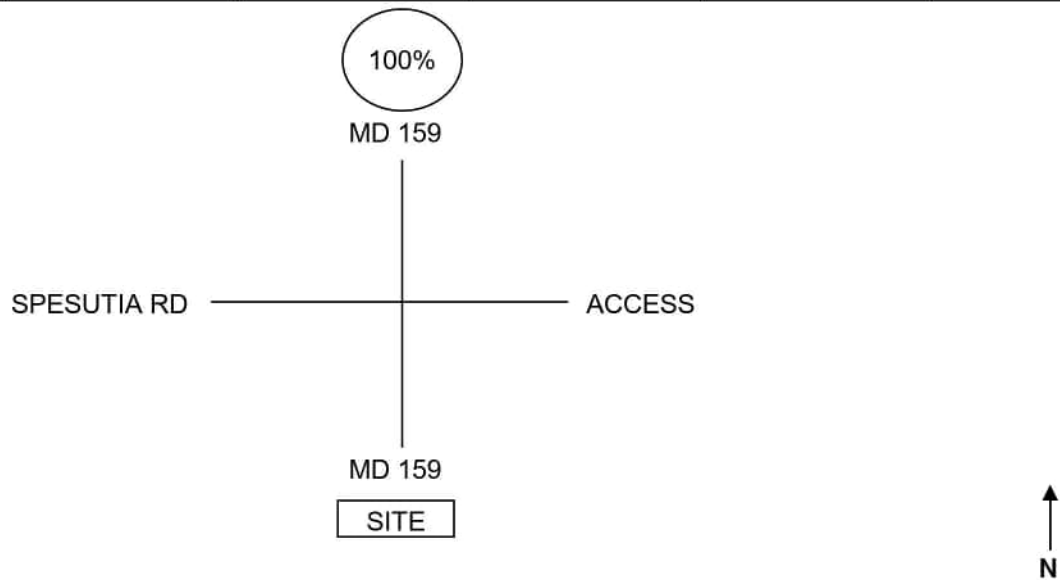
**SITE PASSENGER CAR TRIPS**  
  
**WAREHOUSING**

## SITE TRUCK TRIPS

WAREHOUSING (LUC 154) - 5,200,000 SF

ADT - 3068

TIME	TOTAL	IN	OUT	IN	OUT
6-7 AM	6.2%	5.10%	1.10%	156	34
7-8	4.8%	3.65%	1.15%	112	35
8-9	3.9%	2.50%	1.40%	77	43
9-10	7.2%	4.40%	2.80%	135	86
10-11	6.2%	4.75%	1.45%	146	44
11-12 PM	3.7%	1.90%	3.80%	58	117
12-1	6.0%	2.55%	3.45%	78	106
1-2	5.9%	2.95%	2.95%	91	91
2-3	5.2%	3.00%	2.20%	92	67
3-4	7.6%	2.60%	5.00%	80	153
4-5	4.7%	1.60%	3.10%	49	95
5-6	5.0%	1.10%	3.90%	34	120
6-7	5.7%	1.30%	4.40%	40	135



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**HOURLY IMPACT**  
**WAREHOUSING (LUC 154)**

## TRAFFIC VOLUMES

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND			
	MD 159				MD 159				SPESUTIA RD				ACCESS			
TIME	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL
6-7 AM		34		34		156		156				0				0
7-8		35		35		112		112				0				0
8-9		43		43		77		77				0				0
9-10		86		86		135		135				0				0
10-11		44		44		146		146				0				0
11-12 PM		117		117		58		58				0				0
12-1		106		106		78		78				0				0
1-2		91		91		91		91				0				0
2-3		67		67		92		92				0				0
3-4		153		153		80		80				0				0
4-5		95		95		49		49				0				0
5-6		120		120		34		34				0				0
6-7		135		135		40		40				0				0
TOTAL	0	1126	0	1126	0	1147	0	1147	0	0	0	0	0	0	0	0

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SITE TRUCK TRIPS  
  
 WAREHOUSING

# TRAFFIC VOLUMES

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND			
	MD 159				MD 159				SPESUTIA RD				ACCESS			
TIME	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL	L	S	R	TOTAL
6-7 AM	210	190	0	400	26	534	24	584	52	12	753	817	0	0	14	14
7-8	152	169	0	321	16	283	14	313	25	13	267	305	0	0	20	20
8-9	158	190	0	348	11	239	7	257	21	13	215	249	0	0	19	19
9-10	220	274	2	496	18	358	9	385	7	6	311	324	0	0	18	18
10-11	177	177	1	355	17	364	11	392	12	4	298	314	0	0	22	22
11-12 PM	291	352	0	643	18	210	17	245	12	5	161	178	0	0	24	24
12-1	254	316	0	570	16	260	14	290	10	7	234	251	0	0	20	20
1-2	302	296	0	598	14	273	26	313	11	7	243	261	0	0	20	20
2-3	272	269	0	541	19	295	26	340	28	1	242	271	0	0	17	17
3-4	548	475	3	1026	10	274	53	337	5	0	246	251	0	0	20	20
4-5	386	359	0	745	8	230	29	267	5	0	203	208	0	0	20	20
5-6	361	388	2	751	25	182	22	229	9	3	213	225	0	0	18	18
6-7	308	344	ES'D	652	15	189	20	224	12	19	260	291	0	0	18	18
TOTAL	3639	3799	8	7446	213	3690	272	4175	209	90	3646	3945	0	0	250	250

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**TOTAL FUTURE TRAFFIC VOLUMES**  
  
**MD 159 @ SPESUTIA ROAD**



**TABLE 1**  
**TRAFFIC SIGNAL WARRANT SUMMARY**  
**MD 159 AT SPESUTIA ROAD**

<b>WARRANTS</b>	<b><u>EXISTING CONDITIONS</u></b>
<b>1-Eight-Hour Vehicular Volume</b> <b>A-Minimum Vehicle Volume</b> (met for 0 of the required 8 hours)	Not Satisfied
<b>1-Eight-Hour Vehicular Volume</b> <b>B-Interruption of Continuous Traffic</b> (met for 0 of the required 8 hours)	Not Satisfied
<b>1-Eight-Hour Vehicular Volume</b> <b>-Combination of Warrants 1A &amp; 1B</b> (met 1A for 0 of the required 8 hours) (met 1B for 0 of the required 8 hours)	Not Satisfied
<b>2-Four-Hour Vehicular Volume</b> (met for 0 of the required 4 hours)	Not Satisfied
<b>3-Peak Hour</b> (met for 0 of the required 1 hour)	Not Satisfied
<b>4-Pedestrian Volume</b>	Not Satisfied
<b>5-School Crossing</b>	Not Applicable
<b>6-Coordinated Signal System</b>	Not Applicable
<b>7-Crash Experience</b>	Not Satisfied
<b>8-Roadway Network</b>	Not Applicable
<b>9-Intersection Near A Grade Crossing</b>	Not Applicable
<b>NOTE: SIDE RD VOLUME TESTED = NB MD 159 LEFT TURN VOLUME</b> <b>MAINLINE VOLUME = CONFLICTING SB MD 159 THRU/RIGHTS</b>	

**Warrant 1, Eight-Hour Vehicular Volume, Condition A, Minimum Vehicular Volume-** This warrant is intended for application where a large volume of intersection traffic is the principal reason to consider a traffic control signal. This warrant is satisfied when the minimum volumes as shown on Table 2 are met for at least 8 hours.

**TABLE 2**

**WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME – 70%  
CONDITION A - MINIMUM VEHICULAR VOLUME**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	261	350		161	105	X	
7-8	85	350		102	105		
8-9	100	350		96	105		
9-10	111	350		97	105		
10-11	98	350		113	105	X	
11-12PM	117	350		124	105	X	
12-1	126	350		102	105		
1-2	127	350		172	105	X	
2-3	146	350		175	105	X	
3-4	175	350		328	105	X	
4-5	166	350		249	105	X	
5-6	140	350		189	105	X	
6-7	133	350		114	105	X	

Note: Warrant amount 70% of MUTCD requirements due to the major street traffic 85<sup>th</sup> percentile exceeding 40 mph. As shown on Table 2, the minimum volumes are met for none of the required eight (8) hours, therefore, **Warrant 1-Condition A is not satisfied.**

**Condition B-Interruption of Continuous Traffic** – This warrant is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. This warrant is satisfied when the minimum volumes as shown on Table 3, are met for at least eight (8) hours.

**TABLE 3**

**WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME – 70%  
CONDITION B - INTERRUPTION OF CONTINUOUS TRAFFIC**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	261	525		161	53	X	
7-8	85	525		102	53	X	
8-9	100	525		96	53	X	
9-10	111	525		97	53	X	
10-11	98	525		113	53	X	
11-12PM	117	525		124	53	X	
12-1	126	525		102	53	X	
1-2	127	525		172	53	X	
2-3	146	525		175	53	X	
3-4	175	525		328	53	X	
4-5	166	525		249	53	X	
5-6	140	525		189	53	X	
6-7	133	525		114	53	X	

Note: Warrant amount 70% of MUTCD requirements due to the major street traffic 85<sup>th</sup> percentile exceeding 40 mph. As shown on Table 2, the minimum volumes are met for none of the required eight (8) hours, therefore, **Warrant 1-Condition B is not satisfied.**

**Combination of Warrant 1, Condition A and Condition B** – This warrant is intended for application at intersections where no warrants are satisfied, but the minimum required volumes are nearly met for warrant 1, Condition A and Condition B.

**TABLE 4**  
**WARRANT 1 - COMBINATION OF WARRANTS**  
**56% OF WARRANT 1 - CONDITION A**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	261	280		161	84	X	
7-8	85	280		102	84	X	
8-9	100	280		96	84	X	
9-10	111	280		97	84	X	
10-11	98	280		113	84	X	
11-12PM	117	280		124	84	X	
12-1	126	280		102	84	X	
1-2	127	280		172	84	X	
2-3	146	280		175	84	X	
3-4	175	280		328	84	X	
4-5	166	280		249	84	X	
5-6	140	280		189	84	X	
6-7	133	280		114	84	X	

**TABLE 5**  
**WARRANT 1 – COMBINATION OF WARRANTS**  
**56% OF WARRANT 1 – CONDITION B**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	261	420		161	42	X	
7-8	85	420		102	42	X	
8-9	100	420		96	42	X	
9-10	111	420		97	42	X	
10-11	98	420		113	42	X	
11-12PM	117	420		124	42	X	
12-1	126	420		102	42	X	
1-2	127	420		172	42	X	
2-3	146	420		175	42	X	
3-4	175	420		328	42	X	
4-5	166	420		249	42	X	
5-6	140	420		189	42	X	
6-7	133	420		114	42	X	

As indicated in these tables, 56% of the values in warrant 1-condition A are met for none of the required 8 hours, and 56% of the values in warrant 1-condition B are met for none of the required 8 hours, therefore, **Warrant 1 (Combination of Warrants) is not satisfied.**

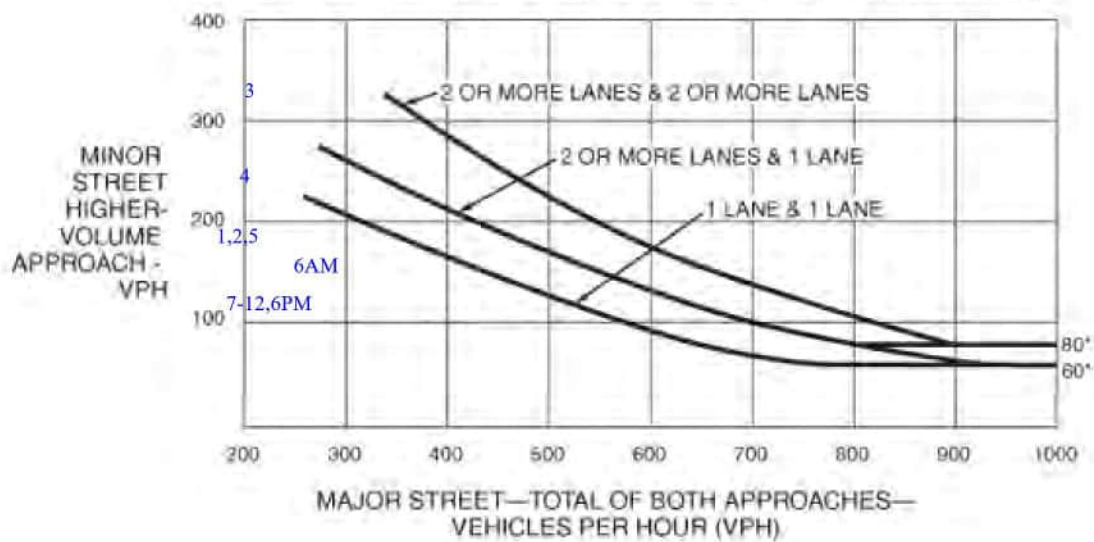
**Warrant 2, Four-Hour Vehicular Volume** – This warrant is intended for application where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. This warrant is satisfied when at least four plotted points, representing vehicles per hour fall above the curve as shown on Table 6.

**TABLE 6**

**FOUR HOUR VEHICULAR VOLUME**

**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

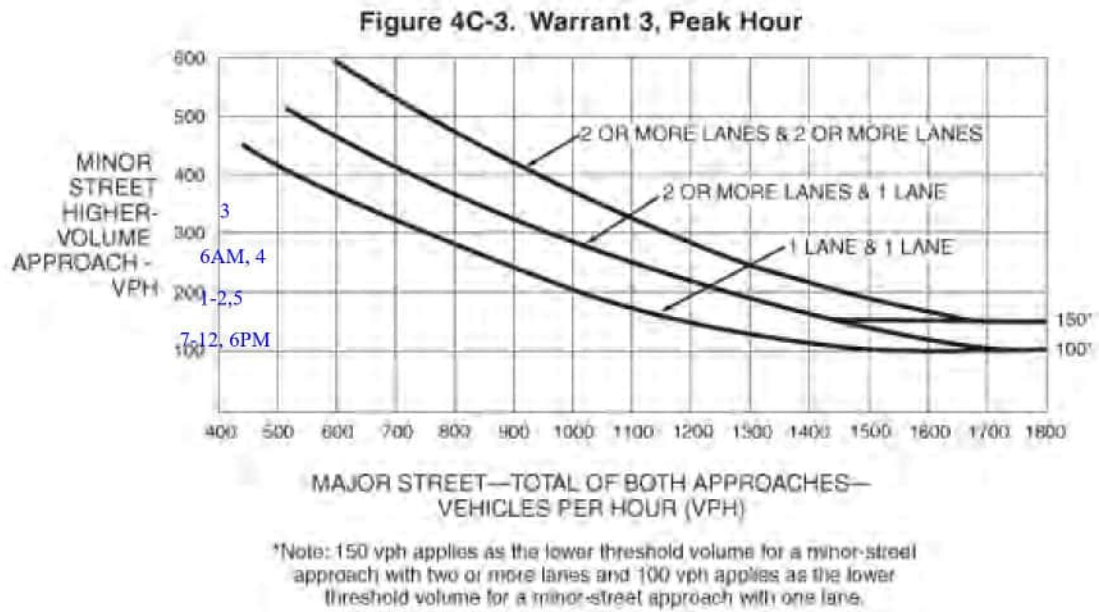


\*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted points did not fall above the curve for at least four hours; therefore, **Warrant 2 is not satisfied.**

**Warrant 3, Peak Hour** – The peak hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor street traffic suffers undue delay when entering or crossing the major street. This warrant is satisfied when for one hour of the day, at least one plotted point, representing vehicles per hour, fall above the curve shown on Table 7.

**TABLE 7**  
**PEAK HOUR VOLUME WARRANT**



The plotted points did not fall above the curve for at least one hour; therefore, **Warrant 3 is not satisfied.**

**Warrant 4, Pedestrian Volume** – This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. This warrant is satisfied when there is a pedestrian volume crossing the major street of at least 75 for each of any four hours, or at least 93 during any one hour.

The warrant also requires that there be less than 60 gaps per hour in main street traffic adequate enough to allow pedestrians to cross.

While conducting the turning movement count no pedestrians were observed crossing the Main Street, therefore **Warrant 4 is not satisfied.**

**Warrant 5, School Crossing** – This warrant is intended for application at established school crossings where the frequency and adequacy of gaps in the vehicular traffic stream do not allow school children to safely cross and there are a minimum of 20 students during the highest crossing hour.

An established school crossing is not located at this intersection; therefore **Warrant 5 is not applicable.**

**Warrant 6, Coordinated Signal Systems** – This warrant is intended for application in coordinated signal systems in order to maintain proper platooning of vehicles.

The intersection is not located within a coordinated signal system; therefore **Warrant 6 is not applicable.**

**Warrant 7, Crash Experience** – This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic signal. The warrant requires five (5) or more reported crashes in the last 12 months susceptible to correction by a traffic signal and 80% of Warrant 1, Condition A or Warrant 1, Condition B or Warrant 4 is met.

The Maryland State Highway Administration no longer releases reported crash data to consultants. Therefore, **Warrant 7 is not applicable.**



**Warrant 8, Roadway Network** – This warrant is intended for application at intersections to encourage concentration and organization of traffic flow on a roadway network.

The warrant requires the intersection to be of two major routes and have 1000 vehicles entering the intersection during the peak hour and 5-year projected traffic volumes that satisfy warrants 1, 2 and 3; or the intersection has an entering volume at least 1000 vehicles per hour for each of any five hours of a non-normal business day.

The side street is not considered a major route; therefore, **Warrant 8 is not applicable.**

**Warrant 9, Intersection Near A Grade Crossing** – This warrant is intended for use at a location where none of the conditions described in the other eight warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing.

This intersection is not near an at grade crossing, therefore, **Warrant 9 is not applicable.**

**TABLE 1**  
**TRAFFIC SIGNAL WARRANT SUMMARY**  
**MD 159 AT SPESUTIA ROAD**

<b>WARRANTS</b>	<b><u>FUTURE CONDITIONS</u></b>
<b>1-Eight-Hour Vehicular Volume</b> <b>A-Minimum Vehicle Volume</b> (met for 3 of the required 8 hours)	Not Satisfied
<b>1-Eight-Hour Vehicular Volume</b> <b>B-Interruption of Continuous Traffic</b> (met for 1 of the required 8 hours)	Not Satisfied
<b>1-Eight-Hour Vehicular Volume</b> <b>-Combination of Warrants 1A &amp; 1B</b> (met 1A for 7 of the required 8 hours) (met 1B for 1 of the required 8 hours)	Not Satisfied
<b>2-Four-Hour Vehicular Volume</b> (met for 10 of the required 4 hours)	<b>Satisfied</b>
<b>3-Peak Hour</b> (met for 0 of the required 1 hour)	Not Satisfied
<b>4-Pedestrian Volume</b>	Not Satisfied
<b>5-School Crossing</b>	Not Applicable
<b>6-Coordinated Signal System</b>	Not Applicable
<b>7-Crash Experience</b>	Not Satisfied
<b>8-Roadway Network</b>	Not Applicable
<b>9-Intersection Near A Grade Crossing</b>	Not Applicable
<b>NOTE: SIDE RD VOLUME TESTED = NB MD 159 LEFT TURN VOLUME</b> <b>MAINLINE VOLUME = CONFLICTING SB MD 159 THRU/RIGHTS</b>	

**Warrant 1, Eight-Hour Vehicular Volume, Condition A, Minimum Vehicular Volume-** This warrant is intended for application where a large volume of intersection traffic is the principal reason to consider a traffic control signal. This warrant is satisfied when the minimum volumes as shown on Table 2 are met for at least 8 hours.

**TABLE 2**

**WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME – 70%  
CONDITION A - MINIMUM VEHICULAR VOLUME**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	558	350	X	210	105	X	1
7-8	297	350		152	105	X	
8-9	246	350		158	105	X	
9-10	367	350	X	220	105	X	2
10-11	375	350	X	177	105	X	3
11-12PM	227	350		291	105	X	
12-1	274	350		254	105	X	
1-2	299	350		302	105	X	
2-3	321	350		272	105	X	
3-4	327	350		548	105	X	
4-5	259	350		386	105	X	
5-6	204	350		361	105	X	
6-7	209	350		308	105	X	

Note: Warrant amount 70% of MUTCD requirements due to the major street traffic 85<sup>th</sup> percentile exceeding 40 mph. As shown on Table 2, the minimum volumes are met for three (3) of the required eight (8) hours, therefore, **Warrant 1-Condition A is not satisfied.**

**Condition B-Interruption of Continuous Traffic** – This warrant is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. This warrant is satisfied when the minimum volumes as shown on Table 3, are met for at least eight (8) hours.

**TABLE 3**

**WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME – 70%  
CONDITION B - INTERRUPTION OF CONTINUOUS TRAFFIC**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	558	525	X	210	53	X	1
7-8	297	525		152	53	X	
8-9	246	525		158	53	X	
9-10	367	525		220	53	X	
10-11	375	525		177	53	X	
11-12PM	227	525		291	53	X	
12-1	274	525		254	53	X	
1-2	299	525		302	53	X	
2-3	321	525		272	53	X	
3-4	327	525		548	53	X	
4-5	259	525		386	53	X	
5-6	204	525		361	53	X	
6-7	209	525		308	53	X	

Note: Warrant amount 70% of MUTCD requirements due to the major street traffic 85<sup>th</sup> percentile exceeding 40 mph. As shown on Table 2, the minimum volumes are met for one of the required eight (8) hours, therefore, **Warrant 1-Condition B is not satisfied.**

**Combination of Warrant 1, Condition A and Condition B** – This warrant is intended for application at intersections where no warrants are satisfied, but the minimum required volumes are nearly met for warrant 1, Condition A and Condition B.

**TABLE 4**  
**WARRANT 1 - COMBINATION OF WARRANTS**  
**56% OF WARRANT 1 - CONDITION A**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	558	280	X	210	84	X	1
7-8	297	280	X	152	84	X	2
8-9	246	280		158	84	X	
9-10	367	280	X	220	84	X	3
10-11	375	280	X	177	84	X	4
11-12PM	227	280		291	84	X	
12-1	274	280		254	84	X	
1-2	299	280	X	302	84	X	5
2-3	321	280	X	272	84	X	6
3-4	327	280	X	548	84	X	7
4-5	259	280		386	84	X	
5-6	204	280		361	84	X	
6-7	209	280		308	84	X	

**TABLE 5**  
**WARRANT 1 – COMBINATION OF WARRANTS**  
**56% OF WARRANT 1 – CONDITION B**

TIME PERIOD	VEH/HR MAIN ST. BOTH DIR	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR SIDE ROAD	VEH/HR WARRANT AMOUNT	VEH/HR WARRANT MET	VEH/HR WARRANT MET
6-7 AM	558	420	X	210	42	X	1
7-8	297	420		152	42	X	
8-9	246	420		158	42	X	
9-10	367	420		220	42	X	
10-11	375	420		177	42	X	
11-12PM	227	420		291	42	X	
12-1	274	420		254	42	X	
1-2	299	420		302	42	X	
2-3	321	420		272	42	X	
3-4	327	420		548	42	X	
4-5	259	420		386	42	X	
5-6	204	420		361	42	X	
6-7	209	420		308	42	X	

As indicated in these tables, 56% of the values in warrant 1-condition A are met for 7 of the required 8 hours, and 56% of the values in warrant 1-condition B are met for one of the required 8 hours, therefore,

**Warrant 1 (Combination of Warrants) is not satisfied.**

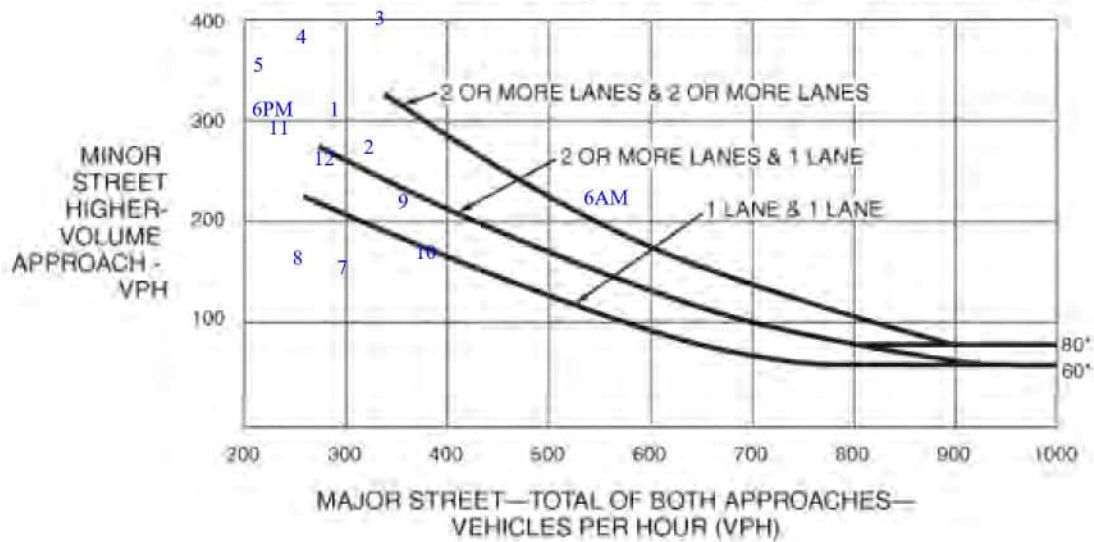
**Warrant 2, Four-Hour Vehicular Volume** – This warrant is intended for application where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. This warrant is satisfied when at least four plotted points, representing vehicles per hour fall above the curve as shown on Table 6.

**TABLE 6**

**FOUR HOUR VEHICULAR VOLUME**

**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

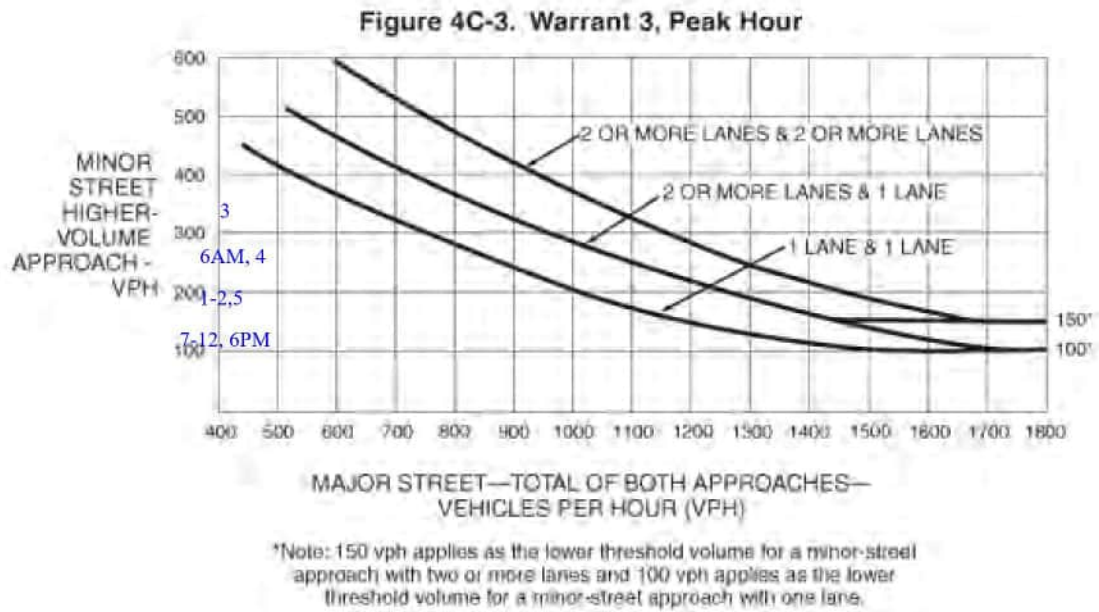


\*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted points did fall above the curve for at least four hours; therefore, **Warrant 2 is not satisfied.**

**Warrant 3, Peak Hour** – The peak hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor street traffic suffers undue delay when entering or crossing the major street. This warrant is satisfied when for one hour of the day, at least one plotted point, representing vehicles per hour, fall above the curve shown on Table 7.

**TABLE 7**  
**PEAK HOUR VOLUME WARRANT**



The plotted points did not fall above the curve for at least one hour; therefore, **Warrant 3 is not satisfied.**



**Warrant 4, Pedestrian Volume** – This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. This warrant is satisfied when there is a pedestrian volume crossing the major street of at least 75 for each of any four hours, or at least 93 during any one hour.

The warrant also requires that there be less than 60 gaps per hour in main street traffic adequate enough to allow pedestrians to cross.

While conducting the turning movement count no pedestrians were observed crossing the Main Street, therefore **Warrant 4 is not satisfied.**

**Warrant 5, School Crossing** – This warrant is intended for application at established school crossings where the frequency and adequacy of gaps in the vehicular traffic stream do not allow school children to safely cross and there are a minimum of 20 students during the highest crossing hour.

An established school crossing is not located at this intersection; therefore **Warrant 5 is not applicable.**

**Warrant 6, Coordinated Signal Systems** – This warrant is intended for application in coordinated signal systems in order to maintain proper platooning of vehicles.

The intersection is not located within a coordinated signal system; therefore **Warrant 6 is not applicable.**

**Warrant 7, Crash Experience** – This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic signal. The warrant requires five (5) or more reported crashes in the last 12 months susceptible to correction by a traffic signal and 80% of Warrant 1, Condition A or Warrant 1, Condition B or Warrant 4 is met.

The Maryland State Highway Administration no longer releases reported crash data to consultants. Therefore, **Warrant 7 is not applicable.**

**Warrant 8, Roadway Network** – This warrant is intended for application at intersections to encourage concentration and organization of traffic flow on a roadway network.

The warrant requires the intersection to be of two major routes and have 1000 vehicles entering the intersection during the peak hour and 5-year projected traffic volumes that satisfy warrants 1, 2 and 3; or the intersection has an entering volume at least 1000 vehicles per hour for each of any five hours of a non-normal business day.

The side street is not considered a major route; therefore, **Warrant 8 is not applicable.**

**Warrant 9, Intersection Near A Grade Crossing** – This warrant is intended for use at a location where none of the conditions described in the other eight warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing.

This intersection is not near an at grade crossing, therefore, **Warrant 9 is not applicable.**