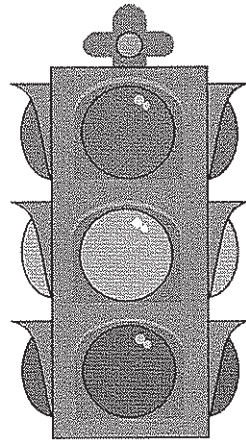


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INTERSECTION CONTROL ANALYSIS

LOCATION

New York City
Department of Transportation



ELECTED OFFICIAL ACKNOWLEDGMENTS

Location _____

Borough _____ Reference # _____ CB# _____

Date notification was sent out _____

BOROUGH PRESIDENT _____

CONGRESS MEMBER _____

STATE SENATOR _____

ASSEMBLY MEMBER _____

COUNCIL MEMBER _____

C.B. MANAGER _____

REQUESTOR _____

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Signal Approval

Location

- RECOMMENDATION
- APPROVAL
- DENIAL

MELITA JAMES
Chief, Intersection Control Unit

Date

-
- APPROVAL
 - DENIAL

ERNEST ATHANAILOS, P.E.
Director of Signals and ITS Engineering

Date

-
- APPROVAL
 - DENIAL

ALAN BOROCK, P.E.
Director of Signal Operations & Street Lighting

Date

Intersection Control Unit

Location: _____

File#: _____

Request: _____

Requestor: _____

Date: _____

Determination: _____

Comments: Based upon our evaluation of data collected, it is our judgment that a traffic signal
be approved under Warrant _____

Melita James
Chief, Intersection Control Unit

INTRODUCTION

A comprehensive investigation of traffic conditions and physical characteristics of the location is required to determine the necessity for a signal installation and to furnish necessary data for the proper design and operation of a signal that is found to be warranted. Such data is included in this Intersection Control Analysis.

An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.

The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

Warrant 1, Eight-Hour Vehicular Volume
Warrant 2, Four-Hour Vehicular Volume
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network

Source: Manual on Uniform Traffic Control Devices (MUTCD) – FHWA
November ~~2003~~ Edition
2009

STUDY AREA MAP

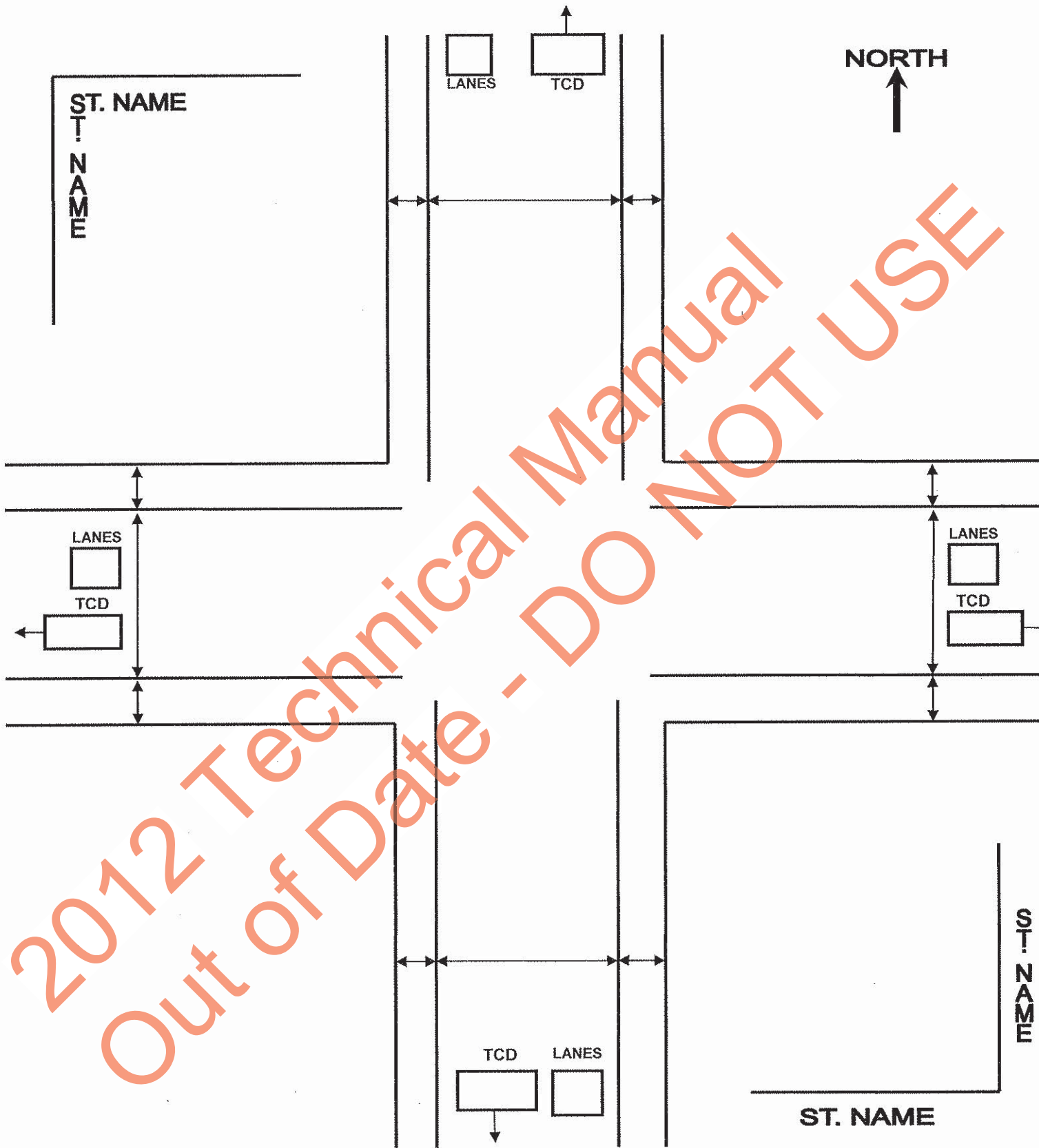
THE STUDY AREA MAP SHOULD INCLUDE THE FOLLOWING:

- A. LOCATION OF REQUESTED SIGNAL IS TO BE HIGHLIGHTED BY A RED CIRCLE.
- B. AN OFFICIAL SCHOOL MAP MAY BE USED AS A SUBSTITUTE.

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CONDITION DIAGRAM

Ref# _____ Date: _____ Day: _____ Inspector: _____



TCD = DISTANCE TO NEAREST TRAFFIC CONTROL DEVICE (Feet)
 LANES = NUMBER OF MOVING LANES

NOTE: Indicate all curb regulations, street furniture, curb cuts, and a pavement markings related to the intersection. The # of lane: observed are the traveled lanes for each approach; parking lanes are not included. Show street direction by placing an arrow(s), indicating direction on all legs of the intersection.

CONDITION DIAGRAM

Ref# _____ Date: _____ Day: _____ Inspector: _____

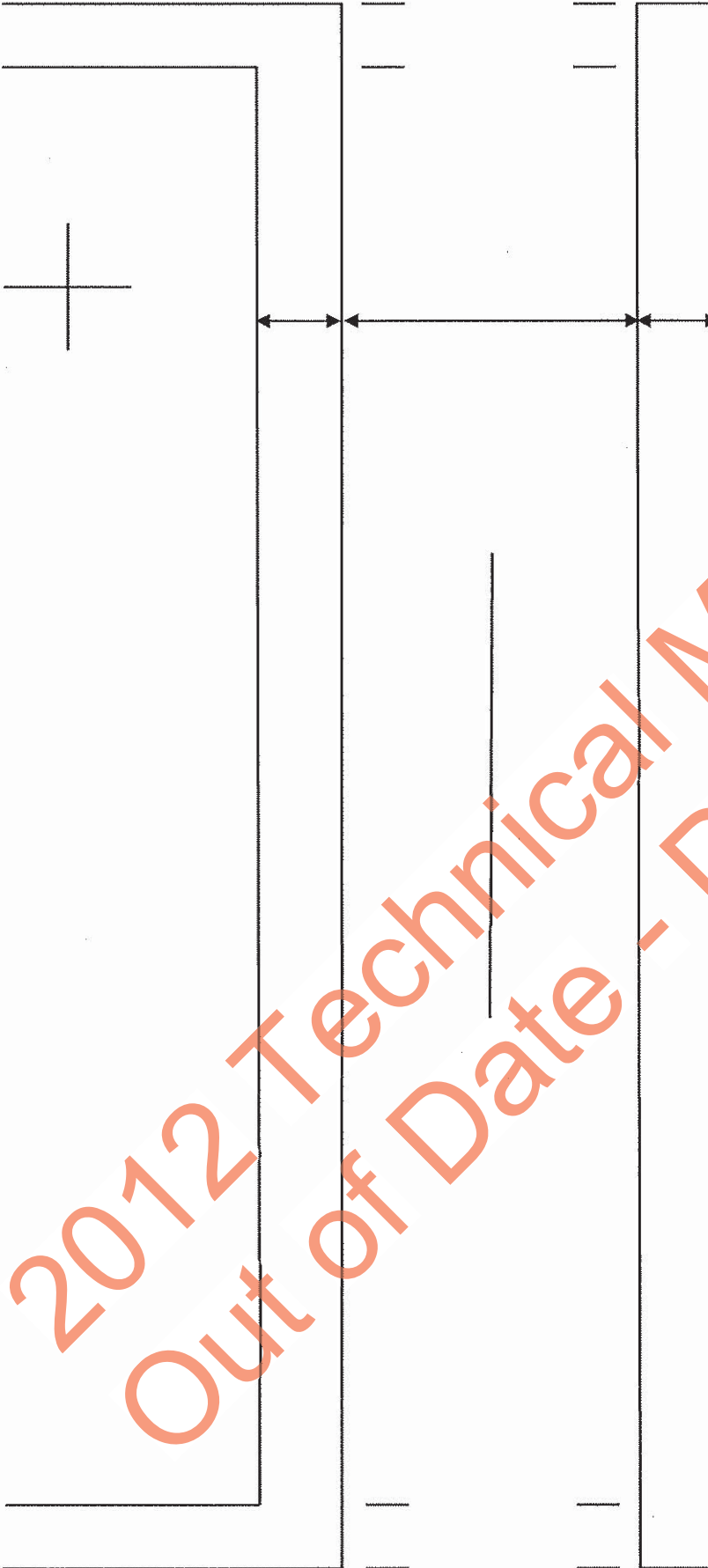
NORTH
↑

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TCD = DISTANCE TO NEAREST TRAFFIC CONTROL DEVICE (Feet)
LANES = NUMBER OF MOVING LANES

NOTE: Indicate all curb regulations, street furniture, curb cuts, and a pavement markings related to the intersection. The # of lanes observed are the traveled lanes for each approach; parking lanes are not included. Show street direction by placing an arrow(s), indicating direction on all legs of the intersection.

Survey Sheet



The diagram shows a rectangular area divided into three vertical sections by two vertical lines. A crosshair is located in the leftmost section. Dimension lines with arrows indicate the width of each section. A vertical line is drawn in the middle section. A large diagonal watermark is overlaid across the entire page.

Block Front Survey

Reference: _____

Borough: _____

Date: _____

Inspector: _____

Street: _____

Side of St. _____

from: _____

to: _____

Type of Parking

Passenger _____ %

Commercial _____ %

Type of Area

Residential _____ %

Commercial _____ %

Industrial _____ %

Other _____ %

Comments: _____

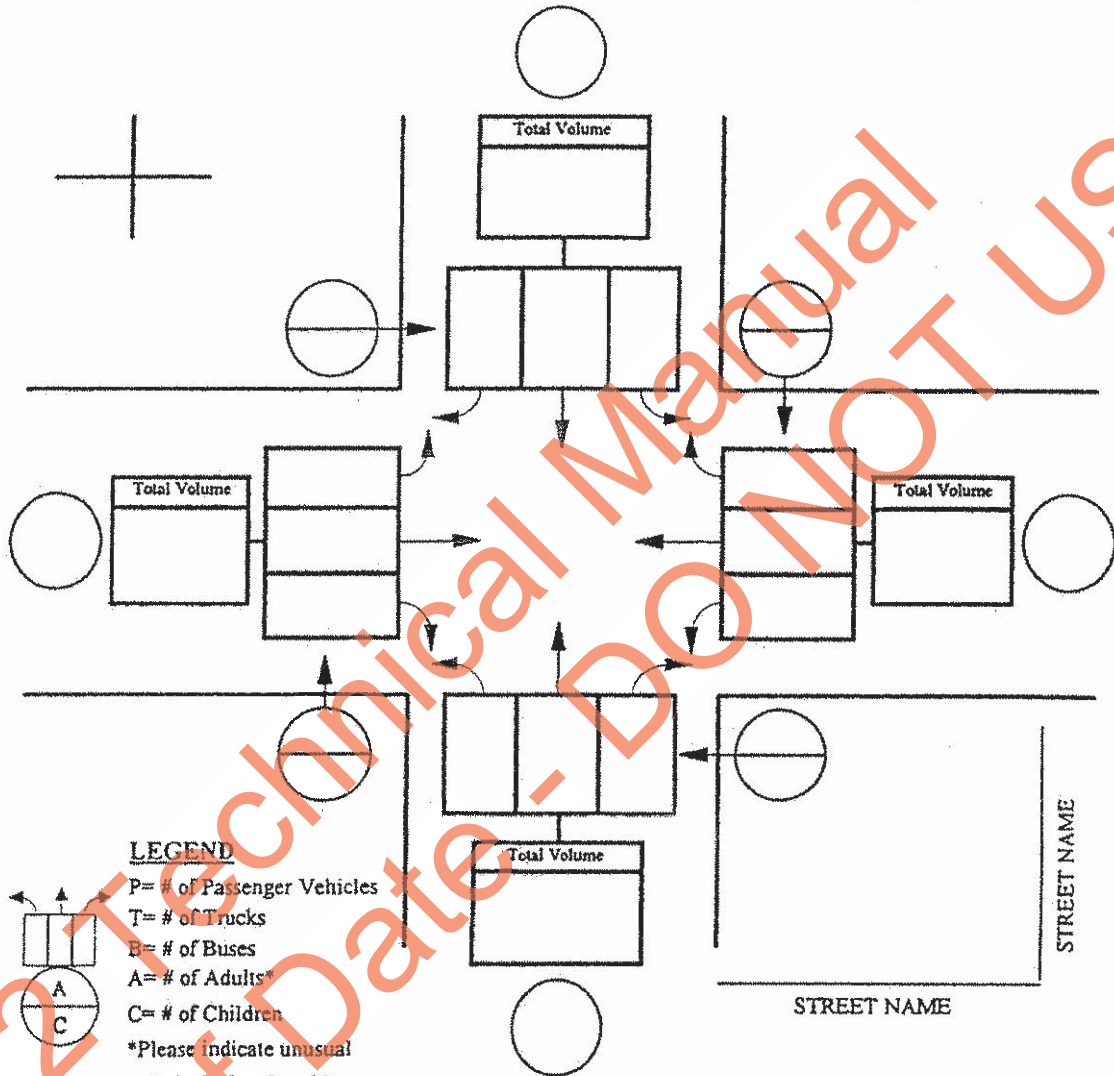
VOLUME CLASSIFICATION AND TURNING COUNTS

DATE: _____

TIME: _____

DAY: _____

INSPECTOR: _____



COMMENTS:

MAJOR	
MINOR	
PEDS	
SC	
Other	

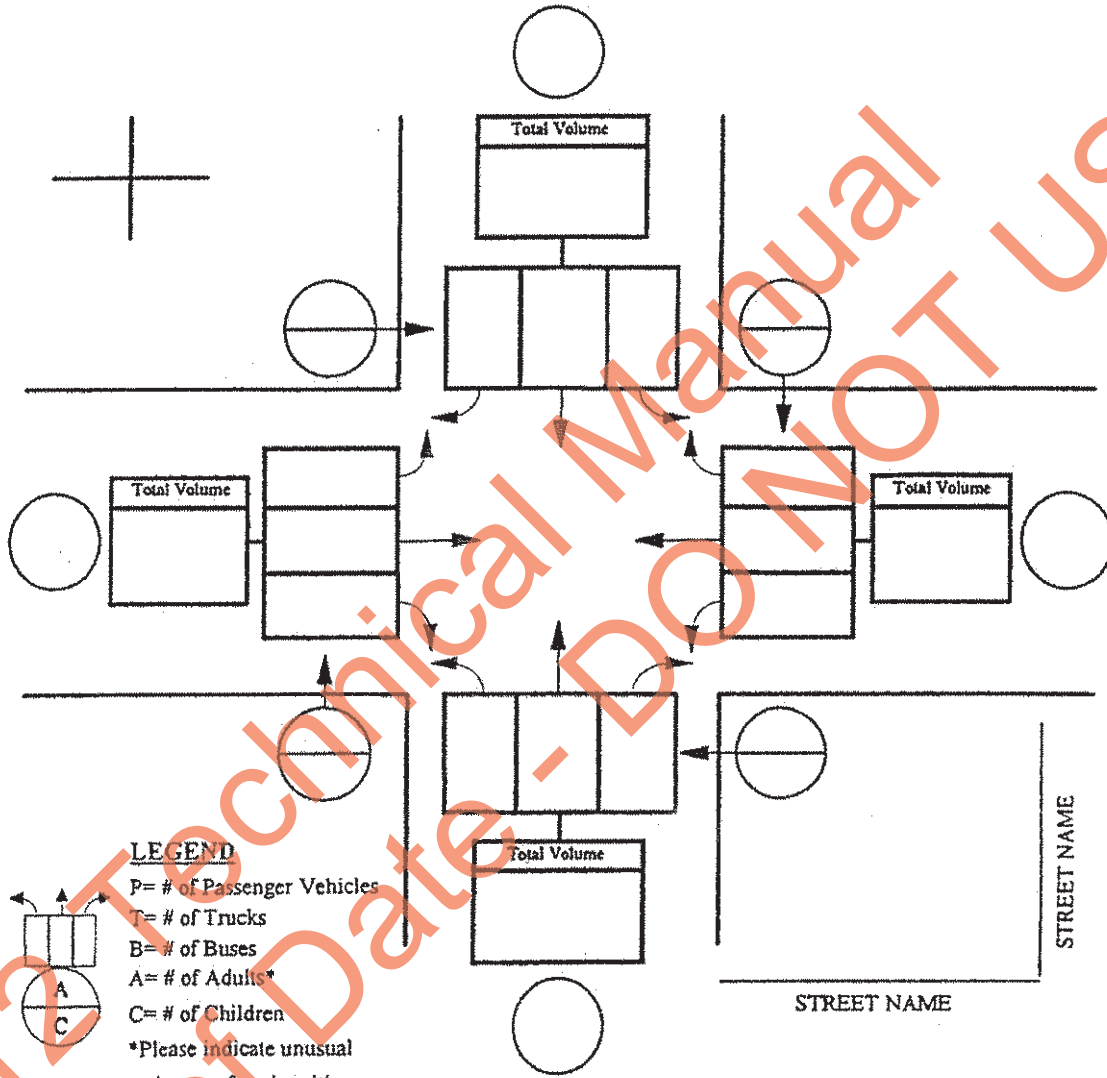
VOLUME CLASSIFICATION AND TURNING COUNTS

DATE: _____

TIME: _____

DAY: _____

INSPECTOR: _____



COMMENTS:

MAJOR	
MINOR	
PEDS	
SC	
Other	

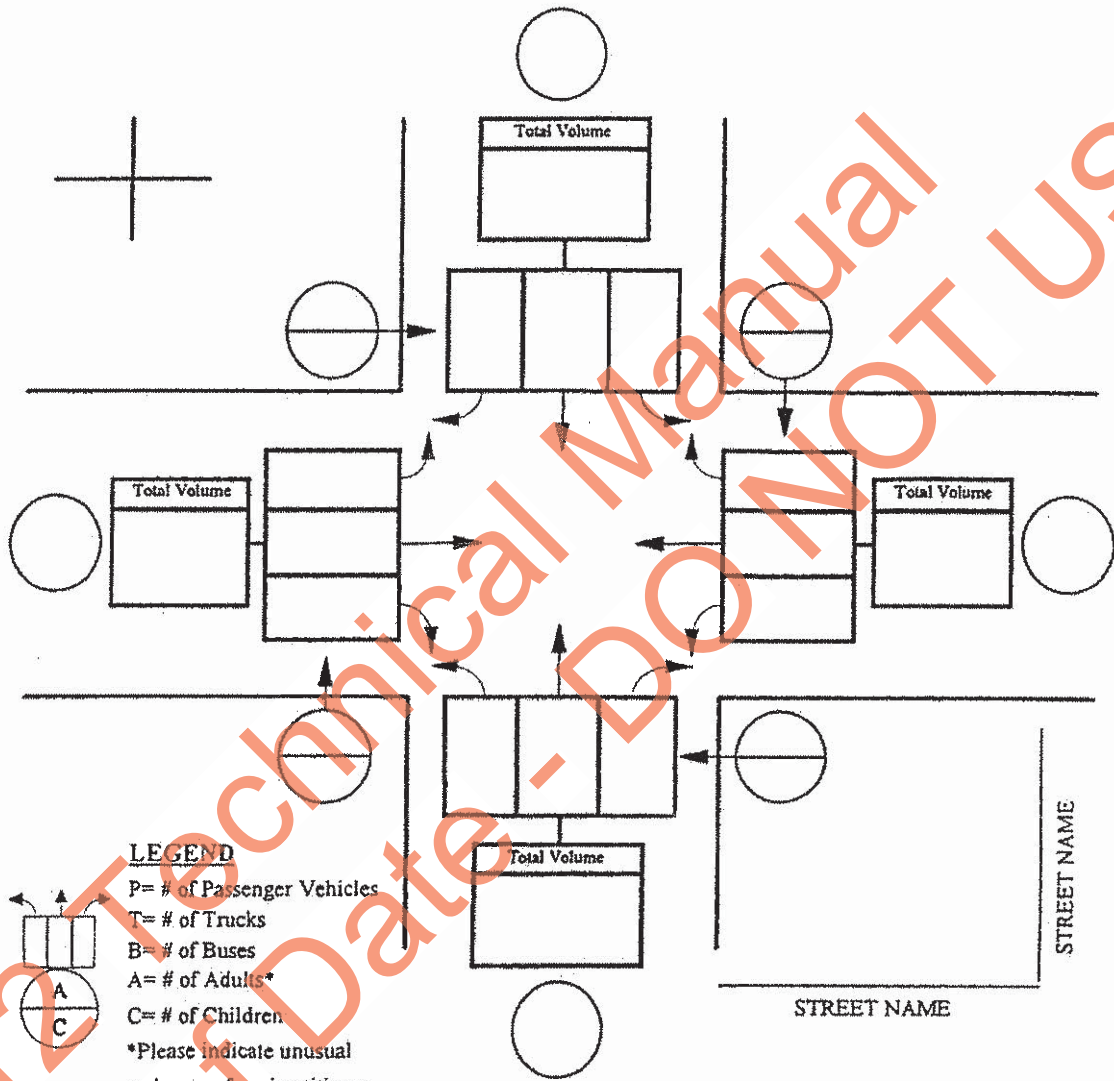
VOLUME CLASSIFICATION AND TURNING COUNTS

DATE: _____

TIME: _____

DAY: _____

INSPECTOR: _____



COMMENTS:

MAJOR	
MINOR	
PEDS	
SC	
Other	

REF. _____ START: _____ END: _____
WEATHER _____ DIRECTION: _____
MPH SPEED LIMIT: _____ POSTED: _____
UNPOSTED: _____

(MAJOR)

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WARRANT ANALYSIS

INSPECTOR: _____ School X-Walk _____ GAP DATE & TIMES _____ # OF GAPS VS. # OF MIN _____

School X-ING Guard _____

LOCATION: _____ MIN

85% SPEED: _____ B= _____ B= _____ MIN

POSTED _____ MPH / UNPOSTED _____ MIN

REFERENCE# _____ ATR'S

DISTANCE TO THE NEAREST TRAFFIC CONTROL DEVICE ON MAJOR STREET _____ Feet

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume									
		MAJOR STREET VOLUMES				MINOR STREET VOLUMES			
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	Observer	100% ^a	80% ^b	70% ^c	Observer
1.....	1.....	500	400	350		150	120	105	
2 or more...	1.....	600	480	420		150	120	105	
2 or more...	2 or more...	600	480	420		200	160	140	
1.....	2 or more...	500	400	350		200	160	140	

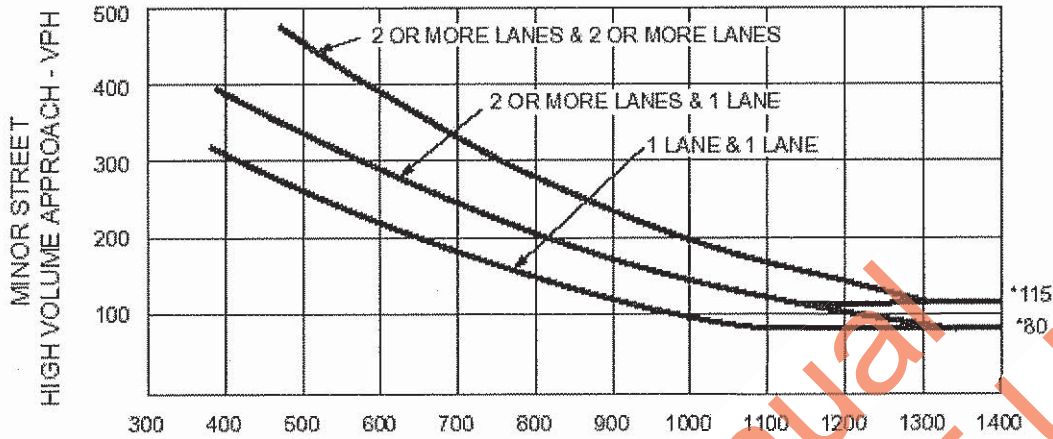
Condition B - Interruption of Continuous Traffic									
		MAJOR STREET VOLUMES				MINOR STREET VOLUMES			
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	Observer	100% ^a	80% ^b	70% ^c	Observer
1.....	1.....	750	600	525		75	60	53	
2 or more...	1.....	900	720	630		75	60	53	
2 or more...	2 or more...	900	720	630		100	80	70	
1.....	2 or more...	750	600	525		100	80	70	

^a Basic minimum hourly volume.

^b Used for combination of Conditions A and B after adequate trial of other remedial measures.

^c May be used when the major street speed exceeds 70 km/h (40 mph) or in an isolated community with a population of less than 10,000.

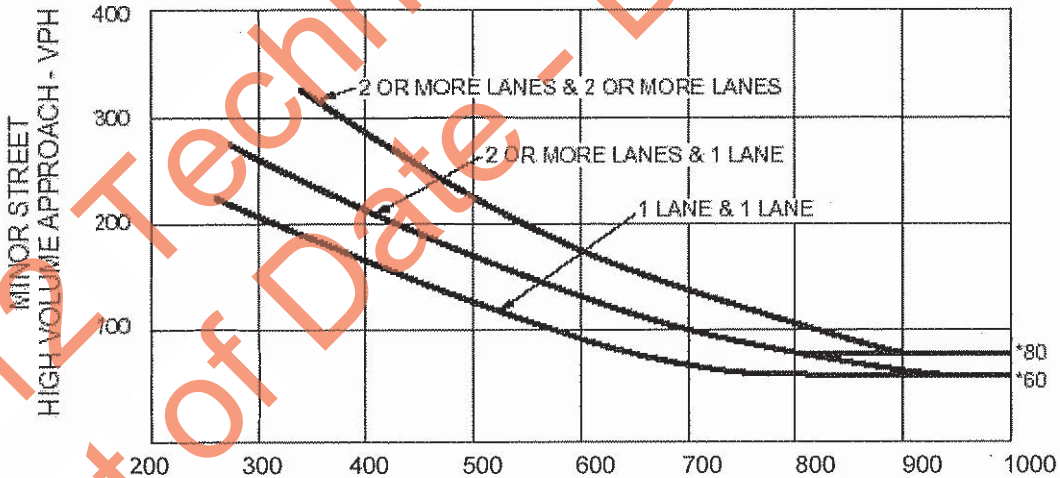
Warrant 2 – Four-Hour Vehicular Volume



MAJOR STREET - TOTAL OF BOTH APPROACHES – VEHICLES PER HOUR (VPH)

*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.

**Warrant 2 - Four-Hour Vehicular Volume (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)**



MAJOR STREET - TOTAL OF BOTH APPROACHES – VEHICLES PER HOUR (VPH)

*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.

WARRANT 3, PEAK HOUR



INTERSECTION DELAY STUDY

TOTAL DELAY = TOTAL VEHICLES STOPPED * SAMPLING INTERVAL

$$= \underline{\hspace{2cm}} * 15 = \underline{\hspace{2cm}} \text{ Veh. Sec.}$$

AVERAGE DELAY PER APPROACH VEHICLE =

$$\frac{\text{TOTAL DELAY}}{\text{APPROACH VOLUME}} = \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}} \text{ Sec.}$$

AVERAGE DELAY FOR WARRANT 3 = AVERAGE DELAY * PEAK HOUR VOLUME FROM MACHINE COUNTS

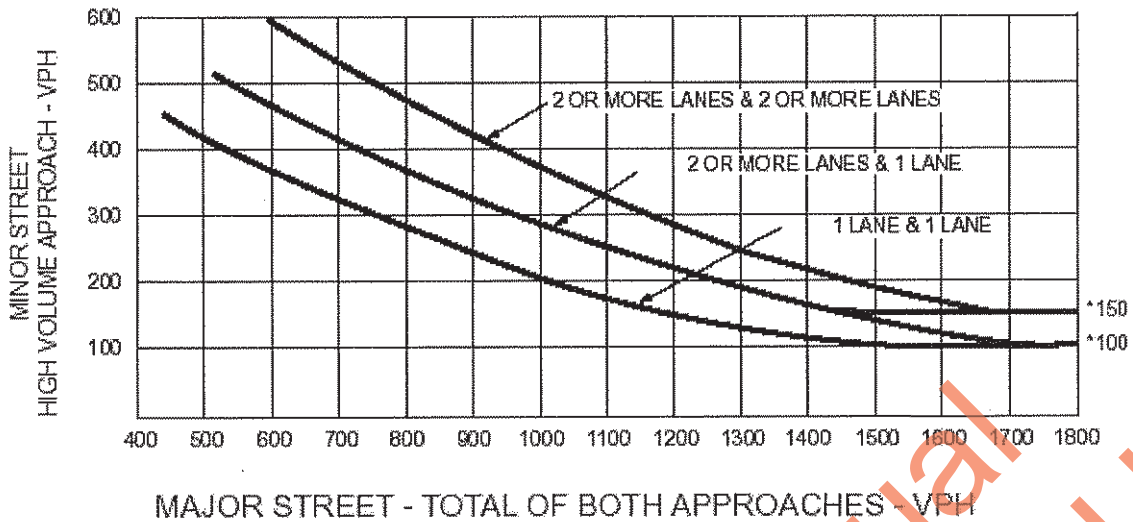
$$= \underline{\hspace{2cm}} * \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}} \text{ Veh. -Sec.}$$

NOTE:

The above information will be used for the Warrant 3 – Peak Hour analysis.

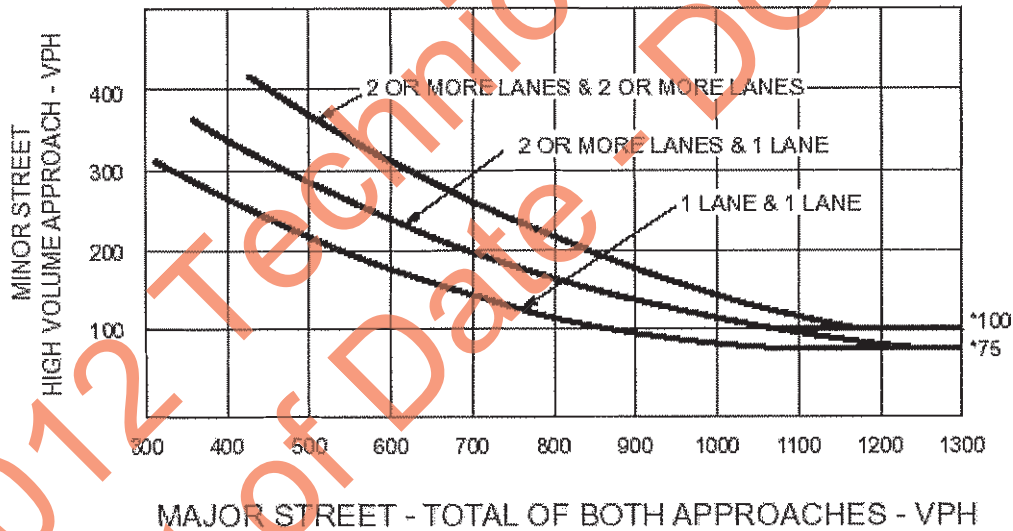
Warrant 3 - Peak Hour



*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.

Warrant 3 - Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (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.

*SEE LAST THREE PAGES OF DOCUMENT

DATE	TIME		VOLUMES				DEFAULTS	
			STREET		PEDESTRIANS		ALL	SCHOOL/ ELDERLY
			MAJOR	MINOR	ALL	SC/ ELDERLY	> 100	> 75
		AM						
		PM						

WARRANT 6, COORDINATED SIGNAL SYSTEM

The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:

- A. 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.
- B. 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.

Note: The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 300 m (1000 ft).

WARRANT 7, CRASH EXPERIENCE

ACC. TIME PERIOD	ACCIDENT TYPE											PREV. Acc.'s before N.R.'s	PREV. Acc.'s after N.R.'s	
	T	NR	↔	↕	↔↕	↔↕	↔↕	↔↕	↔↕	↔↕	PEDS			
12 MONTH PERIOD														

Highest # of Preventables in any 12 month period: ___/___/___ - ___/___/___ # of Preventable Accidents _____

Comments: _____

Improvements/Changes: _____

WARRANT 8, ROADWAY NETWORK



The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday, or

B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a nonnormal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have one or more of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow, or

B. It includes rural or suburban highways outside, entering, or traversing a city, or

C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

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FIELD OBSERVATION REPORT

LOCATION: _____

BOROUGH: _____

DATE: _____

TIME: _____

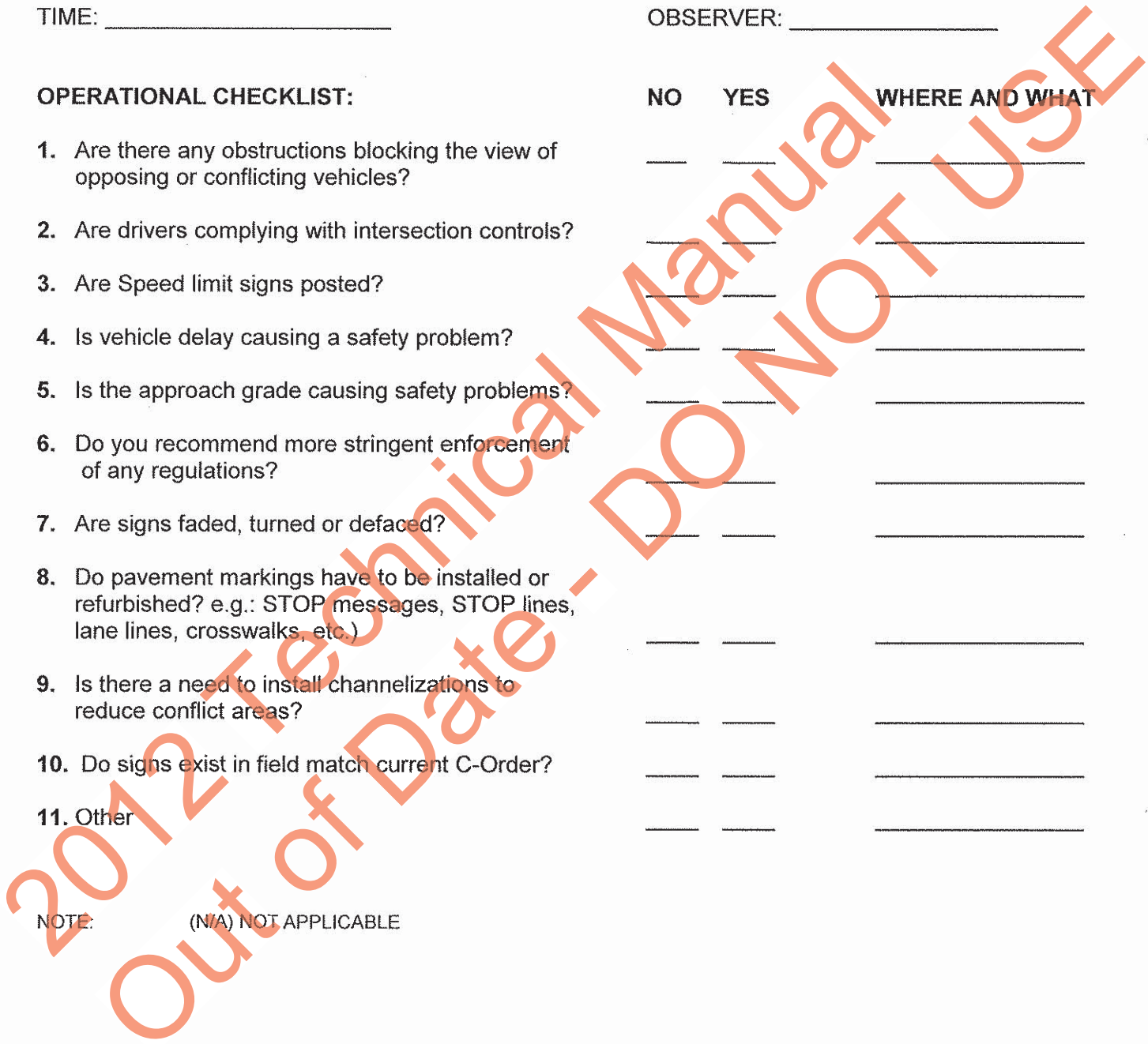
OBSERVER: _____

OPERATIONAL CHECKLIST:

NO YES WHERE AND WHAT

- | | | | |
|---|------|------|-------|
| 1. Are there any obstructions blocking the view of opposing or conflicting vehicles? | ____ | ____ | _____ |
| 2. Are drivers complying with intersection controls? | ____ | ____ | _____ |
| 3. Are Speed limit signs posted? | ____ | ____ | _____ |
| 4. Is vehicle delay causing a safety problem? | ____ | ____ | _____ |
| 5. Is the approach grade causing safety problems? | ____ | ____ | _____ |
| 6. Do you recommend more stringent enforcement of any regulations? | ____ | ____ | _____ |
| 7. Are signs faded, turned or defaced? | ____ | ____ | _____ |
| 8. Do pavement markings have to be installed or refurbished? e.g.: STOP messages, STOP lines, lane lines, crosswalks, etc.) | ____ | ____ | _____ |
| 9. Is there a need to install channelizations to reduce conflict areas? | ____ | ____ | _____ |
| 10. Do signs exist in field match current C-Order? | ____ | ____ | _____ |
| 11. Other | ____ | ____ | _____ |

NOTE: (N/A) NOT APPLICABLE



Section 4C.05 Warrant 4, Pedestrian Volume**Support:**

01 The Pedestrian Volume signal 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.

Standard:

02 The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

Standard:

04 The Pedestrian Volume signal warrant 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.

05 If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.

Guidance:

06 If this warrant is met and a traffic control signal is justified by an engineering study, then:

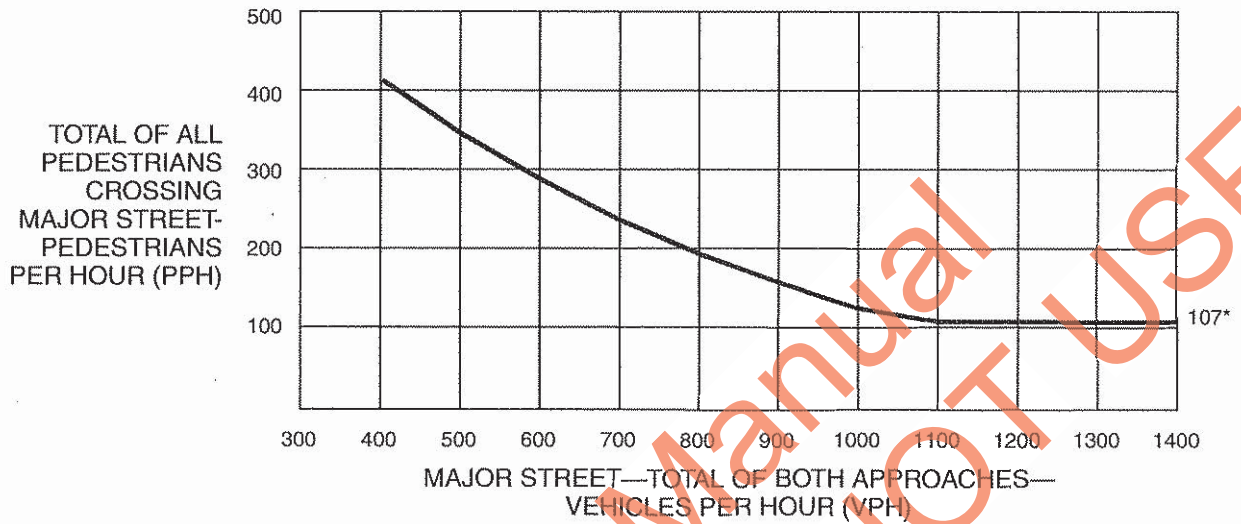
- A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.
- B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. 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.
- C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.

Option:

07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

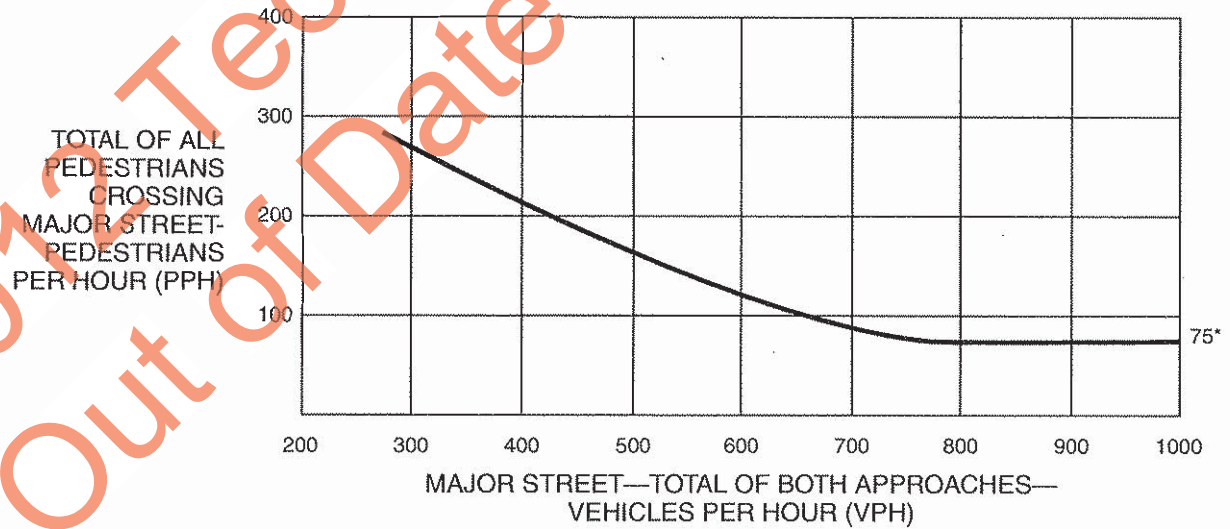
08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



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

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



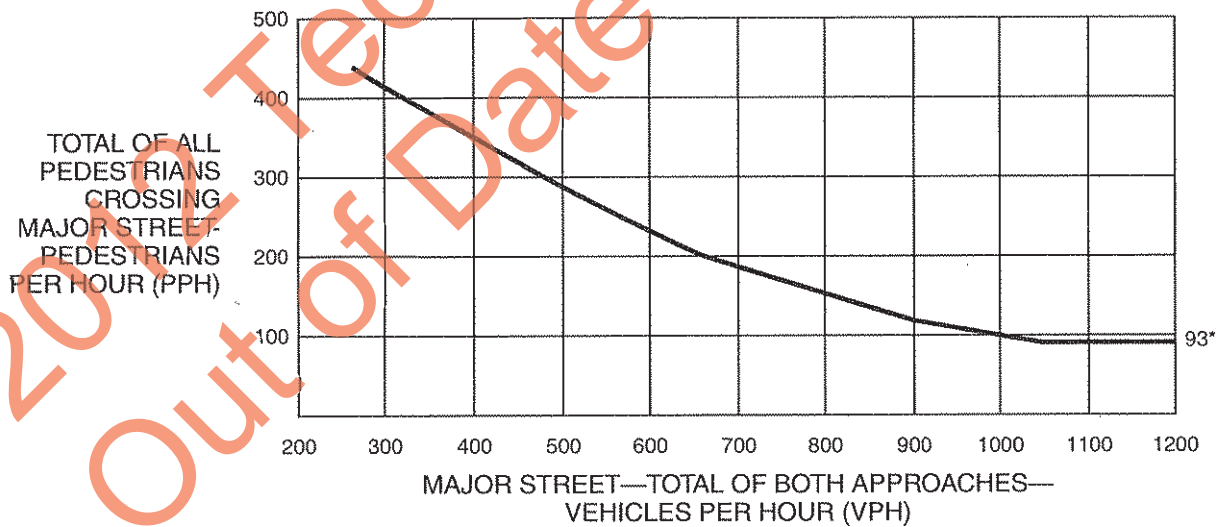
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



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

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



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

Left Turn Signal Survey Sheet

Borough: _____ BT #: _____ Ref. #: _____

Location: _____ CB #: _____

Requestor: _____ Investigator: _____

Date Completed: _____

VPH

Signal Timing	Signal Timing			
	D1	D2	D3	D4
Green				
Yellow				
All Red				
Cycle Length	_____ Seconds			

Date: _____

Time: _____

Peak Hour
Traffic Volume Counts

ft. T/S →

VPH



ft.

VPH

← T/S _____ ft.

T/S = Traffic Signal

VPH = Vehicles / Hour
(Total of the four
15 minute periods) = _____

Total number of Lanes
(including Left Turn Bays)

D1 D3

D2 D4

ft.

T/S

VPH

ft.

Street Name

1. Separate movement with solid line.
2. Separate shared movements with dashed lines.
3. Indicate ped column with solid line.
4. Indicate movements with arrow and label as follows: L (left); T(thru); R (right); Ped (ped); U (u-turn); I (illegal) or other and specify.

Street Name

Borough Engineer: _____ Date: _____

Reviewed _____ Date: _____ Satisfied

Recommended _____ Date: _____ Warrant #

Denied _____ Date: _____ Not Satisfied

Left Turn Signal Survey Sheet

Borough: _____ BT #: _____ Ref. #: _____
 Location: _____ CB #: _____
 Requestor: _____ Investigator: _____
 Date Completed: _____

Date: _____
Time: _____

Peak Hour
Traffic Volume Counts

VPH

Signal Timing	Signal Timing			
	D1	D2	D3	D4
Green				
Yellow				
All Red				
Cycle Length:	_____ Seconds			

ft. T/S →

H/VPH

VPH

ft.

T/S = Traffic Signal
 VPH = Vehicles / Hour
 (Total of the four 15 minute periods) *

Total number of Lanes
 (including Left Turn Bays)

D1 D3
 D2 D4

VPH

ft.

Street Name

1. Separate movement with solid line.
2. Separate shared movements with dashed lines.
3. Indicate ped column with solid line.
4. Indicate movements with arrow and label as follows: L (left); T (thru); R (right); Ped (ped); U (u-turn); I (illegal) or other and specify.

Street Name

Borough Engineer: _____ Date: _____

Reviewed _____ Date: _____ Satisfied

Recommended _____ Date: _____ Warrant #

Denied _____ Date: _____ Not Satisfied

Left Turn Signal Warrant Sheet

WARRANT 1 (Accident Experience)

Satisfied
Not Satisfied

This Warrant is satisfied when a minimum of 5 related left turn accidents exist in the latest 12 month period in which accident records are available.

Year	Total Accidents	Left Turn Accidents

Accident sheets must be attached.

WARRANT 2 (Left Turn Capacity)

Satisfied
Not Satisfied

This Warrant is satisfied when for the analyzed direction the Left-Turn flow rate exceeds the left-turn capacity.

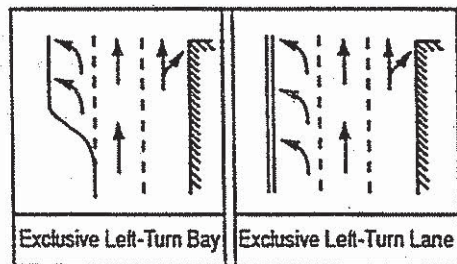
The left-turn capacity is the maximum flow rate that may be assigned to the designated phase.

- On approaches with exclusive left-turn bays / lanes, the left-turn capacity is computed by using the following equations:

(1A)
$$C_{ELT} = (1,400 - V_o) (g/c)_{LT}$$

or

(2)
$$C_{ELT} = 2 \text{ vehicles per signal cycle}$$



where:

C_{ELT} = capacity of the left-turn protected / permitted phase, in vph;

V_o = opposing thru plus right-turn service flow rate*, in vph, and

$(g/c)_{LT}$ = effective green** ratio for the protected / permitted phase, in seconds.

* Service flow rate is the equivalent hourly rate at which vehicles pass a roadway during a given time interval less than one hour, usually 15 minutes.

Service flow rate = (highest 15 minute count) × 4.

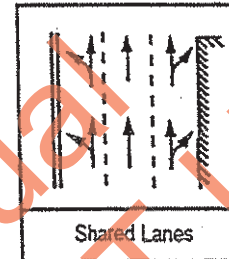
** Effective green time is the time during a given phase that is effectively available to the permitted movements; this is generally taken to be the green time (G) plus the change interval (Y + AR) minus the lost time (3.0 seconds) for the designated phase.

On approaches with shared left-turn and thru vehicles, the left-turn capacity is computed by using the following equations:

(1B) $C_{SLT} = [(1400 - V_0) (g/c)_{LT}] f_{SLT}$

Or

(2) $C_{SLT} = 2 \text{ vehicles per signal cycle}$



where:

C_{SLT} = capacity of the left-turn in the shared lane, in vph;

f_{SLT} = adjustment factor for left-turn vehicles

The adjustment factor basically accounts for the fact that the left-turn movements cannot be made at the same saturation flow rates as thru movements. They consume more of the available green time, and consequently, more of the intersection's available capacity.

The adjustment factor is computed as the ratio of the left-turn flow rate (which is converted to an approximate equivalent flow of thru vehicles) to the thru vehicles that share the same lane.

The following TABLE 1 may be used to convert the left-turn vehicles to equivalent thru vehicles.

TABLE 1

TOTAL OPPOSING FLOW RATE (V_0)	CONVERSION FACTOR (f_{PCE})	TOTAL OPPOSING FLOW RATE (V_0)	CONVERSION FACTOR (f_{PCE})
0 - 200	1.50	1001 - 1050	5.00
201 - 500	2.00	1051 - 1075	5.50
501 - 700	2.50	1076 - 1100	6.00
701 - 800	3.00	1101 - 1125	6.50
801 - 900	3.50	1126 - 1145	7.00
901 - 950	4.00	> 1146 *	
951 - 1000	4.50		

* Use exclusive Left-Turn lane procedure.

Comments: _____

COMPUTATIONS

EXCLUSIVE LEFT-TURN LANE

Opposing Thru Plus Right Turn Service Flow Rate

Left Turn Service Flow Rate
(Direction analyzed for Left-Turn Phase)

$V_o = (\text{highest 15 minute count}) \times 4$

$V_{LT} = (\text{highest 15 minute count}) \times 4$

$V_o = \boxed{} \times 4 = \boxed{} \text{ vph}$

$V_{LT} = \boxed{} \times 4 = \boxed{} \text{ vph}$

Left Turn Capacity

$C_{ELT} = (1400 - V_o) (g/c)_{LT}$

where:

$g = [G + Y + AR - 3.0] \times f_q^* = \boxed{} \times \boxed{} = \boxed{} \text{ seconds}$

* Adjustment factor f_q to calculate the portion of the green phase that is not blocked by an opposing queue of vehicles. The f_q factor is given for each case in TABLE 2.

$c = \text{cycle length} = \boxed{} \text{ seconds}$

thus, $(g/c)_{LT} = \boxed{}$

and

$C_{ELT} = (1400 - \boxed{}) (\boxed{})_{LT} = \boxed{} \text{ vph}$

or

$C_{ELT} = 2 \text{ vehicles per signal cycle}$

$C_{ELT} = 2 \times \frac{3600}{c} = \boxed{} \text{ vph}$

$V_{LT} = \boxed{} \text{ vph} \begin{cases} \geq \\ \leq \end{cases} \text{ or } \begin{cases} \geq \\ \leq \end{cases} C_{ELT}^{**} = \boxed{} \text{ vph}$

** Select the highest left turn capacity

- If V_{LT} (left turn service flow rate) is greater than (\geq) the C_{ELT} (left turn capacity), the Warrant is satisfied and a left turn phase is needed.
- If V_{LT} is less than (\leq) the C_{ELT} , the Warrant is not satisfied because the signal and geometric design can accommodate the left turn volume at the intersection.

OPPOSING THRU LANES	f_q
1	0.85
2	0.90
≥ 3	0.95

COMPUTATIONS
SHARED LEFT-TURN / THRU LANE

Adjustment Factor for Left-Turn Vehicles
(Opposing Thru Plus Right Turn Service Flow Rate)

Left Turn Service Flow Rate
(Direction analyzed for Left-Turn Phase)

$$V_o = (\text{highest 15 minute count}) \times 4$$

$$V_{LT} = (\text{highest 15 minute count}) \times 4$$

$$V_o = \boxed{} \times 4 = \boxed{} \text{ vph}$$

$$V_{LT} = \boxed{} \times 4 = \boxed{} \text{ vph}$$

Using TABLE 1, $f_{PCE} = \boxed{}$

$$V_{PCE} = V_{LT} \times f_{PCE} = \boxed{} \times \boxed{} = \boxed{} \text{ vph}$$

$$V_{TV} = \boxed{} \times 4 = \boxed{} \text{ vph}$$

$$f_{SLT} = \frac{V_{PCE}}{V_{TV} + V_{PCE}} = \frac{\boxed{}}{\boxed{} + \boxed{}} = \boxed{}$$

where: V_{TV} = Thru vehicles in the shared lane.

Left Turn Capacity

$$C_{SLT} = [(1400 - V_o) (g/c)_{LT}] f_{SLT}$$

OPPOSING THRU LANES	f_q
1	0.85
2	0.90
≥ 3	0.95

where:

$$g = [G + Y + AR - 3.0] \times f_q = \boxed{} \times \boxed{} = \boxed{} \text{ seconds}$$

$$c = \text{cycle length} = \boxed{} \text{ seconds} \quad \text{thus, } (g/c)_{LT} = \boxed{}$$

and

$$C_{SLT} = [(1400 - \boxed{}) (\boxed{})_{LT}] \times \boxed{} = \boxed{} \text{ vph}$$

or

$$C_{SLT} = 2 \text{ vehicles per signal cycle}$$

$$C_{SLT} = 2 \times \frac{3600}{c} = \boxed{} \text{ vph}$$

$$V_{LT} = \boxed{} \text{ vph} \quad \boxed{>} \text{ or } \boxed{<} \quad C_{SLT}^* = \boxed{} \text{ vph}$$

* Select the highest left turn capacity

- If V_{LT} (left turn service flow rate) is greater than ($>$) the C_{SLT} (left turn capacity), the Warrant is satisfied and a left turn phase is needed.
- If V_{LT} is less than ($<$) the C_{SLT} , the Warrant is not satisfied because the signal and geometric design can accommodate the left turn volume at the intersection.

HIGHWAY CAPACITY MANUAL 2000 INTERSECTION LEVEL OF SERVICE CRITERIA

Level of Service Criteria (LOS) at Signalized Intersections	
LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	$> 10 - 20$
C	$> 20 - 35$
D	$> 35 - 55$
E	$> 55 - 80$
F	> 80

Source: Transportation Research Board, *Highway Capacity Manual 2000*

Level of Service Criteria at Unsignalized Intersections	
LOS	Average Control Delay (s/veh)
A	0 – 10
B	$> 10 - 15$
C	$> 15 - 25$
D	$> 25 - 35$
E	$> 35 - 50$
F	> 50

Source: Transportation Research Board, *Highway Capacity Manual 2000*



TOP HIGH ACCIDENT INTERSECTIONS 2010

INTERSECTION	NUMBER	RANK	BORO
PENNSYLVANIA AV \ LINDEN BL	60	1	BROOKLYN
J ROBINSON PY EN EB \ JAMAICA AV \ PENNSY	43	2	BROOKLYN
LIBERTY AV \ VAN WYCK EP SR W	42	3	QUEENS
ATLANTIC AV \ VAN WYCK EP SR W	42	3	QUEENS
UNION TP \ WOODHAVEN BL	41	5	QUEENS
ATLANTIC AV \ PENNSYLVANIA AV	41	5	BROOKLYN
BROOKVILLE BL \ S CONDUIT AV	40	7	QUEENS
ADAMS ST \ TILLARY ST	37	8	BROOKLYN
3 AV \ CROSS BX SVC RD S	37	8	BRONX
FLATBUSH AV EX \ TILLARY ST	36	10	BROOKLYN
EASTERN PY EX \ ATLANTIC AV	36	10	BROOKLYN
METROPOLITAN AV \ WOODHAVEN BL	35	12	QUEENS
NORTHERN BL \ UNION ST	35	12	QUEENS
AV J \ OCEAN PY	35	12	BROOKLYN
AV O \ CONEY ISLAND AV	35	12	BROOKLYN
HILLSIDE AV \ VAN WYCK EP SR W	35	12	QUEENS
QNSBORO BR AP \ 2 AV \ E 59 ST	34	17	MANAHATTAN
WHITESTONE EP SR W \ 20 AV	34	17	QUEENS
ATLANTIC AV \ NOSTRAND AV	34	17	BROOKLYN
EASTERN PY \ BUFFALO AV	34	17	BROOKLYN
BRUCKNER BL \ HUNTS POINT AV	34	17	BRONX
BROOKVILLE BL \ ROCKAWAY BL	33	22	QUEENS
LINDEN BL \ VAN WYCK EP SR W	32	23	QUEENS
CLEARVIEW EP SR W \ NORTHERN BL	32	23	QUEENS

INTERSECTION	NUMBER	RANK	BORO
QUEENS BL \ 63 DR \ 63 RD	31	25	QUEENS
ROCKAWAY BL \ 150 RD \ UNNAMED ST \ GUY	30	26	QUEENS
LINDEN BL \ ROCKAWAY AV	30	26	BROOKLYN
E FORDHAM RD \ DR KAZIMIROFF BL	30	26	BRONX
EASTERN PY \ UTICA AV	30	26	BROOKLYN
WOODHAVEN BL \ 101 AV	29	30	QUEENS
WOODHAVEN BL \ CROSS BAY BL \ ROCKAWA	29	30	QUEENS
WEBSTER AV \ E GUN HILL RD	29	30	BRONX
3 AV \ E 57 ST	29	30	MANAHATTAN
8 AV \ W 34 ST	28	34	MANAHATTAN
CHRYSTIE ST \ DELANCEY ST	28	34	MANAHATTAN
GRND CNTRL PY ET EB \ GRND CNTRL PY SR W	28	34	QUEENS
GOWANUS EP \ CENSUS BLK BNDY	28	34	BROOKLYN
QUEENS BL \ 65 PL	27	38	QUEENS
WEBSTER AV \ E FORDHAM RD	27	38	BRONX
11 AV \ W 33 ST	27	38	MANAHATTAN
AV U \ FLATBUSH AV	27	38	BROOKLYN
COLLEGE POINT BL \ GRND CNTRL PY EN WB \	27	38	QUEENS
CANAL ST \ BOWERY	27	38	MANAHATTAN
BRUCKNER BL \ WHITE PLAINS RD	27	38	BRONX
JAMAICA AV \ WOODHAVEN BL	27	38	QUEENS
W 42 ST \ 11 AV	26	46	MANAHATTAN
QUEENS BL \ SKILLMAN AV	26	46	QUEENS
AMSTERDAM AV \ W 125 ST	26	46	MANAHATTAN
JAMAICA AV \ VAN WYCK EP SR W \ METROPO	26	46	QUEENS
FLATLANDS AV \ PAERDEGAT AV S \ RALPH AV	26	46	BROOKLYN
KINGS HY \ REMSEN AV	25	51	BROOKLYN
QUEENS BL \ VAN DAM ST	25	51	QUEENS
108 ST \ HOR HARDING EP SR N	25	51	QUEENS

INTERSECTION	NUMBER	RANK	BORO
BEDFORD AV \ ATLANTIC AV	25	51	BROOKLYN
DIST BNDY \ OCEAN AV \ EMPIRE BL \ FLATBUS	25	51	BROOKLYN
ESSEX ST \ DELANCEY ST	25	51	MANAHATTAN
LINDEN BL \ 234 ST	24	57	QUEENS
TYSENS LA \ HYLAN BL	24	57	STATEN ISLAND
AMSTERDAM AV \ W 181 ST \ WASHINGTON BR	24	57	MANAHATTAN
BRUCKNER BL \ LONGWOOD AV	24	57	BRONX
DITMAS AV \ OCEAN PY	24	57	BROOKLYN
NORTHERN BL \ PARSONS BL	23	62	QUEENS
MAJOR DEEGAN EN NB \ E 135 ST \ WILLIS AV	23	62	BRONX
W 34 ST \ 7 AV	23	62	MANAHATTAN
2 AV \ E 34 ST	23	62	MANAHATTAN
75 AV \ METROPOLITAN AV	23	62	QUEENS
AV I \ OCEAN PY	23	62	BROOKLYN
ATLANTIC AV \ CRESCENT ST	23	62	BROOKLYN
KENSINGTON AV \ HYLAN BL	23	62	STATEN ISLAND
CLARENDON RD \ E 55 ST \ KINGS HY	23	62	BROOKLYN
GRND CNTRL PY SR N \ MAIN ST \ 141 ST	23	62	QUEENS
LOGAN ST \ ATLANTIC AV	22	72	BROOKLYN
LINDEN PL \ WHITESTONE EP SR W	22	72	QUEENS
OCEAN PY \ AV P	22	72	BROOKLYN
\ HUDSON RVR SHL	22	72	MANAHATTAN
ALBANY AV \ ATLANTIC AV	22	72	BROOKLYN
82 ST \ DITMARS BL \ GRND CNTRL PY ET WB \	22	72	QUEENS
BEVERLY RD \ OCEAN PY	22	72	BROOKLYN
FLATBUSH AV \ ATLANTIC AV	22	72	BROOKLYN
CROSS BAY BL \ PITKIN AV	22	72	QUEENS
LEFFERTS BL \ ATLANTIC AV	21	81	QUEENS
LINDEN BL \ UTICA AV	21	81	BROOKLYN

INTERSECTION	NUMBER	RANK	BORO
UNIVERSITY AV \ W FORDHAM RD \ DR M L KIN	21	81	BRONX
N CONDUIT AV \ SPRINGFIELD BL	21	81	QUEENS
TRIBORO BR ET RP \ 2 AV \ E 125 ST \ TRIBORO	21	81	MANAHATTAN
WASHINGTON AV \ EASTERN PY	21	81	BROOKLYN
ROCKAWAY PY \ FLATLANDS AV	21	81	BROOKLYN
MYRTLE AV \ WOODHAVEN BL	21	81	QUEENS
SNYDER AV \ UTICA AV	21	81	BROOKLYN
3 AV \ E 34 ST	21	81	MANAHATTAN
ARTHUR KILL RD \ RICHMOND AV	21	81	STATEN ISLAND
ATLANTIC AV \ UTICA AV	21	81	BROOKLYN
ATLANTIC AV \ ROCKAWAY AV	21	81	BROOKLYN
E 138 ST \ MAJOR DEEGAN EP	21	81	BRONX
BROOKLYN AV \ EASTERN PY	21	81	BROOKLYN
EASTERN PY \ FRANKLIN AV	21	81	BROOKLYN
LINDEN BL \ NEW YORK AV	20	97	BROOKLYN
NOSTRAND AV \ LINDEN BL	20	97	BROOKLYN
RICHMOND HILL RD \ RICHMOND AV	20	97	STATEN ISLAND
STILLWELL AV \ NEPTUNE AV	20	97	BROOKLYN
SUNRISE HY \ FRANCIS LEWIS BL	20	97	QUEENS
YORK AV \ E 62 ST	20	97	MANAHATTAN
MERRICK BL \ LIBERTY AV	20	97	QUEENS
BAYCHESTER AV \ BARTOW AV	20	97	BRONX
4 AV \ TIMES PZ \ ATLANTIC AV	20	97	BROOKLYN
2 AV \ E 42 ST	20	97	MANAHATTAN
3 AV \ ATLANTIC AV	20	97	BROOKLYN
HOWARD AV \ EASTERN PY EX	20	97	BROOKLYN
GOLD ST \ FLATBUSH AV EX	20	97	BROOKLYN
KINGS HY \ CHURCH AV \ E 58 ST	20	97	BROOKLYN
RICHMOND AV \ FOREST HILL RD	19	111	STATEN ISLAND

INTERSECTION	NUMBER	RANK	BORO
MOTT AV \ BEACH CHANNEL DR	19	111	QUEENS
MORRIS PK AV \ WHITE PLAINS RD	19	111	BRONX
QUEENS BL \ 108 ST \ 71 AV	19	111	QUEENS
OCEAN PY \ AV S	19	111	BROOKLYN
TROY AV \ EASTERN PY	19	111	BROOKLYN
RALPH AV \ CLARENDON RD \ DITMAS AV	19	111	BROOKLYN
VICTORY BL \ RICHMOND AV	19	111	STATEN ISLAND
UTOPIA PY \ HOR HARDING EP SR S	19	111	QUEENS
MAIN ST \ HOR HARDING EP SR N	19	111	QUEENS
LITTLE NECK PY \ HOR HARDING EP SR N	19	111	QUEENS
UTICA AV \ WINTHROP ST	19	111	BROOKLYN
NEW DORP LA \ HYLAN BL	19	111	STATEN ISLAND
WHITE PLAINS RD \ E GUN HILL RD	19	111	BRONX
ATLANTIC AV \ WASHINGTON AV \ UNDERHILL	19	111	BROOKLYN
3 AV \ 60 ST \ CENSUS BLK BNDY	19	111	BROOKLYN
AV D \ UTICA AV	19	111	BROOKLYN
DELANCEY ST S \ CLINTON ST	19	111	MANAHATTAN
ELDRIDGE ST \ DELANCEY ST	19	111	MANAHATTAN
KINGS HY \ CONEY ISLAND AV	19	111	BROOKLYN
BRUSH AV \ CROSS BX EP ET RP	19	111	BRONX
FLATBUSH AV EX \ PRINCE ST \ WILLOUGHBY ST	19	111	BROOKLYN
E 42 ST \ W 42 ST \ 5 AV	19	111	MANAHATTAN
EASTERN PY EX \ BUSHWICK AV \ VANDERVEER	19	111	BROOKLYN
KINGSTON AV \ EASTERN PY	18	135	BROOKLYN
ROCKAWAY BL \ VAN WYCK EP SR W	18	135	QUEENS
NOSTRAND AV \ EASTERN PY	18	135	BROOKLYN
WATERS PL \ EASTCHESTER RD	18	135	BRONX
LITTLE NECK PY \ NORTHERN BL	18	135	QUEENS
SEAVIEW AV \ ROCKAWAY PY	18	135	BROOKLYN



TOP HIGH ACCIDENT INTERSECTIONS 2009

INTERSECTION	NUMBER	RANK	BORO
WOODHAVEN BL AND UNION TP	51	1	QUEENS
LINDEN BL AND PENNSYLVANIA AV	49	2	BROOKLYN
ROCKAWAY BL AND BROOKVILLE BL	44	3	QUEENS
LINDEN BL /REMESEN AV/KINGS HWY	41	4	BROOKLYN
BRUCKNER BL AND WHITE PLAINS RD	40	5	BRONX
LIBERTY AV AND IN678 SR	40	5	QUEENS
RMP E 135TH ST TO IN87 AND E 135TH ST	39	7	BRONX
AVENUE U AND FLATBUSH AV	38	8	BROOKLYN
BUSHWICK AV AND E NEW YORK AV	38	8	BROOKLYN
SOUTHERN BL AND E FORDHAM RD	37	10	BRONX
TILLARY ST AND ADAMS ST	37	10	BROOKLYN
NORTHERN BL AND JACKSON AV	37	10	QUEENS
FLATBUSH AV EXT AND TILLARY ST	36	13	BROOKLYN
NORTHERN BL AND UNION ST	36	13	QUEENS
NORTHERN BL AND RMP CIP TO NY25A	34	15	QUEENS
QUEENS BL/VANDAM ST AND THOMSON AV	33	16	QUEENS
FLATLANDS AV AND PAERDEGAT AV S	32	17	BROOKLYN
WEBSTER AV AND E FORDHAM RD	31	18	BRONX
ATLANTIC AV AND PENNSYLVANIA AV	31	18	BROOKLYN
WOODHAVEN BL AND ROCKAWAY BL	31	18	QUEENS
PEARTREE AV AND JEWEL AV	31	18	QUEENS
35TH AV AND IN295 SR	30	22	QUEENS
LINDEN BL AND IN678 SR	30	22	QUEENS
20TH AV AND IN678 SR	29	24	QUEENS

INTERSECTION	NUMBER	RANK	BORO
NORTHERN BL AND DOUGLASTON PW	29	24	QUEENS
COLLEGE POINT BL AND IN495 SR	29	24	QUEENS
RMP E 125TH ST TO TBB AND E 125TH ST	29	24	MANHATTAN
RICHMOND AV AND ARTHUR KILL RD	28	28	STATEN ISLAND
HYLAN BL AND NEW DORP LA	28	28	STATEN ISLAND
BROADWAY AND W 230TH ST	28	28	BRONX
SPRINGFIELD BL AND IN495 SR	28	28	QUEENS
CLINTON ST AND DELANCEY ST	28	28	MANHATTAN
SOUTHERN PW AND RMP SP TO NY27	28	28	QUEENS
UTICA AV AND EASTERN PW	27	34	BROOKLYN
BAYCHESTER AV AND BARTOW AV	26	35	BRONX
3RD AV AND NO NAME	26	35	BRONX
BRUCKNER BL AND HUNTS POINT AV	26	35	BRONX
ATLANTIC AV AND LOGAN ST	26	35	BROOKLYN
ATLANTIC AV AND UTICA AV	26	35	BROOKLYN
NEW YORK BL/ROCKAWAY BL AND 150TH RD	26	35	QUEENS
QUEENS BL/WOODAHVEN BL AND 59 AV	26	35	QUEENS
WOODHAVEN BL AND JAMAICA AV	26	35	QUEENS
QUEENS BLVD AND SKILLMAN AVE	26	35	QUEENS
AVENUE I AND OCEAN PW	25	44	BROOKLYN
IN495 SR AND 108TH ST	25	44	QUEENS
BOWERY AND DELANCEY ST	25	44	MANHATTAN
VICTORY BL AND RMP WLE TO VICTORY BL	24	47	STATEN ISLAND
AVENUE P AND OCEAN PW	24	47	BROOKLYN
OCEAN PW AND CORTELYOU RD	24	47	BROOKLYN
UTICA AV AND KINGS HW	24	47	BROOKLYN
ATLANTIC AV AND EASTERN PW EXT	24	47	BROOKLYN
E GUN HILL RD AND WHITE PLAINS RD	24	47	BRONX
GRAND BL AND CONCOURSE AND E 165TH ST	24	47	BRONX

INTERSECTION	NUMBER	RANK	BORO
11TH AV AND W 42ND ST	24	47	MANHATTAN
7TH AV AND W 34TH ST	24	47	MANHATTAN
QUEENS BL AND 58TH ST	24	47	QUEENS
ATLANTIC AV AND 94TH AV	24	47	QUEENS
GRAND CENTRAL PW SR AND 164TH ST	24	47	QUEENS
18TH AV AND OCEAN PW	23	59	BROOKLYN
OCEAN AV AND PARKSIDE AV	23	59	BROOKLYN
SNYDER AV AND KINGS HW	23	59	BROOKLYN
CASTLE HILL AV AND IN95 SR	23	59	BRONX
RALPH AV AND CLARENDON RD	23	59	BROOKLYN
LEXINGTON AV AND E 125TH ST	23	59	MANHATTAN
ESSEX ST AND DELANCEY ST	23	59	MANHATTAN
12TH AV AND W 57TH ST	23	59	MANHATTAN
8TH AV AND W 42ND ST	23	59	MANHATTAN
HYLAN BL AND GUYON AV	22	68	STATEN ISLAND
BRUCKNER BL AND BRUSH AV	22	68	BRONX
AVENUE D AND UTICA AV	22	68	BROOKLYN
UTICA AV AND GLENWOOD RD	22	68	BROOKLYN
ATLANTIC AV AND 5TH AV	22	68	BROOKLYN
ROCKAWAY AV AND ATLANTIC AV	22	68	BROOKLYN
BUSHWICK AV AND EASTERN PW EXT	22	68	BROOKLYN
ROCKAWAY PW AND KINGS HW	22	68	BROOKLYN
UTICA AV AND CLARKSON AV	22	68	BROOKLYN
MAJOR DEEGAN XW AND REST AREA	22	68	BRONX
BAYCHESTER AV AND BOSTON RD	22	68	BRONX
2ND AV AND E 59TH ST	22	68	MANHATTAN
WOODHAVEN BL AND METROPOLITAN AV	22	68	QUEENS
GRAND CENTRAL PW SR AND 254TH ST	22	68	QUEENS
1ST AV AND E 23RD ST	22	68	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
BROADWAY AND	22	68	MANHATTAN
PARK AV AND E 52ND ST	22	68	MANHATTAN
HENRY HUDSON PKWY AND	22	68	MANHATTAN
FLUSHING AV AND CLASSON AV	21	86	BROOKLYN
UNIVERSITY AV TU AND W FORDHAM RD	21	86	BRONX
GRAND ARMY PLAZA And FLATBUSH AV/ E PW	21	86	BROOKLYN
UTICA AV AND WINTHROP ST	21	86	BROOKLYN
UNION TP AND MAIN ST	21	86	QUEENS
12TH AV AND W 34TH ST	21	86	MANHATTAN
RICHMOND AV AND RICHMOND HILL RD	20	92	STATEN ISLAND
BOERUM PL AND LIVINGSTON ST	20	92	BROOKLYN
NEPTUNE AV AND OCEAN PW	20	92	BROOKLYN
BAY PW AND 65TH ST	20	92	BROOKLYN
ATLANTIC AV AND NOSTRAND AV	20	92	BROOKLYN
AVENUE R AND OCEAN PW	20	92	BROOKLYN
UTICA AV AND CHURCH AV	20	92	BROOKLYN
ATLANTIC AV AND TROY AV	20	92	BROOKLYN
ATLANTIC AV AND COURT ST	20	92	BROOKLYN
BEDFORD AV AND ATLANTIC AV	20	92	BROOKLYN
ATLANTIC AV AND RALPH AV	20	92	BROOKLYN
ATLANTIC AV AND 4TH AV	20	92	BROOKLYN
BOSTON RD AND E GUN HILL RD	20	92	BRONX
WEBSTER AV AND E 233RD ST	20	92	BRONX
HUNTS POINT AV AND RMP HUNTS PT AV TO IN89E	20	92	BRONX
6TH AV AND W 57TH ST	20	92	MANHATTAN
NORTHERN BL AND ASTORIA BL	20	92	QUEENS
WOODHAVEN BL AND 101ST AV	20	92	QUEENS
BROOKVILLE BL AND S CONDUIT AV	20	92	QUEENS
PARK AV AND E 34TH ST	20	92	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
CONCOURSE VILLAGE E AND E 161ST ST	19	112	BRONX
LINDEN BL AND CHURCH AV	19	112	BROOKLYN
EMPIRE BL AND FLATBUSH AV	19	112	BROOKLYN
PROSPECT AV AND 4TH AV	19	112	BROOKLYN
LENOX AV AND W 125TH ST	19	112	MANHATTAN
7TH AV AND W 125TH ST	19	112	MANHATTAN
2ND AV AND E 34TH ST	19	112	MANHATTAN
ATLANTIC AV AND IN678 SR	19	112	QUEENS
UTOPIA PW AND IN495 SR	19	112	QUEENS
QUEENS BL AND 63RD RD	19	112	QUEENS
IN678 SR AND LINDEN PL	19	112	QUEENS
METROPOLITAN AV AND UNION TP	19	112	QUEENS
FRANCIS LEWIS BL AND IN495 SR	19	112	QUEENS
ALLISON AV AND EBBITTS AV	18	125	STATEN ISLAND
ROCKLAND AV AND FOREST HILL RD	18	125	STATEN ISLAND
BATH AV AND BAY PW	18	125	BROOKLYN
AVENUE D AND E 54TH ST	18	125	BROOKLYN
OCEAN PW AND KINGS HW	18	125	BROOKLYN
NOSTRAND AV AND FLATBUSH AV	18	125	BROOKLYN
BRONX AND PELHAM PW AND RMP BRP TO US1	18	125	BRONX
FLATBUSH AV AND CHURCH AV	18	125	BROOKLYN
BRUCKNER BL AND BARRETTO ST	18	125	BRONX
HOWARD AV AND ST JOHNS PL	18	125	BROOKLYN
GEORGIA AV AND ATLANTIC AV	18	125	BROOKLYN
CHURCH AV AND KINGS HW	18	125	BROOKLYN
E NEW YORK AV AND UTICA AV	18	125	BROOKLYN
FLATBUSH AV AND NEVINS ST	18	125	BROOKLYN
AVENUE J AND OCEAN PW	18	125	BROOKLYN
PENNSYLVANIA AV AND LIVONIA AV	18	125	BROOKLYN



TOP HIGH PEDESTRIAN ACCIDENT INTERSECTIONS 2010

INTERSECTION	NUMBER	RANK	BORO
3 AV \ E 57 ST	14	1	MANHATTAN
NORTHERN BL \ UNION ST	14	1	QUEENS
8 AV \ W 34 ST	13	3	MANHATTAN
CENSUS BLK BNDY \ GOWANUS EP	13	3	BROOKLYN
EASTERN PY \ UTICA AV	12	5	BROOKLYN
W 34 ST \ 7 AV	11	6	MANHATTAN
2 AV \ E 42 ST	10	7	MANHATTAN
AMSTERDAM AV \ W 125 ST	9	8	MANHATTAN
1 AV \ E 59 ST	9	8	MANHATTAN
9 AV \ W 37 ST	9	8	MANHATTAN
9 AV \ W 43 ST	8	11	MANHATTAN
ATLANTIC AV \ NOSTRAND AV	8	11	BROOKLYN
JEROME AV \ E FORDHAM RD \ W FORDHAM RD	8	11	BRONX
AV OF THE AMERICAS \ W 23 ST	8	11	MANHATTAN
QUEENS BL \ 63 DR \ 63 RD	7	15	QUEENS
QUEENS BL \ 108 ST \ 71 AV	7	15	QUEENS
1 AV \ E 52 ST	7	15	MANHATTAN
2 AV \ E 34 ST	7	15	MANHATTAN
E 149 ST \ COURTLANDT AV	7	15	BRONX
UTICA AV \ MALCOLM X BL \ FULTON ST	7	15	BROOKLYN
SOUTHERN BL \ E 174 ST	7	15	BRONX
SNYDER AV \ UTICA AV	7	15	BROOKLYN
WEBSTER AV \ E GUN HILL RD	7	15	BRONX
ROCKAWAY PY \ FLATLANDS AV	7	15	BROOKLYN
JAMAICA AV \ WOODHAVEN BL	7	15	QUEENS
BROADWAY \ E 14 ST	7	15	MANHATTAN
DITMAS AV \ OCEAN PY	7	15	BROOKLYN

INTERSECTION	NUMBER	RANK	BORO
7 AV \ W 45 ST \ BROADWAY	7	15	MANHATTAN
E 42 ST \ W 42 ST \ 5 AV	7	15	MANHATTAN
DIST BNDY \ FLUSHING AV \ BROADWAY	7	15	BROOKLYN
FLATBUSH AV \ HILLEL PL \ NOSTRAND AV	7	15	BROOKLYN
CROSS BAY BL \ PITKIN AV	7	15	QUEENS
HILLSIDE AV \ PARSONS BL	6	33	QUEENS
PRINCE ST \ ROOSEVELT AV	6	33	QUEENS
EASTERN PY \ BUFFALO AV	6	33	BROOKLYN
PENNSYLVANIA AV \ LINDEN BL	6	33	BROOKLYN
ATLANTIC AV \ CRESCENT ST	6	33	BROOKLYN
PROSPECT AV \ E 160 ST \ LONGWOOD AV \ WESTCHESTER AV	6	33	BRONX
UTOPIA PY \ HOR HARDING EP SR S	6	33	QUEENS
FLATLANDS AV \ PAERDEGAT AV S \ RALPH AV \ TB 8012.01 E/SD	6	33	BROOKLYN
GRAND CONCOURSE \ E 183 ST	6	33	BRONX
JAMAICA AV \ SUTPHIN BL	6	33	QUEENS
7 AV \ W 33 ST	6	33	MANHATTAN
UNIVERSITY AV \ W FORDHAM RD \ DR M L KING JR BL	6	33	BRONX
E 233 ST \ WHITE PLAINS RD	6	33	BRONX
WESTCHESTER AV \ E 150 ST \ 3 AV	6	33	BRONX
AV U \ FLATBUSH AV	6	33	BROOKLYN
7 AV \ W 42 ST	6	33	MANHATTAN
3 AV \ E 96 ST	6	33	MANHATTAN
CHAMBERS ST \ BROADWAY	6	33	MANHATTAN
1 AV \ E 62 ST	6	33	MANHATTAN
JICA AV \ VAN WYCK EP SR W \ METROPOLITAN AV \ KEW GARDE	6	33	QUEENS
E 125 ST \ 3 AV	6	33	MANHATTAN
WEBSTER AV \ E FORDHAM RD	6	33	BRONX
W 45 ST \ 9 AV	6	33	MANHATTAN
ALLERTON AV \ WHITE PLAINS RD	6	33	BRONX
KINGSTON AV \ EASTERN PY	6	33	BROOKLYN
2 AV \ E 116 ST	6	33	MANHATTAN
ASHLAND PL \ FULTON ST	6	33	BROOKLYN

INTERSECTION	NUMBER	RANK	BORO
86 ST \ 4 AV	6	33	BROOKLYN
3 AV \ E 34 ST	6	33	MANHATTAN
AV K \ OCEAN AV	6	33	BROOKLYN
CHURCH AV \ NOSTRAND AV	6	33	BROOKLYN
CROTONA AV \ E TREMONT AV	6	33	BRONX
QUEENS BL \ GRAND AV \ BROADWAY	6	33	QUEENS
ARCHER AV \ SUTPHIN BL	6	33	QUEENS
8 AV \ W 53 ST	5	67	MANHATTAN
E 104 ST \ 3 AV	5	67	MANHATTAN
ADAM C POWELL BL \ W 125 ST	5	67	MANHATTAN
AV J \ OCEAN PY	5	67	BROOKLYN
9 AV \ W 47 ST	5	67	MANHATTAN
ASHFORD ST \ NEW LOTS AV	5	67	BROOKLYN
8 AV \ W 43 ST	5	67	MANHATTAN
SOUTHERN BL \ E 163 ST \ HUNTS POINT AV	5	67	BRONX
SMITH ST \ LIVINGSTON ST	5	67	BROOKLYN
SILVER ST \ EASTCHESTER RD \ WILLIAMSBRIDGE RD	5	67	BRONX
ARCHER AV \ PARSONS BL	5	67	QUEENS
SEDGWICK AV \ W FORDHAM RD	5	67	BRONX
ROOSEVELT AV \ 104 ST	5	67	QUEENS
TOMPKINS AV \ MYRTLE AV	5	67	BROOKLYN
DIST BNDY \ CHRISTOPHER ST \ WEST ST	5	67	MANHATTAN
OCEAN PY \ AV X	5	67	BROOKLYN
AMSTERDAM AV \ W 71 ST	5	67	MANHATTAN
BERGEN AV \ E 149 ST	5	67	BRONX
W 42 ST \ 11 AV	5	67	MANHATTAN
CORTEYOU RD \ OCEAN PY	5	67	BROOKLYN
BOWERY \ CENSUS BLK BNDY \ CT BNDY \ E HOUSTON ST	5	67	MANHATTAN
QNSBORO BR AP \ 2 AV \ E 59 ST	5	67	MANHATTAN
BCH 20 ST \ MOTT AV \ CENTRAL AV	5	67	QUEENS
BAY PY \ 86 ST	5	67	BROOKLYN
9 AV \ W 49 ST	5	67	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
WEST END AV \ W 72 ST	5	67	MANHATTAN
8 AV \ W 26 ST	5	67	MANHATTAN
4 AV \ TIMES PZ \ ATLANTIC AV	5	67	BROOKLYN
	5	67	BROOKLYN
VALENTINE AV \ E 196 ST	5	67	BRONX
7 AV \ W 23 ST	5	67	MANHATTAN
	5	67	STATEN ISLAND
UNION ST \ UTICA AV	5	67	BROOKLYN
PELHAM PY N \ WHITE PLAINS RD	5	67	BRONX
FLATBUSH AV \ ATLANTIC AV	5	67	BROOKLYN
FLATBUSH AV \ PARKSIDE AV	5	67	BROOKLYN
W 58 ST \ 9 AV	5	67	MANHATTAN
BURKE AV \ WHITE PLAINS RD	5	67	BRONX
FLATLANDS AV \ E 80 ST	5	67	BROOKLYN
MOTT ST \ PARK ROW \ WORTH ST \ CHATHAM SQ	5	67	MANHATTAN
MERRICK BL \ LIBERTY AV	5	67	QUEENS
LEXINGTON AV \ E 125 ST	5	67	MANHATTAN
NOSTRAND AV \ EASTERN PY	5	67	BROOKLYN
COURT ST \ ATLANTIC AV	5	67	BROOKLYN
E 167 ST \ GRAND CONCOURSE	5	67	BRONX
EMPIRE BL \ LEFFERTS AV \ UTICA AV	5	67	BROOKLYN
CHRISTIE ST \ DELANCEY ST	5	67	MANHATTAN
EMPIRE BL \ ALBANY AV	5	67	BROOKLYN
FULTON ST \ BROOKLYN AV	5	67	BROOKLYN
LEXINGTON AV \ E 42 ST	5	67	MANHATTAN
DYER AV \ W 41 ST	5	67	MANHATTAN
AV C \ OCEAN PY	5	67	BROOKLYN
FLATBUSH AV \ KINGS HY	5	67	BROOKLYN
COLGATE AV \ WESTCHESTER AV	5	67	BRONX
FLATBUSH AV \ CHURCH AV	5	67	BROOKLYN
E 149 ST \ MORRIS AV	5	67	BRONX
JEROME AV \ E 208 ST	5	67	BRONX

INTERSECTION	NUMBER	RANK	BORO
E 97 ST \ 1 AV	5	67	MANHATTAN
E 26 ST \ 3 AV	5	67	MANHATTAN
E GUN HILL RD \ BAINBRIDGE AV	5	67	BRONX
JEROME AV \ W 170 ST \ E 170 ST	5	67	BRONX
EASTERN PY \ BEDFORD AV	5	67	BROOKLYN
E 138 ST \ ST ANN'S AV	5	67	BRONX
JAMAICA AV \ PARSONS BL	5	67	QUEENS
W 86 ST \ COLUMBUS AV	5	67	MANHATTAN
E 116 ST \ LEXINGTON AV	5	67	MANHATTAN
NOSTRAND AV \ ST JOHN'S PL	5	67	BROOKLYN
E 49 ST \ 2 AV	5	67	MANHATTAN
18 AV \ OCEAN PY	5	67	BROOKLYN
LENOX AV \ W 125 ST	5	67	MANHATTAN
E 163 ST \ SIMPSON ST	4	137	BRONX
DWAY \ W 225 ST \ W 225 ST BR \ BROADWAY \ W 225	4	137	MANHATTAN
67 ST \ W 8 ST \ BAY PY	4	137	BROOKLYN
E 42 ST \ PARK AV \ PARK AV VI	4	137	MANHATTAN
3 AV \ E 156 ST	4	137	BRONX
2 AV \ 42 ST	4	137	BROOKLYN
9 AV \ 49 ST	4	137	BROOKLYN
4 AV \ 68 ST	4	137	BROOKLYN
DIVISION ST \ ELDRIDGE ST	4	137	MANHATTAN
E 23 ST \ 3 AV	4	137	MANHATTAN
E 23 ST \ LEXINGTON AV	4	137	MANHATTAN
E 138 ST \ WILLIS AV	4	137	BRONX
E 138 ST \ CYPRESS AV	4	137	BRONX
9 AV \ W 41 ST	4	137	MANHATTAN
E 51 ST \ LEXINGTON AV	4	137	MANHATTAN
E 59 ST \ MADISON AV	4	137	MANHATTAN
E 41 ST \ QN MDTWN TNL ET	4	137	MANHATTAN
3 AV \ E 63 ST	4	137	MANHATTAN
45 ST \ 9 AV	4	137	BROOKLYN



TOP HIGH PEDESTRIAN ACCIDENT INTERSECTIONS 2009

INTERSECTION	NUMBER	RANK	BORO
1ST AV AND E 23RD ST	14	1	MANHATTAN
LEXINGTON AV AND E 125TH ST	11	2	MANHATTAN
ATLANTIC AV AND COURT ST	10	3	BROOKLYN
7TH AV AND W 23RD ST	10	3	MANHATTAN
8TH AV AND W 42ND ST	10	3	MANHATTAN
UTICA AV AND EASTERN PW	8	6	BROOKLYN
7TH AV AND W 34TH ST	8	6	MANHATTAN
2ND AV AND E 96TH ST	8	6	MANHATTAN
NORTHERN BL AND UNION ST	8	6	QUEENS
BRUCKNER BL AND HUNTS POINT AV	8	6	BRONX
4TH AV AND 39TH ST	8	6	BROOKLYN
1ST AV AND E 57TH ST	8	6	MANHATTAN
BROADWAY AND W 86TH ST	8	6	MANHATTAN
BOERUM PL AND LIVINGSTON ST	7	14	BROOKLYN
SPRINGFIELD BL AND HEMPSTEAD AV	7	14	QUEENS
COLUMBUS AV AND W 97TH ST	7	14	MANHATTAN
LEXINGTON AV AND E 86TH ST	7	14	MANHATTAN
ESSEX ST AND DELANCEY ST	7	14	MANHATTAN
BROADWAY AND W. 86th St	7	14	MANHATTAN
AVENUE D AND DITMAS AV	7	14	BROOKLYN
SUTPHIN BL AND ARCHER AV	7	14	QUEENS
5TH AV AND 34TH ST	7	14	BROOKLYN
LENOX AV AND W 125TH ST	7	14	MANHATTAN
FLATBUSH AV AND NEVINS ST	7	14	BROOKLYN
SOUTHERN BL AND WESTCHESTER AV	7	14	BRONX
ST NICHOLAS AV AND W 181ST ST	7	14	MANHATTAN
3RD AV AND EAST FORDHAM RD	7	14	BRONX

INTERSECTION	NUMBER	RANK	BORO
LIBERTY AV AND 120TH ST	7	14	QUEENS
FLATLANDS AV AND PAERDEGAT AV S	7	14	BROOKLYN
3RD AV AND E 42ND ST	7	14	MANHATTAN
UTICA AV AND CHURCH AV	7	14	BROOKLYN
UNIVERSITY AV TU AND W FORDHAM RD	7	14	BRONX
8TH AV AND 60TH ST	7	14	BROOKLYN
FRANKLIN AV AND FULTON ST	6	34	BROOKLYN
MORRIS PARK AV AND WILLIAMSBRIDGE RD	6	34	BRONX
CRESTON AV AND E FORDHAM RD	6	34	BRONX
MORRIS AV AND E 149TH ST	6	34	BRONX
ATLANTIC AV AND RALPH AV	6	34	BROOKLYN
2ND AV AND E 26TH ST	6	34	MANHATTAN
BEDFORD AV AND FULTON ST	6	34	BROOKLYN
OCEAN AV AND PARKSIDE AV	6	34	BROOKLYN
PARSONS BL AND HILLSIDE AV	6	34	QUEENS
3RD AV AND E 53RD ST	6	34	MANHATTAN
FLATBUSH AV AND WESTBURY CT	6	34	BROOKLYN
6TH AV AND W 42ND ST	6	34	MANHATTAN
UTICA AV AND WINTHROP ST	6	34	BROOKLYN
FLATBUSH AV AND GLENWOOD RD	6	34	BROOKLYN
2ND AV AND E 23RD ST	6	34	MANHATTAN
WILLIS AV AND E 138TH ST	6	34	BRONX
BOOTH MEMORIAL AV AND MAIN ST	6	34	QUEENS
WEBSTER AV AND E FORDHAM RD	6	34	BRONX
3RD AV AND E 86TH ST	6	34	MANHATTAN
LEXINGTON AV AND E 116TH ST	6	34	MANHATTAN
LINDEN BL AND UTICA AV	6	34	BROOKLYN
1ST AV AND E 60TH ST	6	34	MANHATTAN
JEROME AV AND E FORDHAM RD	6	34	BRONX
3RD AV AND E 41ST ST	6	34	MANHATTAN
5TH AV AND E 34TH ST	6	34	MANHATTAN
2ND AV AND E 49TH ST	6	34	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
7TH AV AND W 125TH ST	6	34	MANHATTAN
6TH AV AND W 57TH ST	6	34	MANHATTAN
7TH AV AND W 14TH ST	6	34	MANHATTAN
AVENUE J AND CONEY ISLAND AV	6	34	BROOKLYN
ST NICHOLAS AV AND W 125TH ST	6	34	MANHATTAN
3RD AV AND E 58TH ST	6	34	MANHATTAN
BROADWAY AND W 138TH ST	6	34	MANHATTAN
NORTHERN BL AND JUNCTION BL	6	34	QUEENS
COLUMBUS AV AND W 96TH ST	5	68	MANHATTAN
SPRINGFIELD BL AND IN495 SR	5	68	QUEENS
NOSTRAND AV AND FULTON ST	5	68	BROOKLYN
JEROME AV AND E 210TH ST	5	68	BRONX
8TH AV AND W 46TH ST	5	68	MANHATTAN
NOSTRAND AV AND GLENWOOD RD	5	68	BROOKLYN
WOODHAVEN BL AND JAMAICA AV	5	68	QUEENS
ROCKAWAY PW AND RUTLAND RD	5	68	BROOKLYN
NOSTRAND AV AND CLARKSON AV	5	68	BROOKLYN
BROADWAY AND MARCY AV	5	68	BROOKLYN
CONCOURSE VILLAGE E AND E 161ST ST	5	68	BRONX
8TH AV AND W 28TH ST	5	68	MANHATTAN
7TH AV AND BAY RIDGE PW	5	68	BROOKLYN
LENOX AV AND W 116TH ST	5	68	MANHATTAN
SUTPHIN BL AND JAMAICA AV	5	68	QUEENS
BROADWAY AND WORTH ST	5	68	MANHATTAN
WEST END AV AND W 72ND ST	5	68	MANHATTAN
AVENUE A AND E 14TH ST	5	68	MANHATTAN
WILLOUGHBY ST AND JAY ST	5	68	BROOKLYN
AMSTERDAM AV AND W 125TH ST	5	68	MANHATTAN
8TH AV AND W 40TH ST	5	68	MANHATTAN
PARK AV AND E 125TH ST	5	68	MANHATTAN
AVENUE O AND CONEY ISLAND AV	5	68	BROOKLYN
9TH AV AND W 36TH ST	5	68	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
2ND AV AND E 38TH ST	5	68	MANHATTAN
9TH AV AND W 26TH ST	5	68	MANHATTAN
HUNTS POINT AV AND RMP HUNTS PT AV TO IN895	5	68	BRONX
ATLANTIC AV AND 5TH AV	5	68	BROOKLYN
KISSENA BL AND IN495 SR	5	68	QUEENS
OCEAN PW AND CORTELYOU RD	5	68	BROOKLYN
JAY ST AND TILLARY ST	5	68	BROOKLYN
AVENUE I AND OCEAN PW	5	68	BROOKLYN
DYRE AV AND E 233RD ST	5	68	BRONX
DYER AV AND W 41ST ST	5	68	MANHATTAN
DIX AV AND BEACH CHANNEL DR	5	68	QUEENS
AVENUE Z AND NOSTRAND AV	5	68	BROOKLYN
GUY R BREWER BL AND BAISLEY BL	5	68	QUEENS
E GUN HILL RD AND WHITE PLAINS RD	5	68	BRONX
RIVER AV AND E 161ST ST	5	68	BRONX
STANLEY AV AND PENNSYLVANIA AV	5	68	BROOKLYN
HILLSIDE AV AND 178TH ST	5	68	QUEENS
2ND AV AND E 116TH ST	5	68	MANHATTAN
WASHINGTON AV AND FULTON ST	5	68	BROOKLYN
7TH AV AND W 31ST ST	5	68	MANHATTAN
NOSTRAND AV AND NEWKIRK AV	5	68	BROOKLYN
THROOP AV AND FULTON ST	5	68	BROOKLYN
HILLSIDE AV AND 169TH ST	5	68	QUEENS
PARSONS BL AND ARCHER AV	5	68	QUEENS
11TH AV AND W 59TH ST	5	68	MANHATTAN
QUEENS BL AND 71ST AV	5	68	QUEENS
DALNY RD AND 184TH ST	5	68	QUEENS
1ST AV AND E 26TH ST	5	68	MANHATTAN
1ST AV AND E 14TH ST	5	68	MANHATTAN
7TH AV AND VARICK ST	5	68	MANHATTAN
1ST AV AND E 51ST ST	5	68	MANHATTAN
FT GEORGE HILL AND DYCKMAN ST	5	68	MANHATTAN

INTERSECTION	NUMBER	RANK	BORO
CROSS BAY BL AND 157TH AV	5	68	QUEENS
6TH AV AND W 27TH ST	5	68	MANHATTAN
FLATBUSH AV AND CATON AV	5	68	BROOKLYN
6TH AV AND W 14TH ST	5	68	MANHATTAN
BAY PW AND 65TH ST	5	68	BROOKLYN
4TH AV AND 60TH ST	5	68	BROOKLYN
GRAND BL AND CONCOURSE AND E 183RD ST	4	130	BRONX
GRAND BL AND CONCOURSE AND E 181ST ST	4	130	BRONX
UNION TP AND MAIN ST	4	130	QUEENS
AVENUE U AND FLATBUSH AV	4	130	BROOKLYN
7TH AV AND BARROW ST	4	130	MANHATTAN
GRAND BL AND CONCOURSE AND E 167TH ST	4	130	BRONX
8TH AV AND 57TH ST	4	130	BROOKLYN
3RD AV AND E 122ND ST	4	130	MANHATTAN
JEROME AV AND E BURNSIDE AV	4	130	BRONX
MERRICK BL AND JAMAICA AV	4	130	QUEENS
3RD AVE AND	4	130	MANHATTAN
JEROME AV AND E MOSHOLU PW N	4	130	BRONX
1ST AV AND E 59TH ST	4	130	MANHATTAN
TILDEN AV AND FLATBUSH AV	4	130	BROOKLYN
NORTHERN BL AND MAIN ST	4	130	QUEENS
GERARD AV AND E 161ST ST	4	130	BRONX
7TH AV AND 60TH ST	4	130	BROOKLYN
JAMAICA AV AND 164TH ST	4	130	QUEENS
31ST RD AND UNION ST	4	130	QUEENS
ROCKAWAY PW AND WILLMOHR ST	4	130	BROOKLYN
7TH AV AND W 42ND ST	4	130	MANHATTAN
7TH AV AND W 28TH ST	4	130	MANHATTAN
AVENUE J AND RALPH AV	4	130	BROOKLYN
GUY R BREWER BLVD AND ARCHER AVE	4	130	QUEENS
ST ANNS AV AND E 138TH ST	4	130	BRONX
CONEY ISLAND AV AND BRIGHTON BEACH AV	4	130	BROOKLYN