

ATTACHMENT E Signal Warrant Analysis

INPUT DATA

Input data only in green fields					
Major/Minor In	formation	1	1 => N/S is r 2 => E/W is		
Urban/Rural In	formation	1	1 => Urban 2 => Rural		
Total Intersect	ion Approaches	4		_	
Lane configu					
Major Street Minor Street	No of lanes 1 1		Scenario	Exist Wed	
TotalVehicles perVehicles onWorst Case DelaysecondApproachMinor Street23316					
Approaching	Volume				
		Street		Street	
Hours	N.B	S.B	E.B	W.B	
12:00 AM	6	13	1	2	
1:00 AM	4	7	2	3	
2:00 AM 3:00 AM	1	4	2	3	
4:00 AM	5	5	4	3	
5:00 AM	26	22	21	4	
6:00 AM	89	62	54	40	
7:00 AM	411	251	254	189	
8:00 AM	328	333	291	206	
9:00 AM	350	238	165	128	
10:00 AM	259	252	101	119	
11:00 AM	267	307	136	128	
12:00 PM	241	344	148	179	
1:00 PM	249	324	111	126	
2:00 PM	336	382	220	240	
3:00 PM	269	381	180	196	
4:00 PM	341	485	240	245	
5:00 PM	336	527	199	274	
6:00 PM	287	551	212	179	
7:00 PM	218	327	150	152	
8:00 PM	124	228	59	69	
9:00 PM	87	240	45	117	
10:00 PM	38	78	18	36	
11:00 PM	15	19	4	6	

Warrant 1A: Minimum Vehicular Volume

The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection.

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total ofboth approaches)	Vehicles per hour on higher-volume minor- street approach
Major Street	Minor Street	(total orboth approaches)	(one direction only)
1	1	500	150
2 or more	1	600	150
2 or more	2 or more	600	200
1	2 or more	500	200

No of lanes

When the 85-percentile speed of major-street exceeds 40 mph in either an urban or rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Minimum Vehicular Volume warrant is 70 percent of the requirements above.

Analysis

Major Street Minor Street

	Major Street		Minor Street		
		Threshhold	Veh/hour on	Threshhold	
Time	Volume on major street (total of both	URBAN	higher volume minor street (one direction	URBAN	Warrants MET/NOT
	approaches)	500	only)	150	
8:00 AM	661		291		MET
5:00 PM	863		274		MET
7:00 AM	662		254	4	MET
4:00 PM	826		245		MET
2:00 PM	718		240		MET
6:00 PM	838		212		MET
3:00 PM	650		196		MET
12:00 PM	58	5	179		MET

1

Number of hours for which warrant met Percentage by which warrant met 8 100.0%

Warrant	MET
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Warrant 1B: Interruption of Continuous Traffic

The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection, and signal installation will not seriously disrupt progressive traffic flow.

Number of lanes for moving traffic on each approach		Vehicles per hour on major street	Vehicles per hour on higher-volume minor-
Major Street	Minor Street	(total ofboth approaches)	street approach (one direction only)
1	1	750	75
2 or more	1	900	75
2 or more	2 or more	900	100
1	2 or more	750	100

The major-street and minor -street volumes are for the same 8 hours. During those 8 hours, the direction of higher volume on the minor street may be on one approach during some hours and on the opposite approach during other hours.

When the 85-percentile speed of major-street exceeds 40 mph in either an urban or rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Interruption of Continuous Traffic warrant is 70 percent of the requirements above.

	No of lanes
Major Street	1
Minor Street	1

	Major Street		Minor Street		
	Volume on	Threshhold	Veh/hour on	Threshhold	\M/orropto
Time	major (total of both	URBAN	higher volume minor (one	URBAN	Warrants MET/NOT
	approaches)	750	direction only)	75	
8:00 AM	661		291		NOT MET
5:00 PM	863		27	4	MET
7:00 AM	662		25	4	NOT MET
4:00 PM	826		24	5	MET
2:00 PM	718		240		NOT MET
6:00 PM	838		212		MET
3:00 PM	650		196		NOT MET
12:00 PM	585		179		NOT MET

Number of hours for which warrant met
Percentage by which warrant met



Warrant		NOT MET
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Warrant 1: Combination of Warrants

In exceptional cases, signals occasionally may be justified where no single warrant is satisfied but where Warrants 1A and 1B are satisfied to the extent of 80% or more of the stated values.

80% of Warrant 1A Met 80% of Warrant 1B Met	YES NO	
Warrant	ΝΟΤ	MET

Warrant 2: Four-Hour Vehicular Volumes

The Four Hour Volume Warrant is satisfied when each of any four hours of an average day the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 4C-1 for the existing combination of approach lanes.

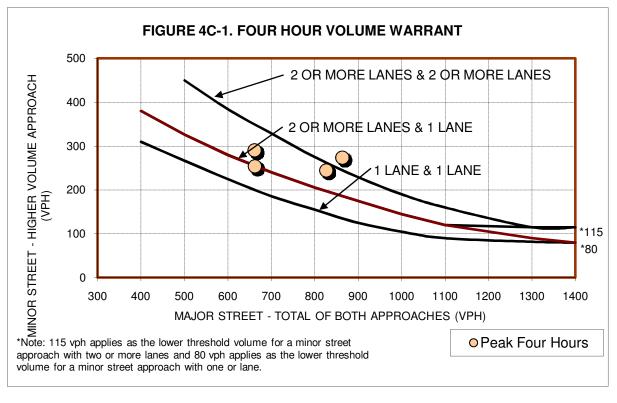
Analysis



Peak Four Hours				
	Vehicles Per Hour			
Time	Major Street	Minor street		
THIC	(Sum of both	(High volume		
	approaches)	approach)		
8:00 AM	661	291		
5:00 PM	863	274		
7:00 AM	662	254		
4:00 PM	826	245		

1

1



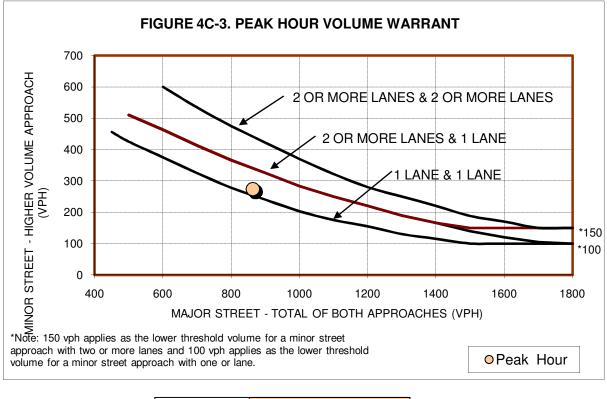


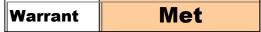
Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.



Peak Hour				
	Vehicles Per Hour			
Time	Major Street	Minor street		
THIC	(Sum of both	(High volume		
	approaches)	approach)		
5:00 PM	863	274		





Warrant 1A: Minimum Vehicular Volume

The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection.

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total ofboth approaches)	Vehicles per hour on higher-volume minor- street approach
Major Street	Minor Street	(total orboth approaches)	(one direction only)
1	1	500	150
2 or more	1	600	150
2 or more	2 or more	600	200
1	2 or more	500	200

No of lanes

When the 85-percentile speed of major-street exceeds 40 mph in either an urban or rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Minimum Vehicular Volume warrant is 70 percent of the requirements above.

Analysis

Major Street Minor Street

	Major Street Minor Street				
		Threshhold	Veh/hour on	Threshhold	
Time	Volume on major street (total of both	URBAN	higher volume minor street (one direction	URBAN	Warrants MET/NOT
	approaches)	500	` only)	150	
5:00 PM	834		313		MET
4:00 PM	762		245		MET
3:00 PM	725		241		MET
2:00 PM	713		240		MET
8:00 AM	625		224		MET
7:00 AM	568		189		MET
6:00 PM	706		189		MET
12:00 PM	59	9	179	9	MET

1

Number of hours for which warrant met Percentage by which warrant met 8 100.0%

Warrant	MET
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Warrant 1B: Interruption of Continuous Traffic

The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection, and signal installation will not seriously disrupt progressive traffic flow.

Number of lanes for moving traffic on each approach		Vehicles per hour on major street	Vehicles per hour on higher-volume minor-	
Major Street	Minor Street	(total ofboth approaches)	street approach (one direction only)	
1	1	750	75	
2 or more	1	900	75	
2 or more	2 or more	900	100	
1	2 or more	750	100	

The major-street and minor -street volumes are for the same 8 hours. During those 8 hours, the direction of higher volume on the minor street may be on one approach during some hours and on the opposite approach during other hours.

When the 85-percentile speed of major-street exceeds 40 mph in either an urban or rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Interruption of Continuous Traffic warrant is 70 percent of the requirements above.

	No of lanes
Major Street	1
Minor Street	1

	Major Street		Minor Street		
	Volume on	Threshhold	Veh/hour on	Threshhold	Warranta
Time	major (total of both	URBAN	higher volume minor (one	URBAN	Warrants MET/NOT
	approaches)	750	direction only)	75	
5:00 PM	834		313		MET
4:00 PM	762		245		MET
3:00 PM	725		241		NOT MET
2:00 PM	713		24	0	NOT MET
8:00 AM	625		224		NOT MET
7:00 AM	568		189		NOT MET
6:00 PM	706		189		NOT MET
12:00 PM	599		179		NOT MET

Number of hours for which warrant met
Percentage by which warrant met



NOT MET Warrant

Warrant 2: Four-Hour Vehicular Volumes

The Four Hour Volume Warrant is satisfied when each of any four hours of an average day the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 4C-1 for the existing combination of approach lanes.

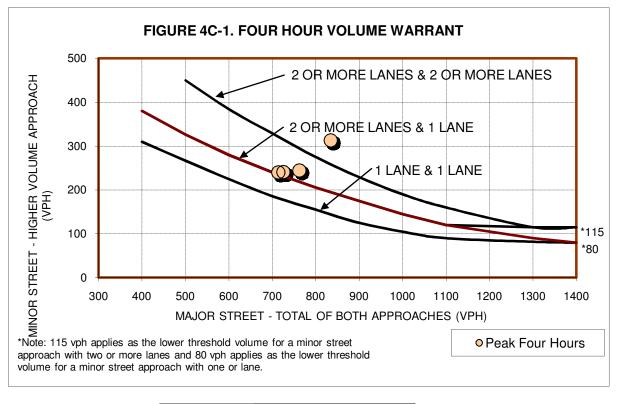
Analysis



Peak Four Hours				
	Vehicles Per Hour			
Time	Major Street	Minor street		
TITIC	(Sum of both	(High volume		
	approaches)	approach)		
5:00 PM	834	313		
4:00 PM	762	245		
3:00 PM	725	241		
2:00 PM	713	240		

1

1



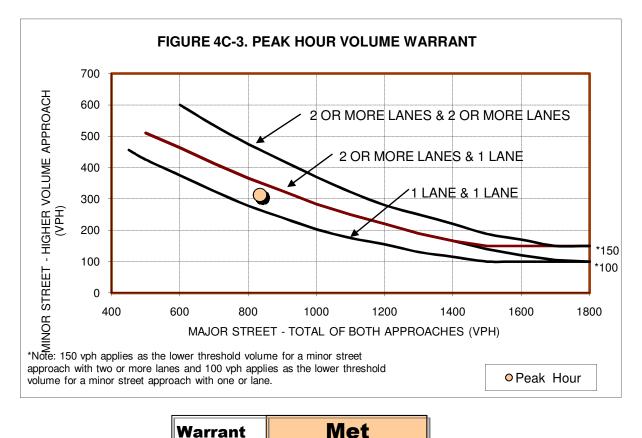


Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.



Peak Hour					
	Vehicles	Per Hour			
Time	Major Street	Minor street			
THIC	(Sum of both	(High volume			
	approaches)	approach)			
5:00 PM	834	313			



Warrant 1: Combination of Warrants

In exceptional cases, signals occasionally may be justified where no single warrant is satisfied but where Warrants 1A and 1B are satisfied to the extent of 80% or more of the stated values.

80% of Warrant 1A Met	YES
80% of Warrant 1B Met	NO
Warrant	NOT MET

INPUT DATA

Major/Minor Information 1 1 => N/S is major 2 => E/W is major Urban/Rural Information 1 Total Intersection Approaches 4 Lane configuartion 1 => Urban Major Street 1 Minor Street 1 Major Street Minor Street Hours N.B S.B E.B W.B 12:00 AM 8 14 0 2:00 AM 3 4 2 1 3:00 AM 2 5 0 3 4:00 AM 85 66 29 40 7:00 AM 351 229 178 189 8:00 AM 312 313 224 206 9:00 AM 258 315 163 128 <	Input data only in green fields							
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