

## Traffic Signal Warrants Worksheet

SR# \_\_\_\_\_

DATE \_\_\_\_\_ PREPARER \_\_\_\_\_ REVIEWER \_\_\_\_\_

MAJOR ST: \_\_\_\_\_

MINOR ST: \_\_\_\_\_

Critical Approach Speed	}	MPH	or	Speed Limit	}	MPH
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Speed limit or critical speed on major street traffic > 40 mph.....	<input type="checkbox"/>	or	<input type="checkbox"/>	} RURAL (R)		<input type="checkbox"/>	} URBAN (U)
In built up area of isolated community of < 10,000 population.....	<input type="checkbox"/>		<input type="checkbox"/>				

Eight-Hour Vehicular Volume	WARRANT <b>1</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%; text-align: center;">N/A</td> <td style="width: 10%; text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">SATISFIED</td> <td style="text-align: center;">YES</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td></td> <td style="text-align: center;">NO</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>		N/A	<input type="checkbox"/>	SATISFIED	YES	<input type="checkbox"/>		NO	<input type="checkbox"/>
	N/A	<input type="checkbox"/>									
SATISFIED	YES	<input type="checkbox"/>									
	NO	<input type="checkbox"/>									

★ *The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal* ★

- a. Condition A or Condition B or combination of 80% of both parts A and B must be satisfied.
- b. A 6-hour Manual Count may be used in a determination that this warrant is not met. However, supplement manual counts should be taken during separate hours for a determination that this warrant is met.
- c. In applying each condition, the major street and minor street volumes shall be for the same hours. On the minor street, the higher volume does not need to be the same approach during each of the hours.
- d. The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count.
- e. Figure 4C-103(CA) should be used for new intersections, significantly reconstructed intersections, where near-term land development will result in increased volumes, or where it is not reasonable to use current traffic volumes.
- f. Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. This site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles. Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.
- g. At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major street" volume. In these cases, engineering judgment should be used to determine if left-turn phasing is necessary to accommodate the high volume of left-turn traffic.

# Eight-Hour Vehicular Volume WARRANT 1 (continued)

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

**Condition A**

**Minimum Vehicle Volume**

<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
100%	<input type="checkbox"/>	<input type="checkbox"/>
80%	<input type="checkbox"/>	<input type="checkbox"/>

MINIMUM REQUIREMENTS  
(80% SHOW IN BRACKETS)

**RIGHT TURN REDUCTION  
APPLICATION MINOR STREET**  
(If Yes, fill in percentage)  \_\_\_\_\_%

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOW IN BRACKETS)				Hours									
	U	R	U	R										
	1		2 or More											
Both Approach Major Street	500 (400)	350 (280)	600 (480)	420 (336)										
Highest Approach Minor Street	150 (120)	105 (84)	200 (160)	140 (112)										

**Condition B**

**Interruption of Continuous Traffic**

<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
100%	<input type="checkbox"/>	<input type="checkbox"/>
80%	<input type="checkbox"/>	<input type="checkbox"/>

MINIMUM REQUIREMENTS  
(80% SHOW IN BRACKETS)

**RIGHT TURN REDUCTION  
APPLICATION MINOR STREET**  
(If Yes, fill in percentage)  \_\_\_\_\_%

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOW IN BRACKETS)				Hours									
	U	R	U	R										
	1		2 or More											
Both Approach Major Street	750 (600)	525 (420)	900 (720)	630 (504)										
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)										

**COMBINATION OF A & B**

<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
	<input type="checkbox"/>	<input type="checkbox"/>

REQUIREMENT	CONDITION	✓	FULFILLED	
			YES	NO
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME			
	AND B. INTERRUPTION OF CONTINUOUS TRAFFIC		<input type="checkbox"/>	<input type="checkbox"/>
	AND AN ADEQUATE TRIAL OF OTHER ALTERNATIVES THAT COULD CAUSE LESS DELAY AND INCOVENIENCE TO TRAFFIC HAS FAILED TO SOLVE THE TRAFFIC PROBLEMS		<input type="checkbox"/>	<input type="checkbox"/>

# Eight-Hour Vehicular Volume WARRANT 1 (continued)

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

<b>Projected Volumes</b>	<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<b>N/A</b>	<input type="checkbox"/>

**Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)**  
Based on Estimated Average Daily Traffic - see Note\*

URBAN <input type="checkbox"/>	RURAL <input type="checkbox"/>	Minimum Requirements Estimated Average Daily Traffic			
<b>CONDITION A - Minimum Vehicular Volume</b>		Vehicles Per Day On Major Street (Total of Both Approaches)		Vehicles Per Day On Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied <input type="checkbox"/> Not Satisfied <input type="checkbox"/>					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Major Street	Minor Street				
1.....	1.....	8,000	5,600	2,400	1,680
2 or More.....	1.....	9,600	6,720	2,400	1,680
2 or More.....	2 or More.....	9,600	6,720	3,200	2,240
1.....	2 or More.....	8,000	5,600	3,200	2,240
<b>CONDITION B - Interruption of Continuous Traffic</b>		Vehicles Per Day On Major Street (Total of Both Approaches)		Vehicles Per Day On Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied <input type="checkbox"/> Not Satisfied <input type="checkbox"/>					
Number of lanes for moving traffic on each approach		Urban	Rural	Urban	Rural
Minor Street	Minor Street				
1.....	1.....	12,000	8,400	1,200	850
2 or More.....	1.....	14,400	10,080	1,200	850
2 or More.....	2 or More.....	14,400	10,080	1,600	1,120
1.....	2 or More.....	12,000	8,400	1,600	1,120
<b>Combination of CONDITIONS A + B</b>					
Satisfied <input type="checkbox"/> Not Satisfied <input type="checkbox"/>					
No one condition satisfied, but following conditions fulfilled 80% or more.....		2 CONDITIONS 80%		2 CONDITIONS 80%	
_____ A      _____ B					

\* Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes

# Four-Hour Vehicular Volume



N/A

SATISFIED YES

NO

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

- Record hourly vehicle volumes for the highest four hours of an average day.
- In applying each condition, the major street and minor street volumes shall be for the same hours. On the minor street, the higher volume does not need to be the same approach during each of the hours.
- The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count.
- Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. This site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles. Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.
- At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major street" volume. In these cases, engineering judgment should be used to determine if left-turn phasing is necessary to accommodate the high volume of left-turn traffic.

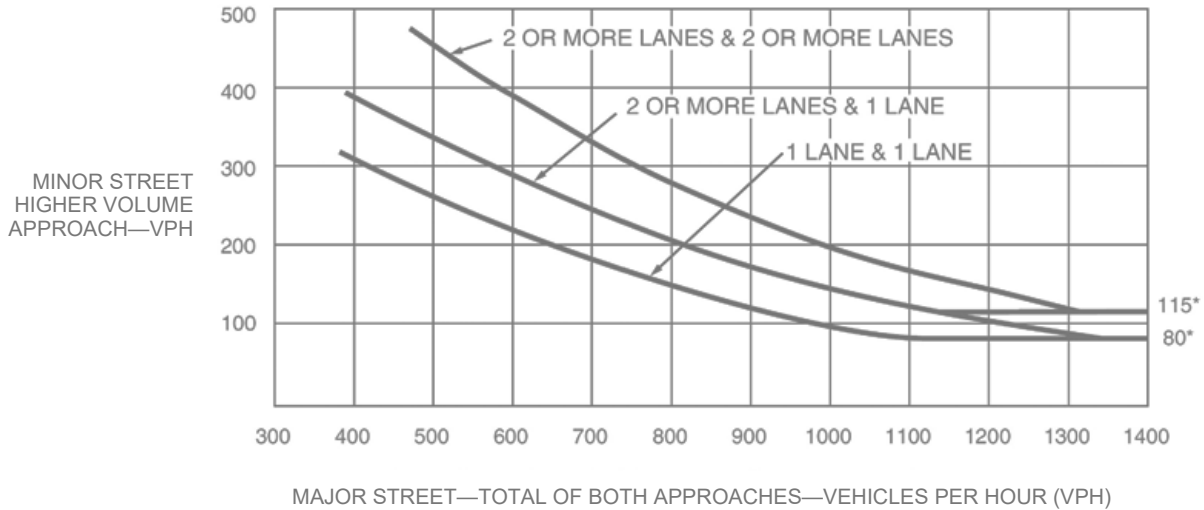
APPROACH LANES			Hours				RIGHT TURN REDUCTION APPLICATION <i>MINOR STREET</i>	YES	NO
	One	2 or More						<input type="checkbox"/>	<input type="checkbox"/>
Both Approaches - Major Street								<input type="checkbox"/>	<input type="checkbox"/>
Higher Approach - Minor Street							(If Yes, fill in percentage)	_____ %	
* All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)								<input type="checkbox"/>	<input type="checkbox"/>
<u>OR</u> , All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)								<input type="checkbox"/>	<input type="checkbox"/>

# Four-Hour Vehicular Volume WARRANT 2 (continued)

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

### URBAN

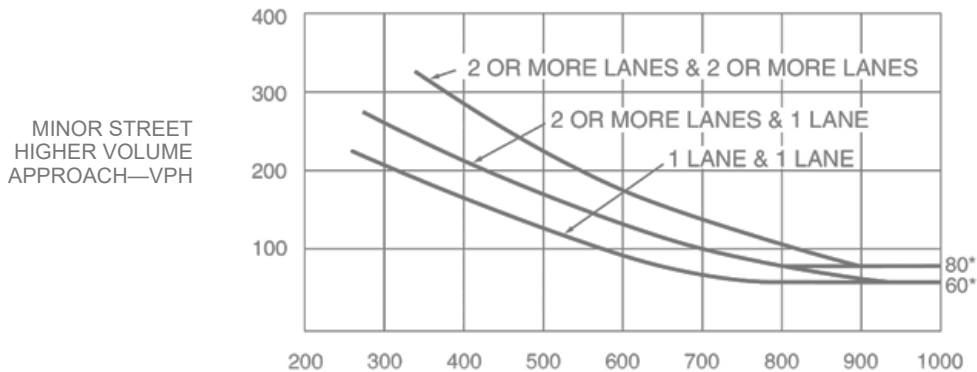
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

### RURAL

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



\*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.

Peak Hour

WARRANT  
3

N/A   
 SATISFIED YES   
 NO

\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \*

- a. Part A or Part B must be satisfied.
- b. This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.
- c. In applying each condition, the major street and minor street volumes shall be for the same hours.
- d. The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count.
- e. Estimated Peak Hour Volumes may be used for new intersections, significantly reconstructed intersections, or where near-term land development will result in increased volumes.
- f. Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. This site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles. Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.
- g. At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major street" volume. In these cases, engineering judgment should be used to determine if left-turn phasing is necessary to accommodate the high volume of left-turn traffic.

**Unusual facility per Note b.**

YES <input type="checkbox"/>	NO <input type="checkbox"/>
------------------------------	-----------------------------

Name \_\_\_\_\_

**PART A**

*All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods*

	YES	NO	N/A
1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; <u>AND</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

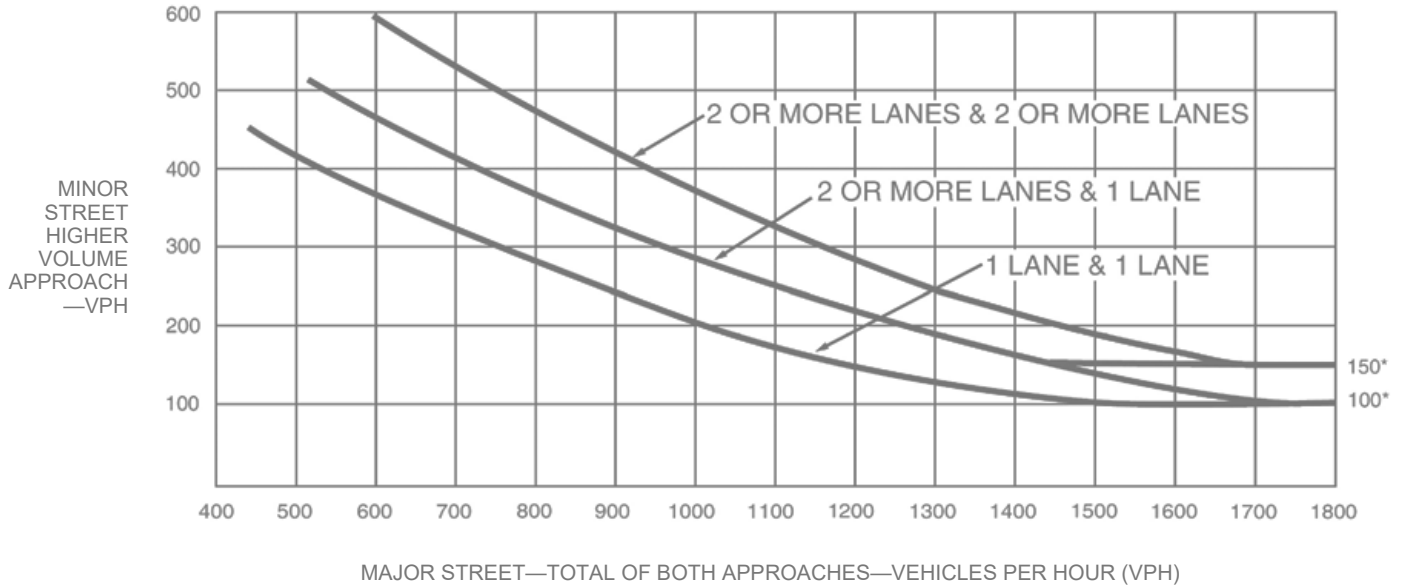
**PART B**

	SATISFIED	YES	NO
Hour		<input type="checkbox"/>	<input type="checkbox"/>
APPROACH LANES			
One			
2 or More			
Both Approaches - Major Street			
Higher Approach - Minor Street			
<b>RIGHT TURN REDUCTION APPLICATION MINOR STREET</b>			
(If Yes, fill in percentage)			
_____ %			
The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	YES	NO	
<u>OR</u> , The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	<input type="checkbox"/>	<input type="checkbox"/>	

Peak Hour
WARRANT 3
(continued)

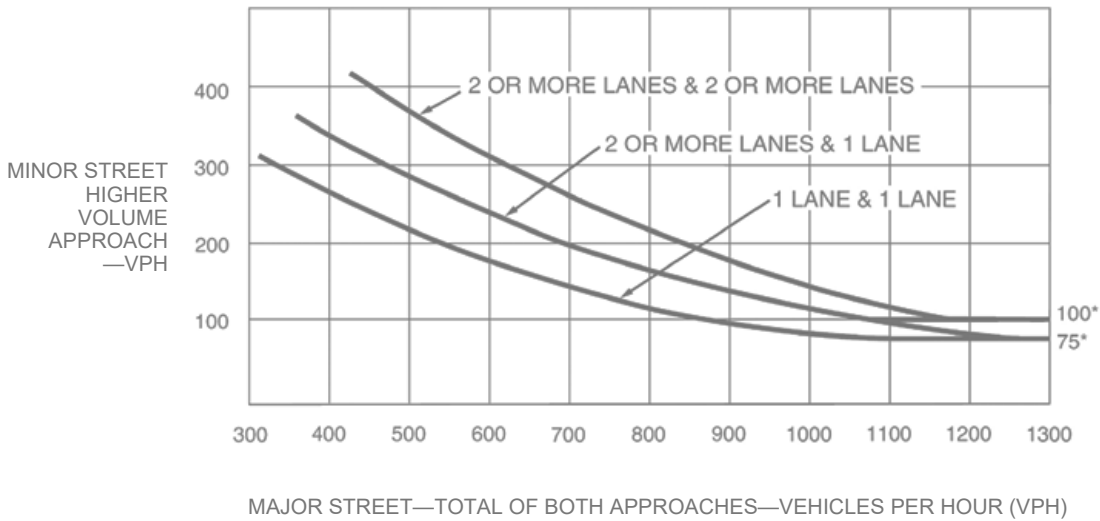
★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

**URBAN**  
Figure 4C-3. Warrant 3, Peak Hour



\* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

**RURAL**  
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

# Pedestrian Volume

**WARRANT**  
4

N/A

SATISFIED YES

NO

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

- a. Parts 1 and 2 shall be satisfied.
- b. The pedestrian volume criterion may be reduced by as much as 50% if the 15th percentile speed of the pedestrians is less than 3.5 feet/second.
- c. Estimated pedestrian volumes may be used where nearby, near-term land use development has been approved for construction.
- d. In applying each condition, the total vehicles per hour on the major street (on both approaches) and the total pedestrians per hour crossing the major street shall be for the same hours.
- e. The Pedestrian Volume signal warrants shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.
- f. Traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.
- g. If it is considered at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.
- h. Bicycles may be counted as pedestrians.
- i. Pedestrian Hybrid Beacons may be considered instead of a traffic signal if a device is recommended based upon pedestrian needs

**PART 1 (A or B must be satisfied)**

SATISFIED	YES	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Hours			
<b>A. FOUR-HOUR PEDESTRIAN VOLUMES</b>				
Vehicles per hour on major street for 4 hours				
Pedestrians crossing major street per hour for highest 4 hours				

(FIGURE 4C-5 OR 4C-6 SATISFIED)

SATISFIED	YES	NO
100%	<input type="checkbox"/>	<input type="checkbox"/>
80%	<input type="checkbox"/>	<input type="checkbox"/>
50%	<input type="checkbox"/>	<input type="checkbox"/>

15% WALKING RATE \_\_\_\_\_

	Hour
<b>B. ONE HOUR PEDESTRIAN VOLUMES</b>	
Vehicles per hour on major street for 1 hour	
Pedestrians crossing major street per hour for highest 1 hour	

(FIGURE 4C-7 or 4C-8 SATISFIED)

SATISFIED	YES	NO
100%	<input type="checkbox"/>	<input type="checkbox"/>
80%	<input type="checkbox"/>	<input type="checkbox"/>
50%	<input type="checkbox"/>	<input type="checkbox"/>

15% WALKING RATE \_\_\_\_\_

**PART 2**

SATISFIED	YES	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

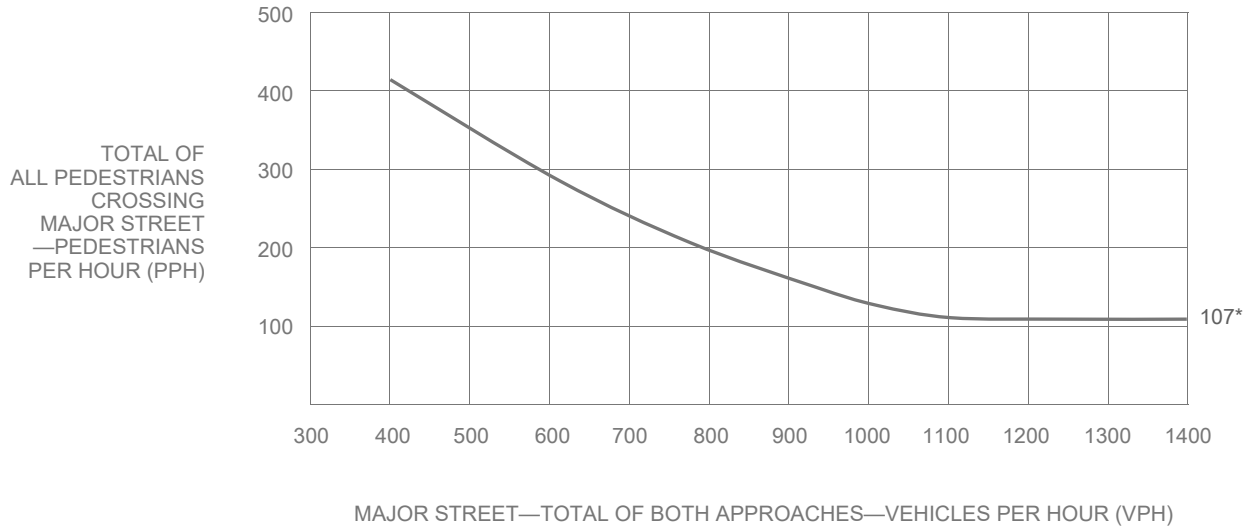
<u>AND</u> , The distance to the nearest traffic signal along the major street is greater than 300 ft	<input type="checkbox"/>	<input type="checkbox"/>
<u>OR</u> , The proposed traffic signal will not restrict progressive traffic flow along the major street	<input type="checkbox"/>	<input type="checkbox"/>



WARRANT 4
Pedestrian Volume
(continued)

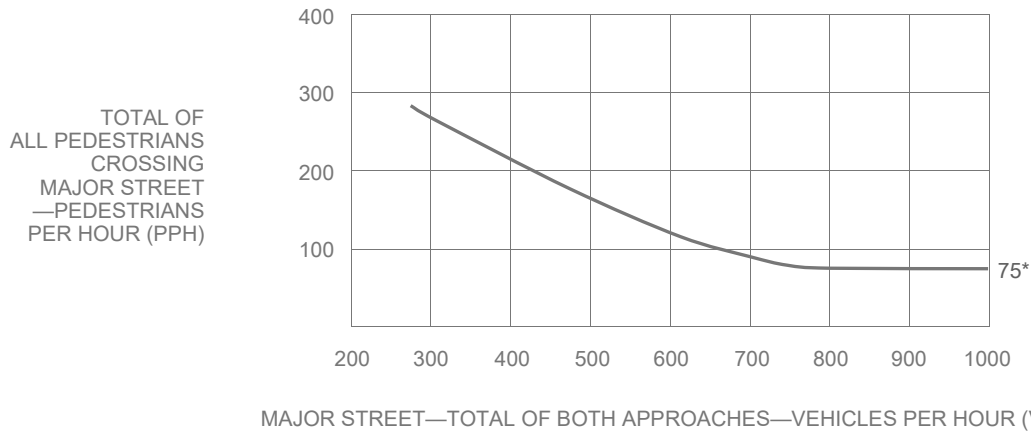
★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

**SPEED ≤ 35 MPH**  
**Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume**



\* Note: 107 pph applies as the lower threshold volume

**SPEED > 35 MPH**  
**Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)**

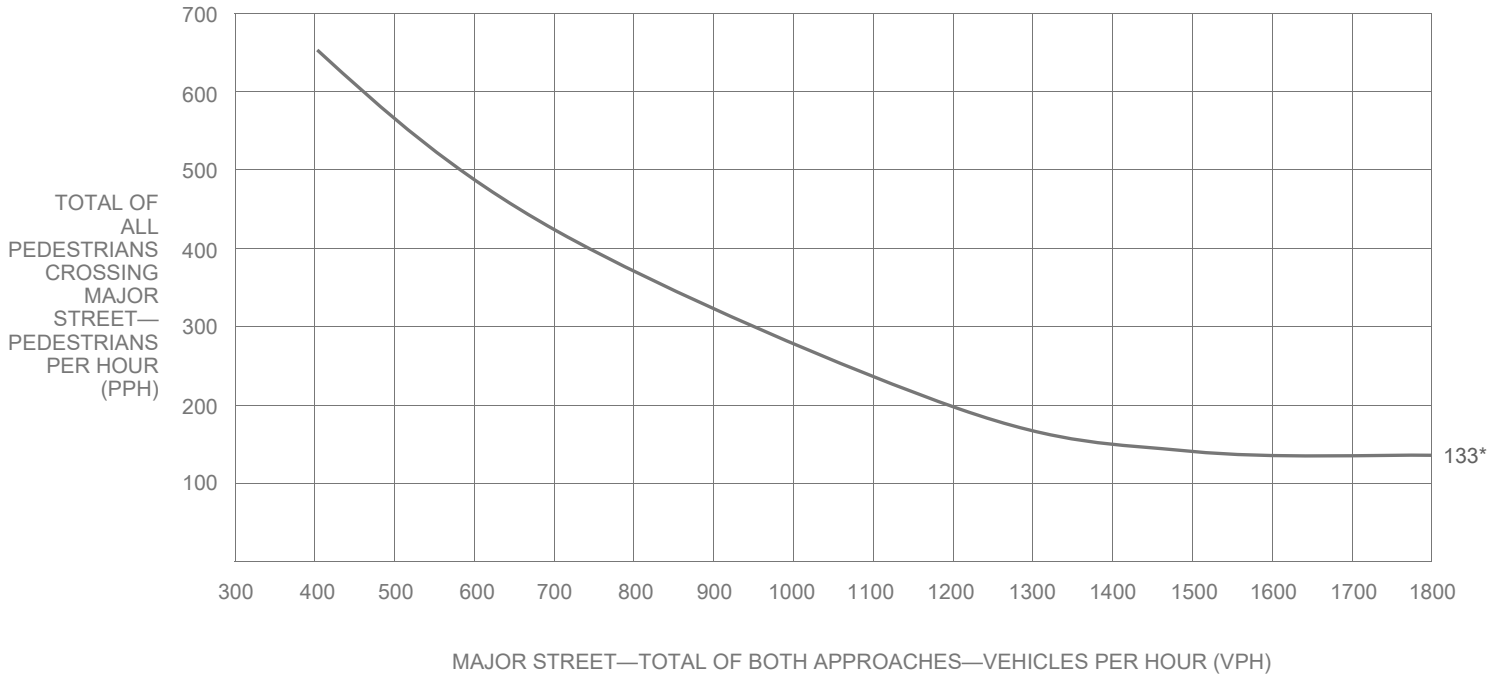


\* Note: 75 pph applies as the lower threshold volume

# Pedestrian Volume WARRANT 4 (continued)

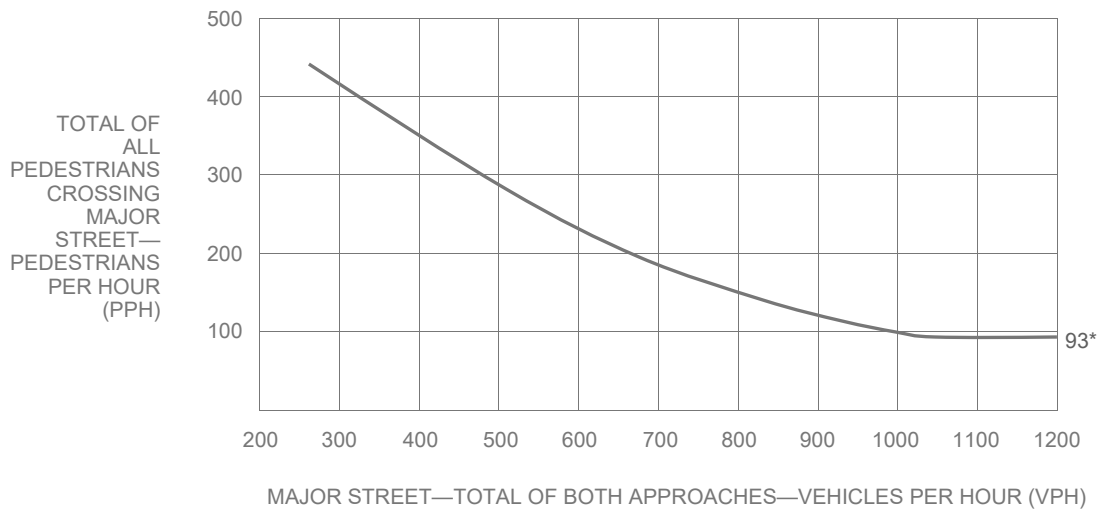
\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \*

**SPEED ≤ 35 MPH**  
**Figure 4C-7. Warrant 4, Pedestrian Peak Hour**



\* Note: 133 pph applies as the lower threshold volume

**SPEED > 35 MPH**  
**Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)**



\* Note: 93 pph applies as the lower threshold volume

# School Crossing

WARRANT  
**5**

N/A

SATISFIED YES

NO

\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \*

- a. Part A and Part B shall be satisfied.
- b. For purposes of this warrant, schoolchildren include elementary through high school students.
- c. Estimated schoolchildren volumes may be used where a new school or expanded school has been approved for construction.
- d. The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 schoolchildren during the highest crossing hour.
- e. The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.
- f. Non-intersectional schoolchildren crosswalk locations may be signalized when justified.
- g. Pedestrian Hybrid Beacons may be considered instead of a traffic signal if a device is recommended based upon pedestrian needs

**PART A**

PART A				SATISFIED	YES	NO
					<input type="checkbox"/>	<input type="checkbox"/>
<b>Gap / Minutes and # of Children</b>			Hour	YES	NO	
Gaps vs Minutes	Minutes Children Using Crossing			<input type="checkbox"/>	<input type="checkbox"/>	Gaps < Minutes <b>AND</b> Children ≥ 20/hr
	Number of Adequate Gaps			<input type="checkbox"/>	<input type="checkbox"/>	
School Age Pedestrians Crossing Street / hr						
<u>AND</u> , Consideration has been given to less restrictive remedial measures				<input type="checkbox"/>	<input type="checkbox"/>	

**PART B**

PART B				SATISFIED	YES	NO
					<input type="checkbox"/>	<input type="checkbox"/>
				YES	NO	
The distance to the nearest traffic signal along the major street is greater than 300 ft				<input type="checkbox"/>	<input type="checkbox"/>	
<u>OR</u> , The proposed traffic signal will not restrict progressive movement of traffic				<input type="checkbox"/>	<input type="checkbox"/>	

# Coordinated Signal System

WARRANT  
**6**

N/A

SATISFIED YES

NO

\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \*

- a. The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.
- b. All Parts must be satisfied.

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNAL	YES	NO
≥ 1000 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	<input type="checkbox"/>	<input type="checkbox"/>
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.		<input type="checkbox"/>	<input type="checkbox"/>
<u>OR</u> , On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		<input type="checkbox"/>	<input type="checkbox"/>

# Crash Experience Warrant



N/A

SATISFIED YES

NO

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

- a. All Parts must be satisfied.
- b. For locations that involve other agencies, crash data from other involved jurisdictions should be obtained.

		YES	NO
Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency		<input type="checkbox"/>	<input type="checkbox"/>
<b>REQUIREMENTS</b>	Number of crashes reported within a 12-month period susceptible to correction by a traffic signal:	<input type="checkbox"/>	<input type="checkbox"/>
<b>5 OR MORE</b>	Indicate Date(s):	<input type="checkbox"/>	<input type="checkbox"/>
<b>REQUIREMENTS</b>	<b>CONDITIONS</b>	<input checked="" type="checkbox"/>	
<b>ONE CONDITION SATISFIED 80%</b>	Warrant 1, Condition A - Minimum Vehicular Volume		
	OR, Warrant 1, Condition B - Interruption of Continuous Traffic	<input type="checkbox"/>	<input type="checkbox"/>
	OR, Warrant 4, Pedestrian Volume Condition - Ped Vol ≥ 80% for ped volumes per Figures 4C-5 to 4C-8		

# Roadway Network



N/A

SATISFIED YES

NO

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

- a. Existing traffic volumes with an ambient growth rate of 1% (or other LADOT approved ambient growth rate) may be used if projected volumes are not available.
- b. All Parts must be satisfied.

MINIMUM VOLUME REQUIREMENTS	ENTERING VOLUMES - ALL APPROACHES	✓	FULLFILLED	
			YES	NO
1000 Veh / Hr	During Typical Weekday Peak Hour _____ Veh/Hr <b>AND</b> has 5-year projected traffic volumes that meet one or more of Warrants 1,2, and 3 during an average weekday.  <b>OR</b> During Each of Any 5 Hrs. of a Saturday or Sunday _____ Veh / Hr		<input type="checkbox"/>	<input type="checkbox"/>
<b>CHARACTERISTICS OF MAJOR ROUTES</b>	<b>MAJOR ROUTE A</b>	<b>MAJOR ROUTE B</b>		
Highway System Serving as Principal Network for Through Traffic				
Rural or Suburban Highway Outside Of, Entering, or Traversing a City				
Appears as Major Route on an Official Plan			YES	NO
Any Major Route Characteristics Met, Both Streets			<input type="checkbox"/>	<input type="checkbox"/>

# Intersection Near a Grade Crossing



N/A

SATISFIED YES

NO

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

- a. Both Parts A and B shall be satisfied.
- b. This Warrant shall only be applied after review and approval by the LADOT Railroad Crossing and Safety Section (RCOSS), subject to CPUC General Order approval.
- c. This Warrant does not apply for Pre-Signals and/or Queue-Cutter signals, as an alternative application of Pre-Signals (See 2012 CA MUTCD, Sec 8C.09). Pre-Signals shall only be applied after review and approval by RCOSS, subject to CPUC General Order approval.

	FULFILLED	
	YES	NO
<p><b>PART A</b></p> <p>A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach. Track Center Line to Limit Line _____ ft</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>PART B</b></p> <p><b>There is one minor street approach lane at the track crossing</b> - During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-9.</p> <p>Major Street - Total of both approaches: _____ VPH                      Minor Street - Crosses the track (one direction only, approaching the intersection): _____ VPH                      X AF (Use Tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p> <hr style="border-top: 1px dashed black;"/> <p><b>OR, There are two or more minor street approach lanes at the track crossing</b> - During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point falls above the applicable curve in Figure 4C-10.</p> <p>Major Street - Total of both approaches: _____ VPH                      Minor Street - Crosses the track (one direction only, approaching the intersection): _____ VPH                      X AF (Use Tables 4C-2, 3, &amp; 4 below to calculate AF) = _____ VPH</p>	<input type="checkbox"/>	<input type="checkbox"/>

The minor street approach volume may be multiplied by up to three following adjustment factors (AF) as described in Section 4C-10.

- 1. Number of Rail Traffic per Day \_\_\_\_\_ Adjustment factor from Table 4C-2 \_\_\_\_\_
- 2. Percentage of High-Occupancy Buses on Minor Street Approach \_\_\_\_\_ Adjustment factor from Table 4C-3 \_\_\_\_\_
- 3. Percentage of Tractor-Trailer Trucks on Minor Street Approach \_\_\_\_\_ Adjustment factor from Table 4C-4 \_\_\_\_\_

NOTE: If no data is available or known, then use AF = 1 (no adjustment)

**Table 4C-2. Warrant 9,  
Adjustment Factor for  
Daily Frequency of Rail Traffic**

Rail Traffic per Day	Adjustment Factor
1	0.67
2	0.91
3 to 5	1.00
6 to 8	1.18
9 to 11	1.25
12 or more	1.33

**Table 4C-3. Warrant 9,  
Adjustment Factor for  
Percentage of High-Occupancy Buses**

% of High-Occupancy Buses * on Minor-Street Approach	Adjustment Factor
0 %	1.00
2 %	1.09
4 %	1.19
6 % or more	1.32

\* A high-occupancy bus is defined as a bus occupied by at least 20 people

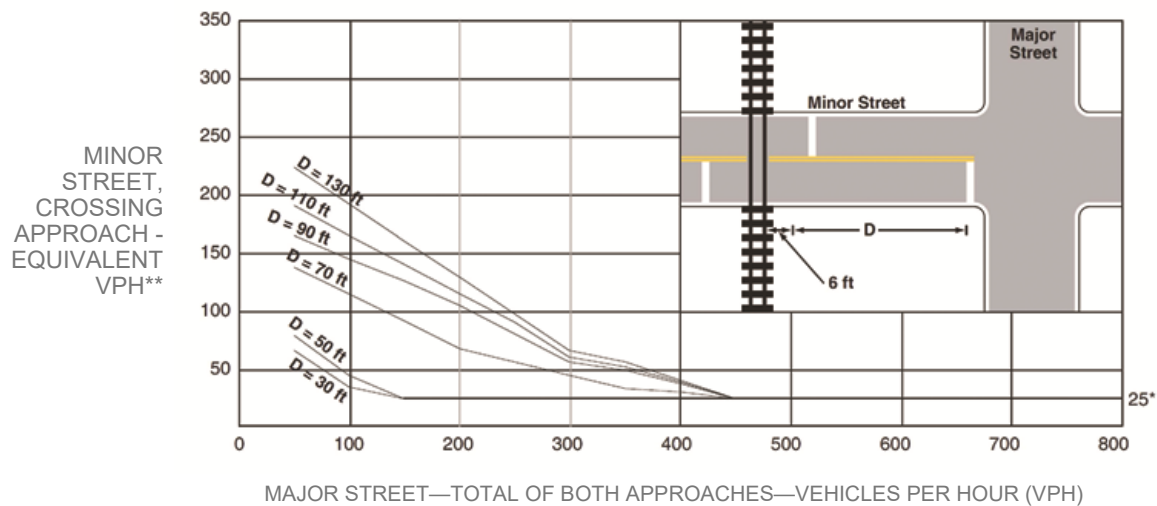
# Intersection Near a Grade Crossing WARRANT 9 (continued)

★ The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal ★

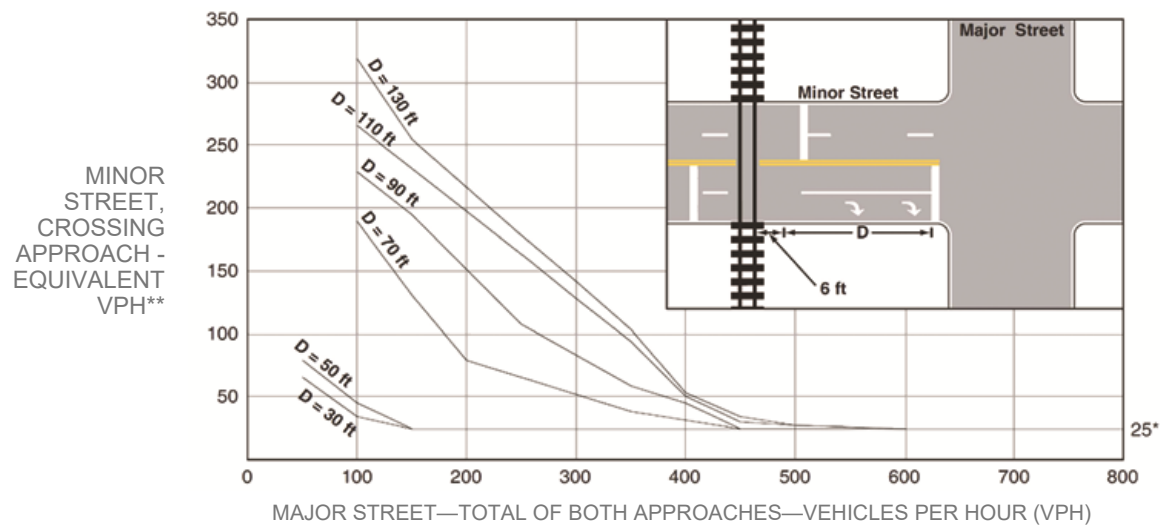
**Table 4C-4. Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks**

% of Tractor-Trailer Trucks on Minor-Street Approach	Adjustment Factor	
	D less than 70 feet	D of 70 feet or more
0% to 2.5%	0.50	0.50
2.6% to 7.5%	0.75	0.75
7.6% to 12.5%	1.00	1.00
12.6% to 17.5%	2.30	1.15
17.6% to 22.5%	2.70	1.35
22.6% to 27.5%	3.28	1.64
More than 27.5%	4.18	2.09

**Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing (One Approach Lane at the Track Crossing)**



**Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing (Two or More Approach Lanes at the Track Crossing)**



\* 25 vph applies as the lower threshold volume

\*\* VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

The next two warrants are not included in the MUTCD (CA) standard warrants, but are added as optional warrants that an engineer may use with discretion to justify a traffic signal for special conditions where other traffic control devices could be considered, but where a traffic signal might be more appropriate

# Bicycles

WARRANT

10

N/A

SATISFIED YES

NO

*\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \**

- a. Part A and Part B shall be satisfied
- b. Per MUTCD (CA) Section 4C.01.15: "For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians."
- c. When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles, and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians; however for this bicycle specific warrant, bicyclists are counted as bicyclists, regardless of where they are riding.
- d. Bicycle signal faces should be considered for use when this warrant is satisfied, with the final determination made during the signal design process. Refer to MUTCD (CA) Section 4D.104 (CA).
- e. Estimated peak hour bicycle volumes may be used for new intersections, significantly reconstructed intersections, or where new bicycle facilities or near-term land development are proposed which will result in increased bicycle volumes.

<b>PART A and B must be satisfied</b>	<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>PART A (1 or 2 below must be satisfied)</b>	<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>
1. Location meets the Department's guidelines for a marked crosswalk with Pedestrian Hybrid Beacons, where pedestrian units are replaced with bicyclists; <b>AND</b> the minor street is designated as part of the Neighborhood Enhanced Network in the Mobility Plan 2035 Element of the City's General Plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The intersection features a two-way bicycle or pedestrian path or trail within the median or alongside one of the roadways.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>PART B (1, 2, or 3 below must be satisfied)</b>	<b>SATISFIED</b>	<b>YES</b>	<b>NO</b>												
1. Signal would be part of a corridor or area project to improve bicycle connectivity.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
2. Signal is associated with a development project.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
3. There have been at least 3 correctable collisions involving bicyclists in the last 1 year, 2 per year for the last 2 years, or 5 in the last 3 years of available data. Specify dates of correctable bicycle collisions:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 30%; text-align: center;">Period Dates</th> <th style="width: 50%; text-align: center;">Dates of Correctable Bicycle Collisions</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: middle;">1 year</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">2 year</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">3 year</td> <td></td> <td></td> </tr> </tbody> </table>		Period Dates	Dates of Correctable Bicycle Collisions	1 year			2 year			3 year					
	Period Dates	Dates of Correctable Bicycle Collisions													
1 year															
2 year															
3 year															

*\*The authority for a traffic signal justified using Part B.1 or B.2 shall be automatically rescinded three years after the date of approval if funding for construction of the traffic signal is not secured or project plans are not actively being reviewed for approval.*

# Pedestrian Activated Yellow Flashing Beacons



N/A	<input type="checkbox"/>
SATISFIED YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

\* The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal \*

- a. All Parts shall be satisfied.
- b. This warrant should be applied when Pedestrian Activated Yellow Flashing Beacons are recommended within 600 feet BOTH upstream and downstream of existing traffic signals.

**PART A**

	YES	NO
Location meets the guidelines for the installation of Pedestrian Activated Yellow Flashing Beacons as described in the LADOT Marked Crosswalk Guidelines.	<input type="checkbox"/>	<input type="checkbox"/>

**PART B**

MINIMUM REQUIREMENTS	DISTANCE TO NEAREST SIGNALS	YES	NO
≤ 600 ft	N _____ ft, S _____ ft, E _____ ft, W _____ ft	<input type="checkbox"/>	<input type="checkbox"/>