Appendix B. Signal Warrant Analysis

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

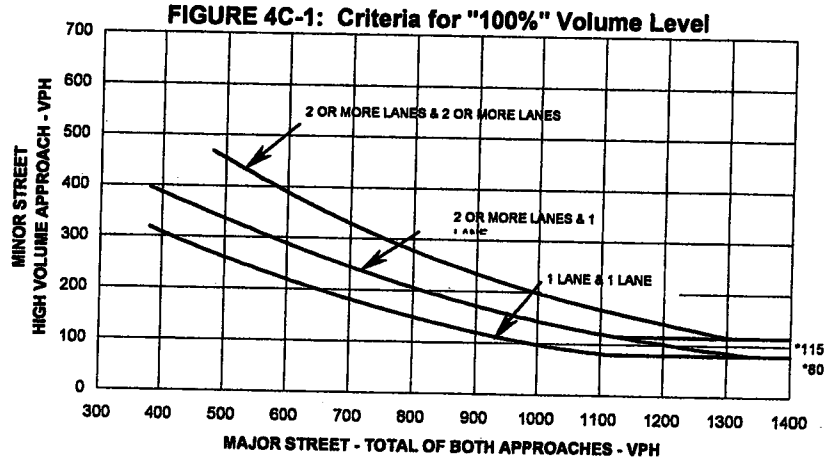
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

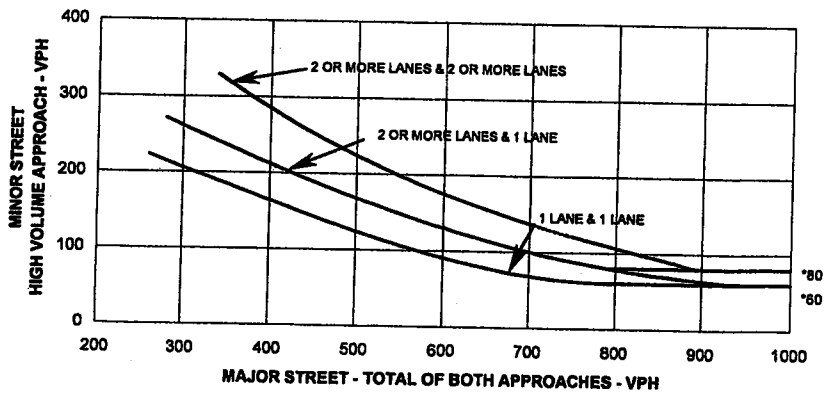
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

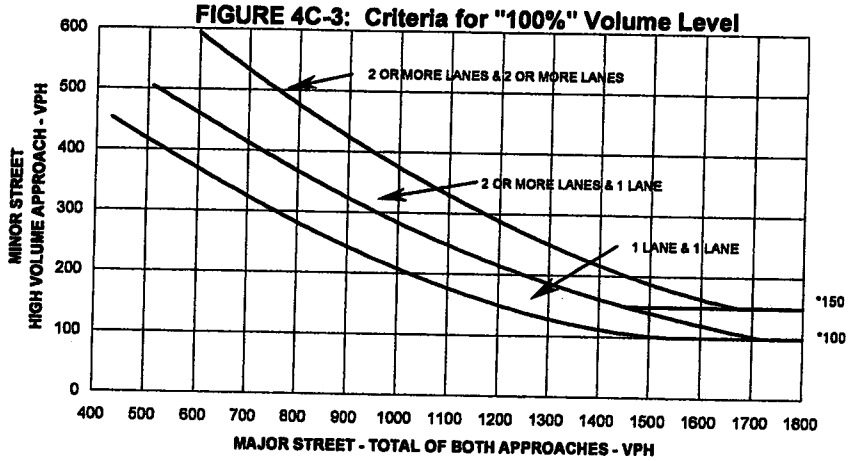
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

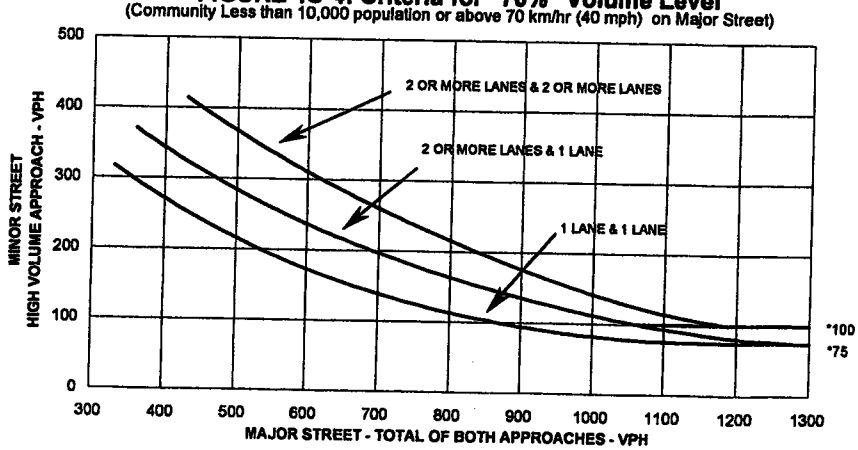
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave.
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	94			X
	800	127			
	1100	106			
	1200	173			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: [X] Yes [ ] No
Satisfied: [ ] Yes [X] No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: [ ] Yes [X] No
Satisfied: [ ] Yes [ ] No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume:							X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 10/5/08

Major Street: Purchase St /SASB
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1140	1077	1077	1076	1084	1237	1215	1561
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	250	218	124	99	117	107	107	129

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1140	1077	1077	1076	1084	1237	1215	1561
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	250	218	124	99	117	107	107	129

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase / SASB
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

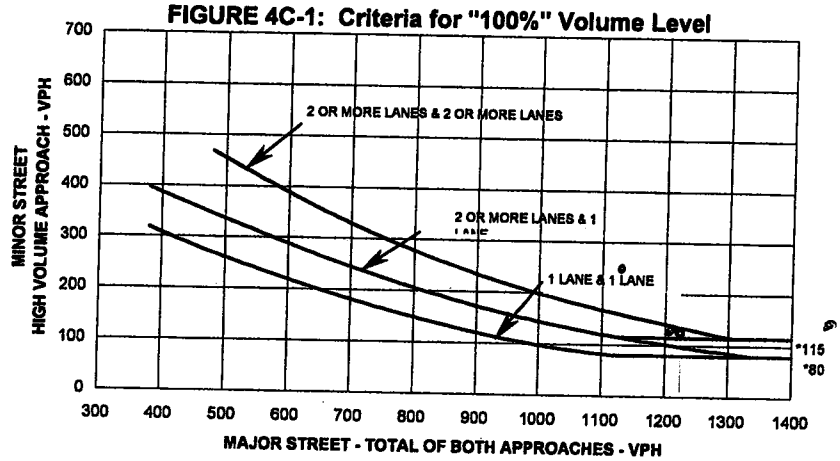
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

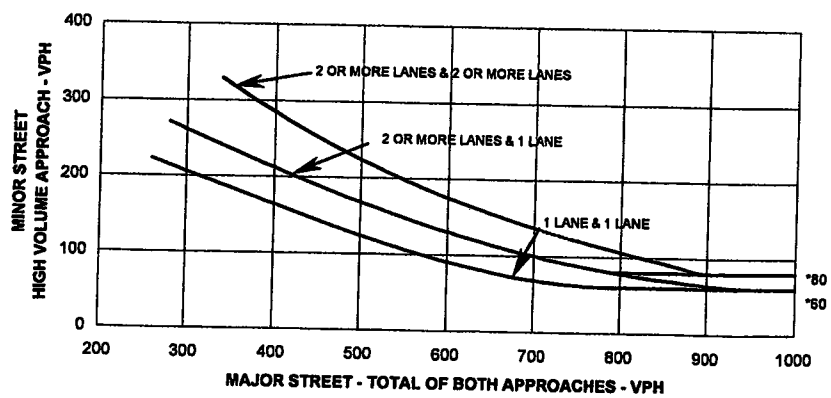
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1140	250
1500	1237	107
1600	1215	107
1700	1561	129

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1561	129

Criteria

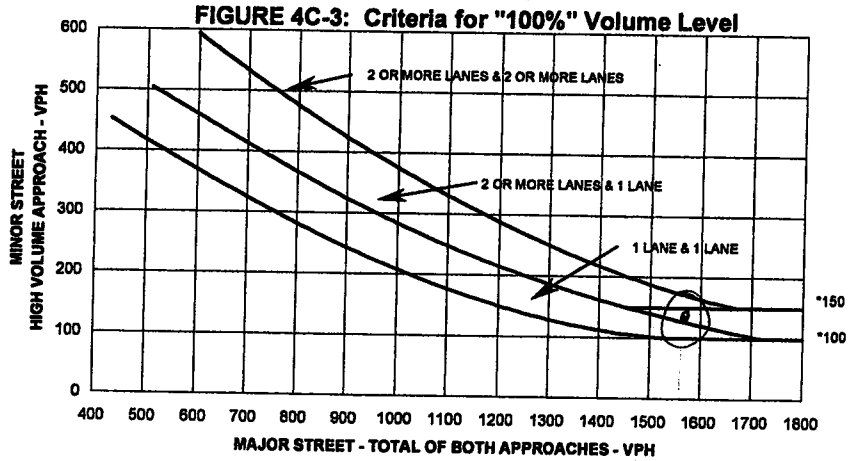
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		129
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1561	
Fulfilled?: ☒ Yes ☐ No		

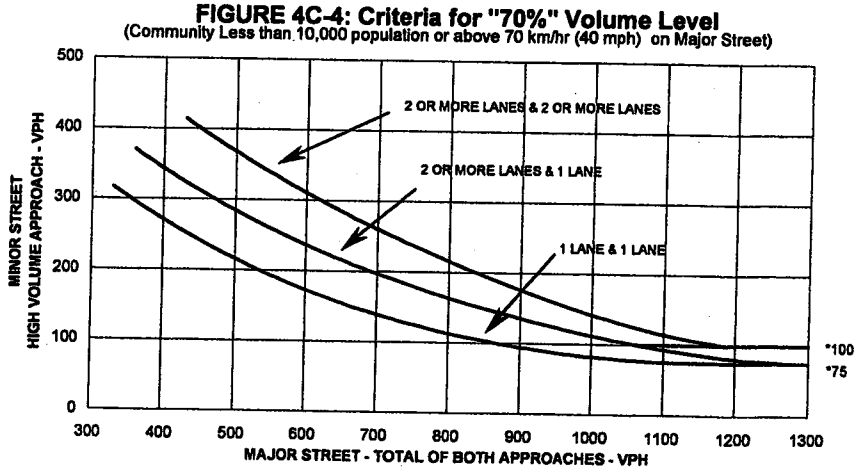
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Pearl St

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	278			
	1300	239			
	1600	213			
	1700	333			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1700	333			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St. / SASB
Minor Street: Pearl St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X	X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1690				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Seaport Blvd.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1100	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	866	1105	914	938	1205	1072	1205	1364
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	850	960	768	460	652	768	911	955

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1100	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	866	1105	914	938	1205	1072	1205	1364
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	850	960	768	460	652	768	911	955

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Seaport Blvd

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

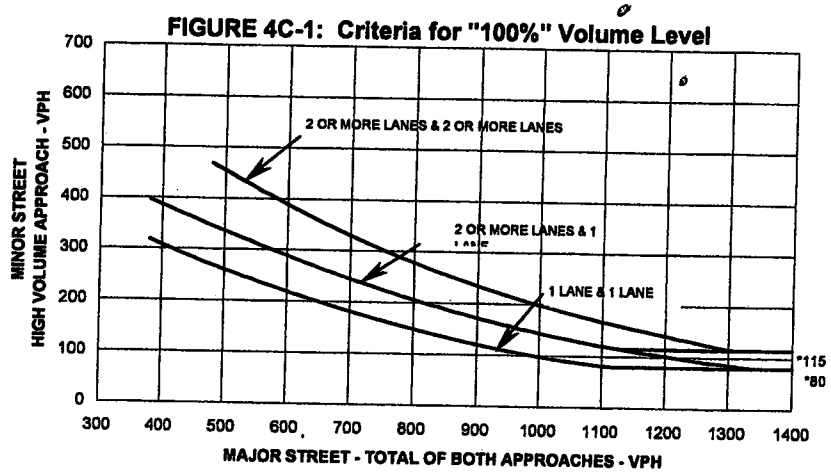
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

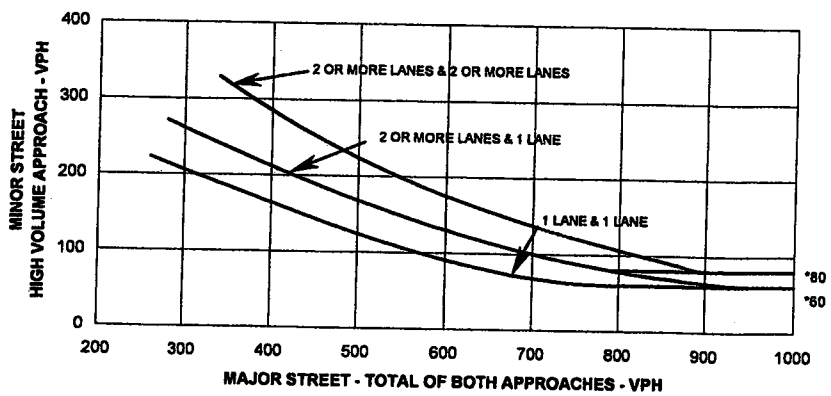
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1105	960
1400	1205	652
1600	1205	911
1700	1364	955

FIGURE 4C-1: Criteria for "100%" Volume Level



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 threshold for a minor street approach with one lane.

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Seaport Blvd.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1364	955

Criteria

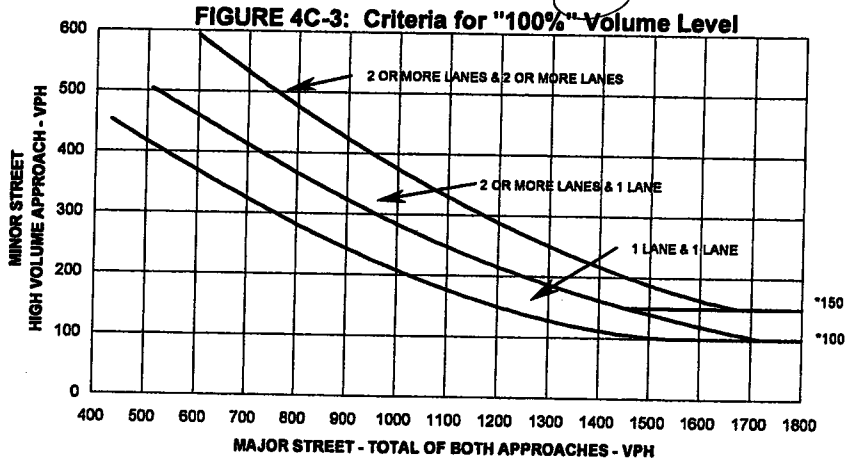
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		955
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	2730	
Fulfilled?: ☒ Yes	☐ No	

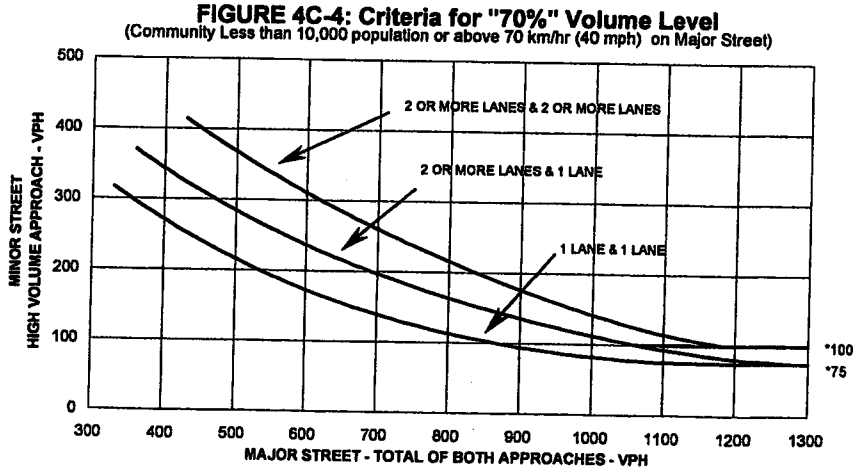
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave.
Minor Street: Seaport Blvd.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	317			
	800	419			
	1200	343			
	1400	349			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: Frapoa Blvd.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 8				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 2730		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Oliver St. / I-93 Ramp

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	574	797	805	870	930	989	882	980
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	428	445	364	211	246	237	203	243

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	574	797	805	870	930	989	882	980
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	428	445	364	211	246	237	203	243

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase / SASB
Minor Street: Oliver, I-93 Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

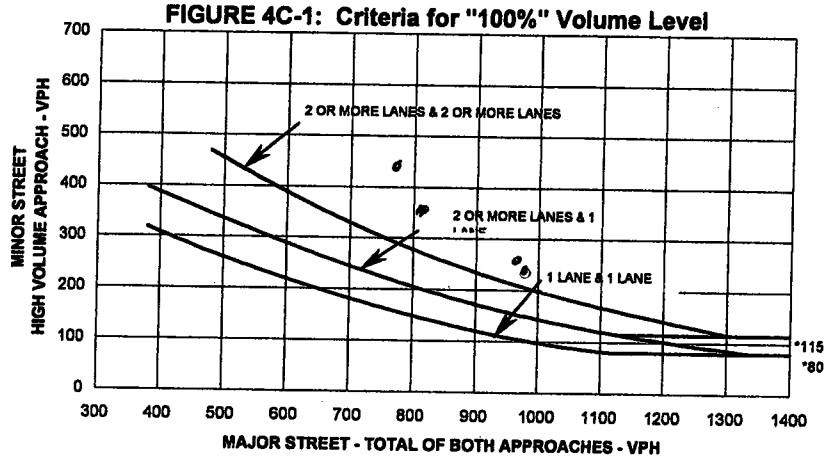
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

All points above line

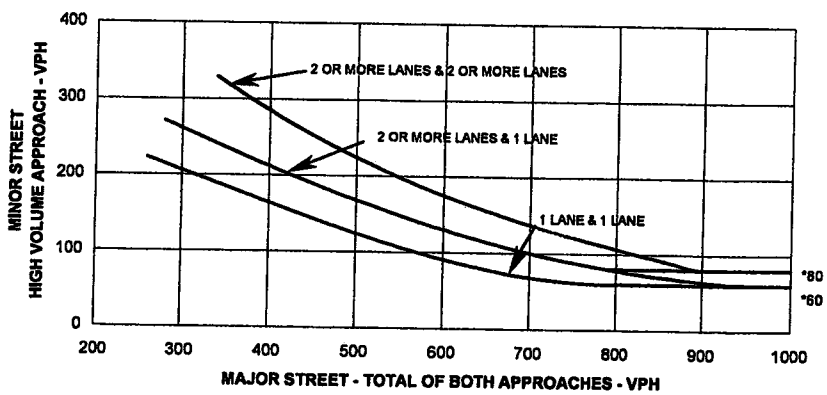
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	797	445
900	805	364
1500	989	237
1700	980	243

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Oliver / ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	797	445

Criteria

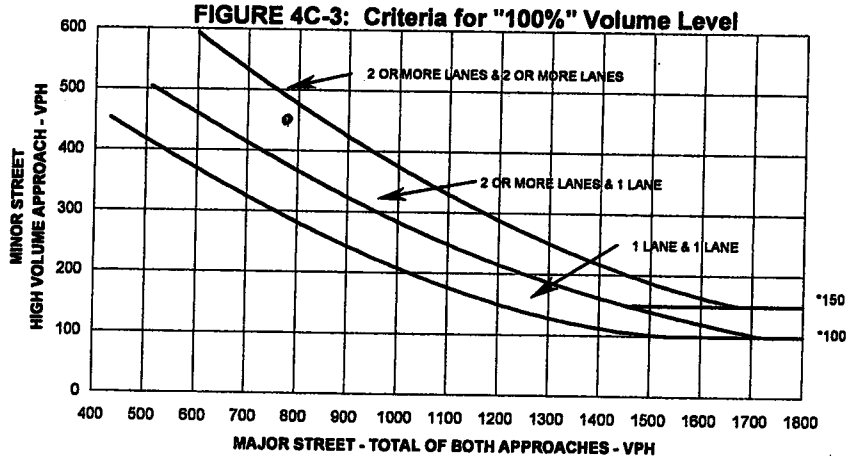
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		445
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1612
Fulfilled?: ☒ Yes ☐ No		

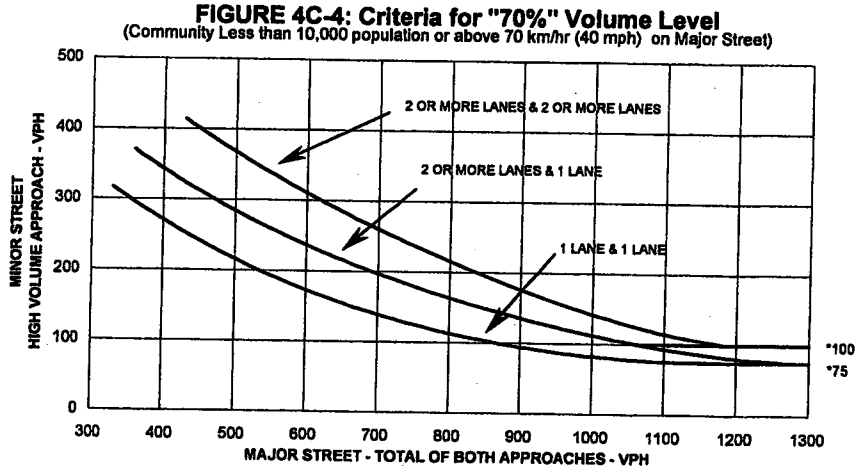
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Oliver, Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	476			
	1200	408			
	1300	364			
	1700	445			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		476			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St. / SASB
Minor Street: Oliver, Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1616			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: High St

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		8:00	9:00	10:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	776	708	633	626	628	624	648	741
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	152	104	126	117	113	107	127	149

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		8:00	9:00	10:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	776	708	633	626	628	624	648	741
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	152	104	126	117	113	107	127	149

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

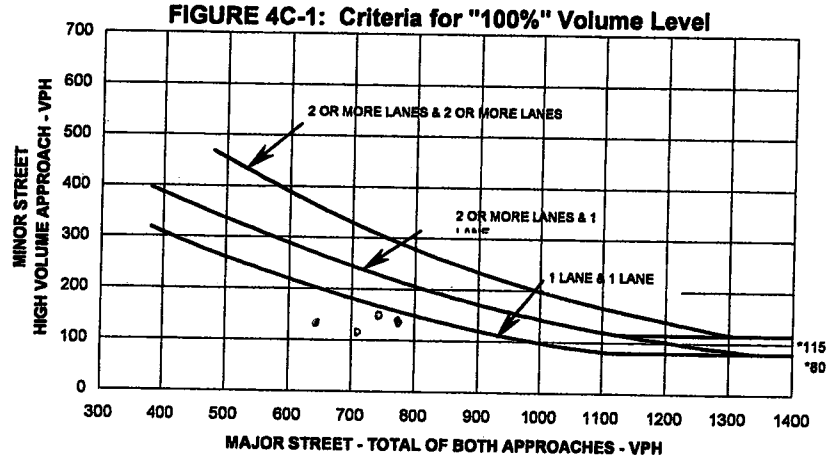
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

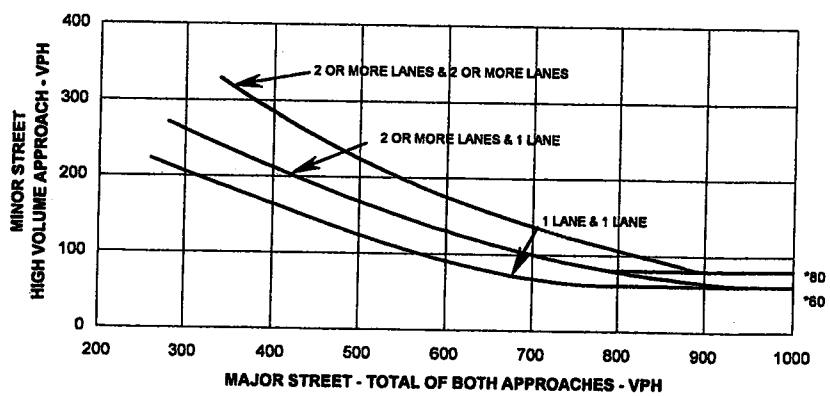
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	776	152
900	708	104
1600	648	127
1700	741	149

FIGURE 4C-1: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	741	149

Criteria

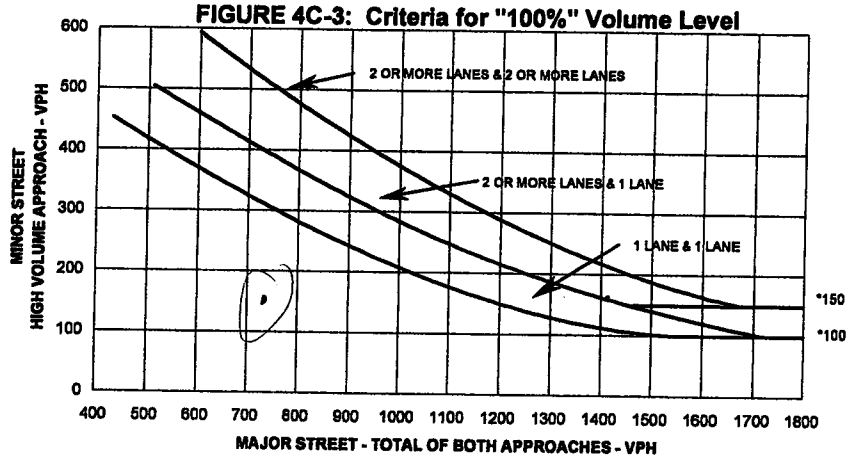
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		149
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	961	
Fulfilled?: ☒ Yes ☐ No		

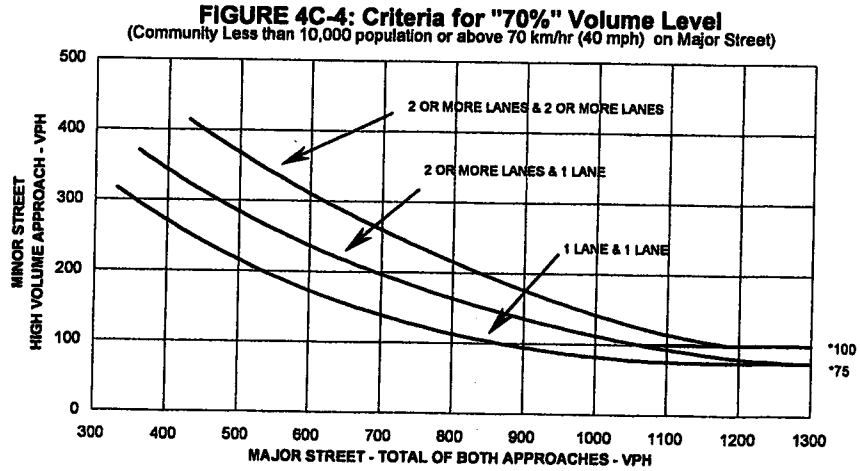
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Atlantic Ave.
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	558			
	1200	702			
	1300	611			
	1700	549			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		702			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/5/08
Major Street: Atlantic Ave
Minor Street: High St.
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	1				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 981				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: High St

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1049	883	813	767	874	916	856	995
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	237	179	200	213	175	175	191	279

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1049	883	813	767	874	916	856	995
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	237	179	200	213	175	175	191	279

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase / SASB
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

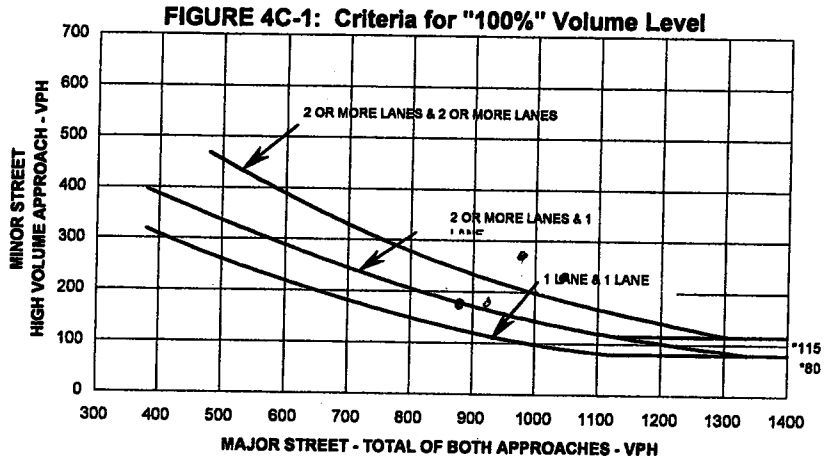
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

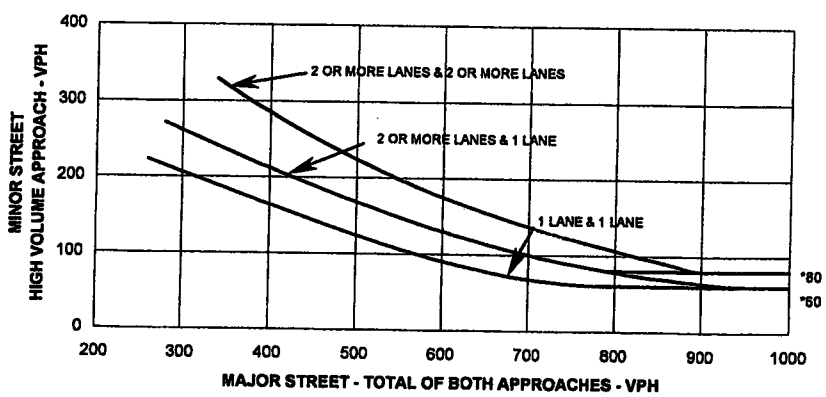
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1049	237
900	883	179
1500	910	175
1700	995	279

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1049	237

Criteria

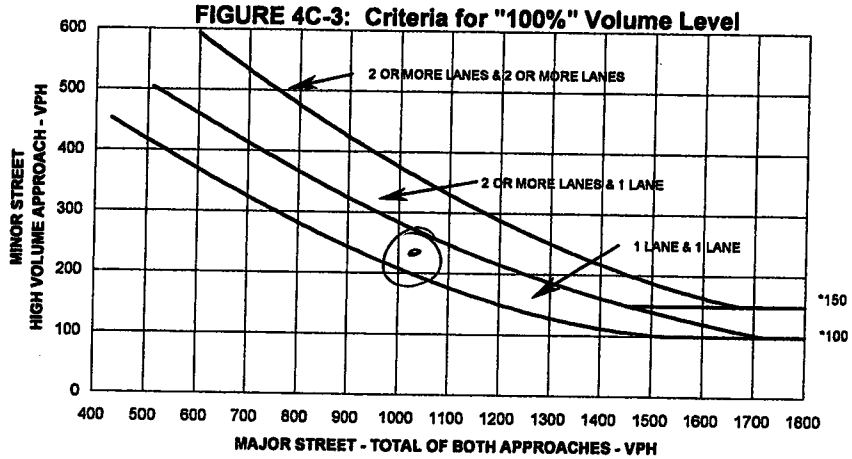
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		237
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1286	
Fulfilled?: ☒ Yes	☐ No	

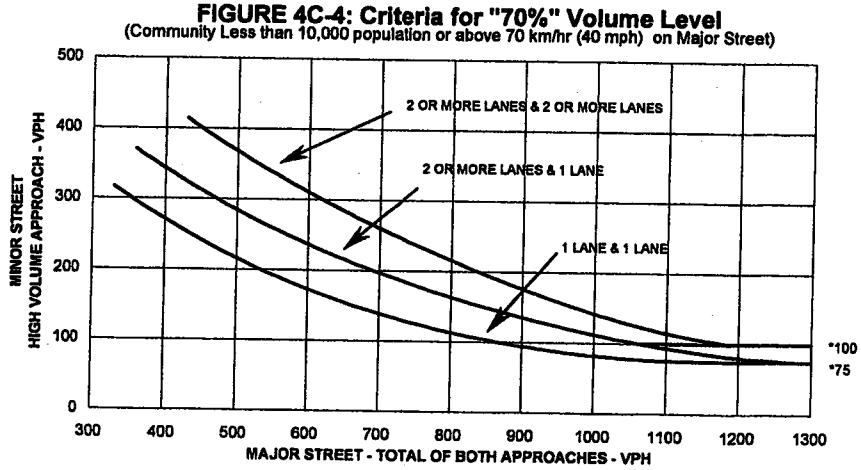
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sim
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: High St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	625			
	1200	867			
	1300	873			
	1700	721			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St. / SASB
Minor Street: Highst

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1286				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X			
		Satisfied?:	Y							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA					← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Broad St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1172	1046	767	781	866	848	844	847
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	70	70	120	150	125	120	109	132

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1172	1046	767	781	860	848	844	847
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	70	70	120	150	125	120	109	132

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase / SASB
Minor Street: Broad St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

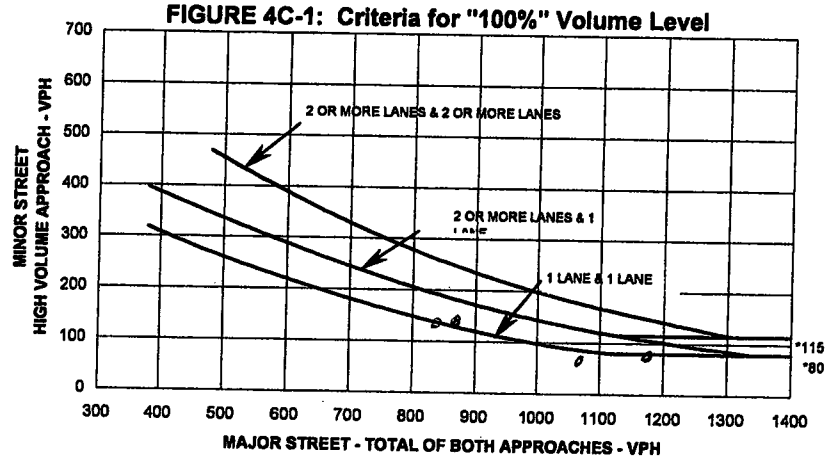
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

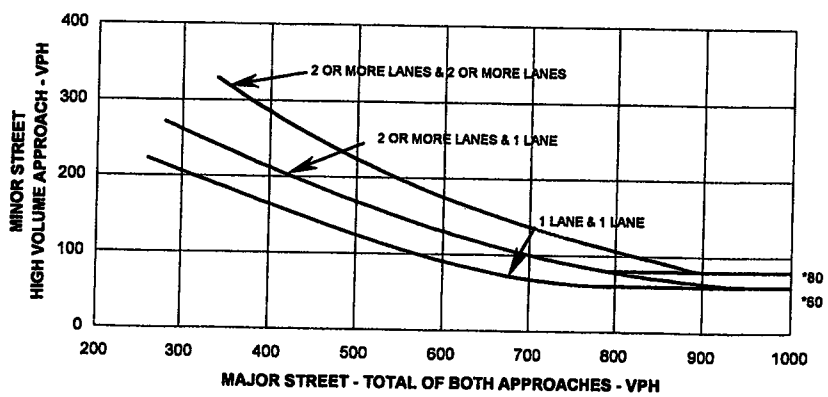
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1172	70
900	1046	70
1400	860	125
1700	847	132

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Broad St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1172	70

Criteria

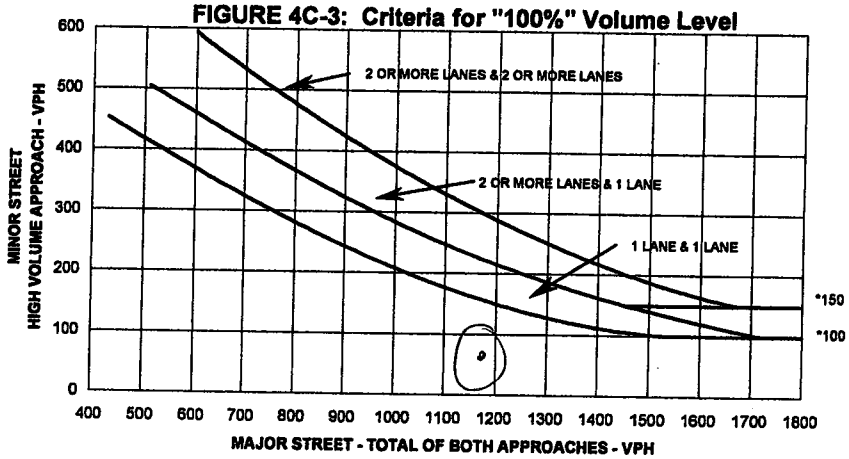
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	70	
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1242	
Fulfilled?: ☒ Yes ☐ No		

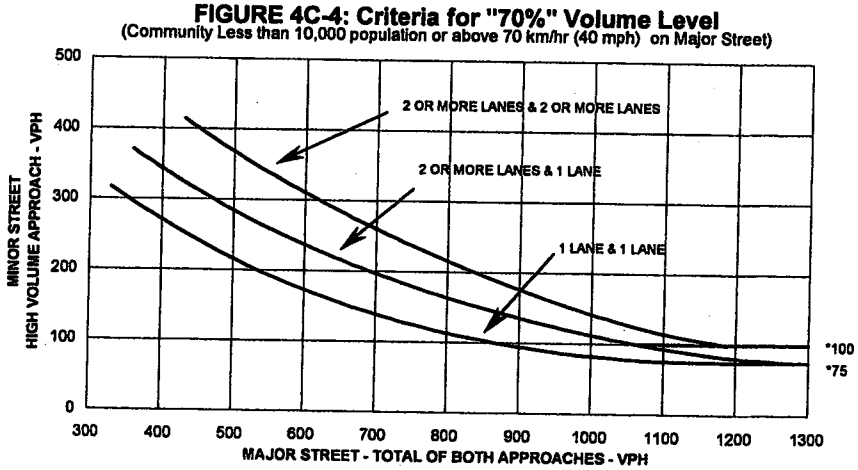
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St / SASB
Minor Street: Broad St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	224			
	1200	216			
	1300	226			
	1700	190			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/5/08

Major Street: Purchase St. / SASB
Minor Street: Broad St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1242			X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: East India

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1200	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	809	674	679	683	657	704	816	968
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	38	35	24	30	39	28	36	30

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1200	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	809	674	679	683	657	704	816	968
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	38	35	24	30	39	28	36	30

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: East India

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

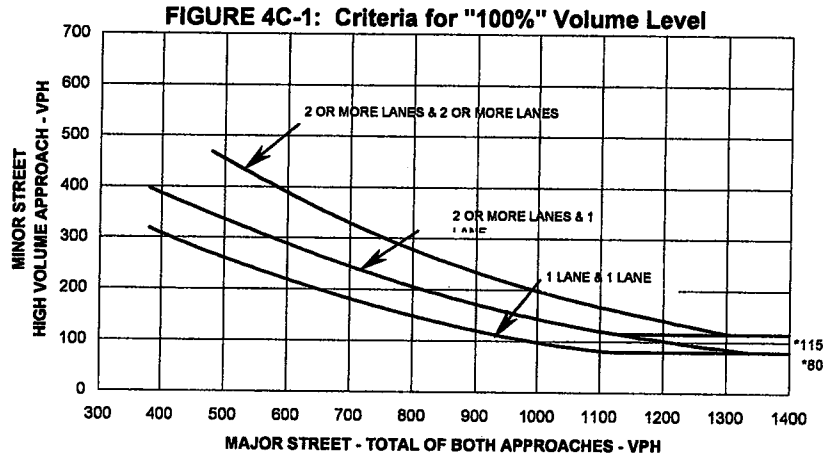
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

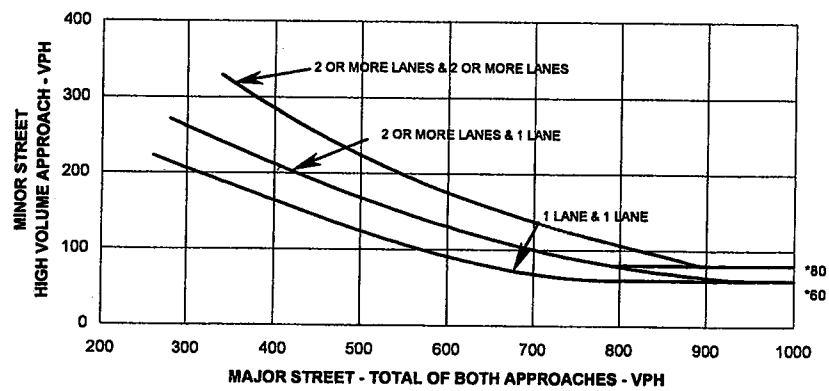
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	809	38
14:00	704	28
16:00	816	36
17:00	968	30

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: East India
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	968	30

Criteria

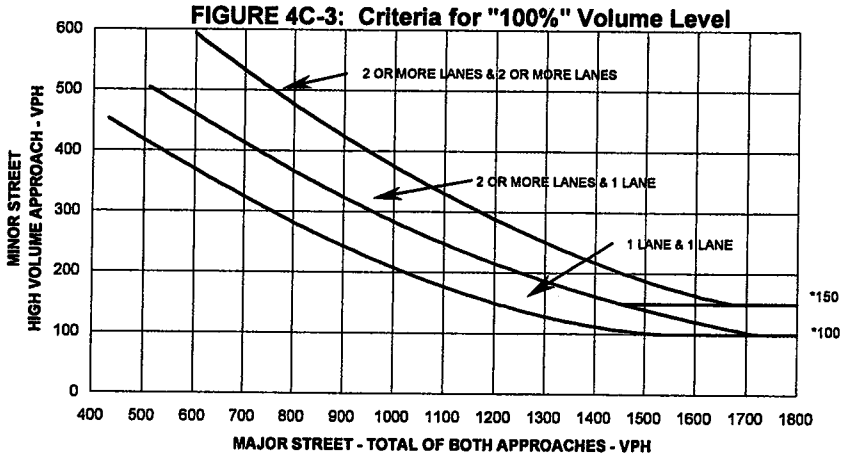
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	30	
Fulfilled?: ☐ Yes	☒ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	998	
Fulfilled?: ☒ Yes	☐ No	

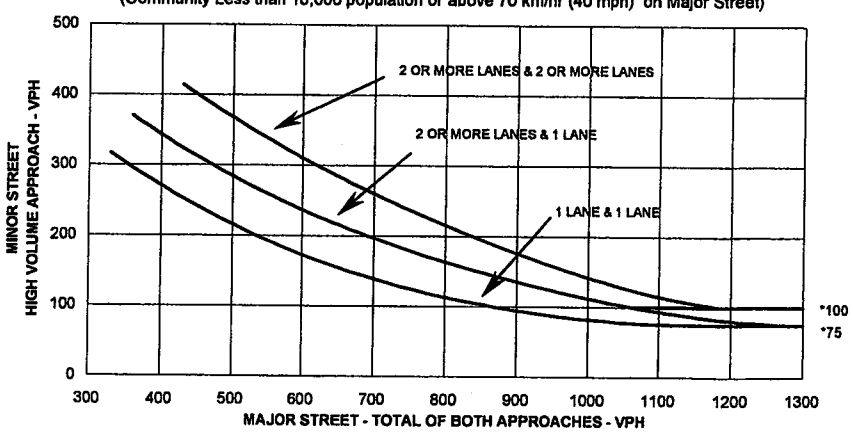
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/16/08

Major Street: Atlantic Ave.
Minor Street: East India

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	71			X
	900	81			
	1200	72			
	1300	65			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: East India

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 998				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	✓	✓	✓				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: India St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	695	1040	745	669	669	626	661	690
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	171	211	184	145	141	153	176	175

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	695	1040	745	669	669	626	661	690
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	171	211	184	145	141	153	176	175

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase / SASB
Minor Street: India St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

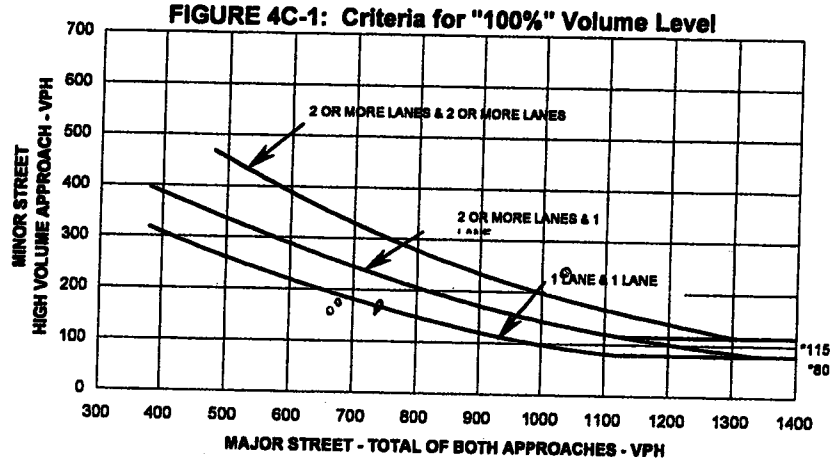
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

All points below line

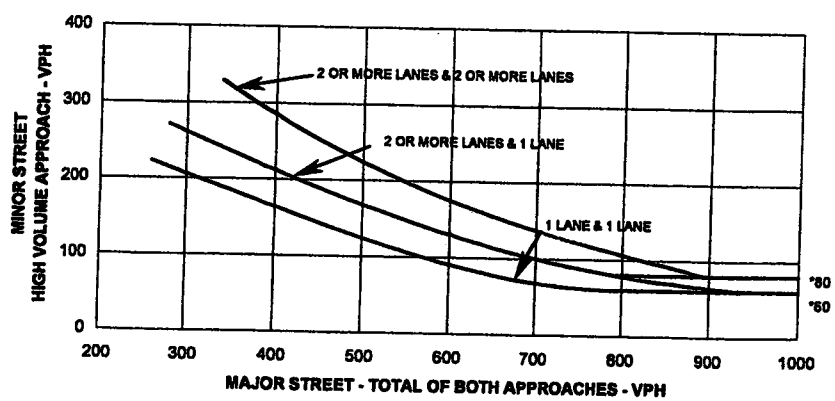
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	695	171
800	1040	211
900	745	184
1700	690	175

FIGURE 4C-1: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: India St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
0800	1040	211

Criteria

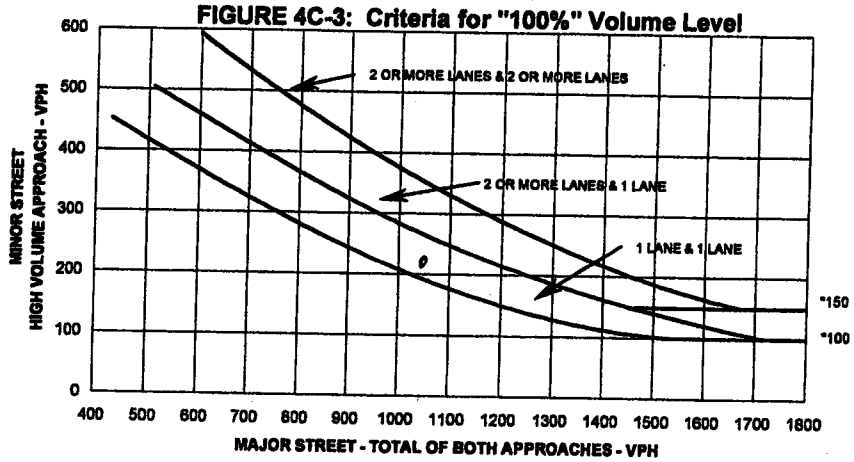
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		211
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1257	
Fulfilled?: ☒ Yes	☐ No	

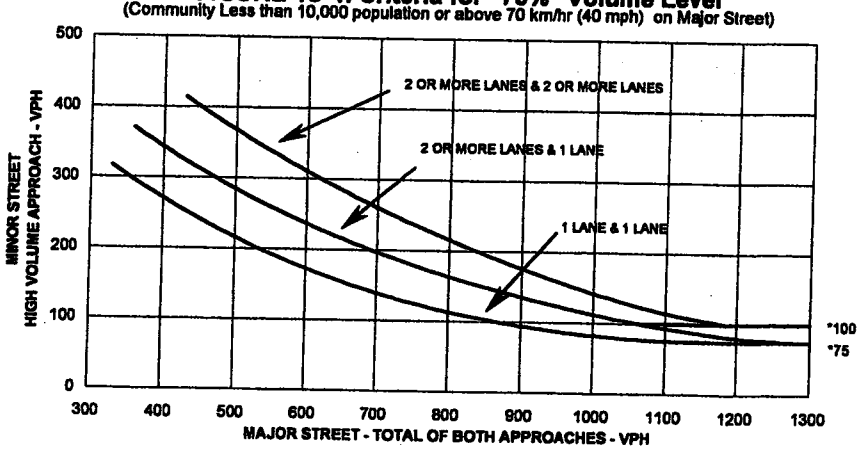
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: India St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	259			
	1200	192			
	1300	180			
	1700	159			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		259			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St. / SASB
Minor Street: India St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1251				X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1200	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	582	579	547	544	527	583	657	774
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	262	218	173	155	154	166	200	249

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1200	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	582	579	547	544	527	583	657	774
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	262	218	173	155	154	166	200	249

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

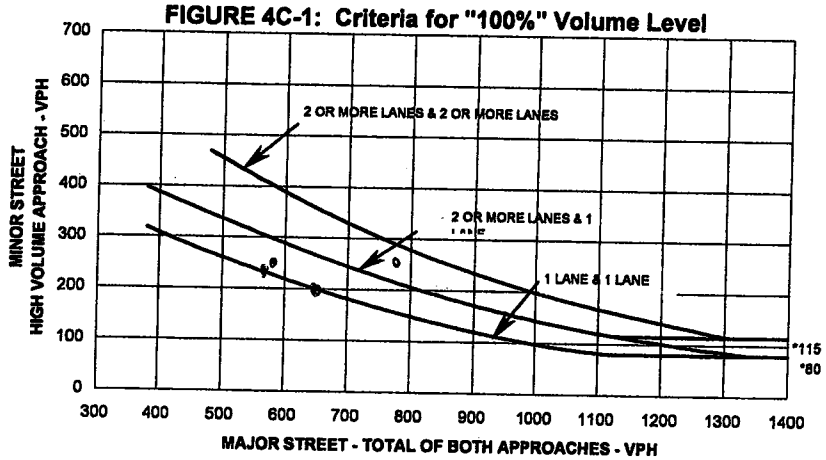
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

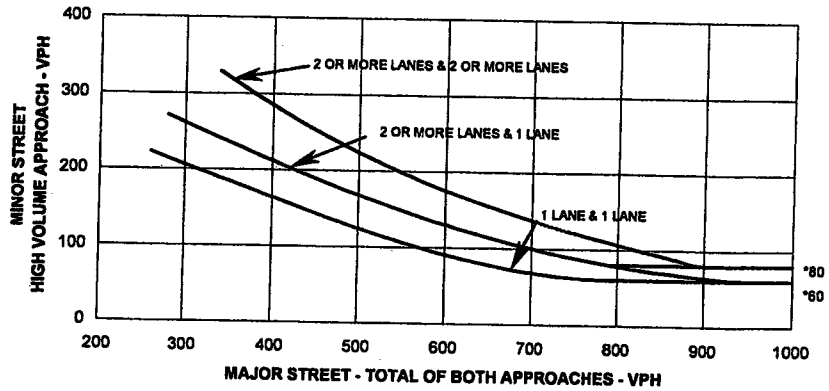
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	582	262
900	579	218
1600	657	200
1700	774	249

FIGURE 4C-1: Criteria for "100%" Volume Level



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 threshold for a minor street approach with one lane.

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Atlantic Ave
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
700	774	249

Criteria

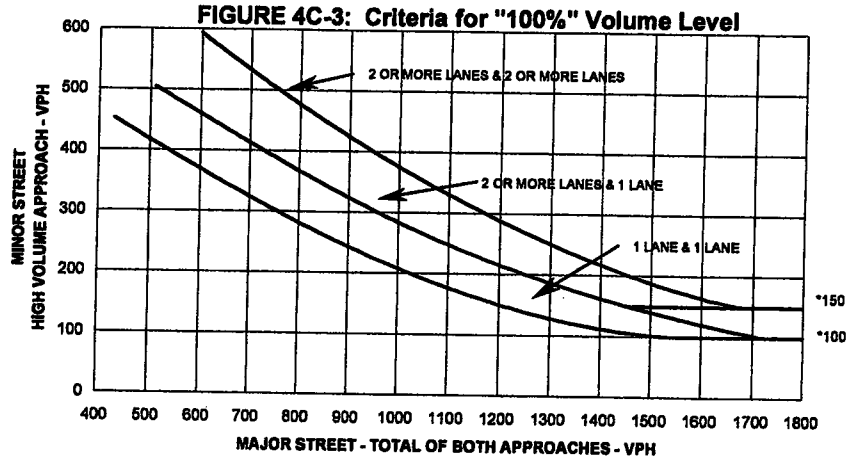
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		249
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1136	
Fulfilled?: ☒ Yes	☐ No	

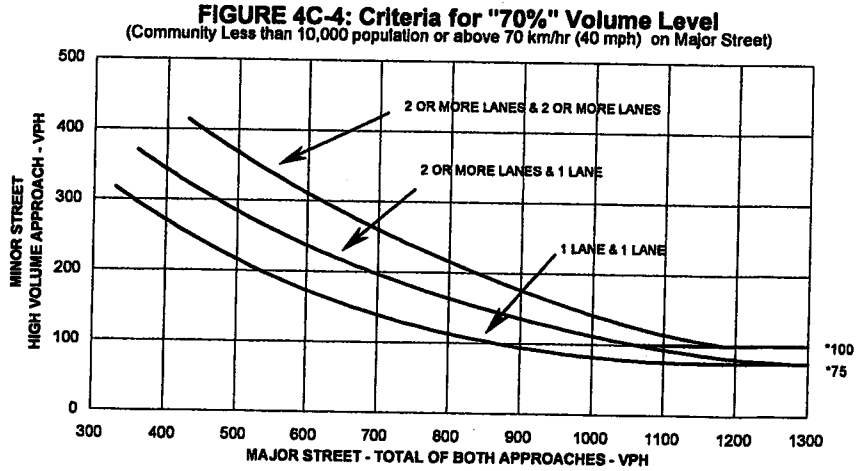
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Sim
Date: 11/6/08
Major Street: Atlantic Ave.
Minor Street: Milk St.
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	357			
	1300	383			
	1500	249			
	1700	297			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/10/08

Major Street: Atlantic Ave
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1136		X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)						← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

(11)

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1400	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	775	1208	837	653	644	687	675	712
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	65	123	105	138	140	143	189	221

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1400	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	775	1208	837	653	644	687	675	712
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	65	123	105	138	140	143	189	221

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase / SASB
Minor Street: Milk St

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

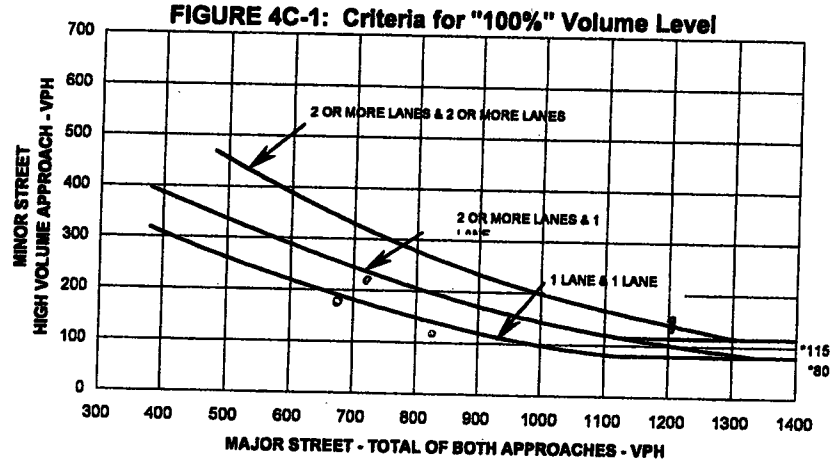
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

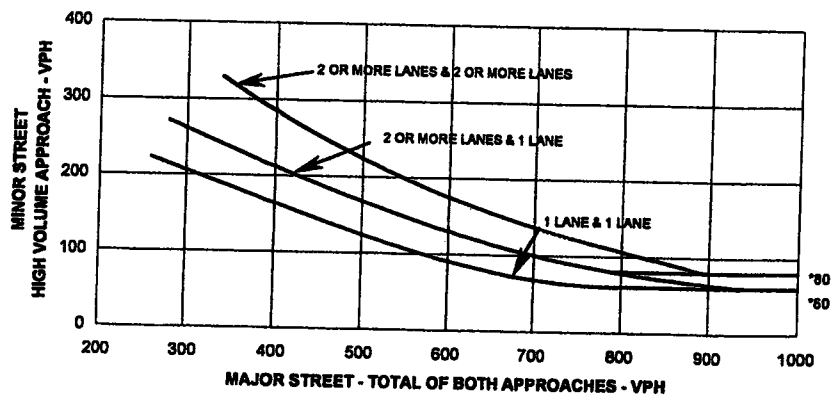
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1208	123
900	837	105
1600	675	189
1700	712	221

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	1208	123

Criteria

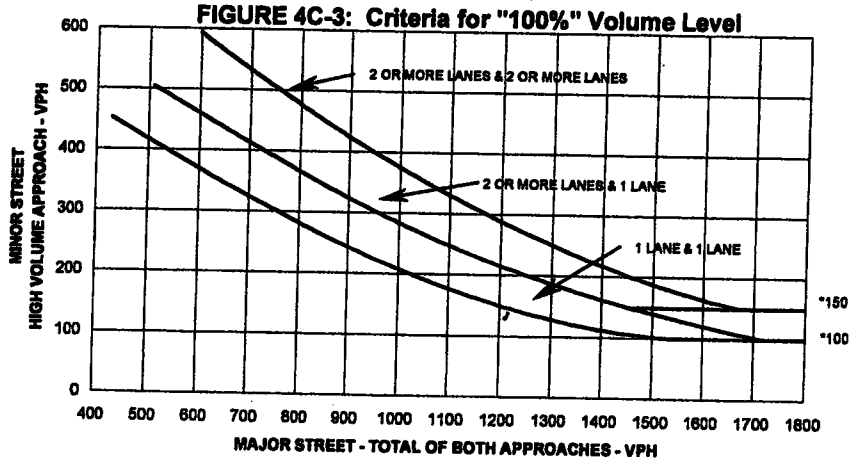
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		123
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1331	
Fulfilled?: ☒ Yes ☐ No		

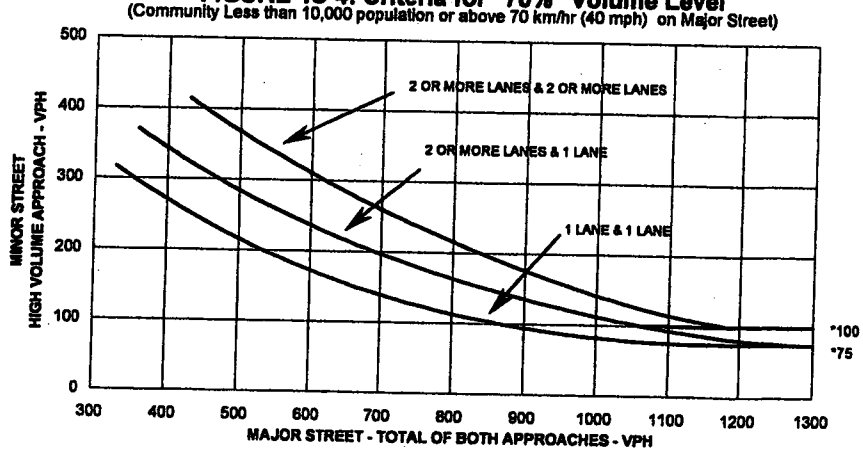
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St / SASB
Minor Street: Milk St

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	216			
	1200	267			
	1300	261			
	1700	255			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		267			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/6/08

Major Street: Purchase St. / SASB
Minor Street: Milk St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	1				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1331				X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: State St

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	638	611	593	609	690	617	808	1021
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	75	84	93	85	114	94	113	121

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1100	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	638	611	593	609	690	617	808	1021
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	75	84	93	85	114	94	113	121

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: State St

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

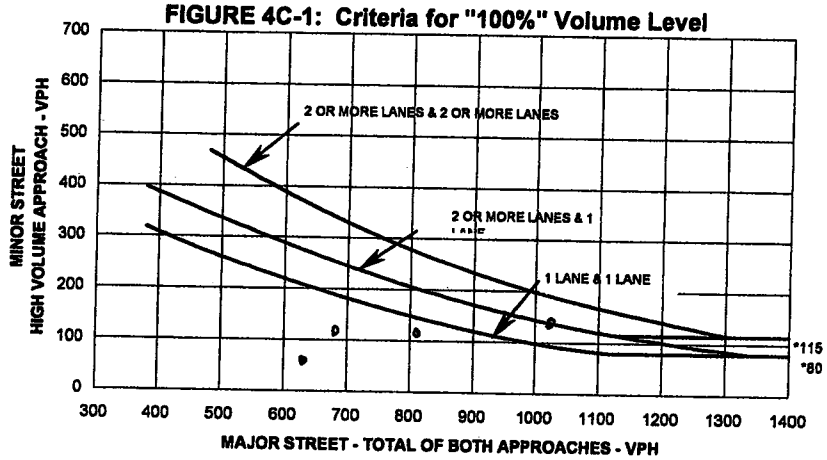
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

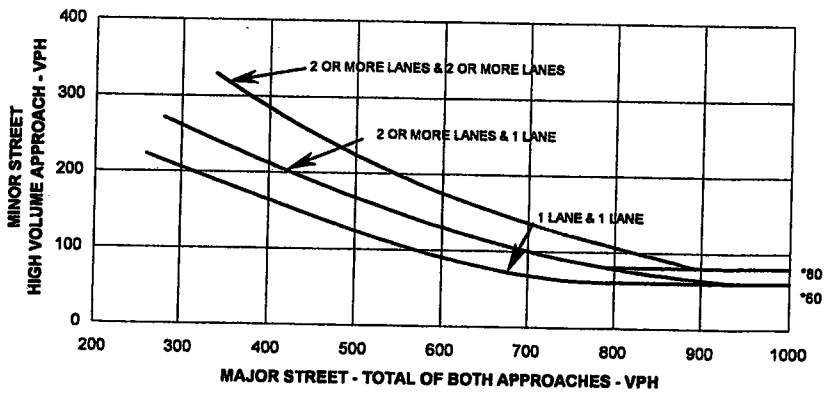
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	638	75
1400	690	114
1600	808	113
1700	1021	121

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: State St

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1021	121

Criteria

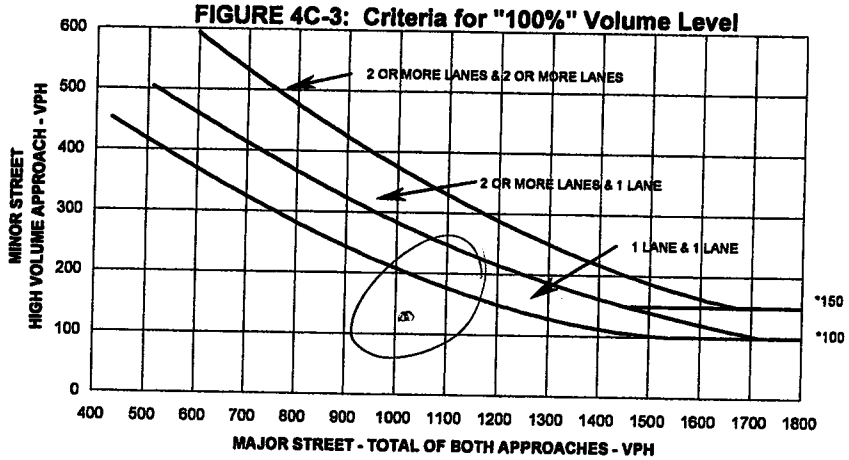
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		121
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1142	
Fulfilled?: ☐ Yes ☒ No		

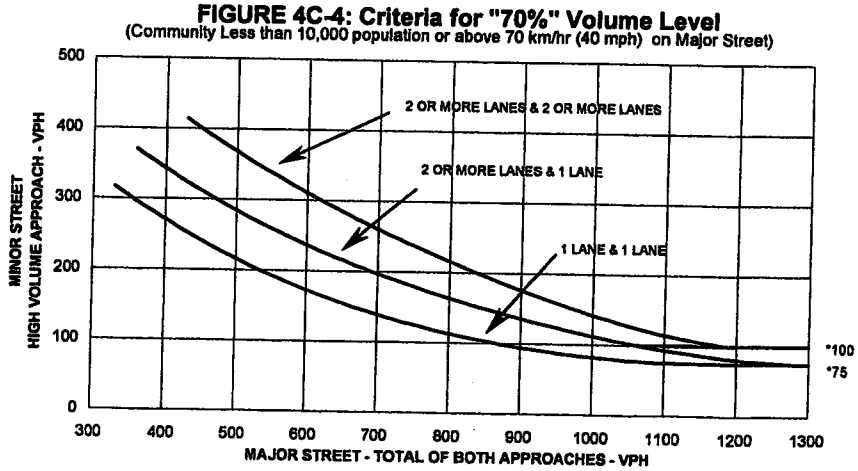
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave.
Minor Street: State St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	555			
	1300	392			
	1400	358			
	1700	374			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		555			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: State St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1142			✓			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		✓		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: State St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1400	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1215	1720	1336	951	905	915	843	866
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	189	204	210	225	223	264	249	240

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1400	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1215	1720	1336	951	905	915	843	866
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	189	204	210	225	223	264	249	240

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase / SASB
Minor Street: State St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

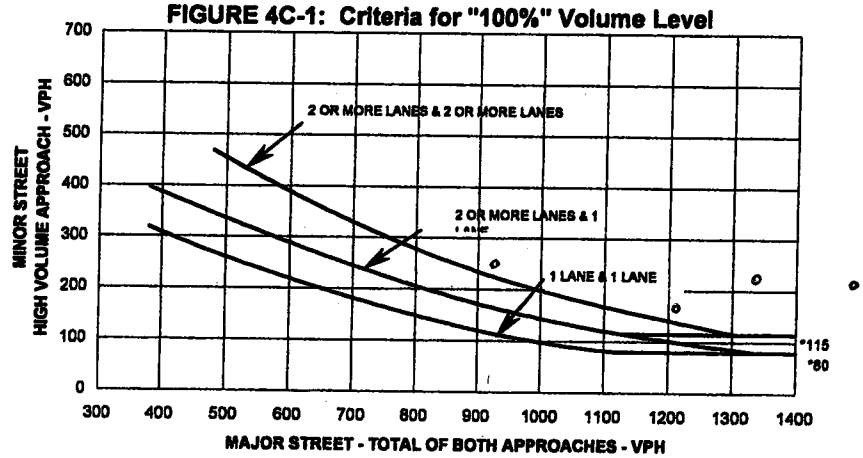
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

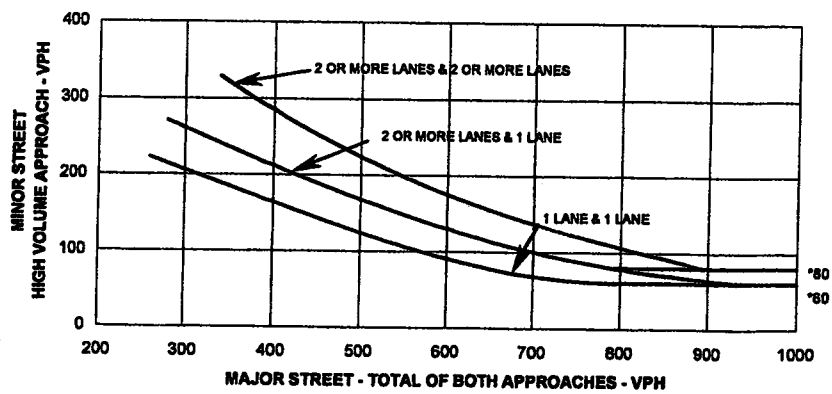
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1215	189
800	1720	204
900	1336	210
1400	918	269

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: State St

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	720	209

Criteria

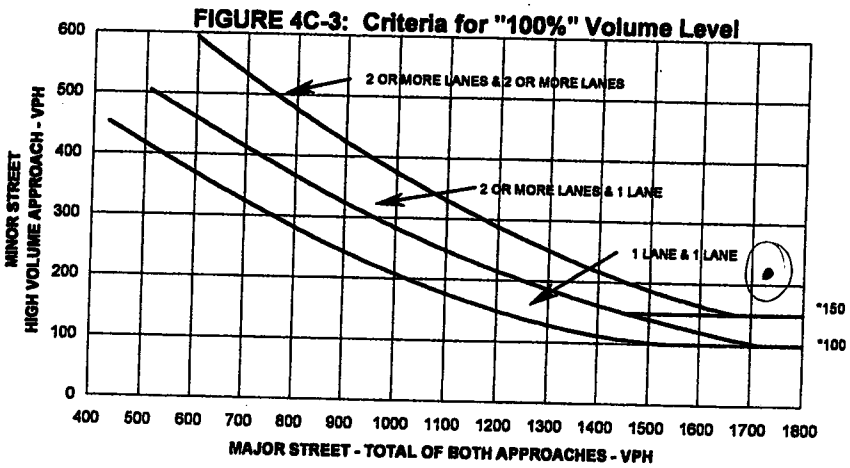
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		264
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1924	
Fulfilled?: ☒ Yes ☐ No		

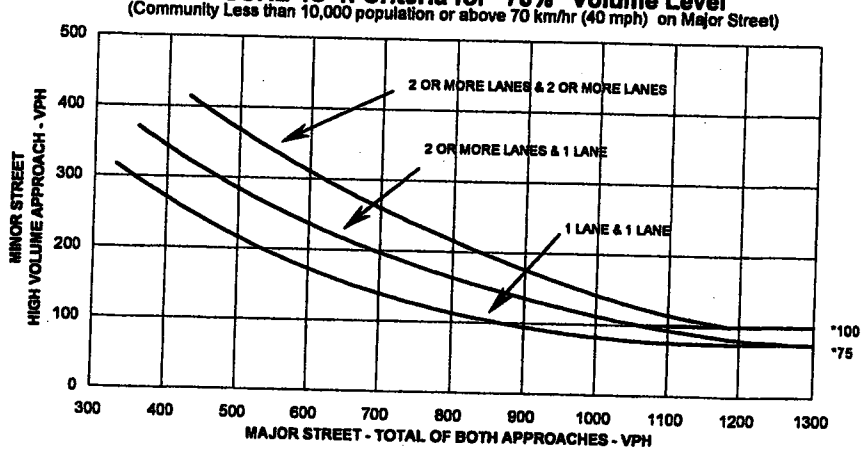
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: State St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	518			
	1300	407			
	1400	306			
	1500	40			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		518			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St. / SASB
Minor Street: State St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 929				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: Atlantic / Mercantile

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	476	456	439	470	518	454	663	887
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	277	228	192	220	256	221	226	226

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	476	456	439	470	518	454	663	887
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	277	228	192	220	256	221	226	226

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: Atlantic/Mercantile

Lanes: 2
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

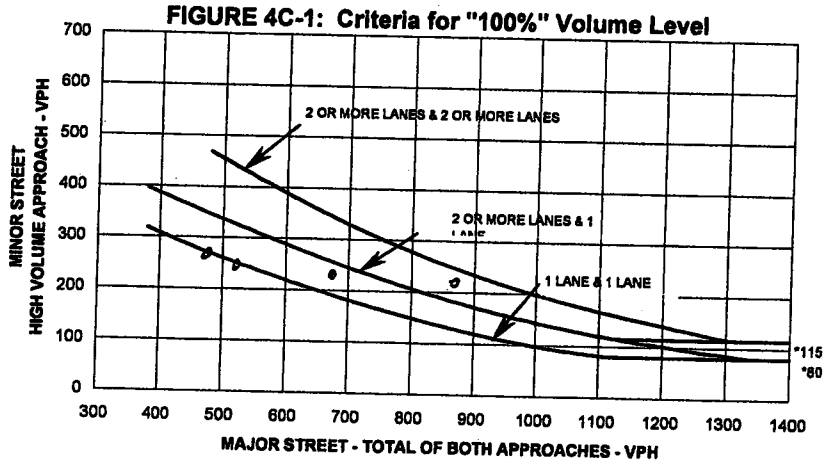
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

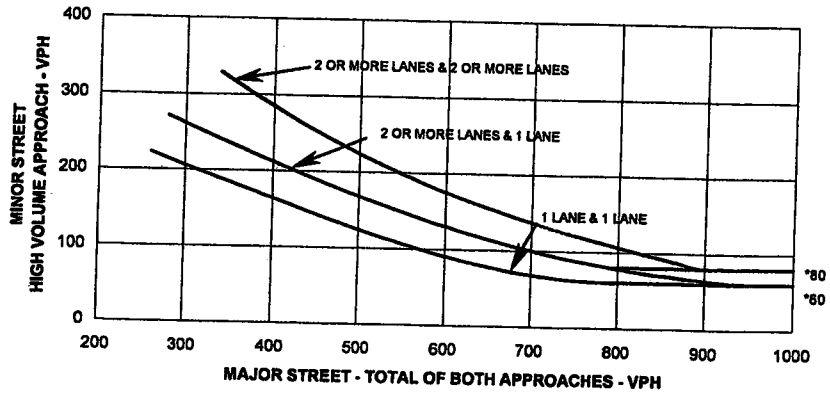
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	476	277
1400	518	256
1600	663	226
1700	887	226

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: Atlantic / Mercantile

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
700	887	226

Criteria

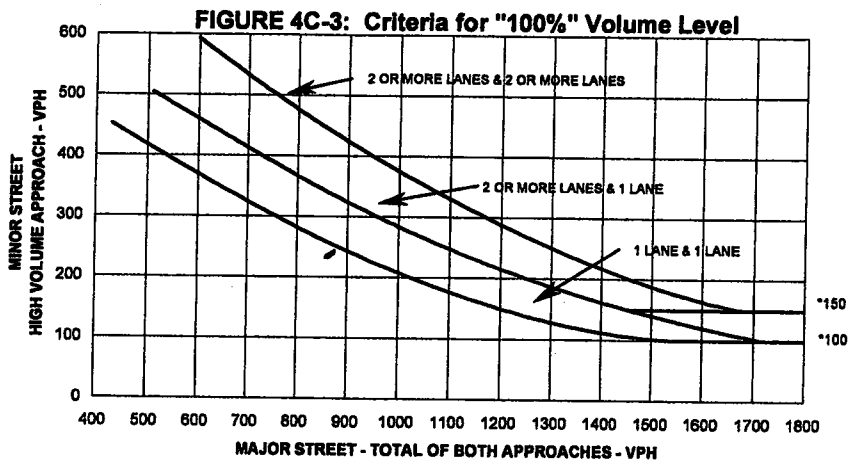
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		226
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1308	
Fulfilled?: ☒ Yes	☐ No	

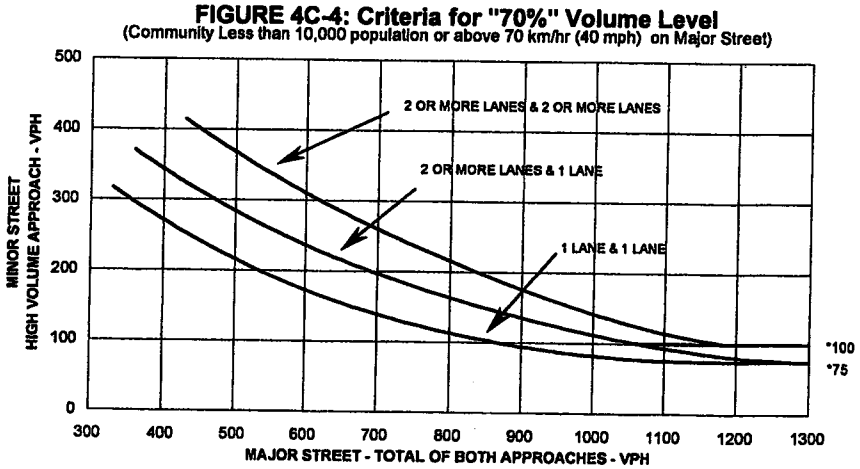
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sill
Date: 11/7/08

Major Street: Atlantic Ave.
Minor Street: Atlantic/Mercantile

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	131			
	1400	108			
	1600	134			
	1700	249			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Atlantic Ave
Minor Street: Atlantic / Merchantile

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1308		X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA			← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: Mercantile St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1180	1686	1272	965	907	799	817	825
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	208	263	207	148	177	190	216	212

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1180	1686	1272	965	907	799	817	825
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	208	263	207	148	177	190	216	212

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase / SASB
Minor Street: Mercatile St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

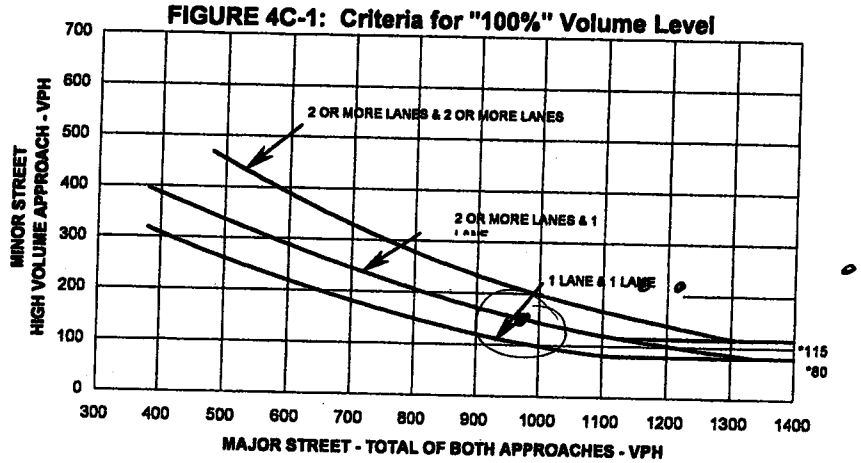
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

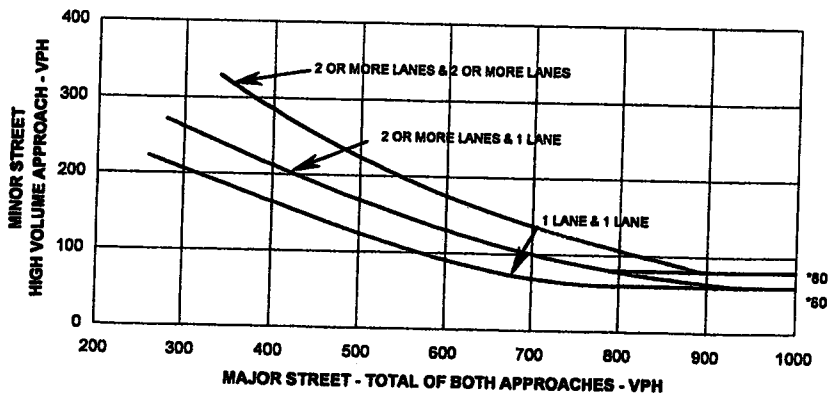
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1180	208
800	1686	263
900	1272	207
1000	965	148

FIGURE 4C-1: Criteria for "100%" Volume Level



**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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: Purchase St / SASB
Minor Street: Mercantile St.

Engineer: A. Siu
Date: 11/7/08
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1686	263

Criteria

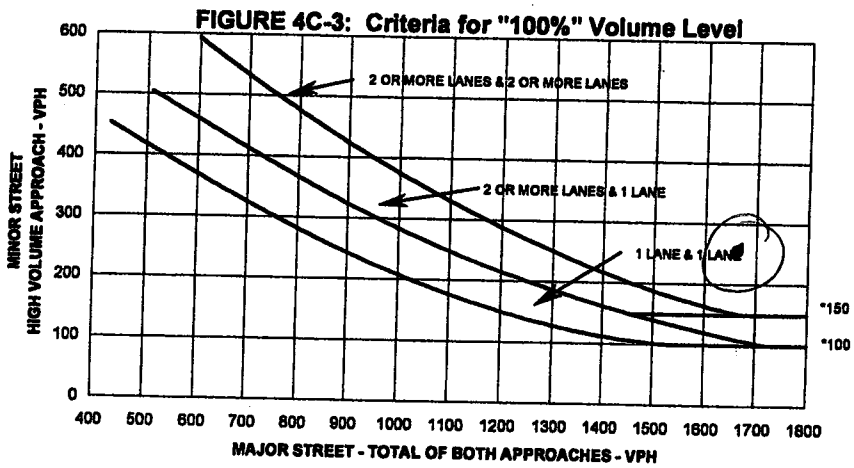
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		263
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1949	
Fulfilled?: ☒ Yes ☐ No		

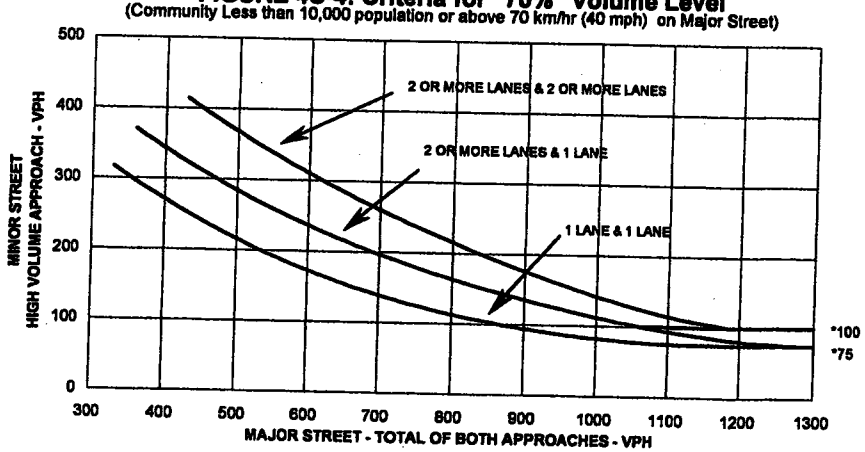
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SPSB
Minor Street: Mercantile St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	43			X
	1300	32			
	1500	27			
	1700	41			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St. / SASB
Minor Street: Mercantile St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X		X	
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1999			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X			
			Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA				← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

16

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Cross St.
Minor Street: commercial St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	325	350	349	344	438	377	439	559
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	55	35	41	40	26	25	23	38

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	325	350	349	344	438	377	439	559
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	55	35	41	40	26	25	23	38

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/7/08

Major Street: Cross St.
Minor Street: Commercial St
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

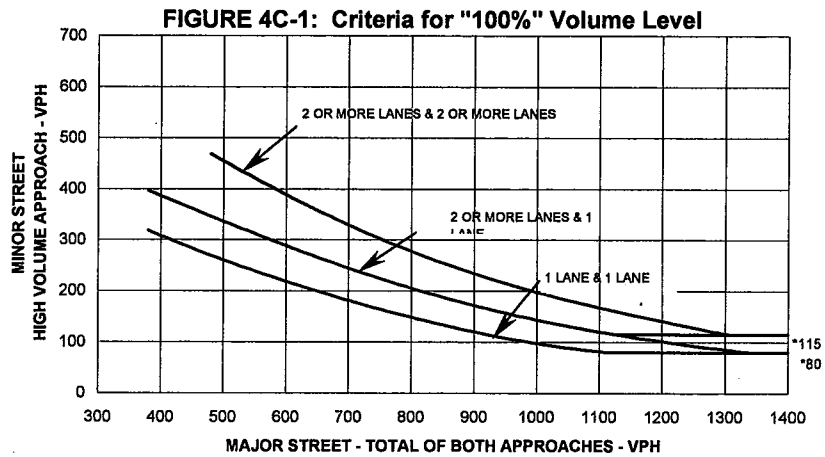
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

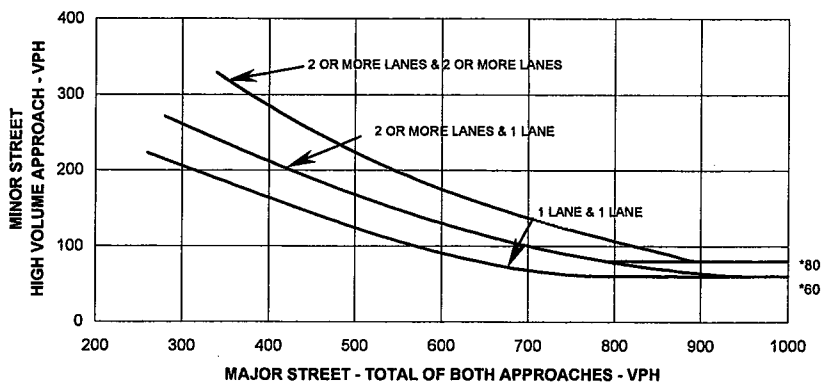
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	438	26
1500	377	25
1600	439	23
1700	559	38

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/7/08

Major Street: Cross St.
Minor Street: Commercial St
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	559	38

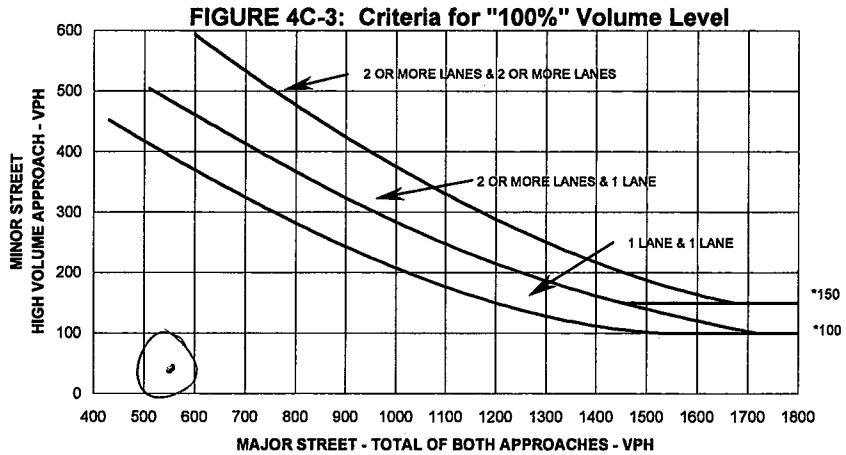
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	38	
Fulfilled?: ☐ Yes ☒ No		

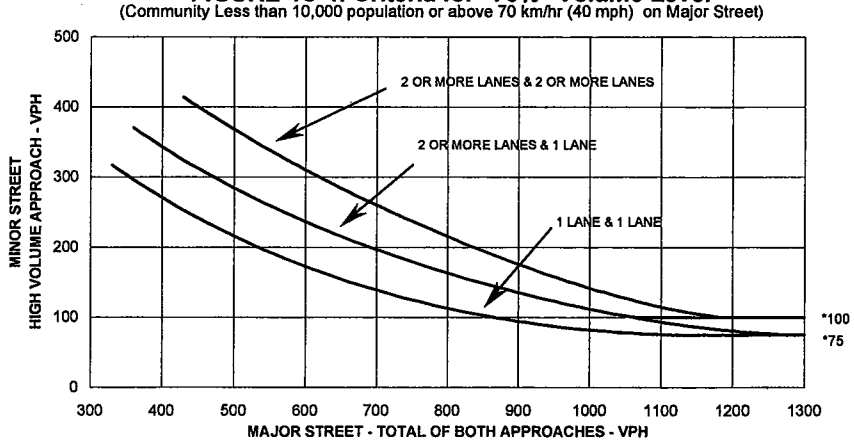
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	597	
Fulfilled?: ☐ Yes ☒ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Cross St.
Minor Street: Commercial St

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	207			
	900	151			
	1600	146			
	1700	207			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		207			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Cross St.
Minor Street: Commercial St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 597				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: Clinton / I-93 ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	736	1089	808	655	665	614	649	581
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	830	1082	870	616	465	377	342	413

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	736	1089	808	655	665	614	649	581
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	830	1082	870	616	465	377	342	413

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase / SASB
Minor Street: Clinton / Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

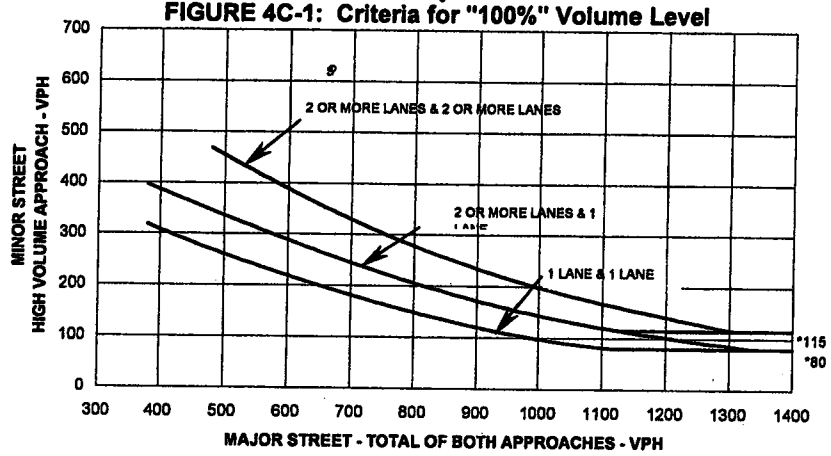
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

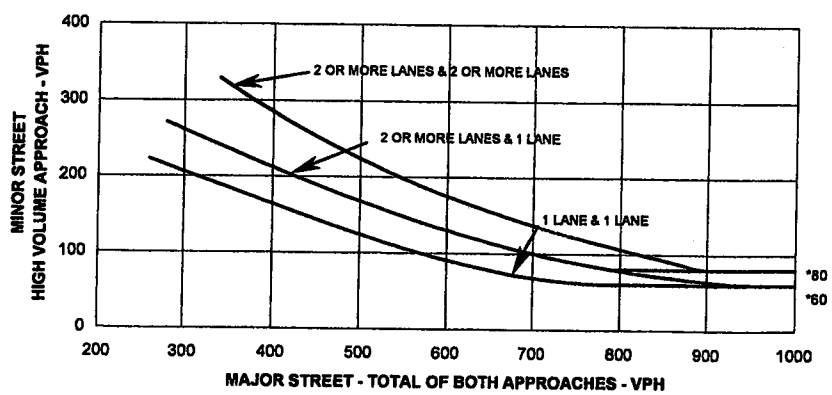
FIGURE 4C-1: Criteria for "100%" Volume Level



Four Highest Hours	Volumes	
	Major Street	Minor Street
700	736	830
800	1089	1082
900	808	870
1000	655	616

** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: Clinton / Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1089	1182

Criteria

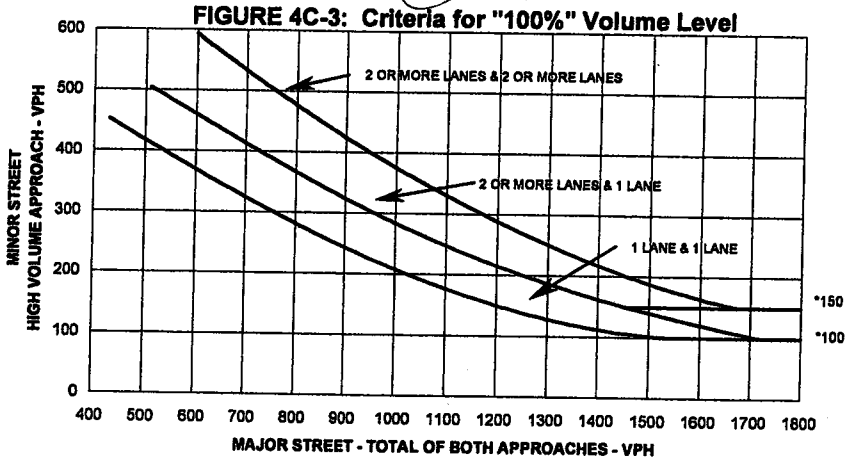
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1082
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	217	
Fulfilled?: ☒ Yes ☐ No		

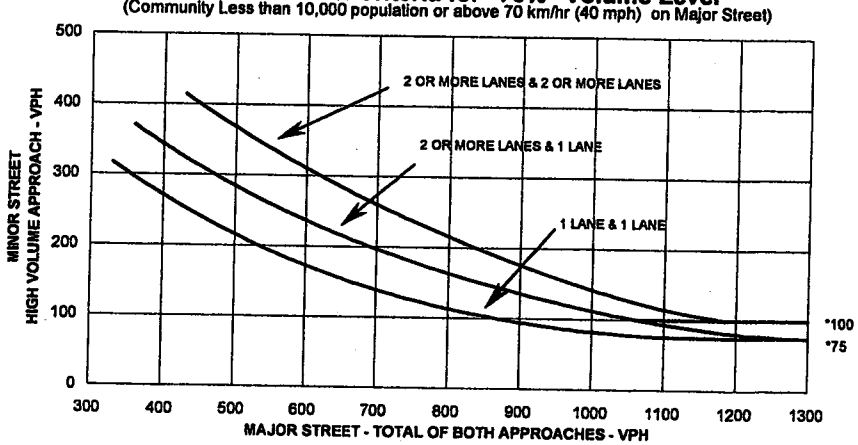
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sid
Date: 11/7/08

Major Street: Purchase St / SASB
Minor Street: Clinton / Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	165			
	1300	159			
	1600	168			
	1700	220			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		220			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/7/08

Major Street: Purchase St. / SASB
Minor Street: Clinton / Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2171			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Surface St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		900	1000	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1339	1306	1197	1207	1223	1330	1354	1450
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	785	967	910	913	932	1118	1185	1260

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		900	1000	1100	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1339	1306	1197	1207	1223	1330	1354	1450
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	785	967	910	913	932	1118	1185	1260

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sin
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Surface St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

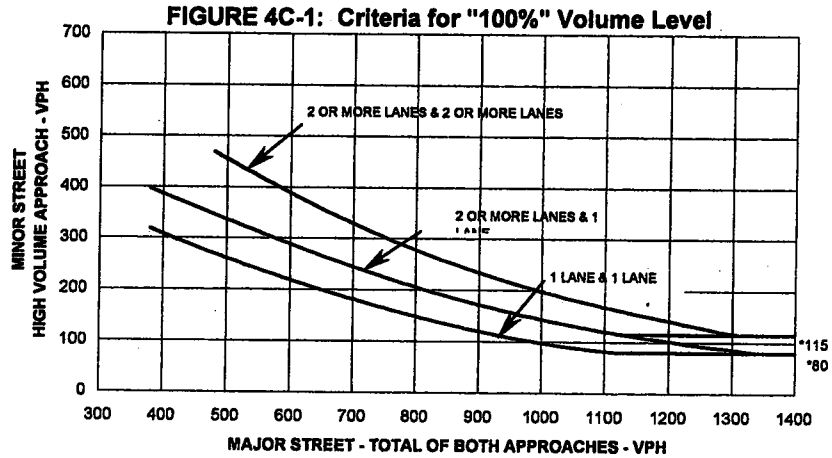
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

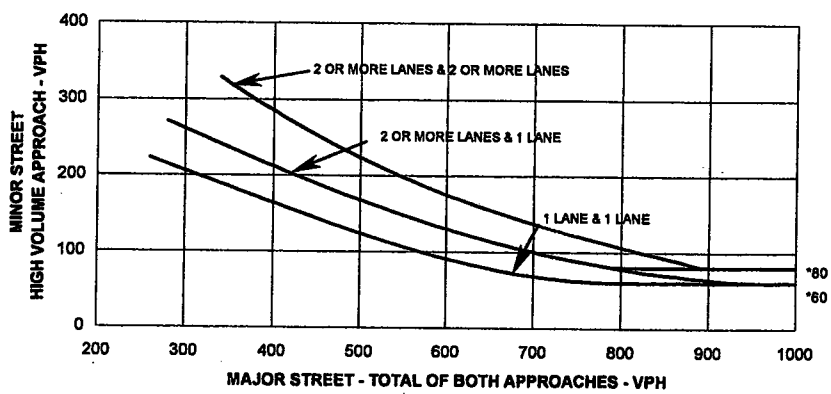
Four Highest Hours	Volumes	
	Major Street	Minor Street
10:00	1306	967
15:00	1330	1118
16:00	1354	1185
17:00	1450	1260

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St. Lanes: 2 Critical Approach Speed: 30
Minor Street: Surface St. Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1450	1260

Criteria

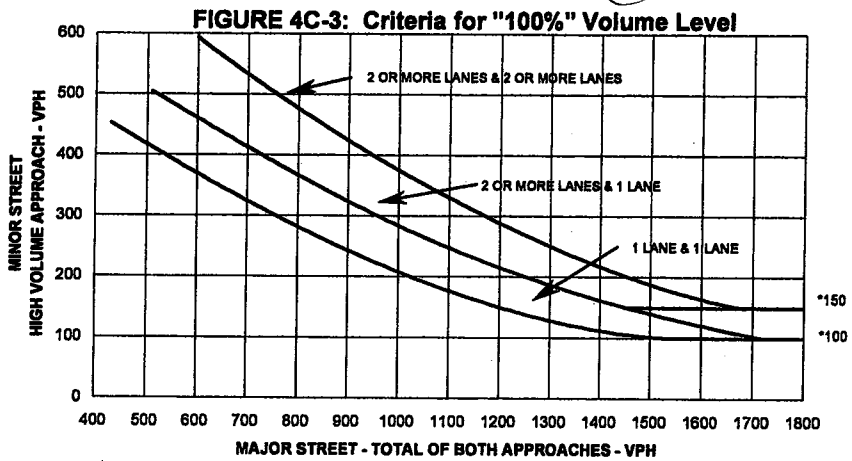
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

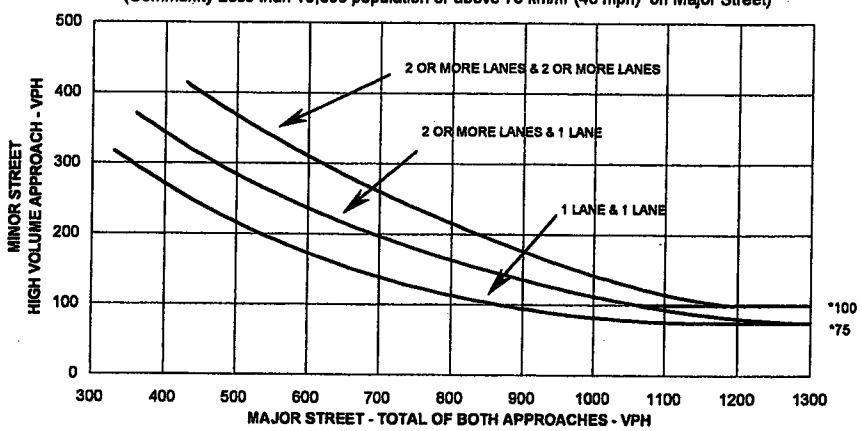
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Surface St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	28			X
	800	38			
	1400	17			
	1600	22			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Surface St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			15	X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2710			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	Y			
	Minor Street:	Y			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SASB
Minor Street: Beach St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	850	786	798	850	928	1070	1213	1298
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	117	98	120	88	79	83	75	88

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	850	786	798	850	928	1070	1213	1298
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	117	98	120	88	79	83	75	88

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Not Applicable: ☐

Delay is not excessive.

WARRANT 3 - PEAK HOUR

Not Applicable: ☐

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/21/08
Major Street: SASB
Lanes: 3
Critical Approach Speed: 30
Minor Street: Beach St.
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

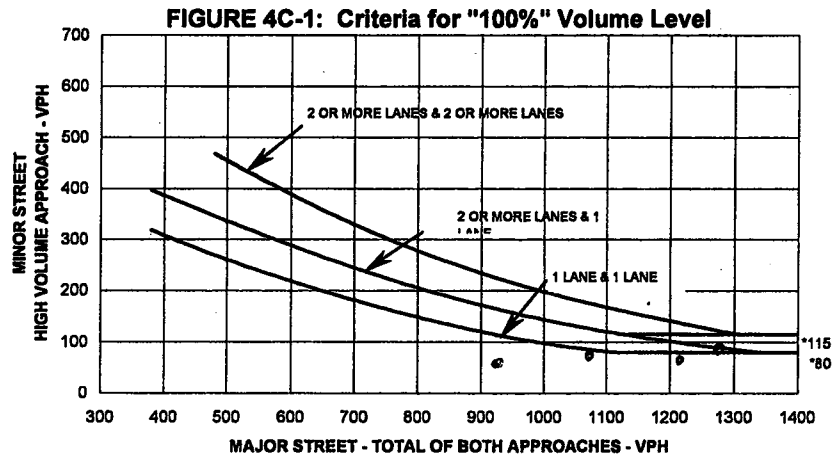
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

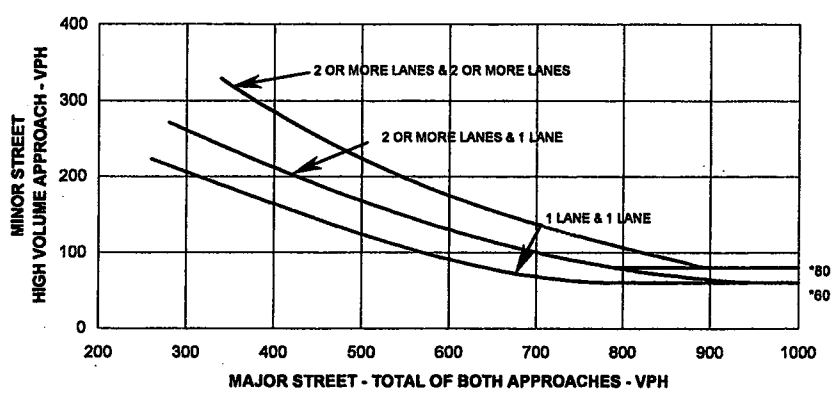
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	928	79
1500	1070	83
1600	1213	75
1700	1298	88

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/7/08
Major Street: SASB
Minor Street: Beach St.
Lanes: 3
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1298	88

Criteria

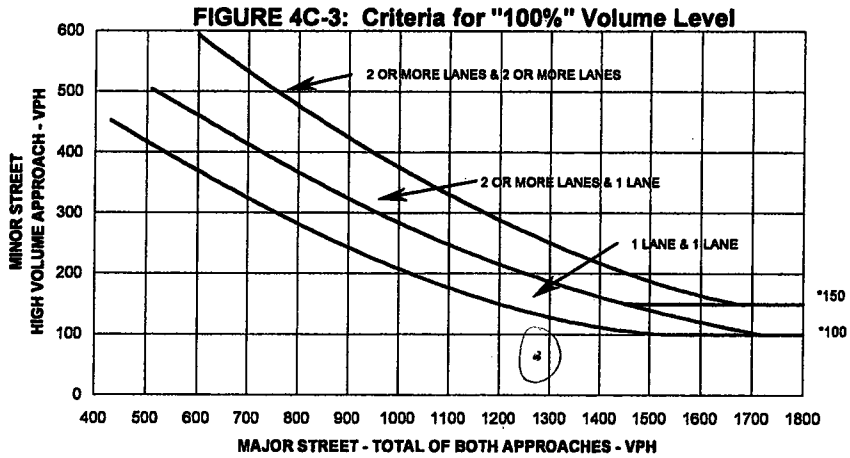
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	88	
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1386	
Fulfilled?: ☒ Yes ☐ No		

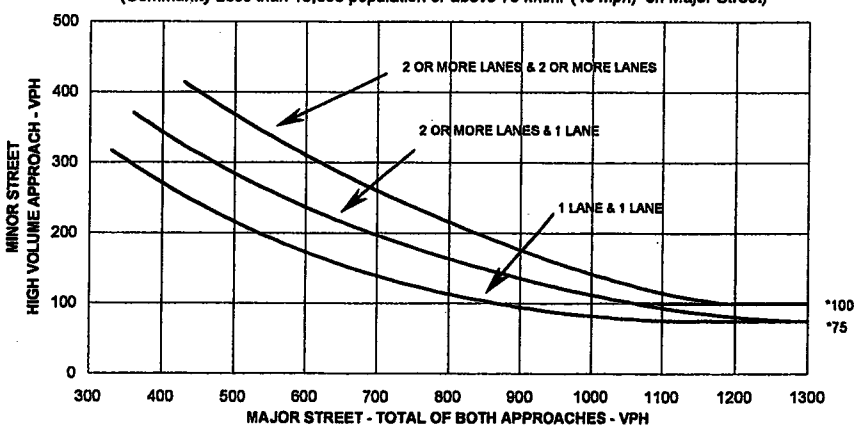
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/27/08
Major Street: SASB
Minor Street: Beach St.
Lanes: 3
Lanes: 1
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	753			
	1000	829			
	1100	700			
	1200	901			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SABB
Minor Street: Beach St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 0					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1386		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			X
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SABB
Minor Street: I-93, ESSEX

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	714	714	794	870	934	873	1013	1104
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	714	648	629	640	692	714	619	732

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	714	714	794	870	934	873	1013	1104
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	714	648	629	640	692	714	619	732

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SASB
Minor Street: I-93, Essex

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

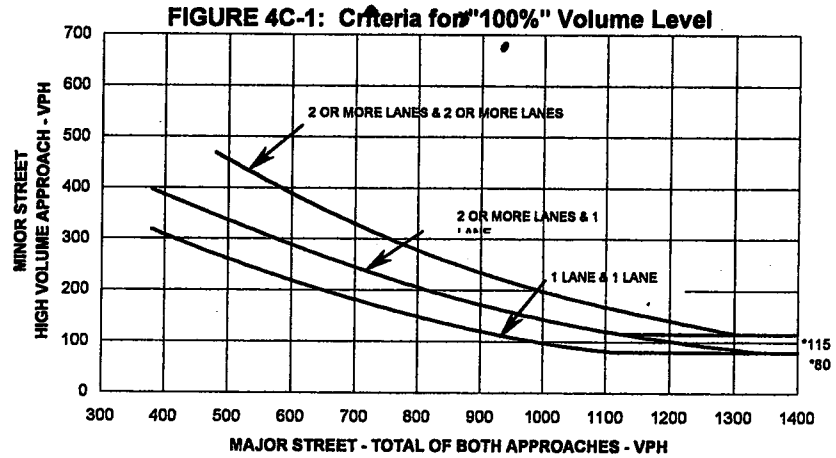
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

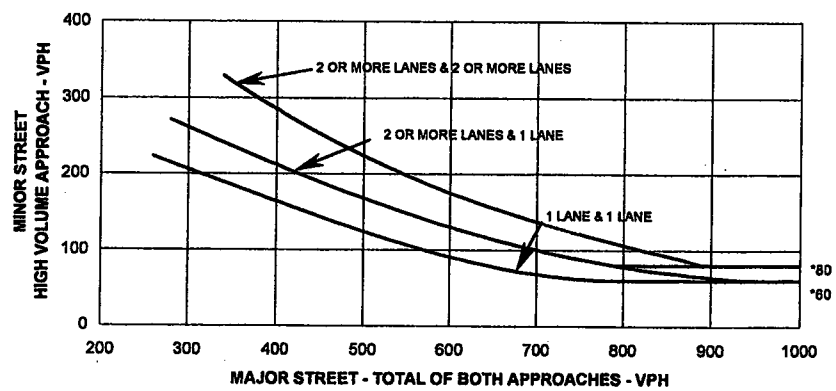
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	714	714
1400	934	692
1500	873	714
1700	1104	732

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/21/08
Major Street: SASB
Lanes: 3
Critical Approach Speed: 30
Minor Street: I-93, Essex
Lanes: 3

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1109	732

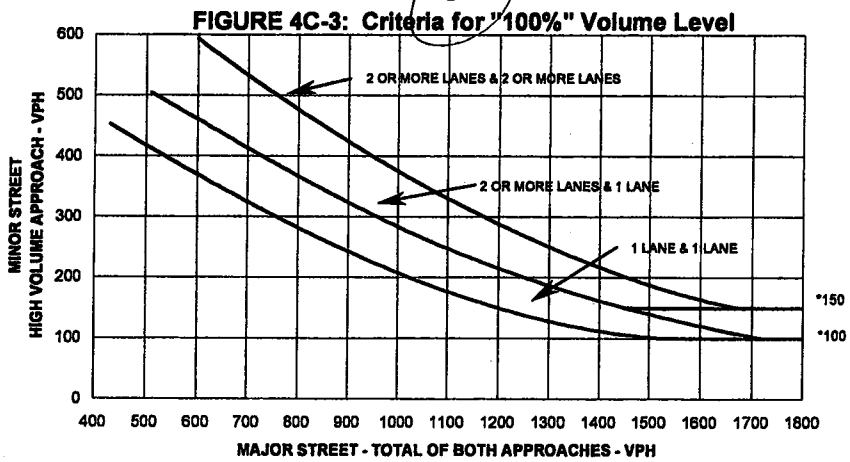
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		732
Fulfilled?: ☒ Yes ☐ No		

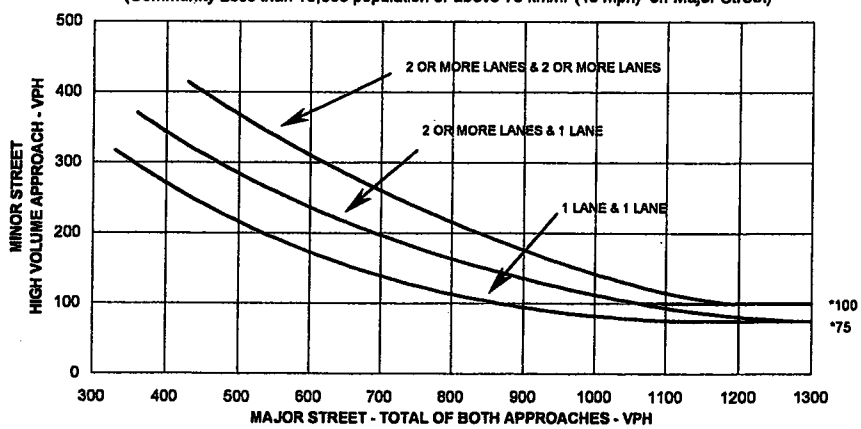
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1109	
Fulfilled?: ☒ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SASB
Minor Street: I-93, Essex

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	445			
	800	612			
	1200	458			
	1700	483			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/21/08

Major Street: SABB
Minor Street: I-93, Essex

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 5				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2259			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

21

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Essex St.
Minor Street: South St.

Lanes: 2
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Not Applicable: ☒

Delay is not excessive.

WARRANT 3 - PEAK HOUR

Not Applicable: ☒

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Essex St.
Minor Street: South St.

Lanes: 2
Lanes: ____

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

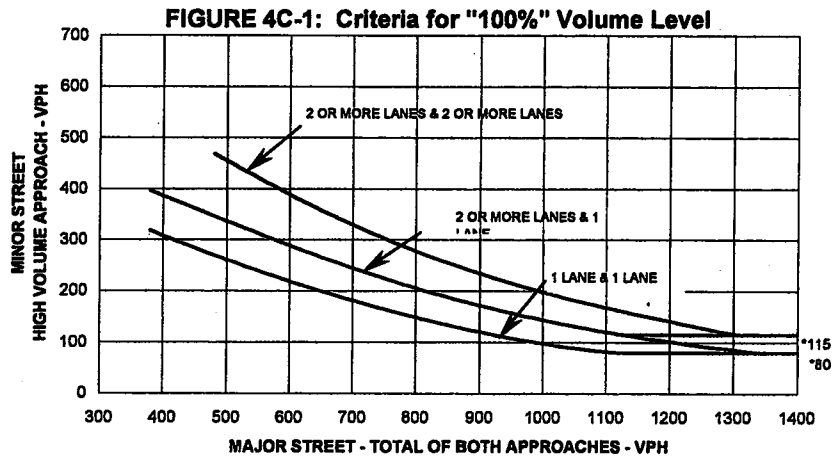
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

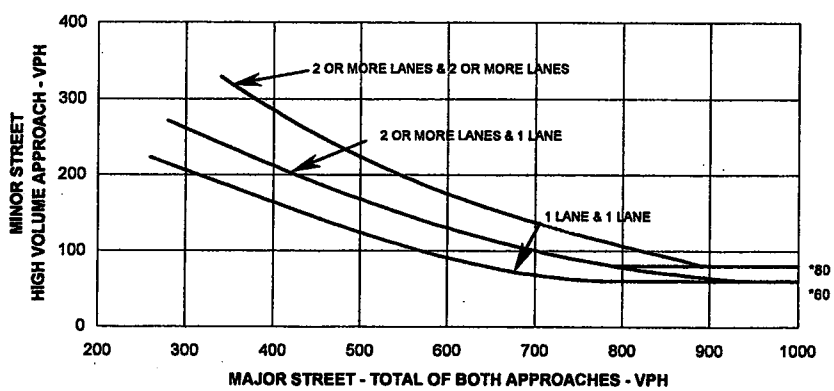
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Essex St.
Minor Street: South St.

Lanes: 2
Lanes: ____

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant:

_____

_____

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

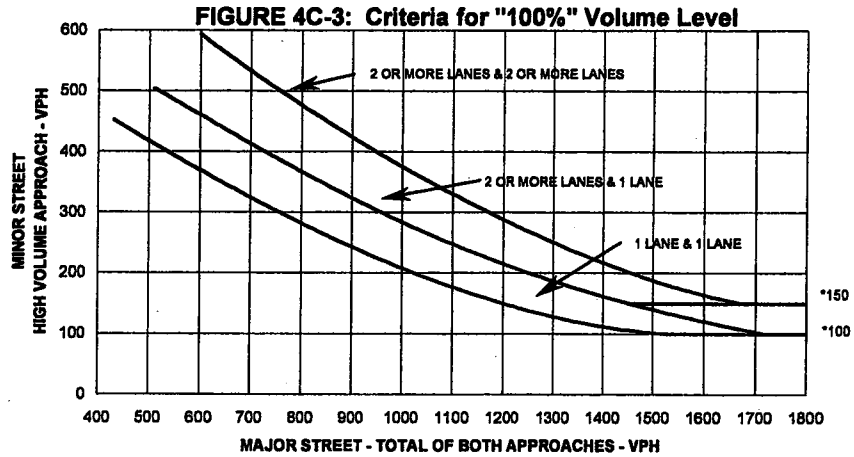
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

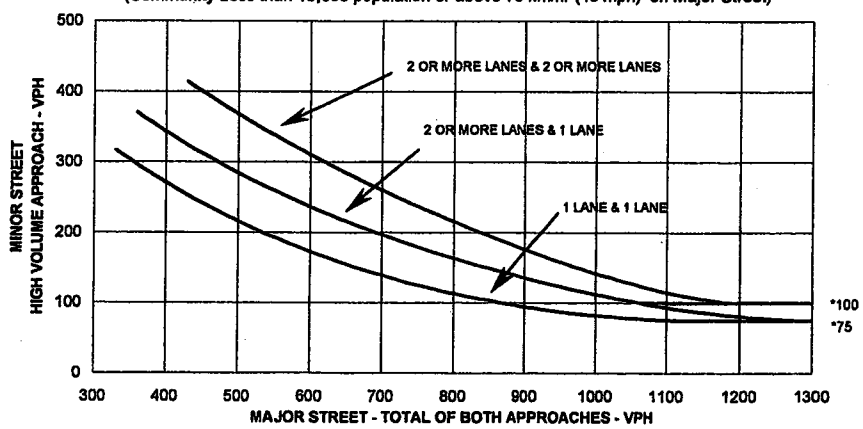
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Essex St.
Minor Street: South St.

Lanes: 2
Lanes:

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	367			
	1200	796			
	1600	349			
	1700	398			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Essex St.
Minor Street: South St.

Lanes: 2
Lanes:

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 499				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Summer St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1300	1400	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	947	1007	1066	1026	878	843	918	1002
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	619	767	637	529	497	526	479	624

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1300	1400	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	947	1007	1066	1026	878	843	918	1002
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	619	767	637	529	497	526	479	624

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Summer St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

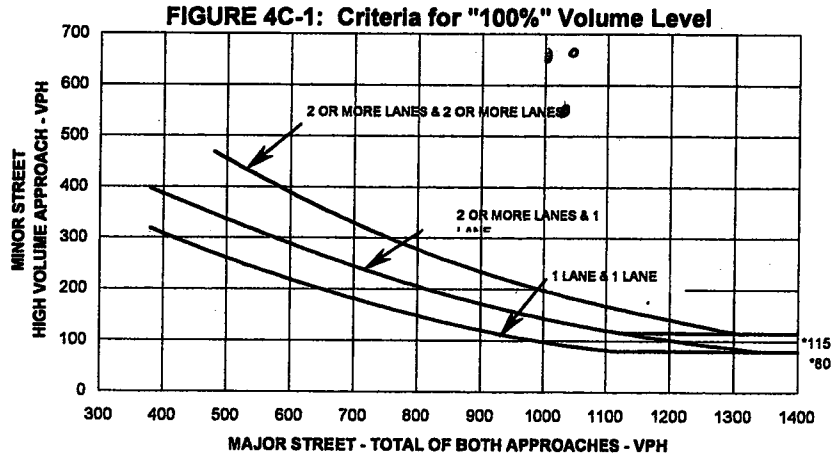
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

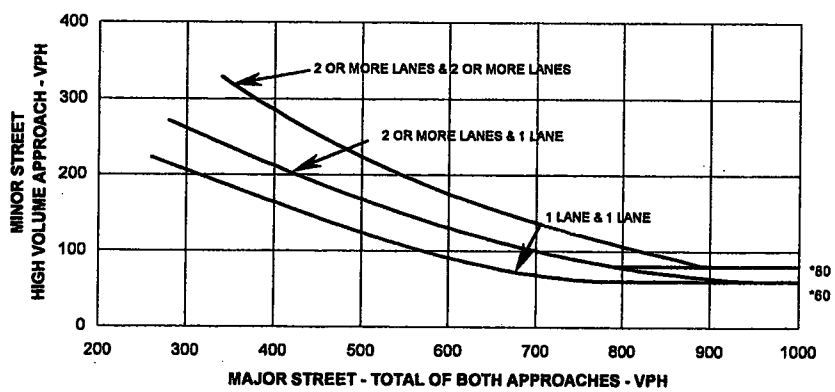
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1007	767
900	1066	637
1000	1026	529
1700	1002	624

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Summer St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1007	767

Criteria

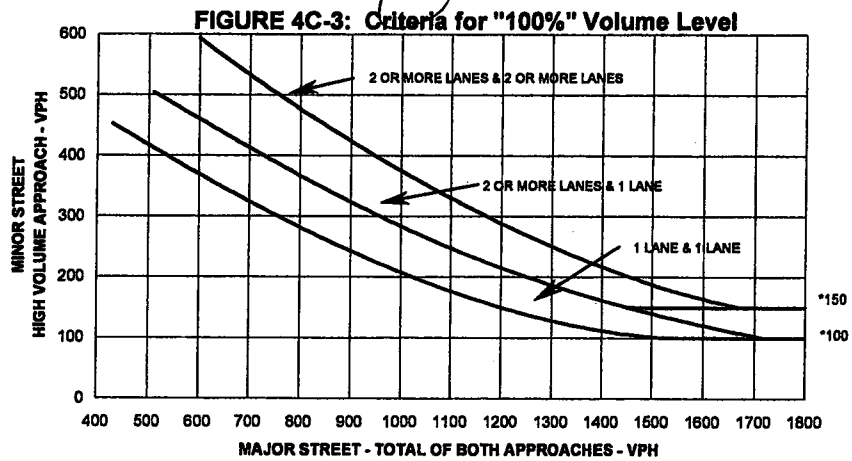
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		767
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1976	
Fulfilled?: ☒ Yes ☐ No		

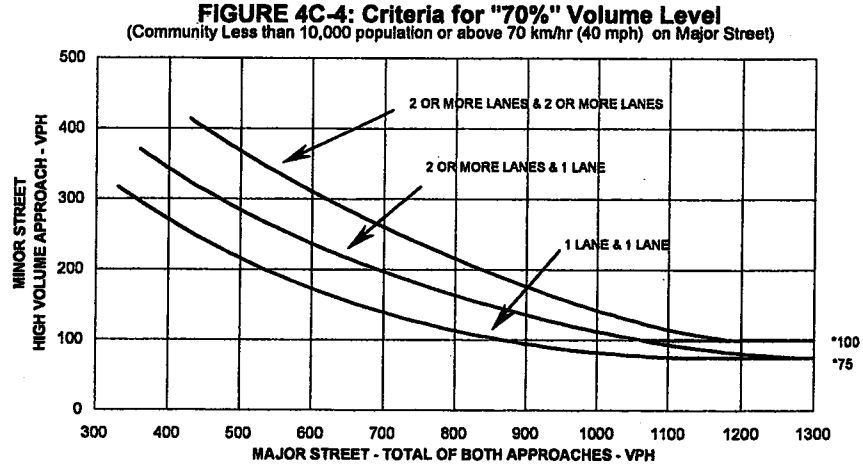
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Purchase St.
Minor Street: Summer St.
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	1549			
	800	2273			
	1600	1890			
	1700	2023			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Summer St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: [X] Yes [ ] No
Satisfied: [ ] Yes [X] No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		1			X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: [X] Yes [ ] No
Satisfied: [X] Yes [ ] No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1876			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Congress St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	1100	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1024	826	909	957	990	1063	1199	1397
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	640	684	672	717	761	972	1126	1381

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	1100	1200	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1024	826	909	957	990	1063	1199	1397
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	640	684	672	717	761	972	1126	1381

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Congress St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

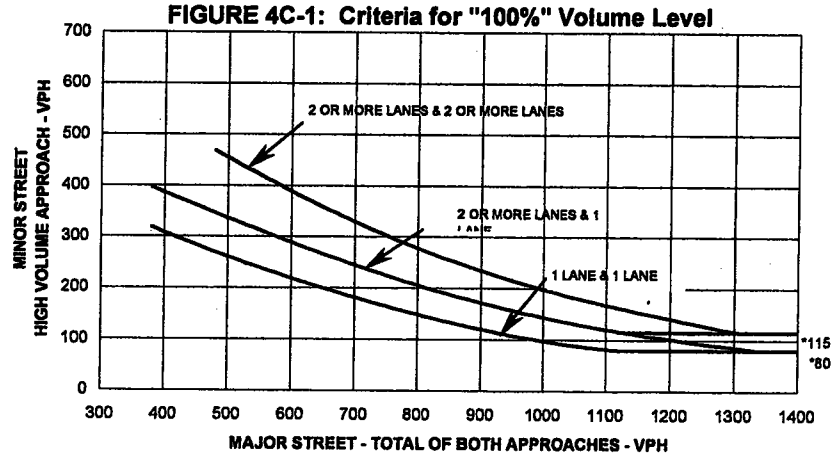
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

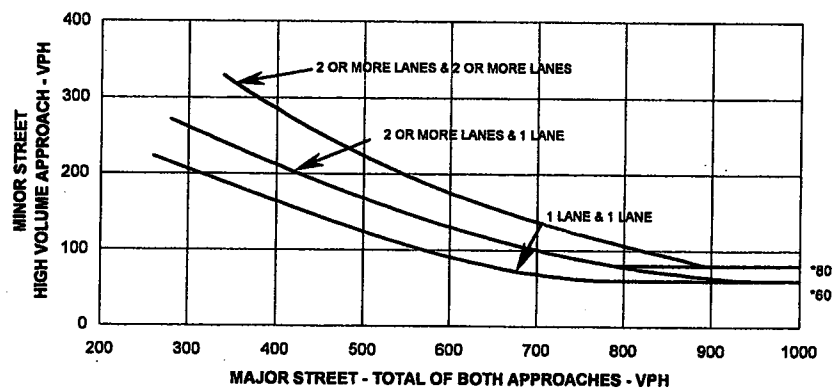
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	990	761
1500	1063	972
1600	1199	1126
1700	1397	1381

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Purchase St.
Lanes: 3
Critical Approach Speed: 30
Minor Street: Congress St
Lanes: 4

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1397	1381

Criteria

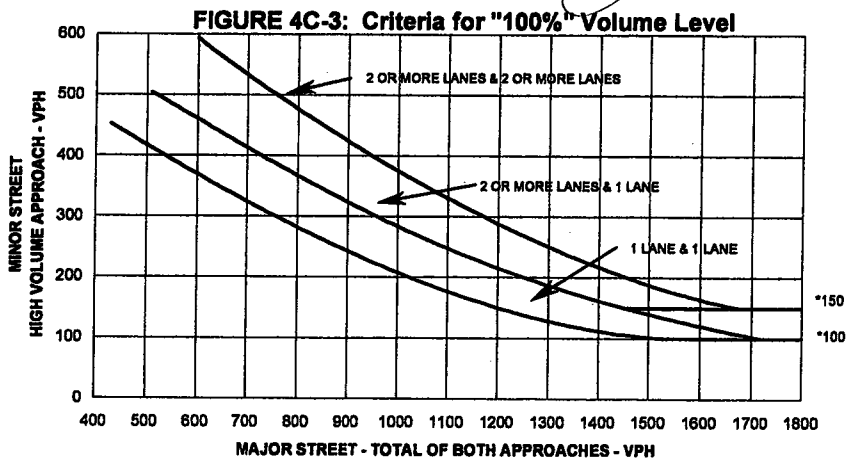
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1381
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	2778	
Fulfilled?: ☒ Yes	☐ No	

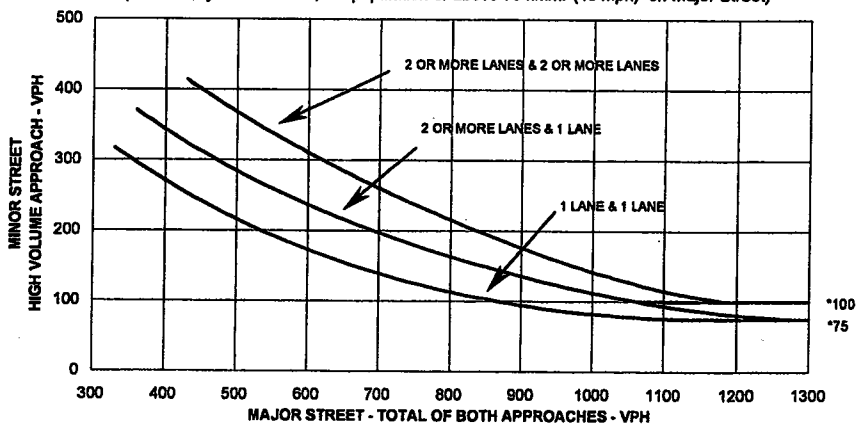
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Congress St

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	237			
	800	446			
	900	239			
	1700	327			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase St.
Minor Street: Congress St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 8				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2778				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Lincoln St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	12:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	912	1174	1137	973	1021	1015	1005	1081
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	894	1005	823	716	535	554	410	466

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	12:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	912	1174	1137	973	1021	1015	1005	1081
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	894	1005	823	716	535	554	410	466

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St
Minor Street: Lincoln St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

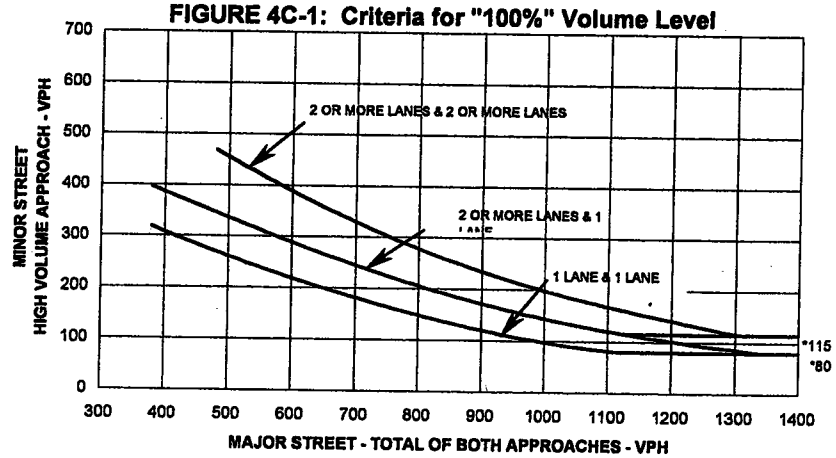
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

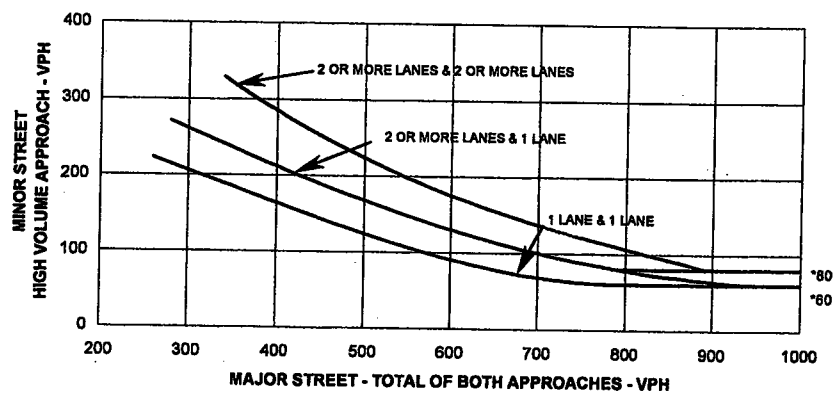
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	912	894
800	1174	1005
900	1137	823
1000	973	716

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St.
Minor Street: Lincoln St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	1174	1005

Criteria

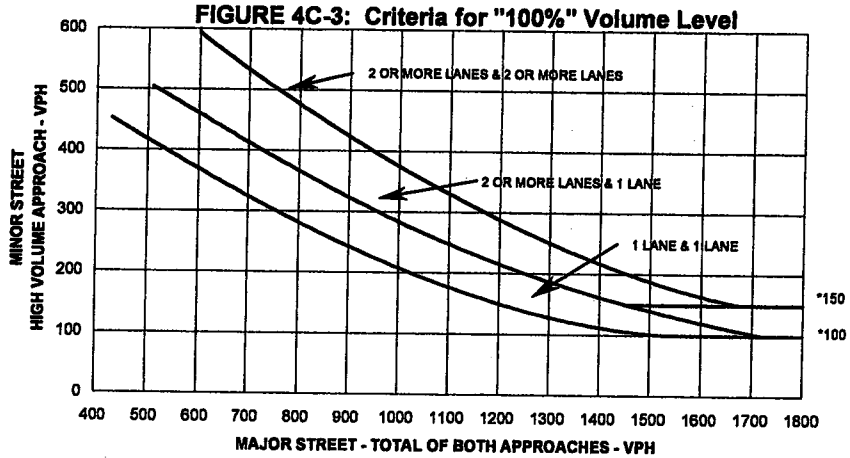
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1005
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	2179	
Fulfilled?: ☒ Yes ☐ No		

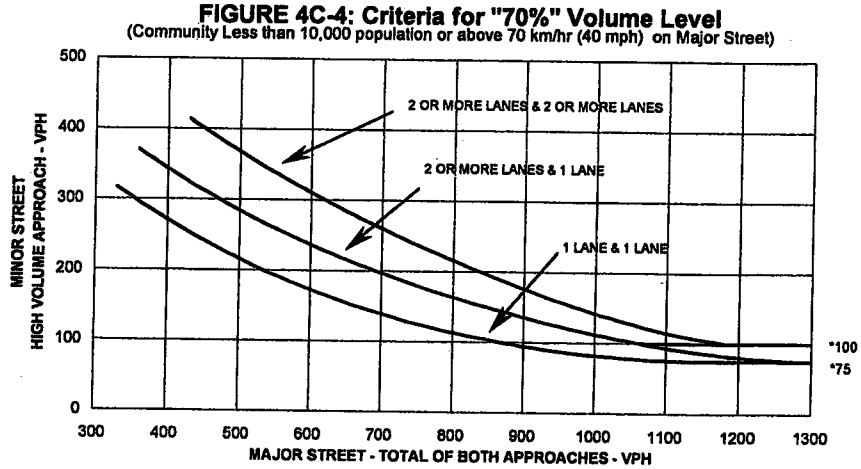
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/19/08

Major Street: Kneeland St. Lanes: 2 Critical Approach Speed: 30
Minor Street: Lincoln St. Lanes: 2

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	9			X
	1400	8			
	1500	9			
	1600	14			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Kneeland St.
Minor Street: Lincoln St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 4					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2179				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 Ramp
Minor Street: Purchase / SPSB

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1006	1132	992	838	654	516	484	454
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	307	410	437	323	373	324	380	414

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1006	1132	992	838	654	516	484	454
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	307	410	437	323	373	324	380	414

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93
Minor Street: Purchase / SASB

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

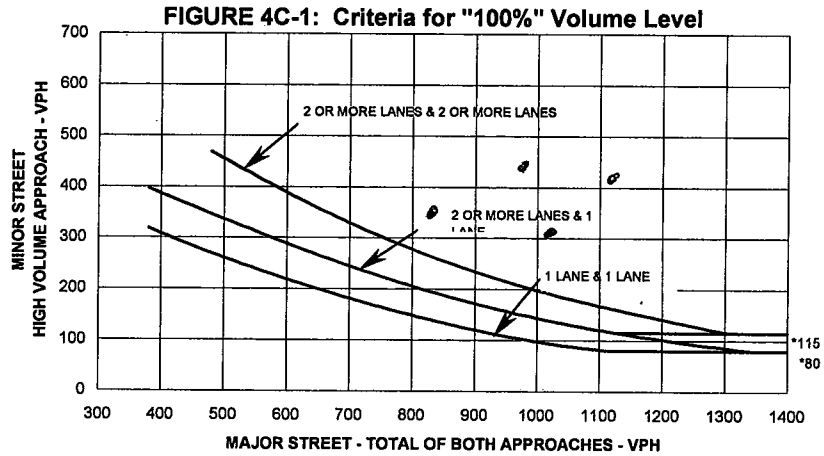
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

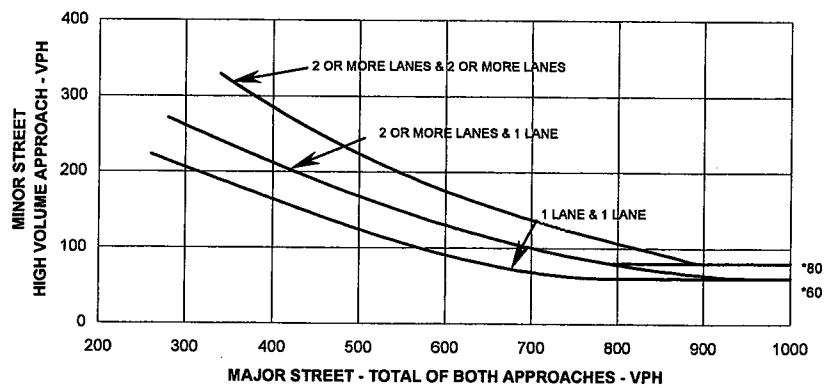
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1006	307
800	1132	416
900	992	437
1000	838	323

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93
Minor Street: Purchase / SASB

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1132	410

Criteria

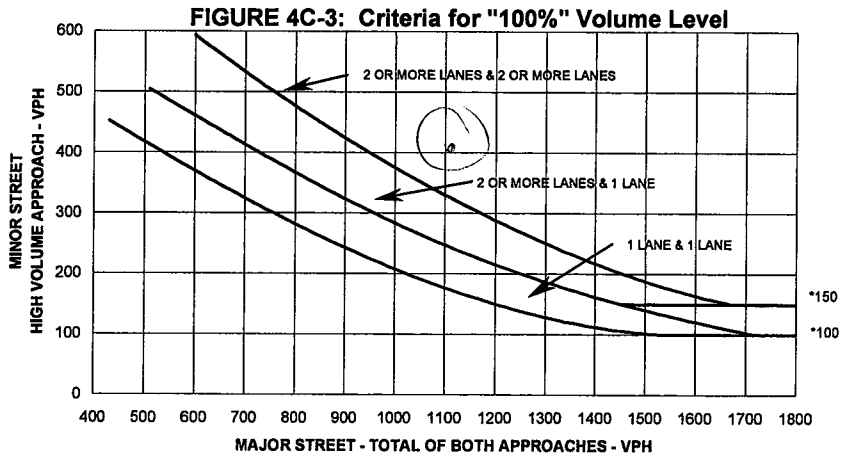
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		410
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1586	
Fulfilled?: ☒ Yes ☐ No		

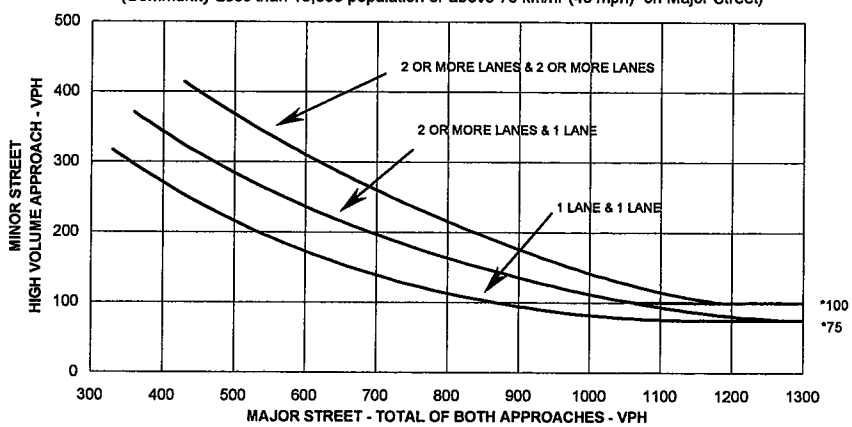
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93
Minor Street: Purchase / SAB

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	156			
	1400	274			
	1600	209			
	1700	292			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93
Minor Street: Purchase / SASB

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1586			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 ramps
Minor Street: Cross St.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	347	407	404	400	526	425	575	790
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	459	587	596	438	412	425	519	543

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	347	407	404	400	526	425	575	79
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	459	587	596	438	412	425	519	543

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 ramps
Minor Street: cross

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

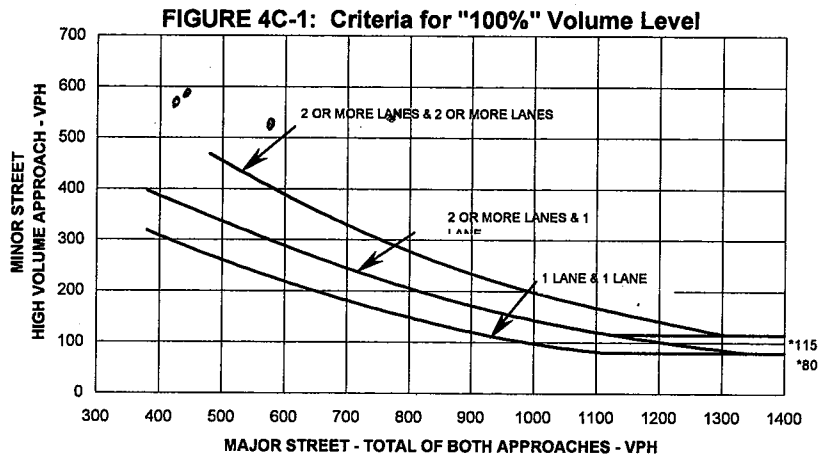
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

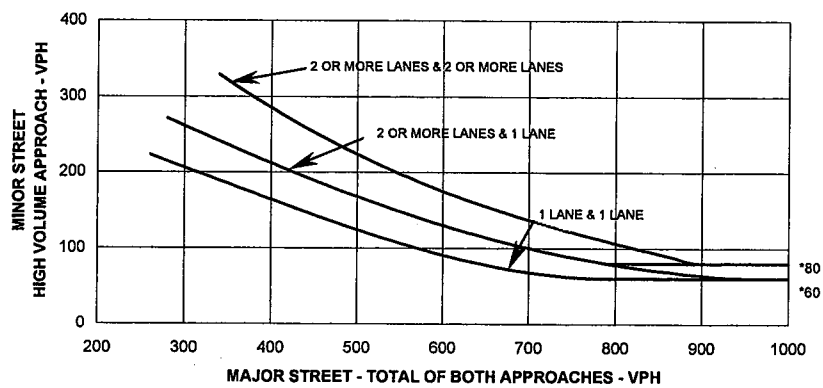
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	407	587
900	404	596
1600	575	519
1700	790	543

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 ramps
Minor Street: cross

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	790	543

Criteria

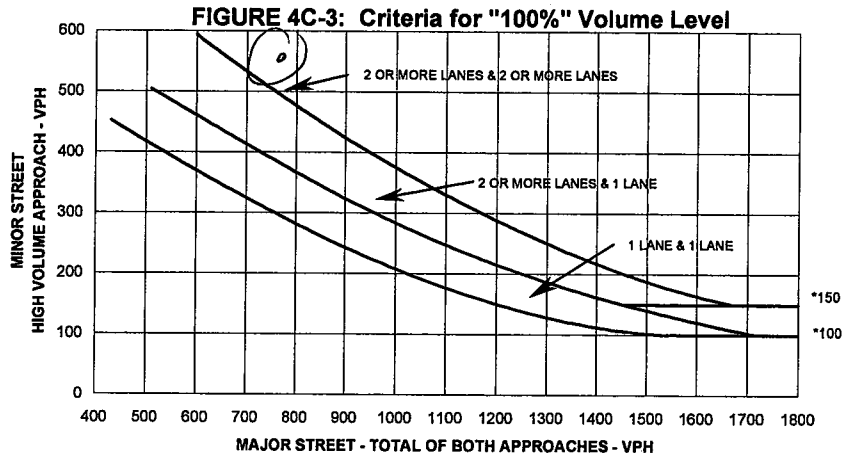
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		543
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	833	
Fulfilled?: ☒ Yes ☐ No		

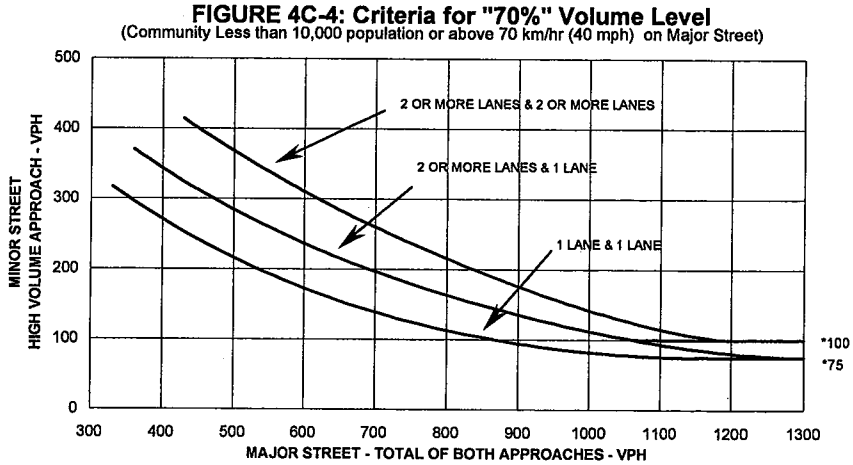
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 ramps
Minor Street: Cross St

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	169			
	1500	149			
	1600	152			
	1700	189			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: I-93 ramps
Minor Street: Cross St.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1333			X			
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: Purchase St / SASB
Minor Street: Hanover

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1300	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	399	436	370	363	348	374	368	412
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	213	202	171	147	163	161	155	172

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1100	1200	1300	1400	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	399	436	370	363	348	374	368	412
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	213	202	171	147	163	161	155	172

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: Purchase / SASB
Minor Street: Hanover

Lanes: 2
Lanes: 1

Critical Approach Speed: 36

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

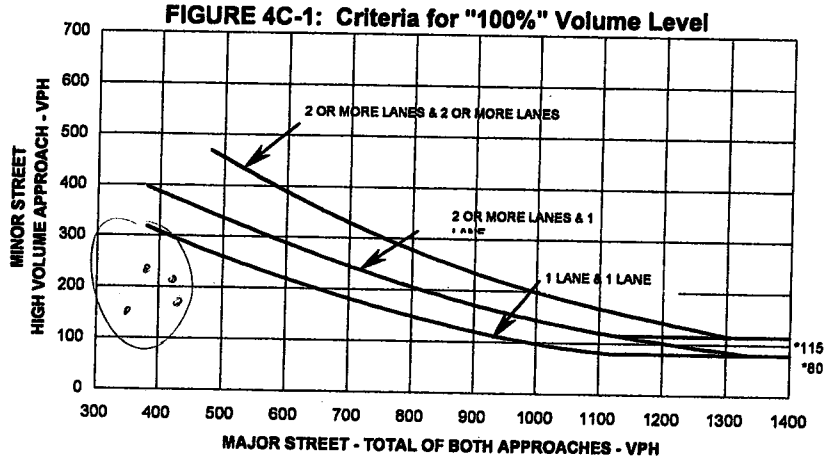
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

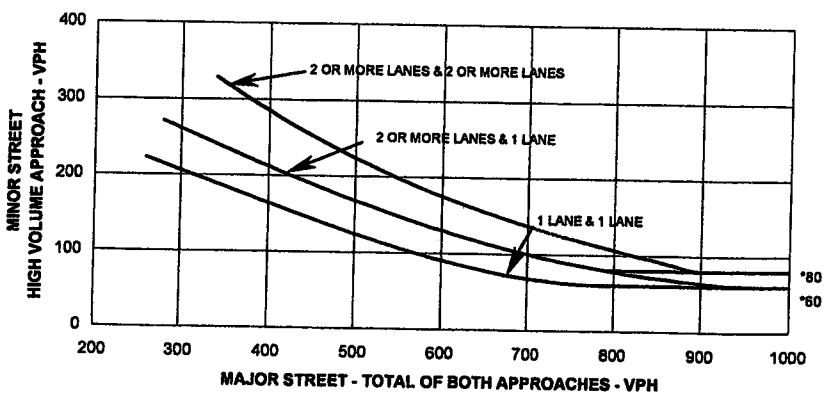
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	399	213
900	436	202
1400	374	161
1700	412	172

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: Purchase St / SASB
Minor Street: Hanover

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	412	172

Criteria

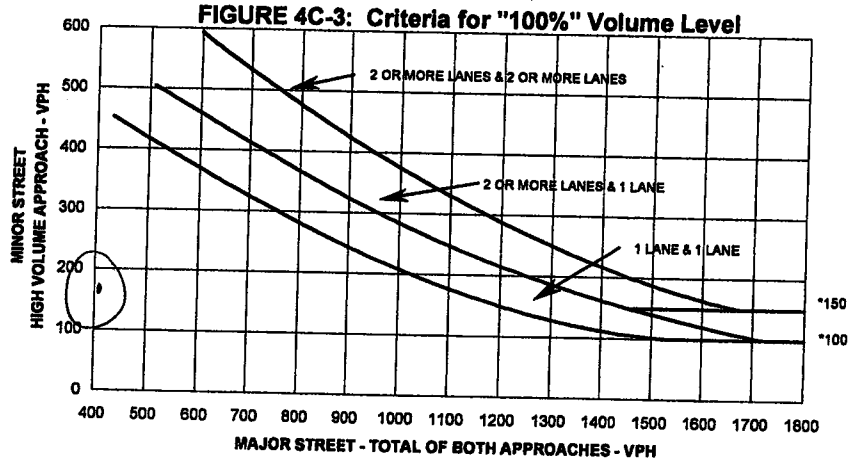
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	172	
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	661	
Fulfilled?: ☒ Yes	☐ No	

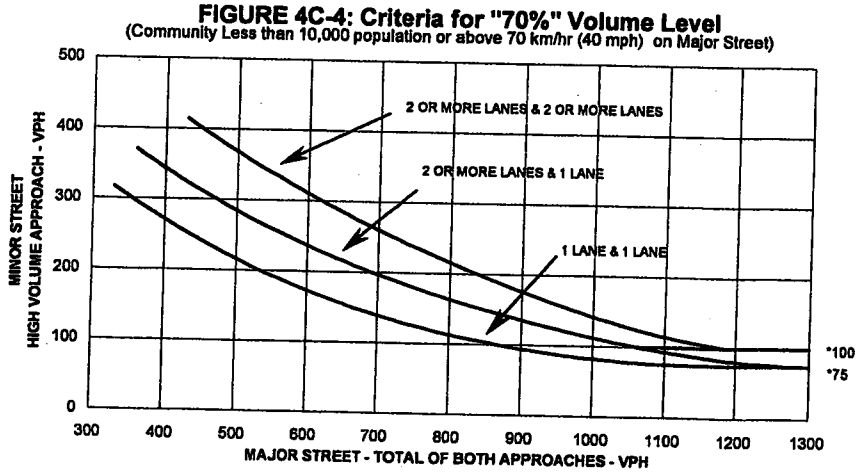
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sim
Date: 11/11/08

Major Street: Purchase St / SASB
Minor Street: Hanover

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	689			
	1400	551			
	1500	562			
	1700	596			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/11/08

Major Street: Purchase St. / SASB
Minor Street: Hanover

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume:	661				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3			X		
		Satisfied?:	N	N	N					
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA			← Hour				
						← Volume				

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Hanover St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	870	880	754	701	761	758	921	1281
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	117	107	133	159	159	182	182	206

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	870	880	754	701	761	758	921	1281
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	117	107	133	159	159	182	182	206

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Not Applicable: ☐

Delay is not excessive.

WARRANT 3 - PEAK HOUR

Not Applicable: ☐

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Hanover St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

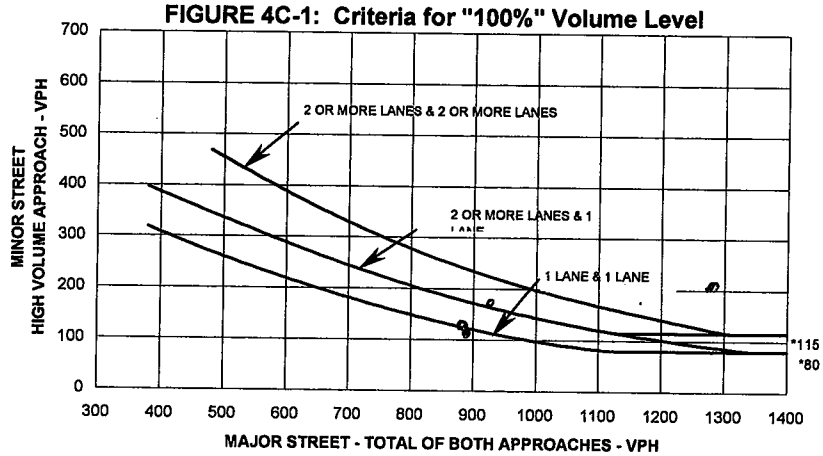
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

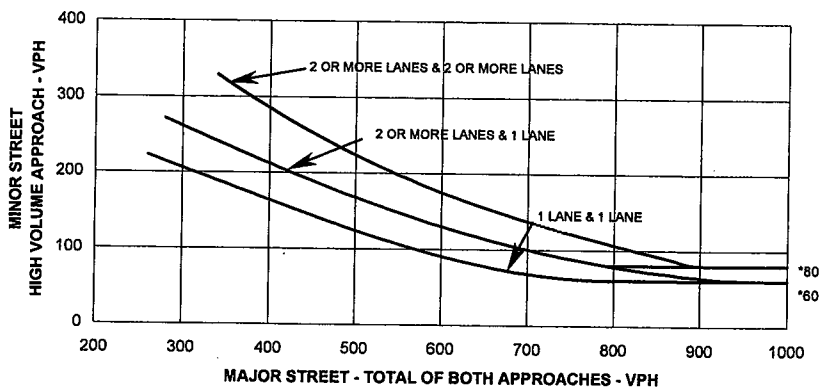
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	870	117
900	880	107
1600	921	182
1700	1281	206

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: Cross St.
Minor Street: Hanover St.
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
170	1281	206

Criteria

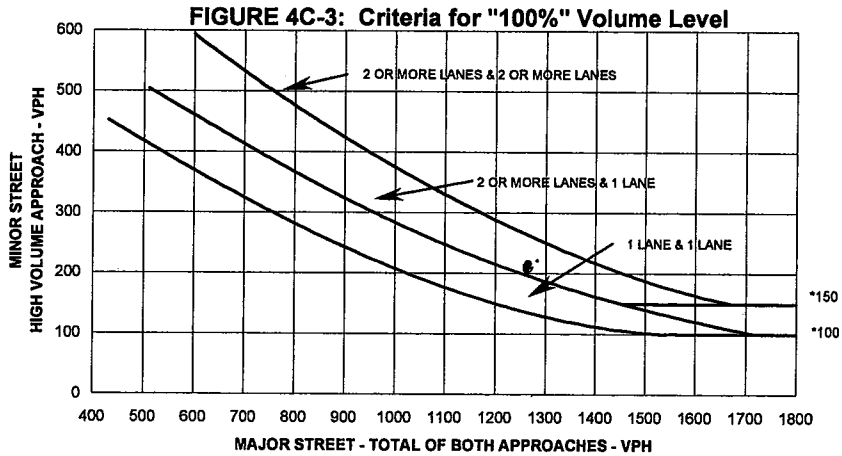
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	206	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1576	
Fulfilled?: ☒ Yes ☐ No		

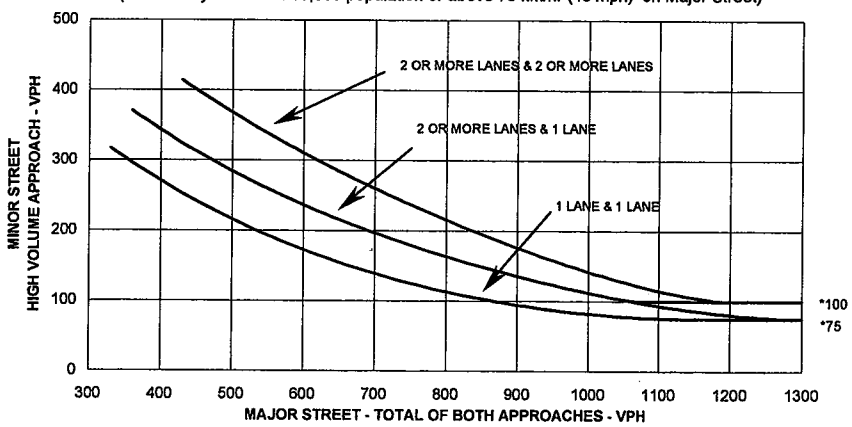
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Hanover St

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	203			
	1130	178			
	1700	272			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		272		X	
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Hanover St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour						
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1576			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	N	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Sudbury St.
Minor Street: Surface Rd.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		900	1100	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	354	488	480	490	585	669	745	908
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	345	219	255	225	257	220	267	330

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		900	1100	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	354	488	480	490	585	669	745	908
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	345	219	255	225	257	220	267	330

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Sudbury St.
Minor Street: Surface Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

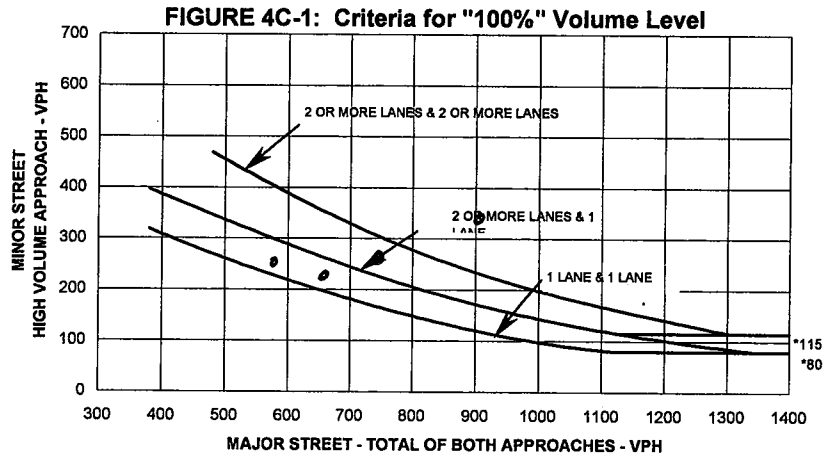
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

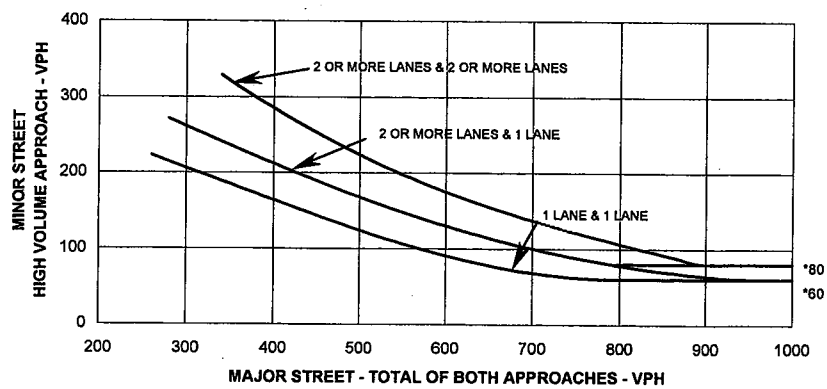
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	585	257
1500	669	220
1600	745	267
1700	908	330

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Sudbury St.
Minor Street: Surfuck Rd.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	908	330

Criteria

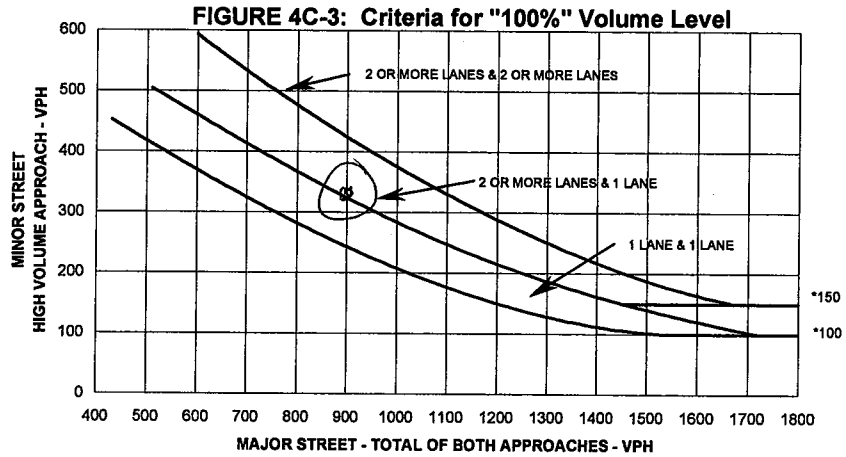
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		330
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1238	
Fulfilled?: ☒ Yes ☐ No		

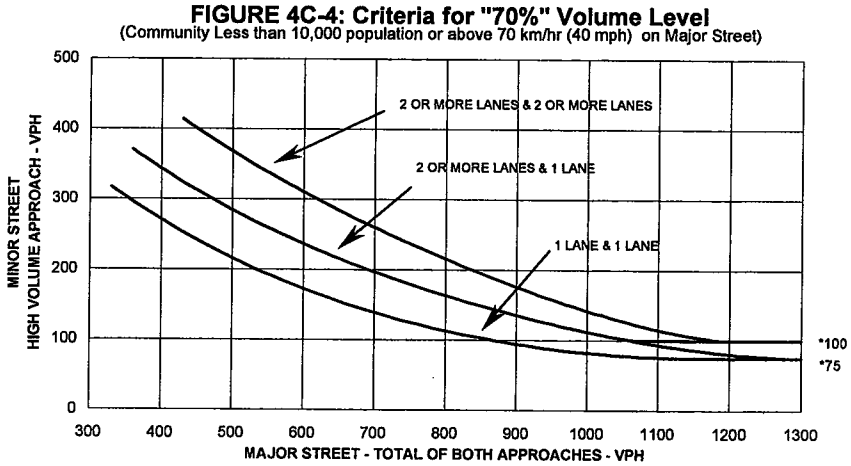
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: Sudbury St.
Minor Street: Surface Rd.
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1300	232			
	1500	259			
	1600	296			
	1700	323			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Sudbury St.
Minor Street: Surface Rd.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1238			X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Sudbury St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	657	666	624	641	613	624	717	1023
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	235	264	235	355	433	499	605	722

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	900	1000	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	657	666	624	641	613	624	717	1023
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	235	264	235	355	433	499	605	722

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Sudbury St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

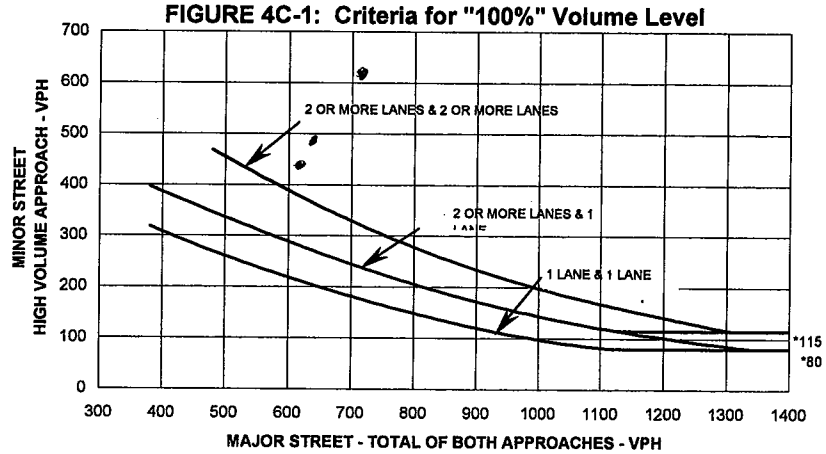
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

All points above line

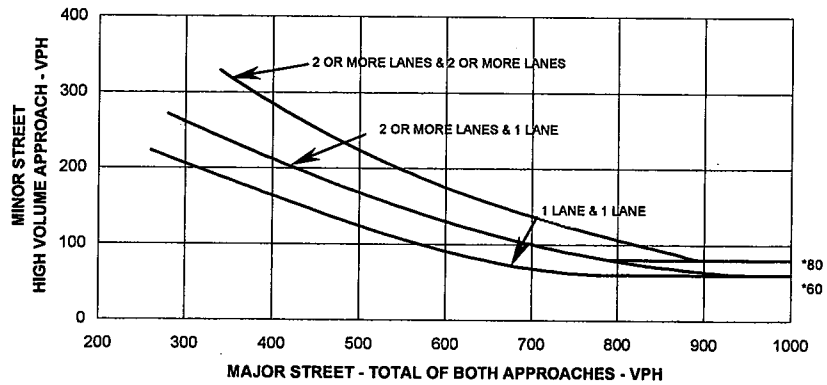
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	613	433
1500	624	499
1600	717	605
1700	1023	722

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Sudbury St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1023	722

Criteria

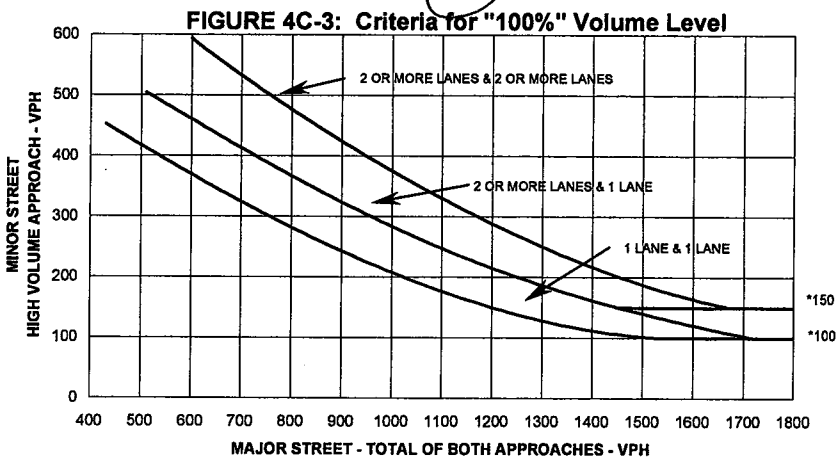
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		722
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1745	
Fulfilled?: ☒ Yes ☐ No		

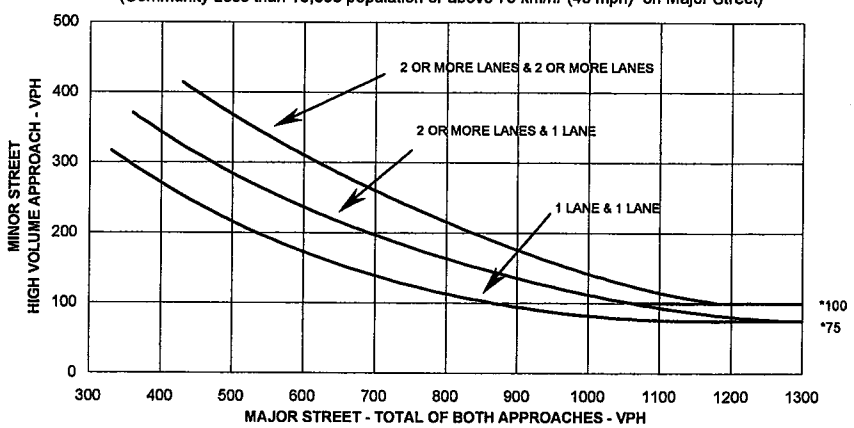
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Sudbury St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	310			
	800	439			
	900	342			
	1700	356			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: Sudbury St

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 7					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1745			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				X
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: SASB
Minor Street: I-93, New Chardon

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1192	1394	1107	938	1040	1427	1553	1339
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	562	624	481	554	686	879	991	1017

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1192	1394	1107	938	1040	1427	1553	1339
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	562	624	481	554	686	879	991	1017

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sin
Date: 11/17/08

Major Street: SASB
Minor Street: I-93, New Chardon

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

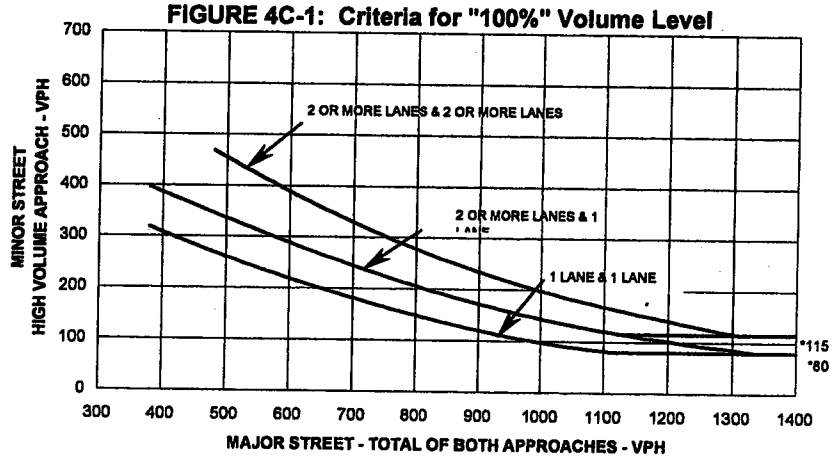
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

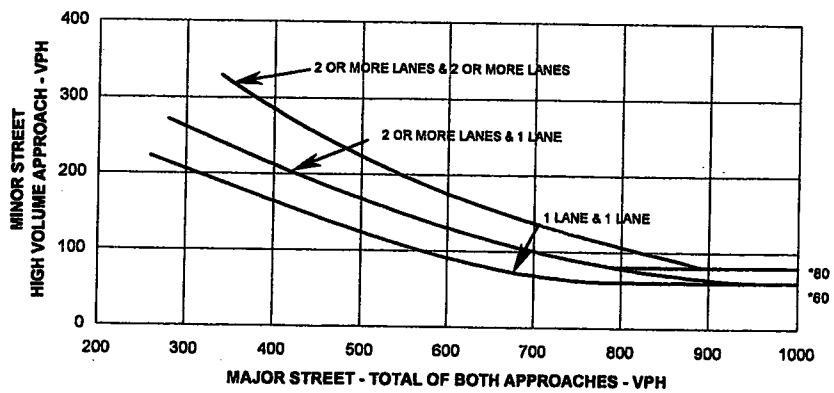
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1394	624
1500	1427	879
1600	1563	991
1700	1339	1017

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A.S.U.
Date: 11/17/08

Major Street: SASB
Minor Street: I-93, New Charaon

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1600	1553	997

Criteria

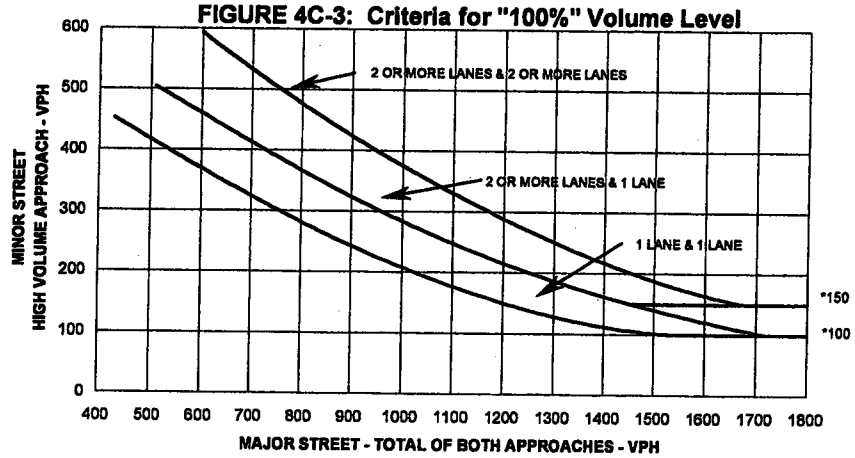
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		997
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	2762	
Fulfilled?: ☒ Yes ☐ No		

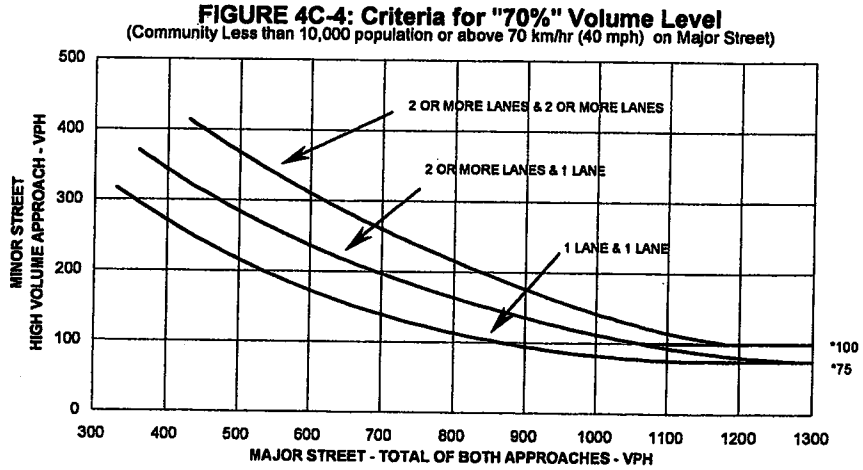
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: SASB
Minor Street: I-93, New Chardon

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	59			X
	900	52			
	1600	39			
	1700	63			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 4/17/08

Major Street: SASB
Minor Street: I-93, New Chardon

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		1			X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2947			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	No	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: I-93 ramp

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	553	654	727	646	659	670	806	943
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	170	154	187	96	124	151	142	136

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	553	654	727	646	659	670	806	943
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	170	154	187	96	124	151	142	136

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: I-93 ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

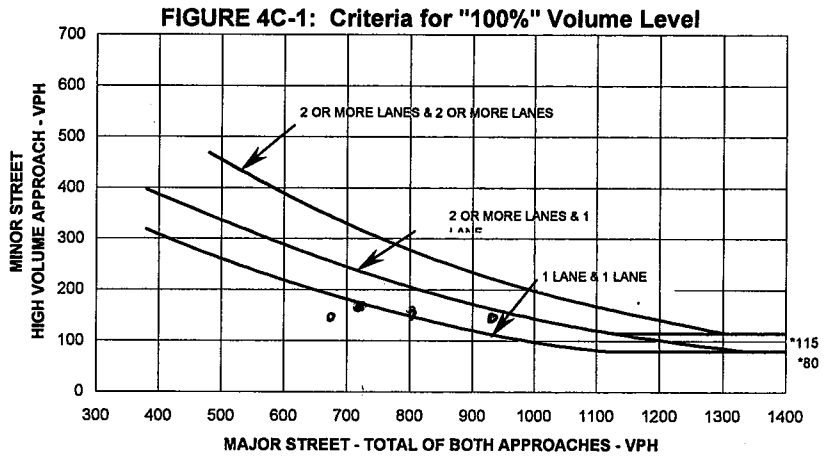
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

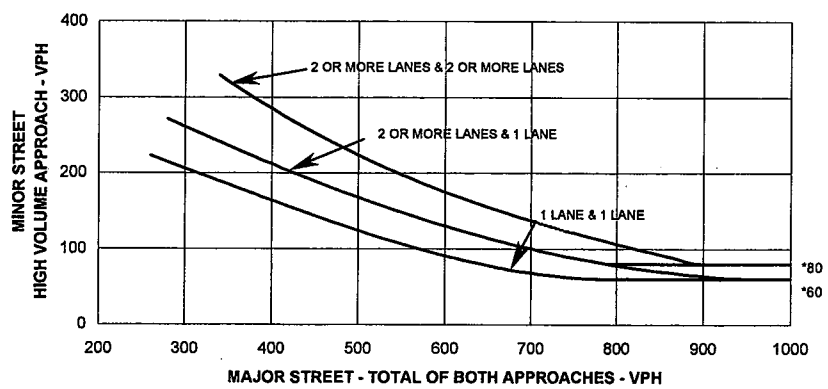
Four Highest Hours	Volumes	
	Major Street	Minor Street
900	727	187
1500	670	151
1600	806	142
1700	943	136

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: Cross St. Lanes: 2 Critical Approach Speed: 30
Minor Street: I-93 ramps Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	943	136

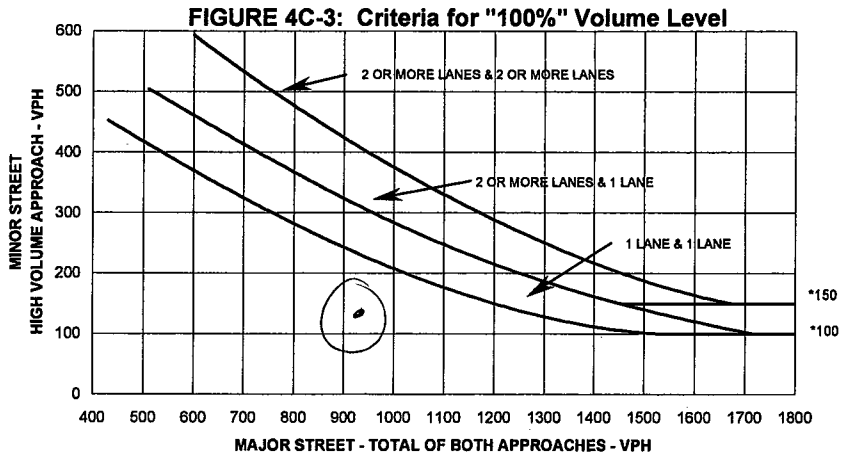
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		136
Fulfilled?: ☐ Yes	☒ No	

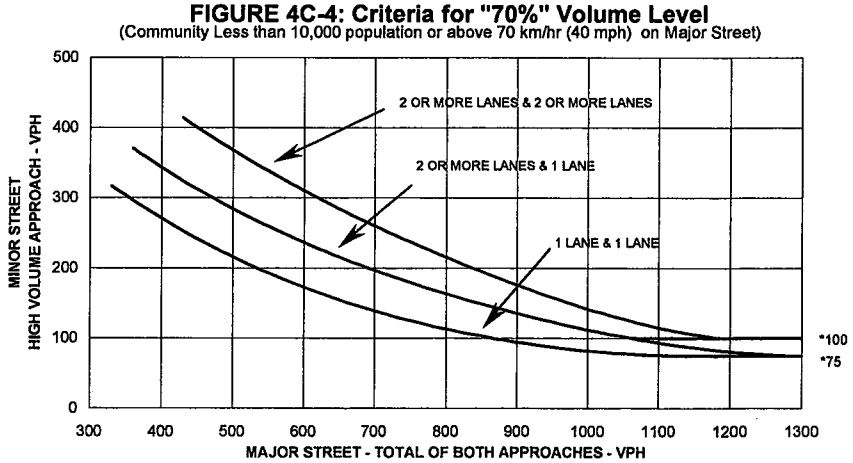
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1131	
Fulfilled?: ☒ Yes	☐ No	

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: I-93 Ramps
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	111			X
	1200	90			
	1600	86			
	1700	111			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: Cross St.
Minor Street: I-93 ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 0					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1131			X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sill
Date: 11/17/08

Major Street: N. Washington
Minor Street: Beverly

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1036	1142	930	715	814	1206	1314	1126
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	222	238	216	275	254	297	313	304

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1036	1142	930	715	814	1206	1314	1126
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	222	238	216	275	254	297	313	304

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: N. Washington
Minor Street: Beverly

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

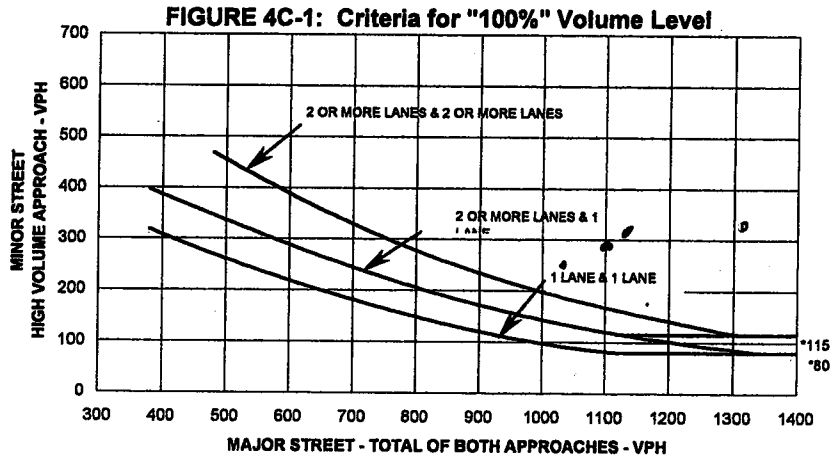
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

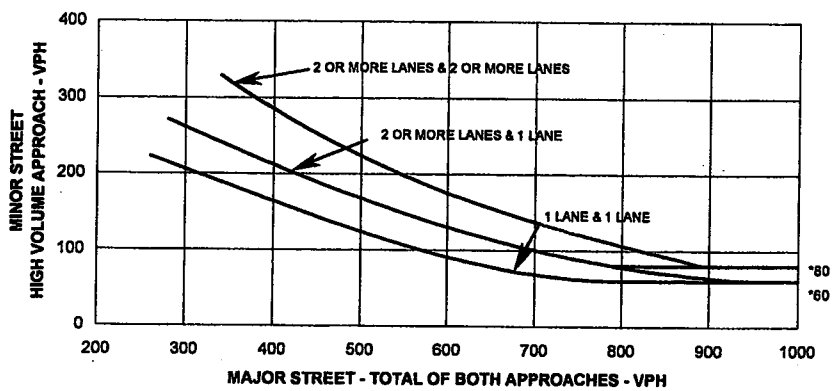
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1142	238
1500	1206	297
1600	1314	313
1700	1126	304

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: N. Washington
Minor Street: Beverly

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1600	1314	313

Criteria

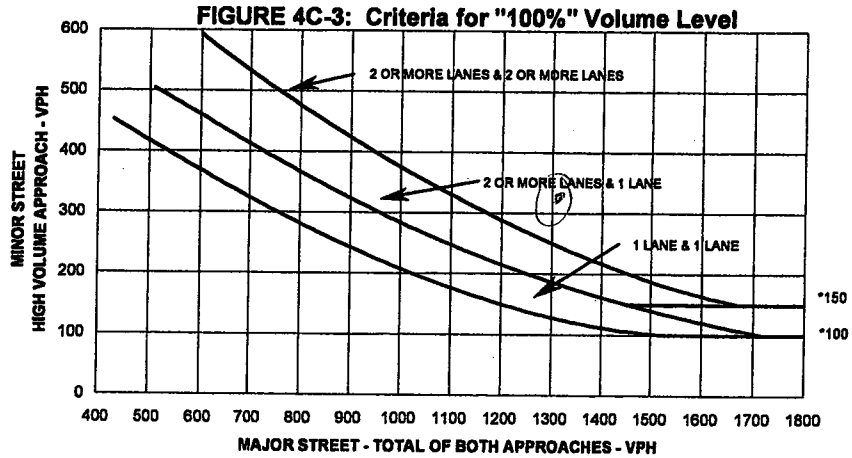
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		313
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1627	
Fulfilled?: ☒ Yes ☐ No		

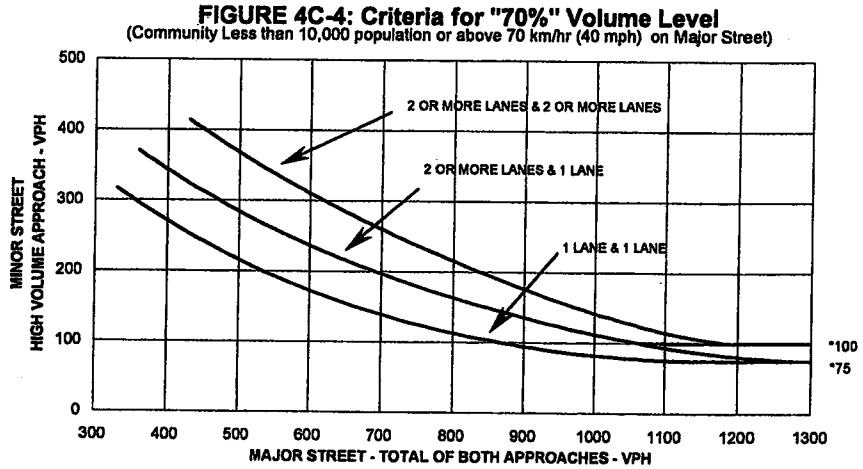
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: N. Washington
Minor Street: Beverly

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	28			X
	800	67			
	1600	36			
	1700	27			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: N. Washington
Minor Street: Beverly

Engineer: A. Siu
Date: 11/17/08
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1627			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)		NO	DATA			← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				X
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: Valenti
Minor Street: Beverly

Engineer: A. Siu
Date: 11/17/08
Lanes: 1
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Valenti
Minor Street: Beverly

Lanes: 1
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

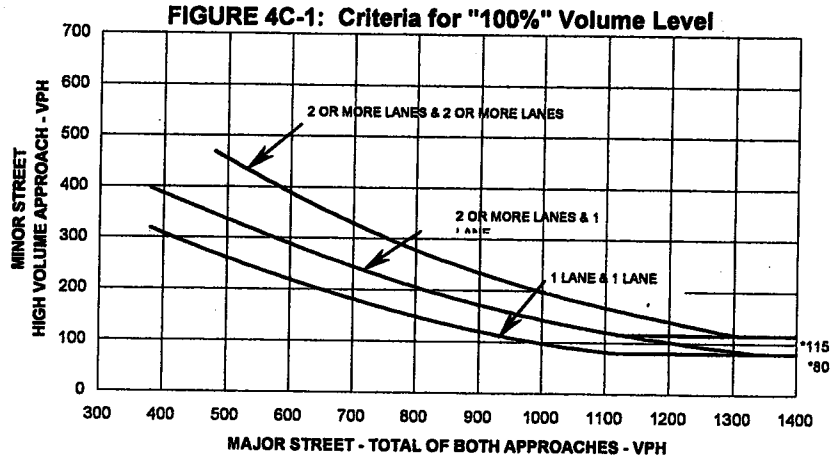
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

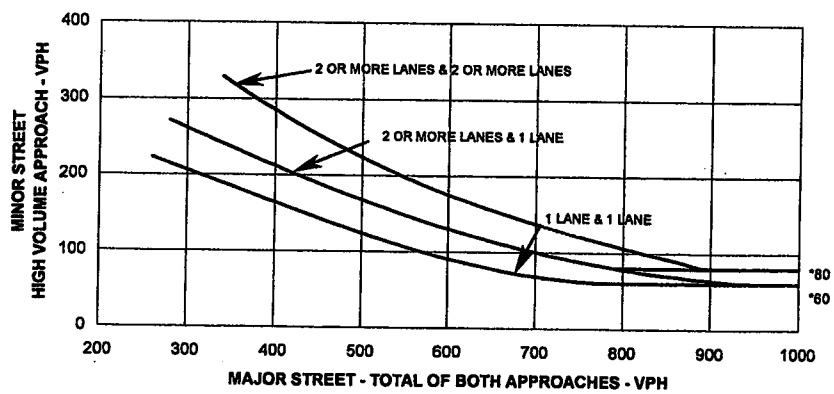
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: Valenti
Minor Street: Beverly

Engineer: A. Siu
Date: 11/17/08
Lanes: 1
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

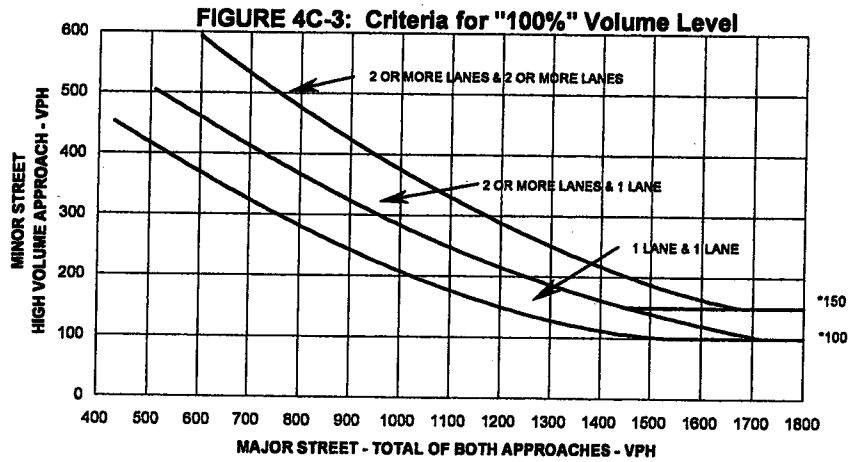
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

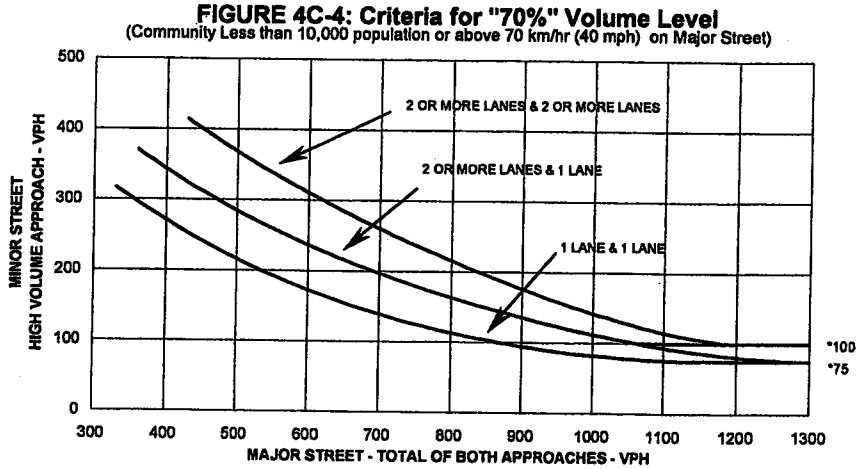
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: Valenti
Minor Street: Beverly

Engineer: A. Siu
Date: 11/17/08
Lanes: 1
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	13			X
	800	20			
	1200	10			
	1600	10			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/10
Major Street: Valenti
Minor Street: Beverly
Lanes: 1
Lanes: 2
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: North Washington
Minor Street: Valenti

Lanes: 2
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: North Washington
Minor Street: Valenti
Lanes: ____
Lanes: ____
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

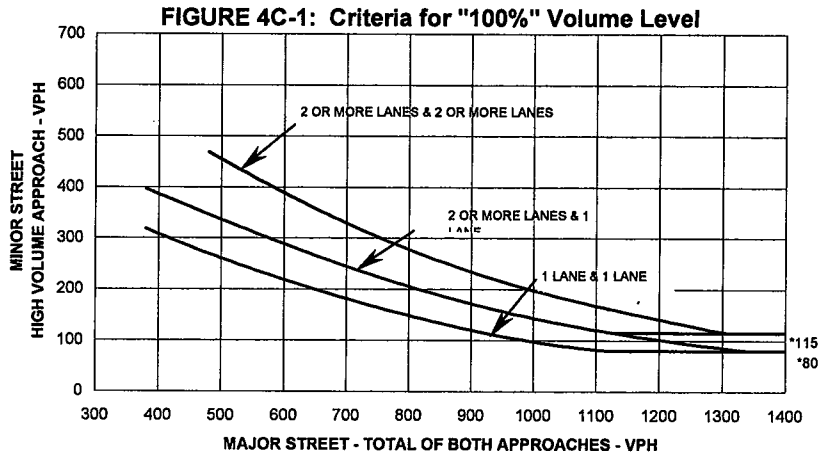
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

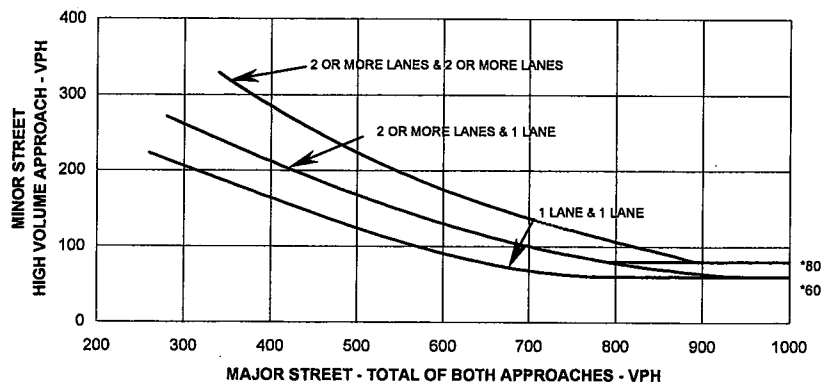
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: N. Washington
Minor Street: Valentine
Lanes: ____
Lanes: ____
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

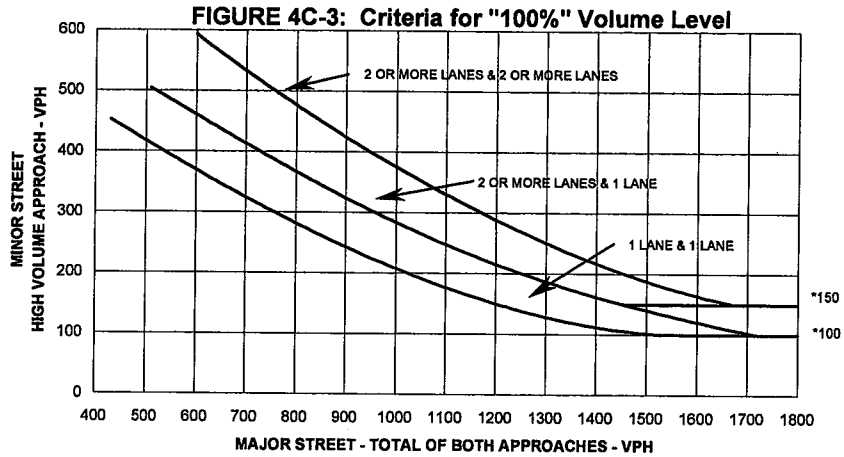
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

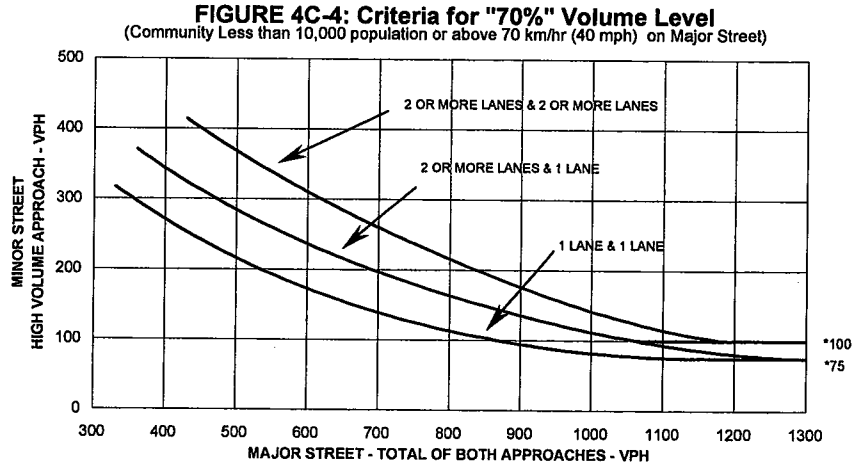
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/09
Major Street: N. Washington
Minor Street: Valenti
Lanes: ____
Lanes: ____
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	160			
	800	263			
	1700	200			
	1700	245			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: N. Washington
Minor Street: Valentin
Lanes: ____
Lanes: ____
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		1			X

WARRANT 8 - ROADWAY NETWORK

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 2421						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks: ____

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Congress
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	942	1097	830	710	663	578	664	748
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	539	718	650	584	620	706	884	1075

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	942	1097	830	710	663	578	664	748
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	539	718	650	584	620	706	884	1075

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Congress
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

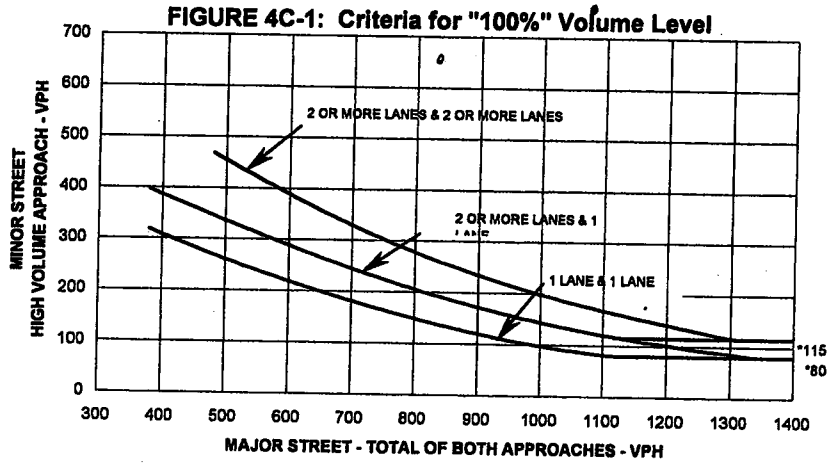
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

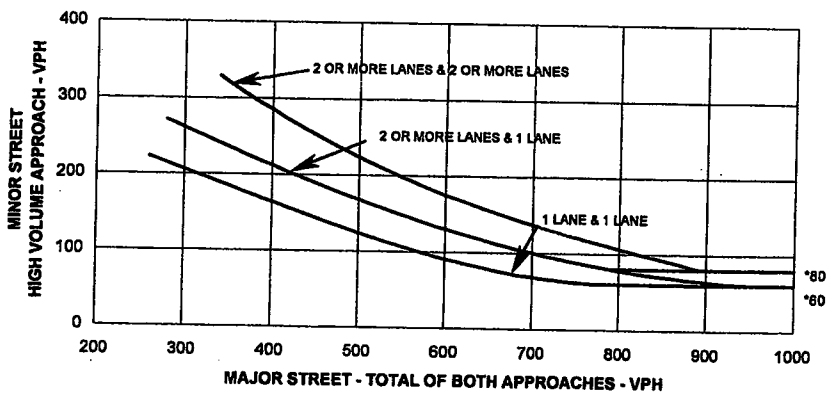
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1097	718
900	830	650
1600	664	884
1700	748	1075

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Congress
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
17:00	748	1075

Criteria

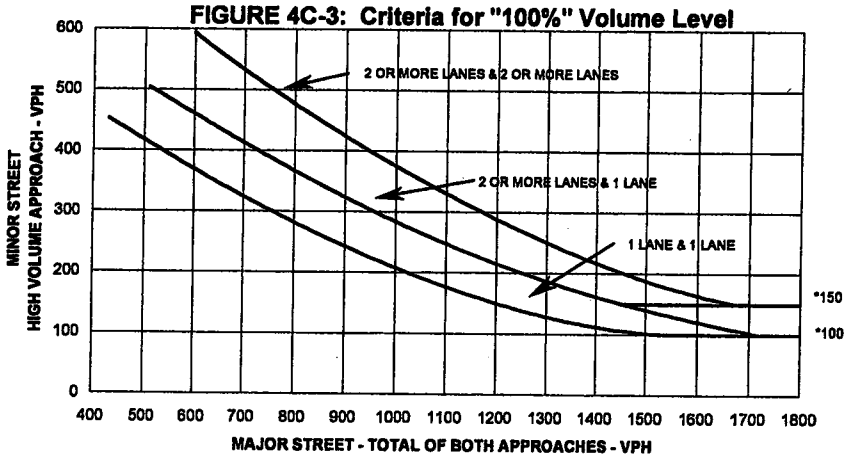
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1075
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	748	
Fulfilled?: ☒ Yes ☐ No		

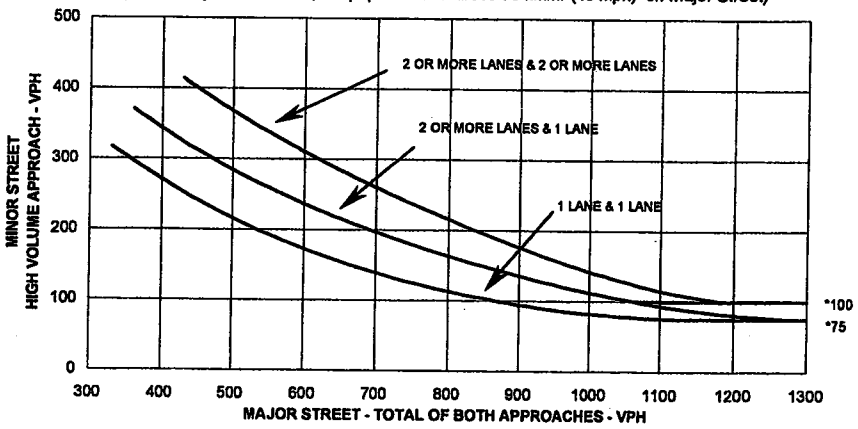
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Congress
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	184			
	1200	195			
	1600	197			
	1900	295			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Congress

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 5				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 2159		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X		
			Satisfied?:	N	Y	Y			
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Summer
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1300	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1425	1695	1185	1001	941	909	871	1047
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	464	451	426	419	447	393	485	525

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1300	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1425	1695	1185	1001	941	909	871	1047
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	464	451	426	419	447	393	485	525

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Summer

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

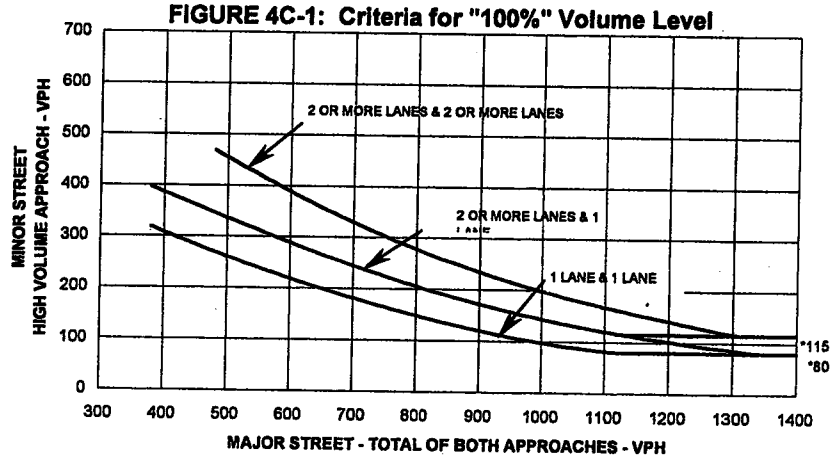
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

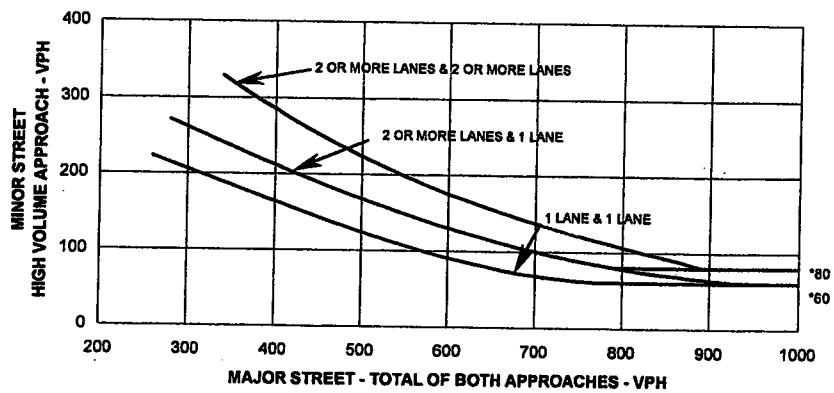
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1425	464
800	1695	451
900	1185	426
1700	1047	525

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/00
Major Street: Atlantic
Lanes: 3
Critical Approach Speed: 30
Minor Street: Summer
Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1695	451

Criteria

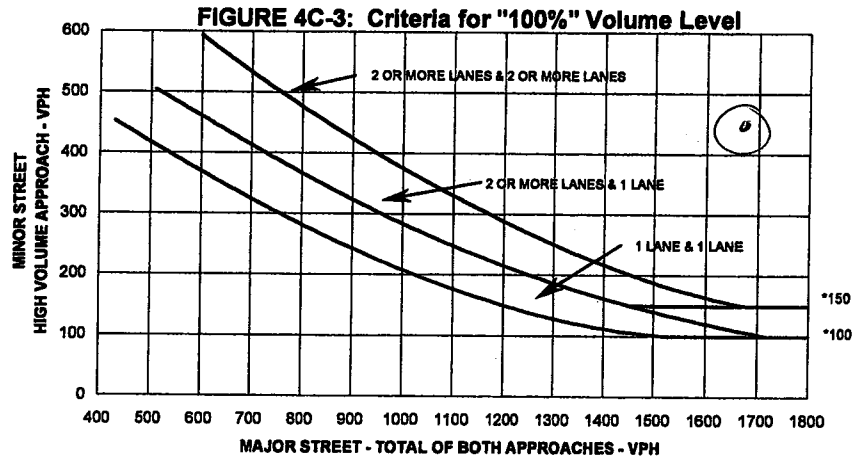
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

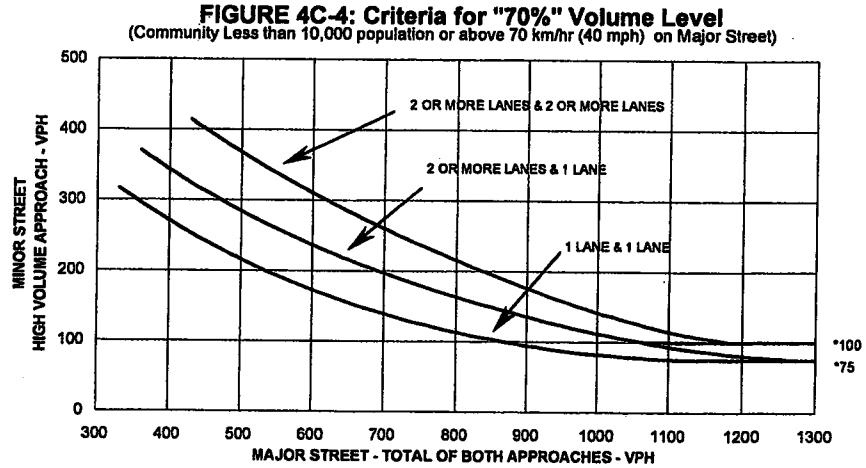
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Summer

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	2959			
	900	4943			
	1600	4021			
	1700	4146			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Summer

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		11		X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2558			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Essex

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	13:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1329	1534	1093	878	830	731	697	835
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	155	258	189	196	200	194	264	317

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	13:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1329	1534	1093	878	830	731	697	835
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	155	258	189	196	200	194	264	317

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Essex

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

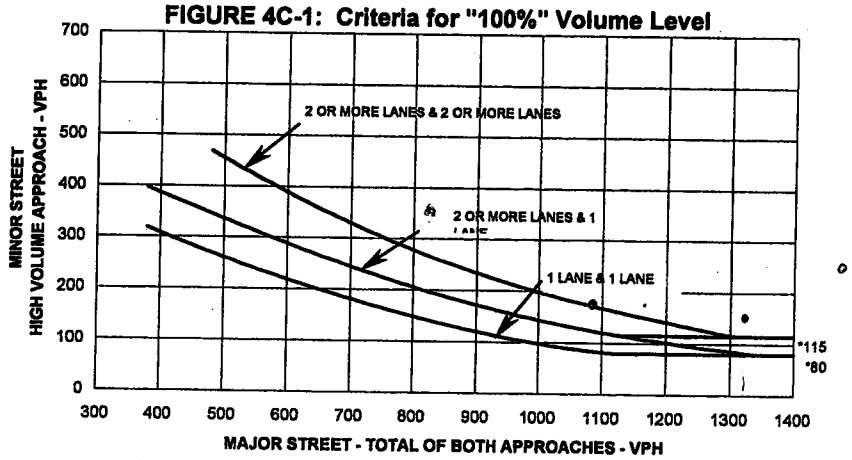
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

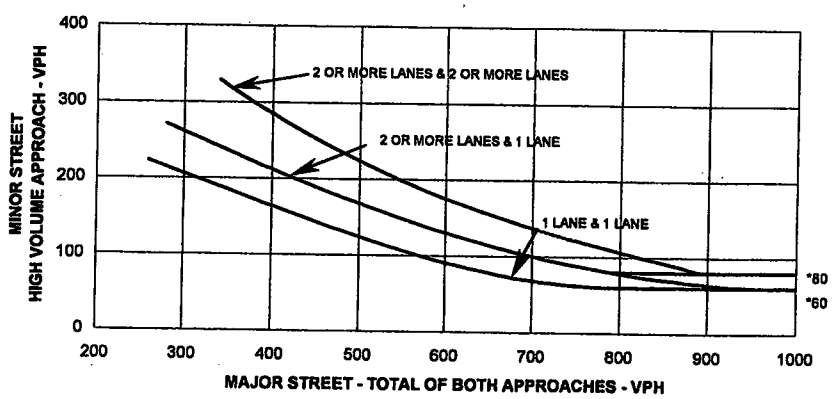
Four Highest Hours	Volumes	
	Major Street	Minor Street
7⁰⁰	1329	155
8⁰⁰	1534	258
9⁰⁰	1093	189
17⁰⁰	933	317

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Lanes: 3
Critical Approach Speed: 30
Minor Street: Essex
Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1534	258

Criteria

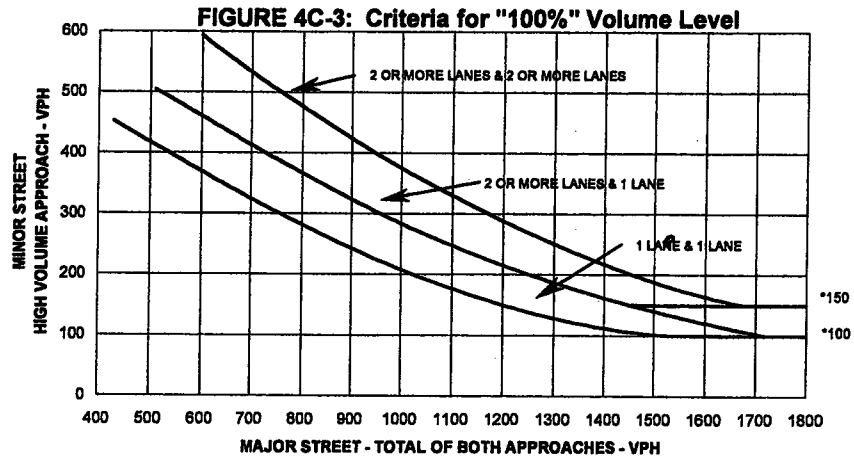
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		258
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1792	
Fulfilled?: ☒ Yes ☐ No		

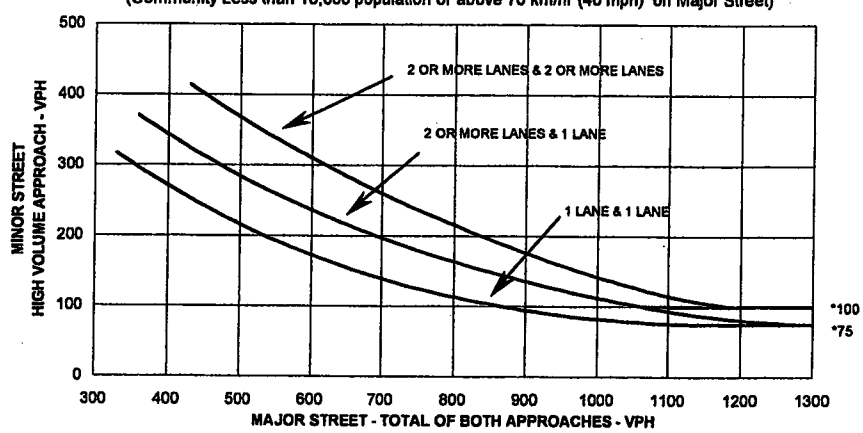
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Essex

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	965			
	800	1726			
	1600	1717			
	1700	1927			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Atlantic
Minor Street: Essex

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1792			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Beach
Lanes: 3
Lanes:
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☒ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Beach
Lanes: 3
Lanes:
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

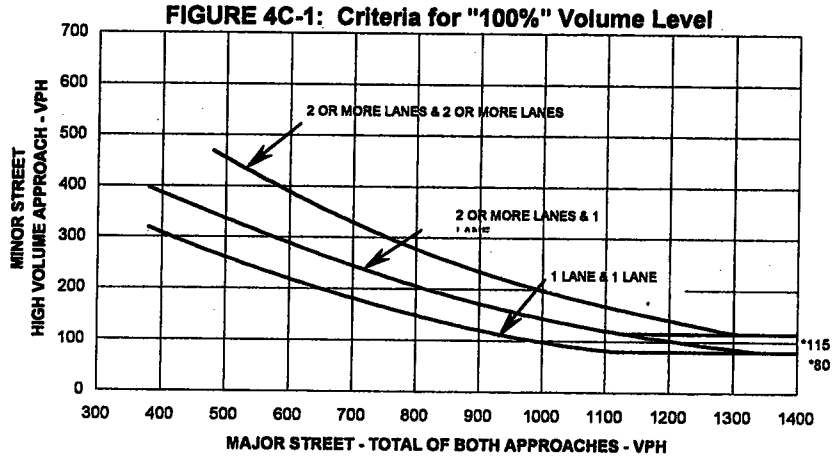
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

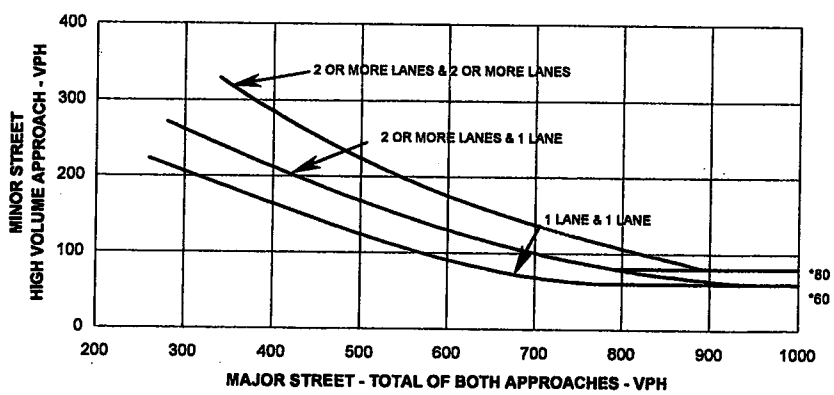
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Beach
Lanes: 3
Lanes:
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

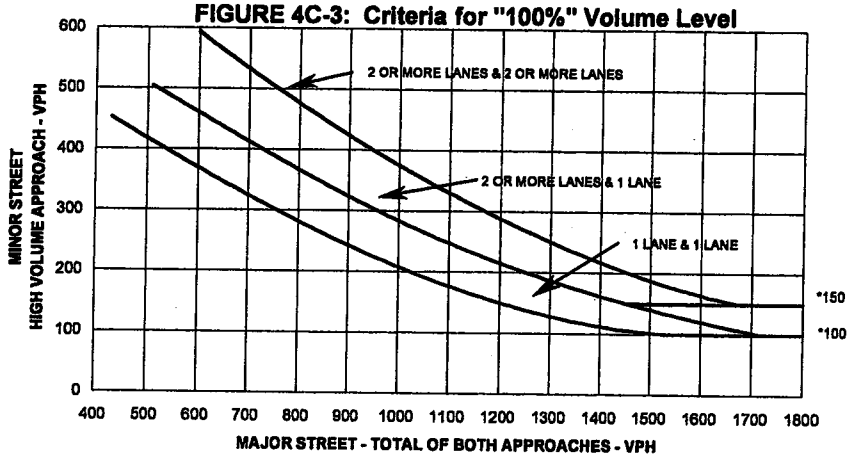
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

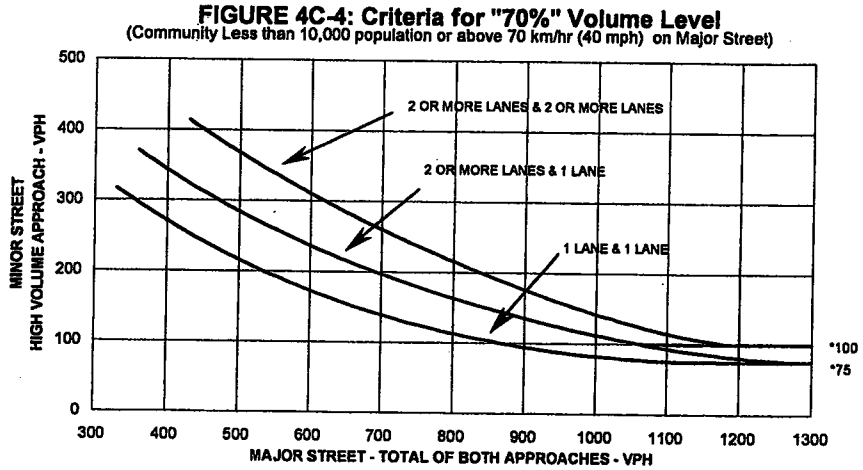
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Beach
Lanes: 3
Lanes:
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	8:00	282			
	12:00	295			
	16:00	382			
	17:00	379			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/17/08
Major Street: Atlantic
Minor Street: Beach
Lanes: 3
Lanes:
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: I-93 ramp
Minor Street: Frontage / Kneeland

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1200	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1101	1383	928	535	508	385	417	515
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	414	420	414	465	406	388	351	365

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1000	1100	1200	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1101	1383	928	535	506	385	417	515
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	414	420	414	465	406	388	351	365

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: I-93 ramp
Minor Street: Frontage, Kneeland

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

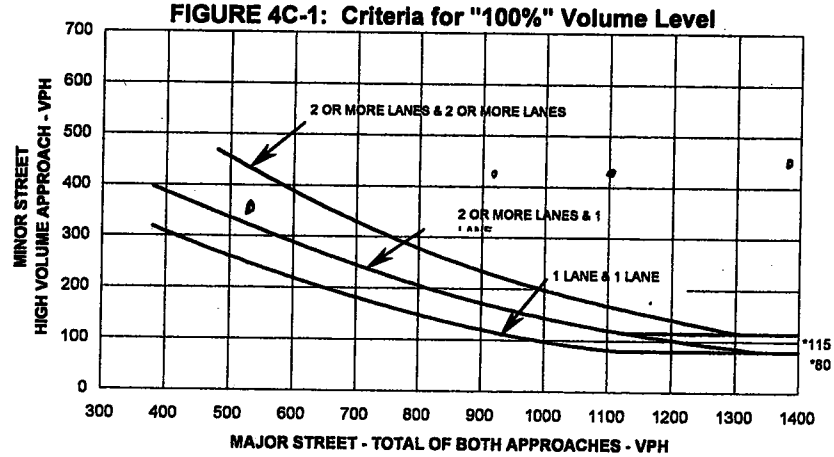
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

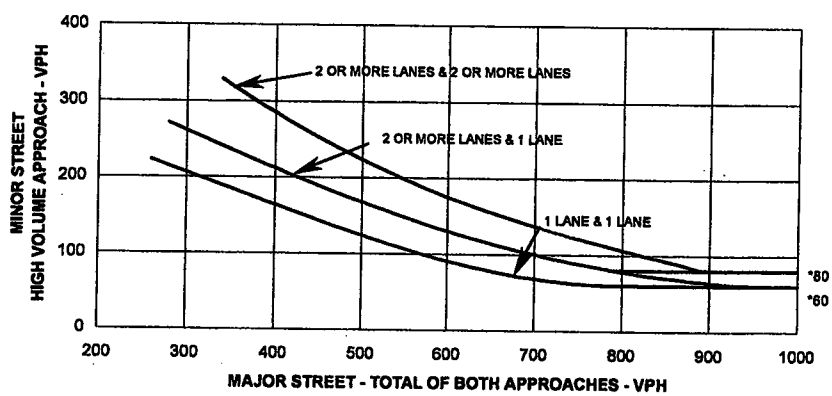
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1101	414
800	1383	420
900	928	414
1000	535	365

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: I-93 ramp
Minor Street: Frontage, Kneeland

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1383	470

Criteria

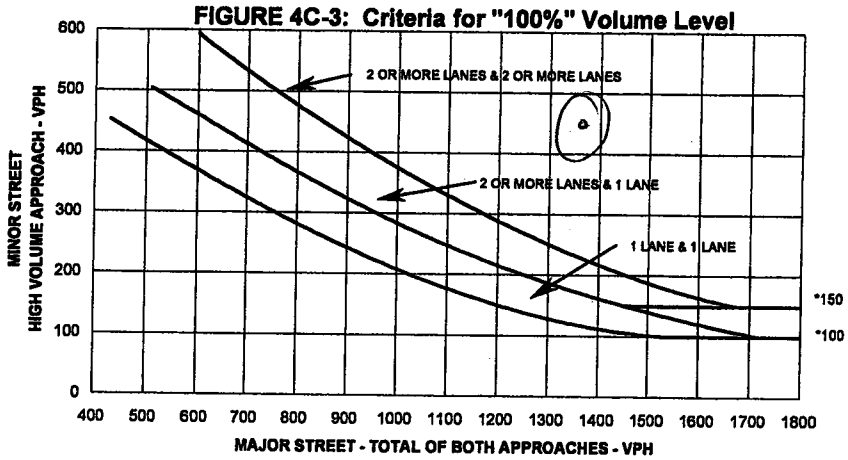
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		470
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1324	
Fulfilled?: ☒ Yes ☐ No		

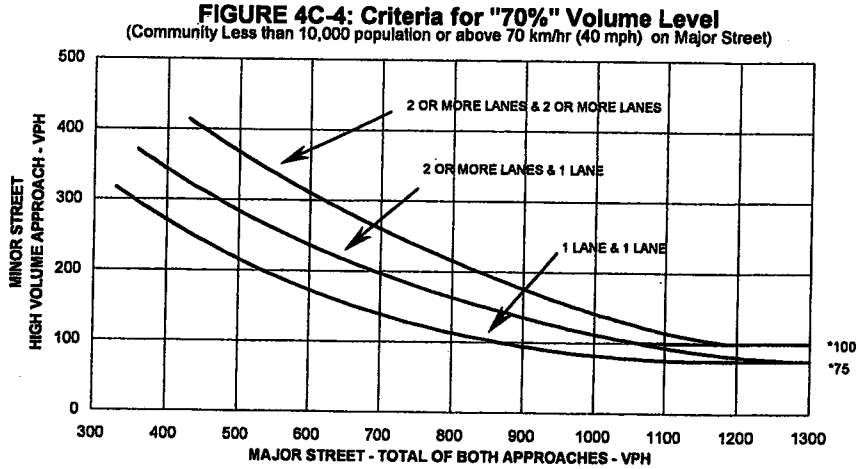
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: I-93 ramp
Minor Street: Frontage, Kneeland

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1300	82			
	1500	135			
	1600	233			
	1700	127			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		233			
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: I-93 ramp
Minor Street: Frontage, Kneeland

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 7				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 2224			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X			
			Satisfied?:	N	N	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA						← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: North St.
Minor Street: Clinton St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	656	796	852	686	720	609	522	555
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	254	297	265	365	302	233	298	258

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1200	1400	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	656	796	852	686	720	609	522	555
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	254	297	265	365	302	233	298	258

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Sin
Date: 11/12/08
Major Street: North St.
Lanes: 2
Critical Approach Speed: 30
Minor Street: Clinton St.
Lanes: 2

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

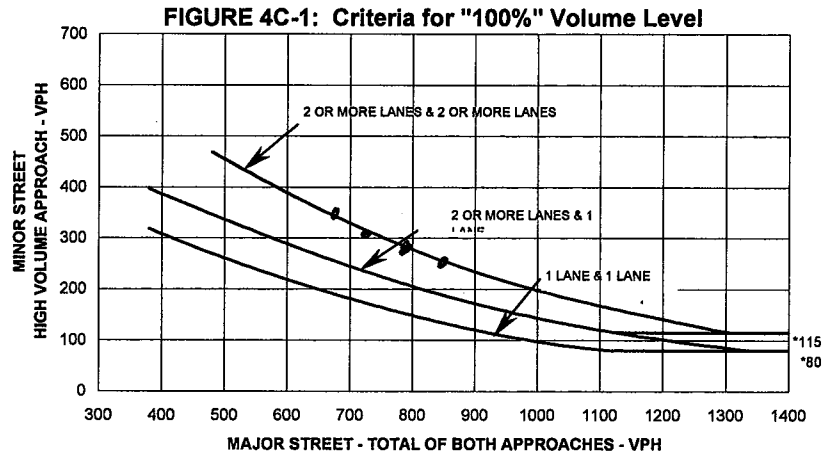
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

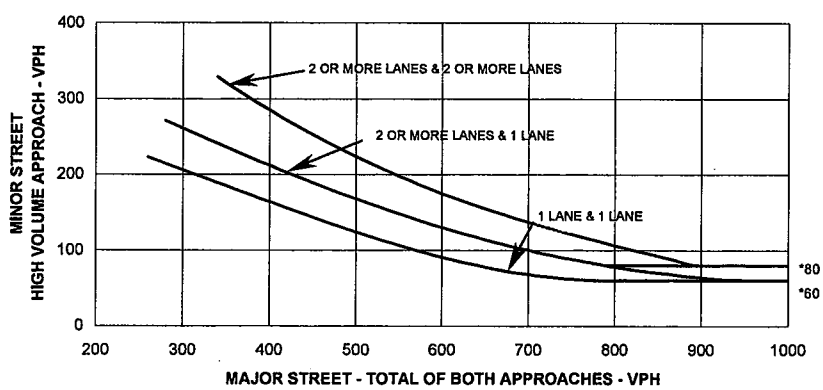
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	796	297
900	852	265
1000	686	365
1100	720	302

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/12/08

Major Street: North St. — Lanes: 2
Minor Street: Clinton St. — Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
900	852	265

Criteria

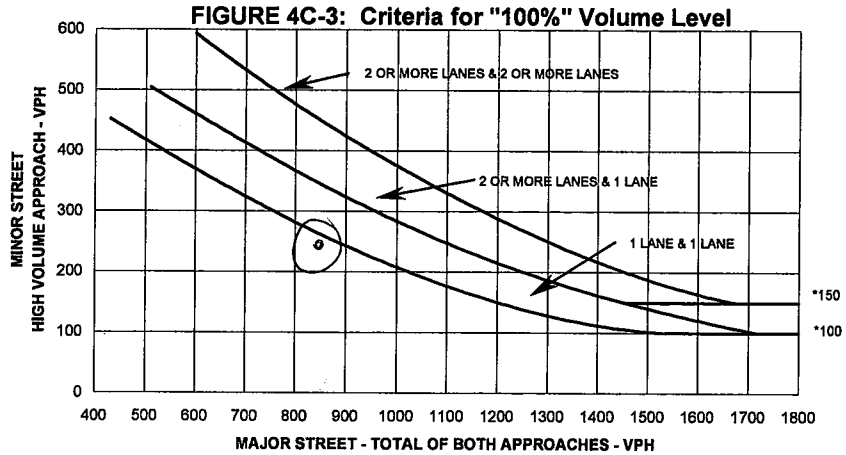
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		265
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1117	
Fulfilled?: ☒ Yes	☐ No	

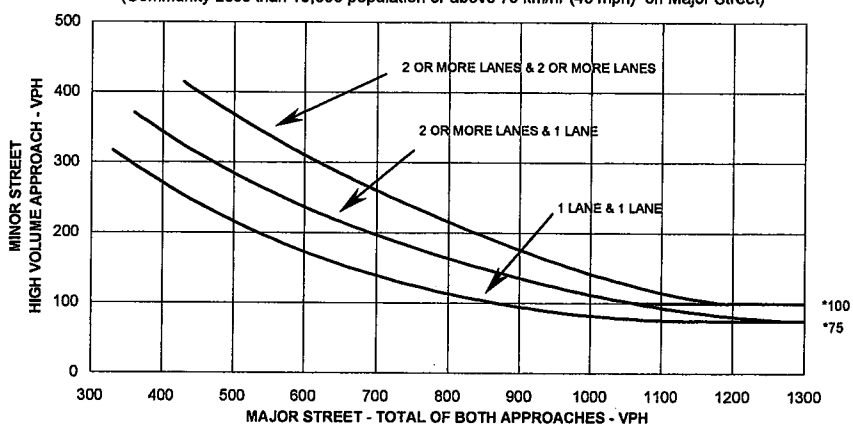
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Sill
Date: 11/12/08

Major Street: North St.
Minor Street: Clinton St.
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1100	999			
	1200	424			
	1400	279			
	1700	242			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 11/12/08
Major Street: North St.
Minor Street: Clinton St.
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume:	1117		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	n				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase
Minor Street: Fire Station / Garage

Lanes: 3
Lanes: ____

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1045	1273	1211	1017	1120	1367	1550	1341
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	19	18	16	22	50	119	149	181

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1045	1273	1211	1017	1120	1367	1550	1341
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	19	18	16	22	50	119	149	181

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase
Minor Street: Fire Station / Garage

Lanes: 3
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

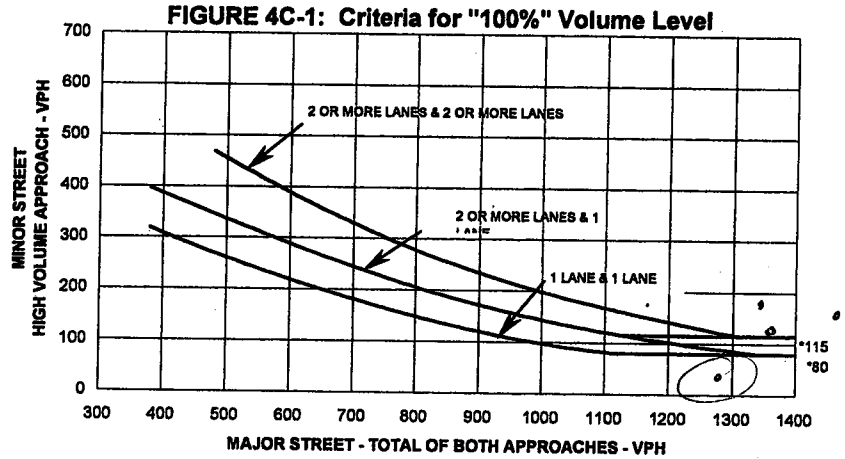
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

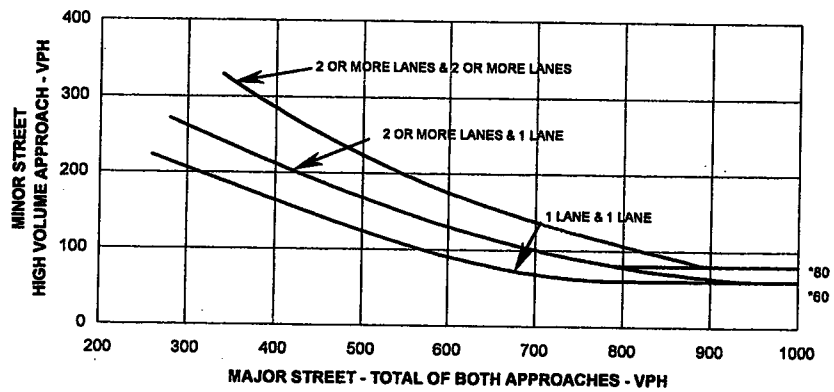
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1273	18
1500	1367	119
1600	1556	149
1700	1341	181

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase
Minor Street: Fire Station / Garage

Lanes: 3
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1600	1550	149

Criteria

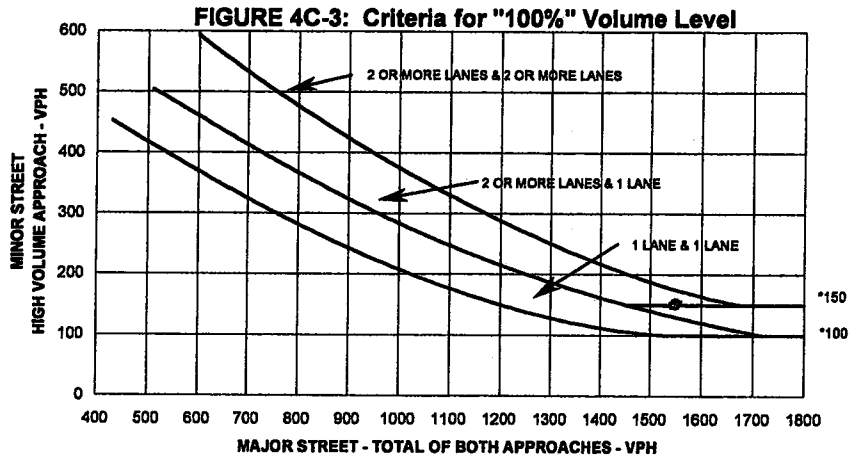
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	149	
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1699	
Fulfilled?: ☒ Yes	☐ No	

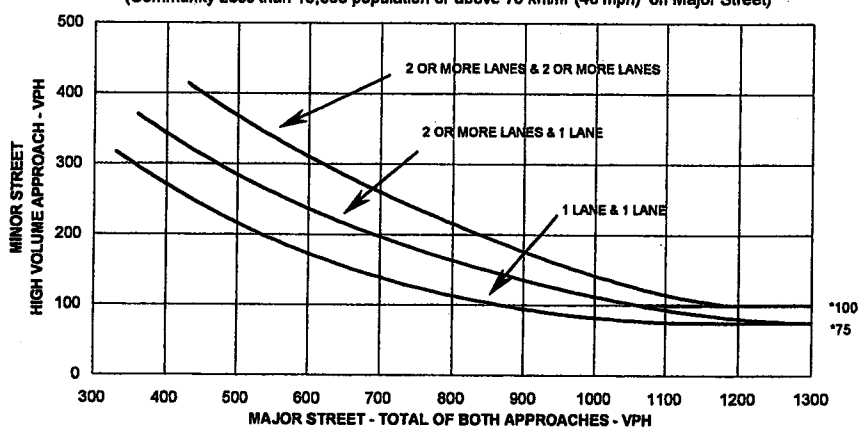
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase
Minor Street: Fire Station / Garage

Lanes: 3
Lanes:

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		0			X
		0			
		6			
		0			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 11/17/08

Major Street: Purchase
Minor Street: Fire Station / Garage

Lanes: 3
Lanes:

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		0			X

WARRANT 8 - ROADWAY NETWORK

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1699		X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: State St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	500 (400)	350	600 (480)	420	990	1282	1183	858	883	983	1034	1262
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	485	636	467	461	499	470	491	512

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	750 (600)	525	900 (720)	630	990	1282	1183	858	883	983	1034	1262
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	485	636	467	461	499	470	491	512

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenby
Date: 4/6/09

Major Street: Congress St.
Minor Street: State St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

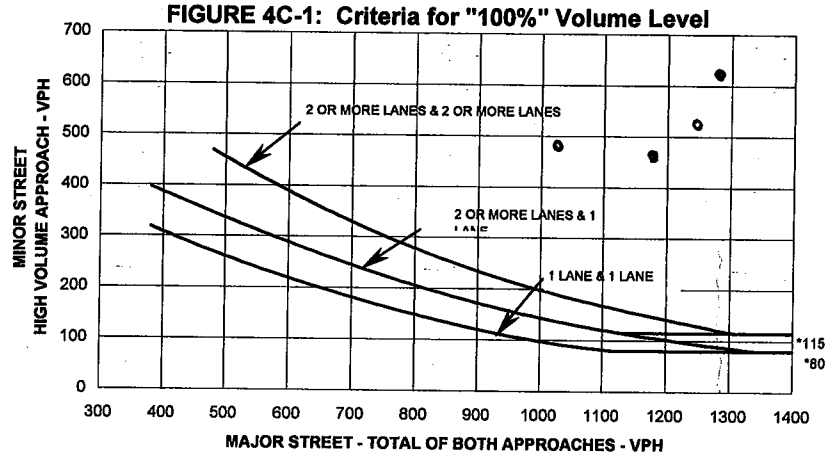
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

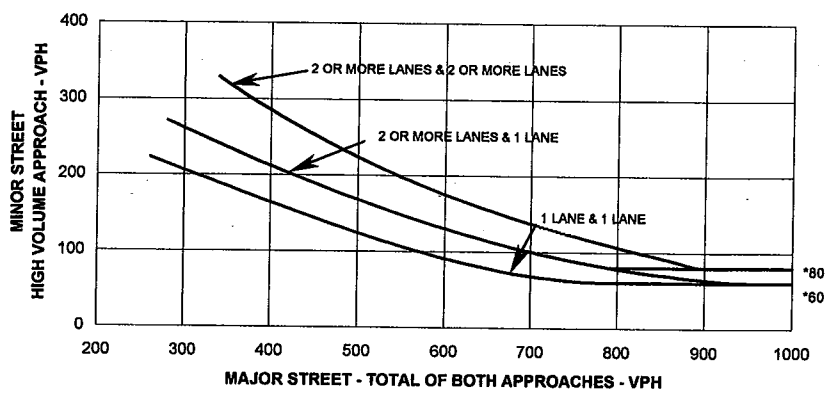
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1782	636
9:00	1183	467
16:00	1034	491
17:00	1262	512

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: State St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8⁰⁰	1282	636

Criteria

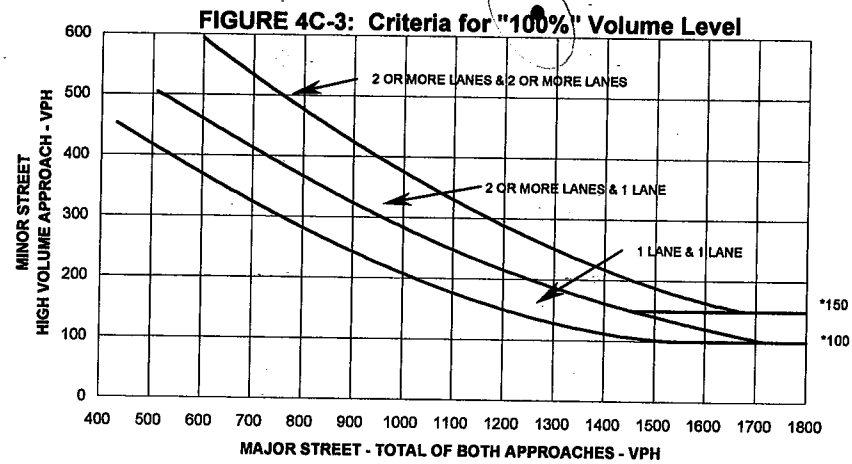
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		636
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1918	
Fulfilled?: ☒ Yes ☐ No		

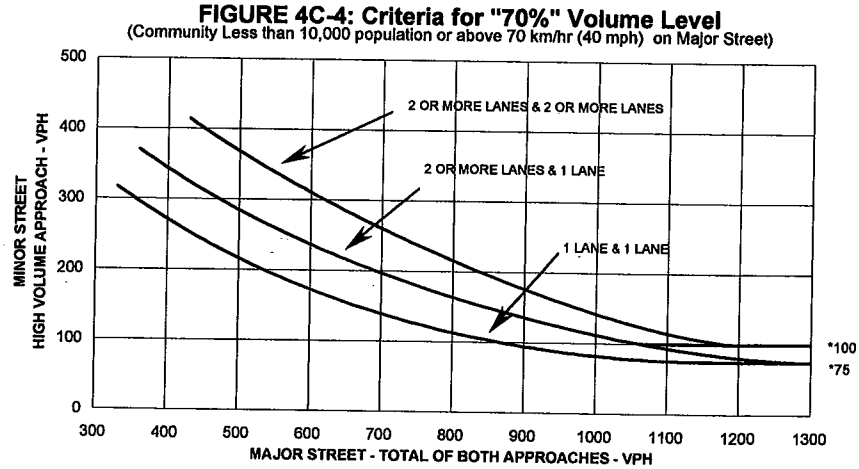
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: State St.

Lanes: 3
Lanes: 3

Critical Approach Speed: _____

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	1798			
	1300	1960			
	1600	1864			
	1700	3183			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: State St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 5				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1918				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3				
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: North St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	629	847	873	758	882	913	998	1104
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	812	1035	1012	588	544	482	536	527

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	629	847	873	758	882	913	998	1104
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	812	1035	1012	588	544	482	536	527

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Cronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: North St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

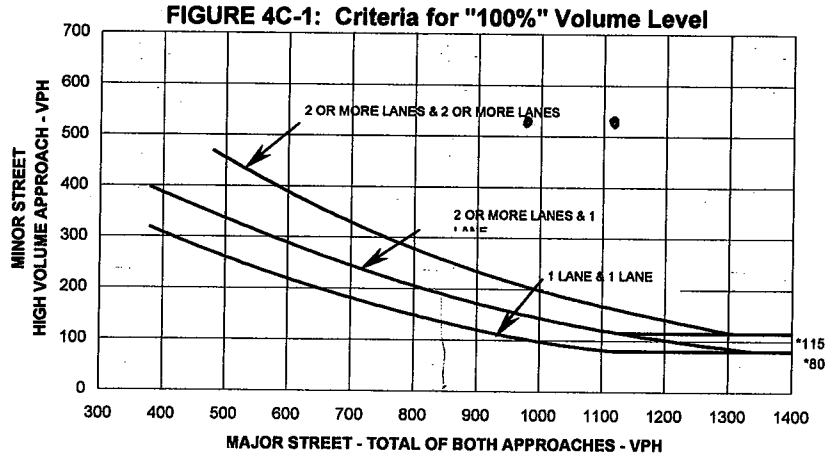
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

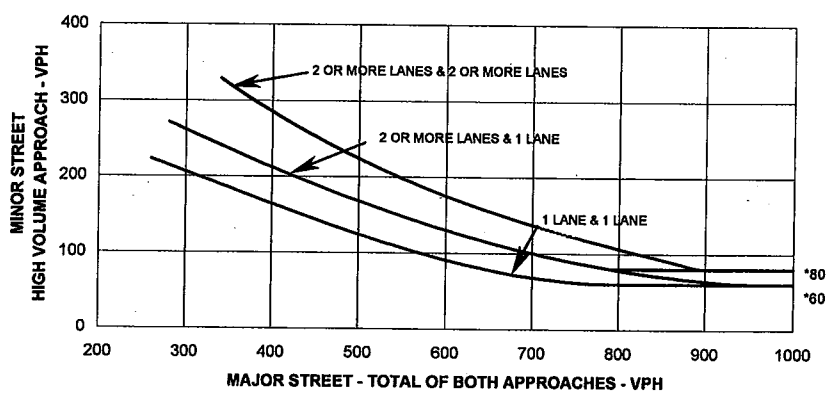
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	847	1035
900	873	1012
1600	998	536
1700	1164	527

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: K. Chrenley
Date: 4/6/09
Major Street: Congress St. Lanes: 3
Minor Street: North St. Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
900	873	1012

Criteria

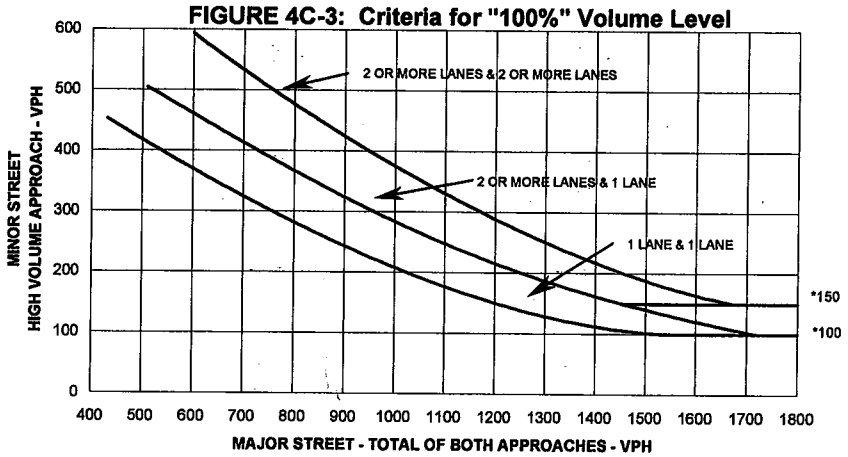
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1012
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1892	
Fulfilled?: ☒ Yes ☐ No		

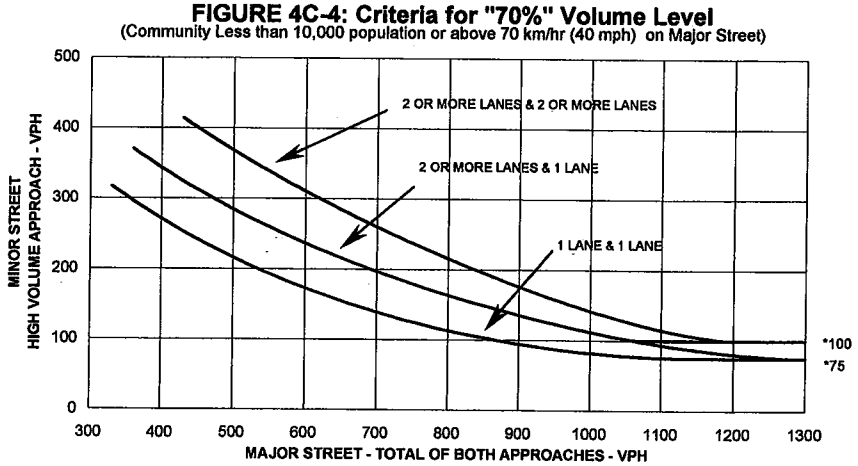
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: North St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	294			
	1200	296			
	1500	548			
	1700	1250			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenka
Date: 4/6/09

Major Street: Congress St.
Minor Street: North St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 6				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1892				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	X				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			X
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

77

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: North St.
Minor Street: Union St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenky
Date: 4/6/09

Major Street: North St.
Minor Street: Union St.

Lanes: 2
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

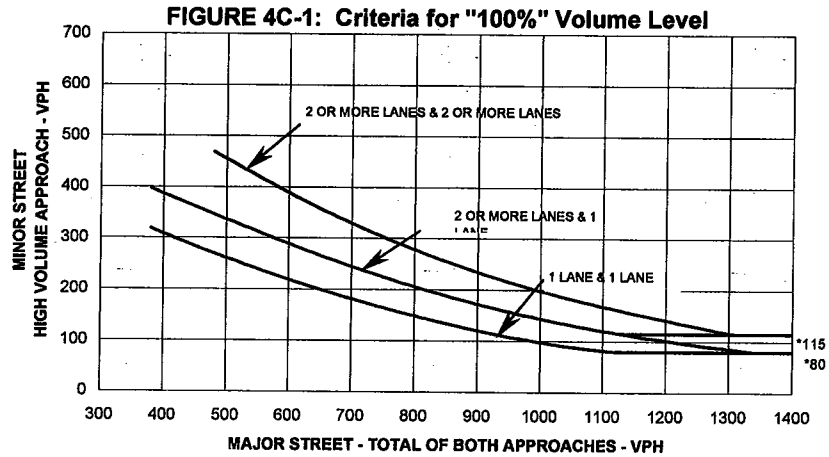
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

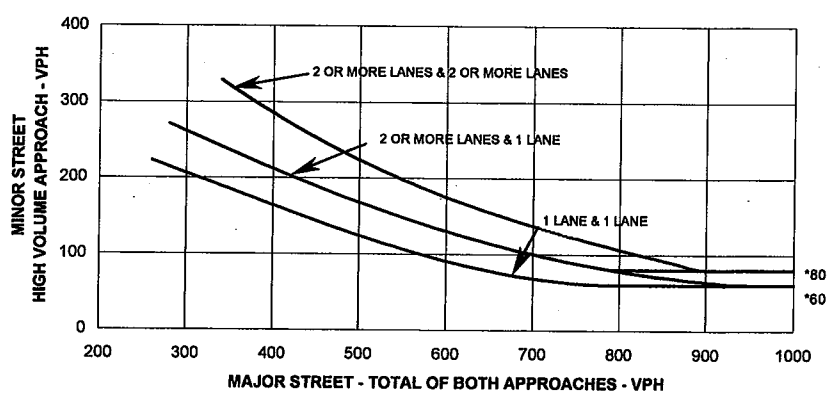
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston, MA
County: Suffolk

Engineer: K. Chromley
Date: 4/6/09

Major Street: North St.
Minor Street: Union St.

Lanes: 2
Lanes: ____

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

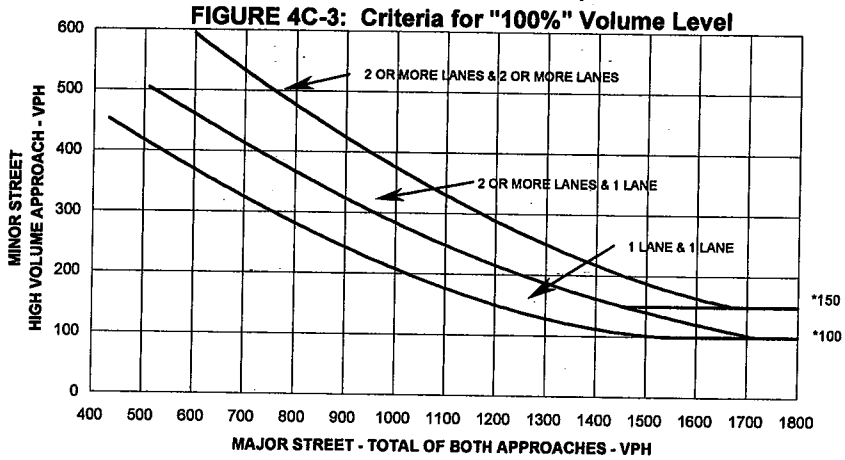
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes	☐ No	

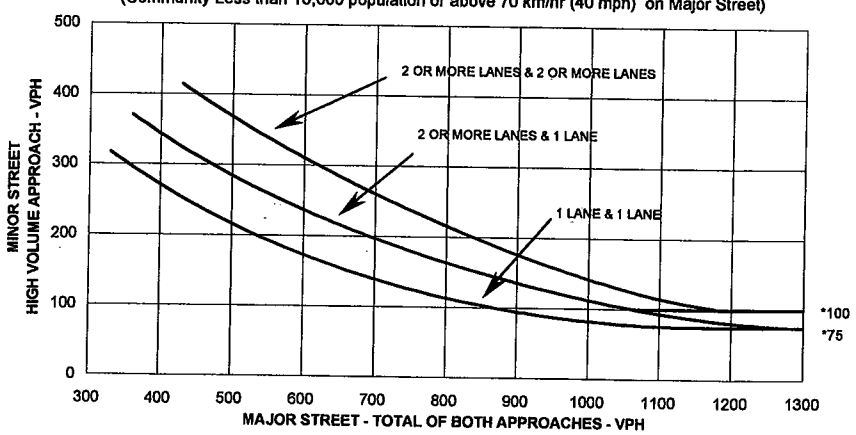
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: North St.
Minor Street: Union St.

Lanes: 2
Lanes:

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	744			
	1300	761			
	1600	834			
	1700	889			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: North St.
Minor Street: Union St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 1					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1131			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	X				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:		X		X
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:		X		
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:		X		
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrapley
Date: 4/6/09

Major Street: Congress St.
Minor Street: Harbor St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1100	1200	1300	1400	1500
Both Approaches on Major Street	500 (400)	350	600 (480)	420	705	753	514	539	548	541	595	650
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	246	211	152	183	165	167	158	161

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1100	1200	1300	1400	1500
Both Approaches on Major Street	750 (600)	525	900 (720)	630	705	753	514	539	548	541	595	650
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	246	211	152	183	165	167	158	161

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: Hanover St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

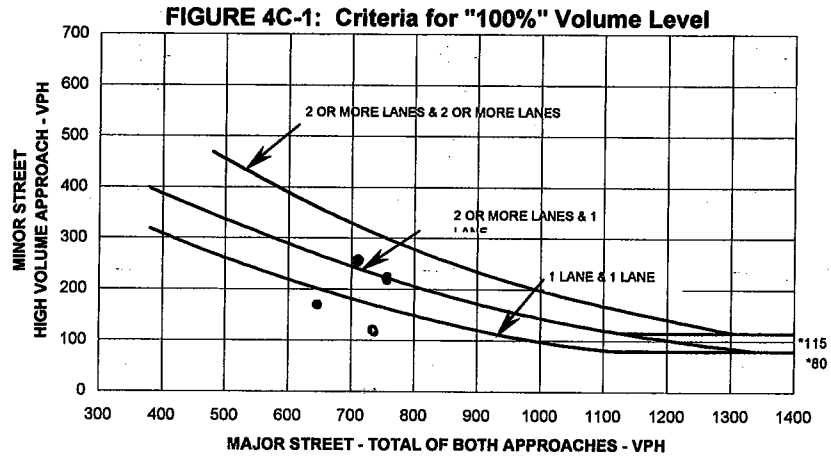
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

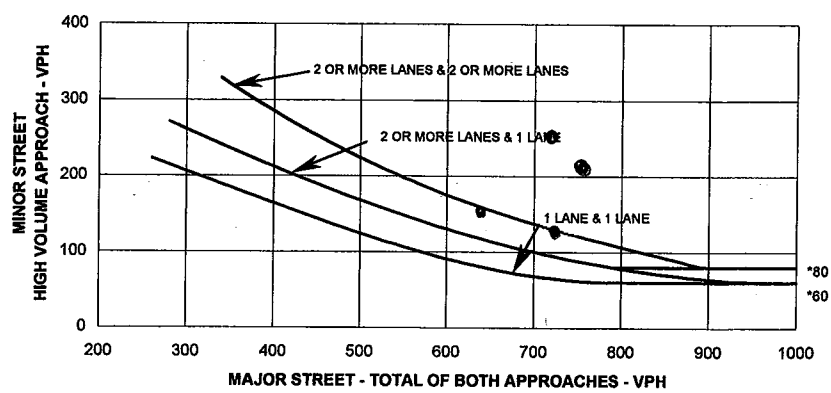
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	705	246
9:00	753	211
15:00	650	161
17:00	738	116

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: Henover St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
900	753	211

Criteria

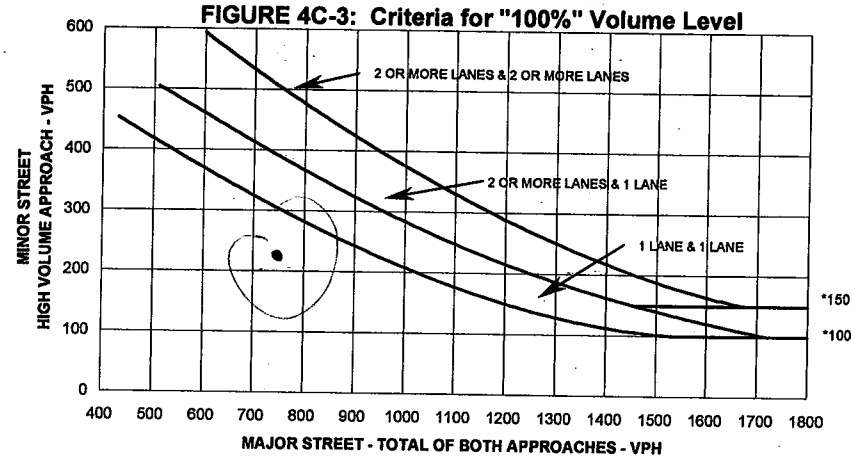
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*	.41	
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	211	
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	964	
Fulfilled?: ☒ Yes	☐ No	

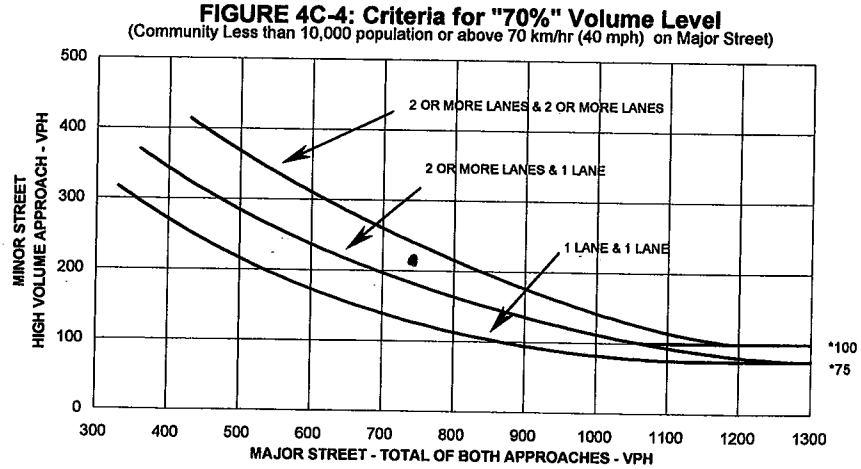
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: Hanover St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	614			
	1500	943			
	1600	627			
	1700	719			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: Hanover St.

Lanes: 3
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 0					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 964						X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3					
		Satisfied?:								
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: New Sudbury St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	8:00	9:00	12:00	13:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1458	1399	1041	1041	1073	1128	1200	1306
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	510	526	595	555	637	703	755	887

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	8:00	9:00	12:00	13:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1458	1399	1041	1041	1073	1128	1200	1306
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	510	526	595	555	637	703	755	887

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St. — Lanes: 3
Minor Street: New Sudbury St. — Lanes: 4
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

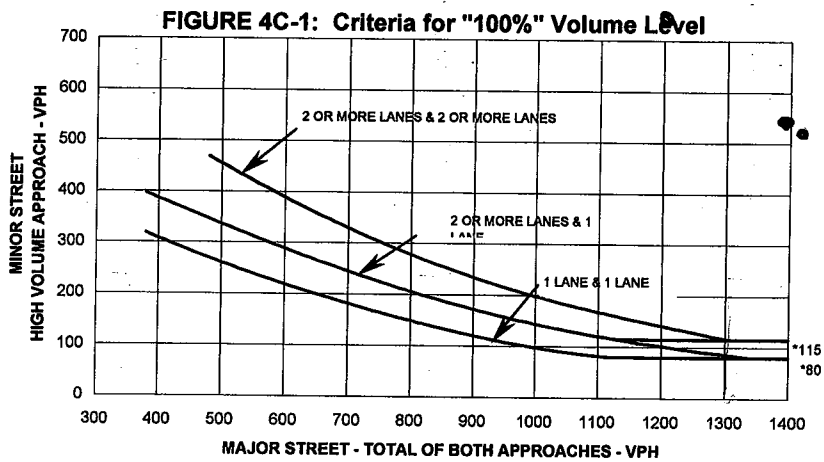
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

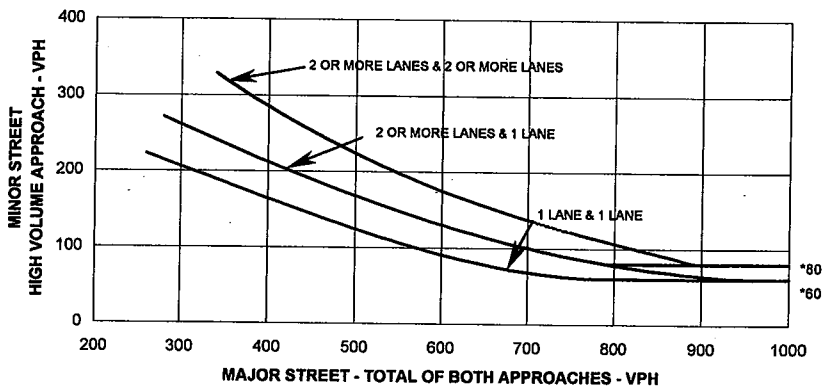
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1458	510
9:00	1399	526
16:00	1200	755
17:00	1306	887

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St.
Minor Street: New Sudbury St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1306	881

Criteria

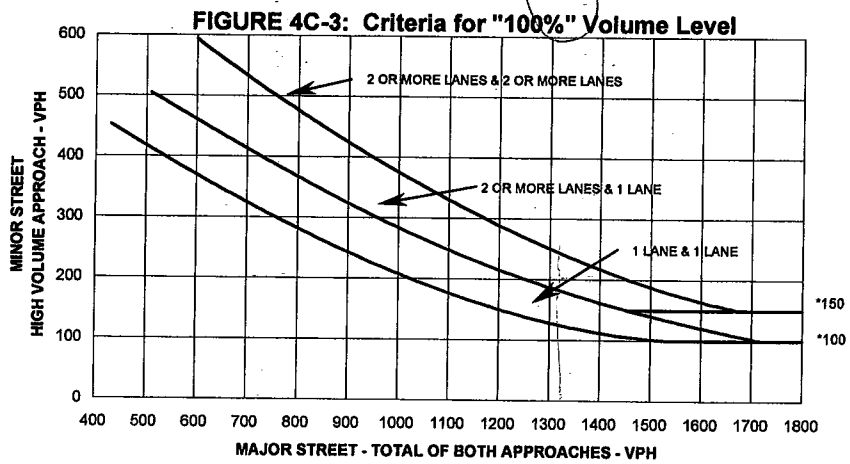
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		881
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	2493	
Fulfilled?: ☒ Yes	☐ No	

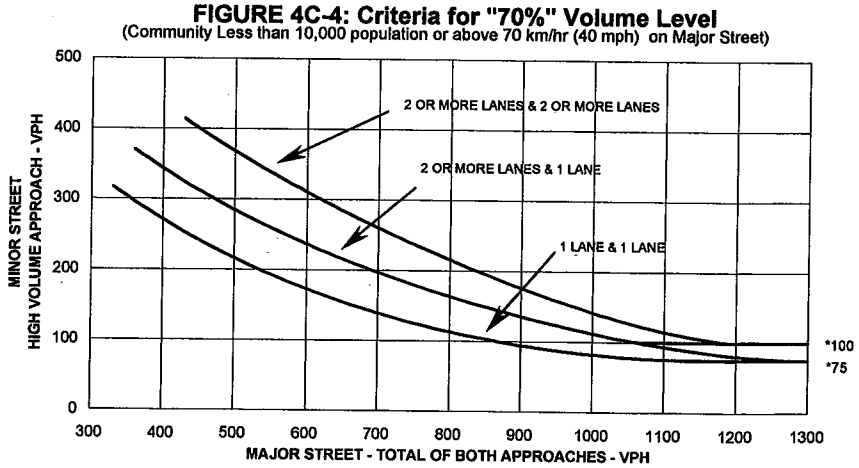
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chronley
Date: 4/6/09

Major Street: Congress St.
Minor Street: New Sudbury St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	291			
	800	333			
	1600	335			
	1700	321			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Conaty
Date: 4/6/09

Major Street: Congress St.
Minor Street: New Sudbury St.

Lanes: 3
Lanes: 4

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 7193				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

(80)

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St/ Merrimac St. Lanes: 3
Minor Street: New Chardon St. Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1337	1332	1059	1087	1218	1431	1401	1390
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	709	655	451	405	409	401	424	498

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1337	1332	1059	1087	1218	1431	1401	1390
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	709	655	451	405	409	401	424	498

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St / Merrimac St.
Minor Street: New Chardon St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

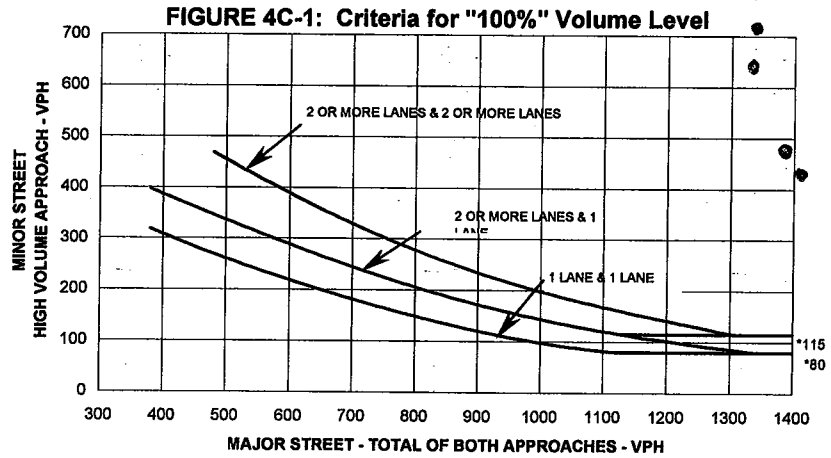
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

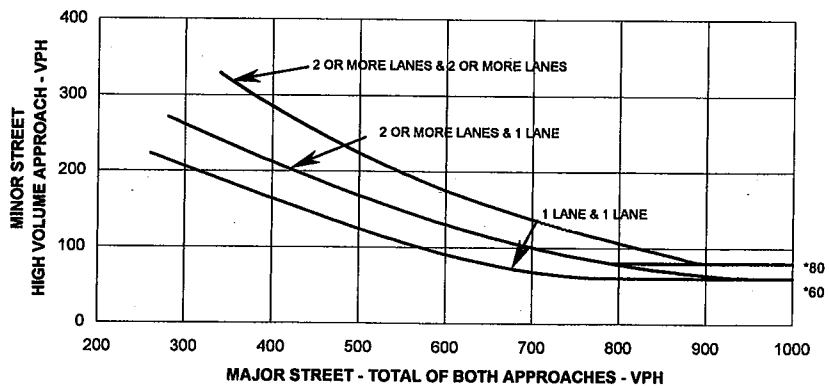
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1337	709
9:00	1332	655
16:00	1461	424
17:00	1390	498

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St. / Merrimac St.
Minor Street: New Chardon St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1390	498

Criteria

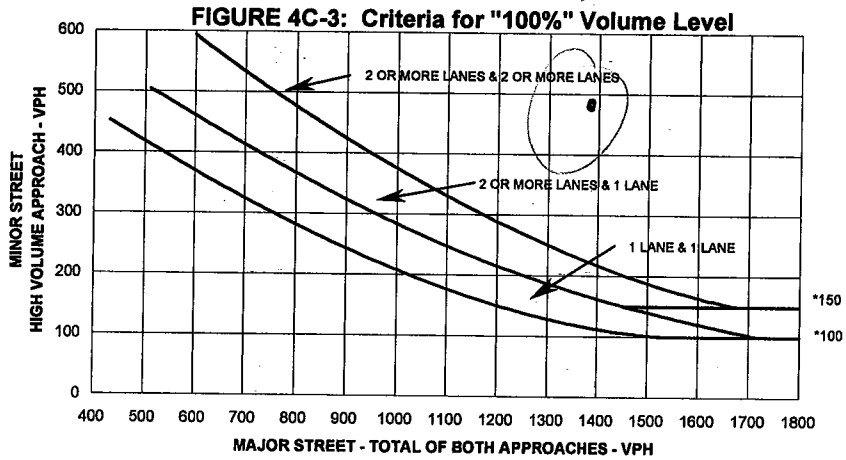
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		498
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		2667
Fulfilled?: ☒ Yes ☐ No		

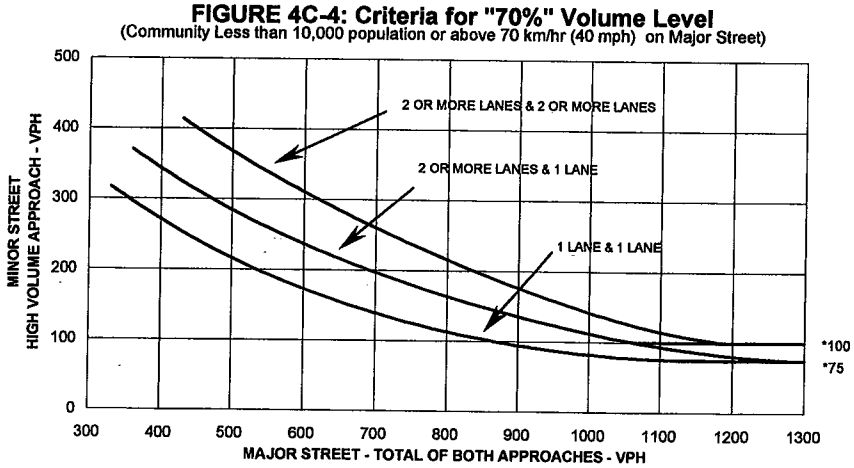
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenley
Date: 4/6/09

Major Street: Congress St. / Merrimac St.
Minor Street: Neal Chardon St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	170			
	1700	157			
	1600	200			
	1700	216			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: K. Chrenlay
Date: 4/6/09

Major Street: Congress St / Merrimac St.
Minor Street: Newell Chardon St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2287				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/2/08

Major Street: Summer St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1466	1540	1500	1300	1329	1325	1206	1218
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	358	351	370	357	330	398	441	402

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1466	1540	1500	1300	1329	1325	1206	1218
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	358	351	370	357	330	398	441	402

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Dorchester Ave

Lanes: 7
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

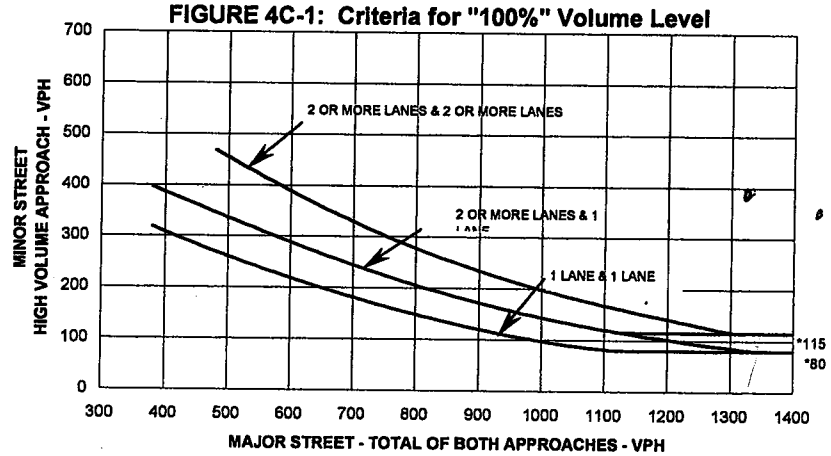
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

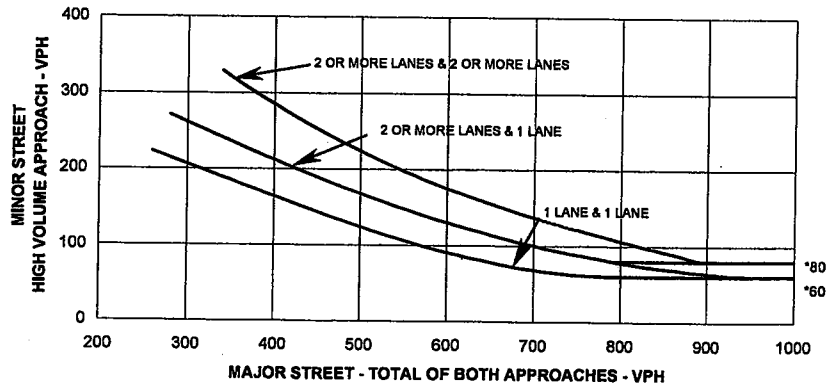
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	1466	358
8:00	1540	351
9:00	1500	370
15:00	1325	398

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
900	1540	351

Criteria

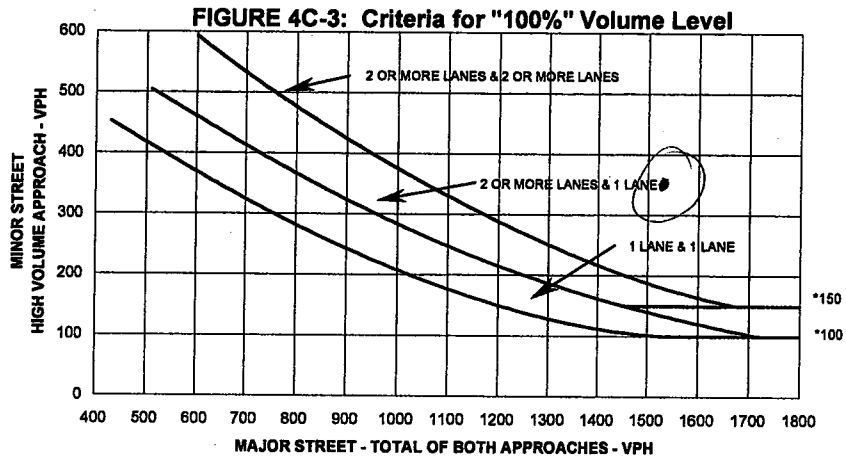
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	351	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1963
Fulfilled?: ☒ Yes ☐ No		

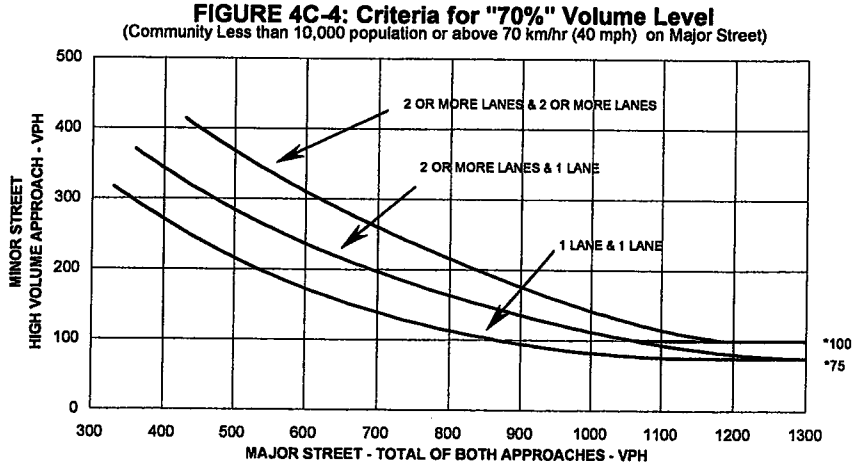
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No
Pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	237			
	900	123			
	1600	162			
	1700	205			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/9/08
Major Street: Summer St.
Minor Street: Dorchester Ave
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 4					X

WARRANT 8 - ROADWAY NETWORK

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1963			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			X
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Melcher St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	12:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1534	1544	1479	1327	1300	1261	1242	1167
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	154	141	144	156	147	237	210	262

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	12:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1534	1544	1479	1327	1300	1261	1242	1167
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	154	141	144	156	147	237	210	262

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sin
Date: 12/9/08

Major Street: Summer St.
Minor Street: Melcher St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

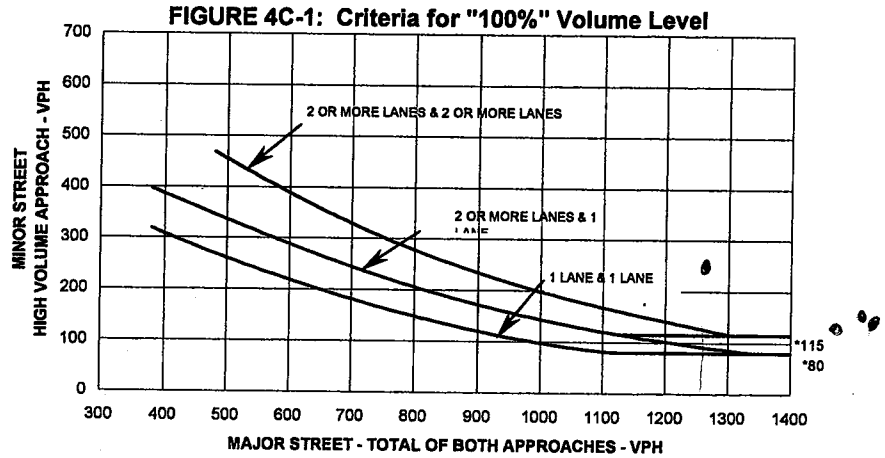
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

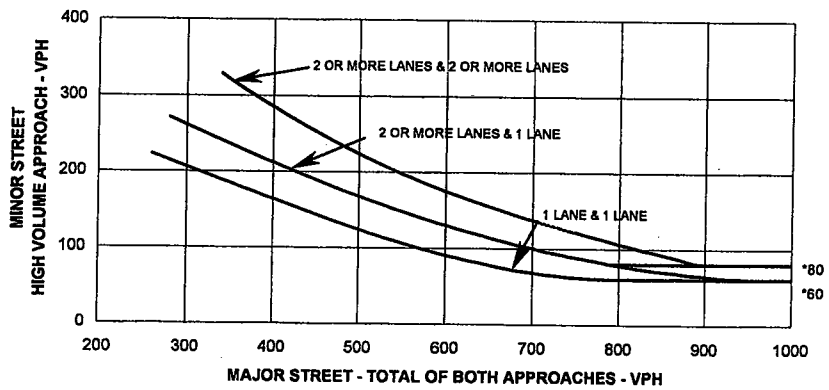
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1534	154
800	1544	141
900	1479	144
1500	1261	237

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer st.
Minor Street: Melcher st.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
700	1534	154

Criteria

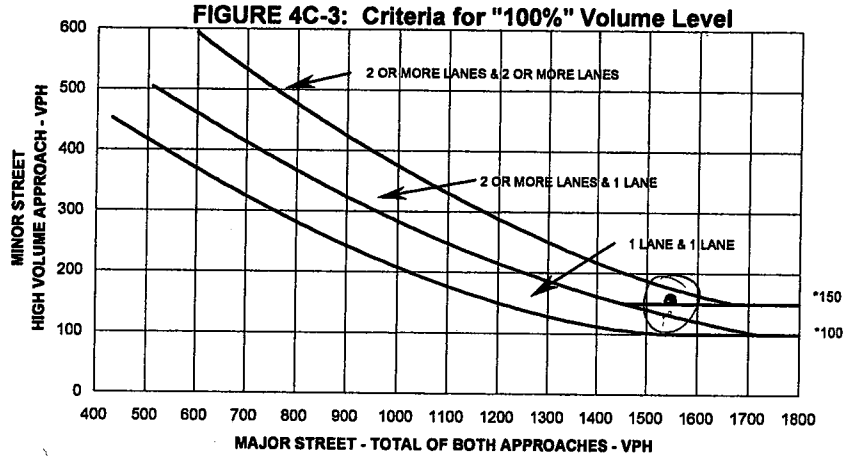
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

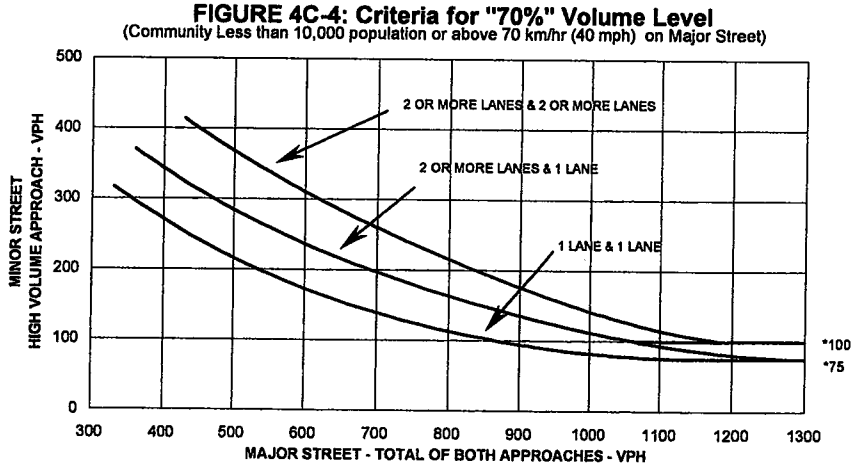
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Melcher St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No
Pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	322			
	900	229			
	1200	309			
	1700	186			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Melcher St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	1				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1688				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			X
	Minor Street:		X		
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:		X		
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:		X		

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1243	1333	921	926	957	1064	1099	1258
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	107	87	97	95	115	126	160	285

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1200	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1243	1333	921	926	957	1064	1099	1258
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	107	87	97	95	115	126	160	285

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

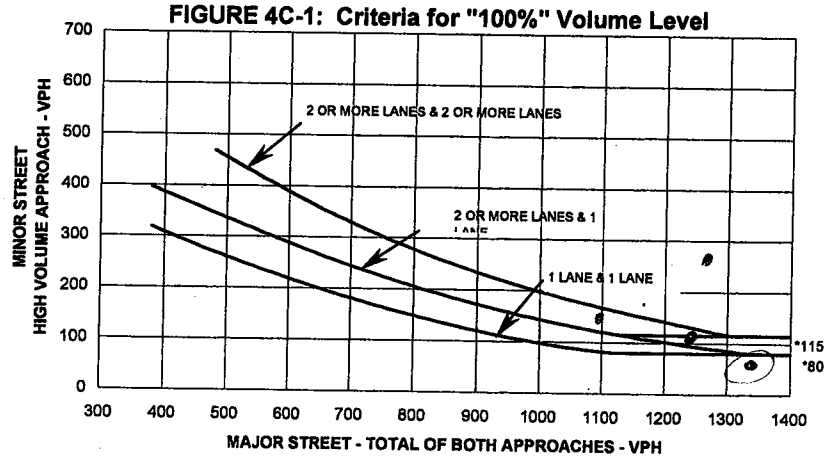
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

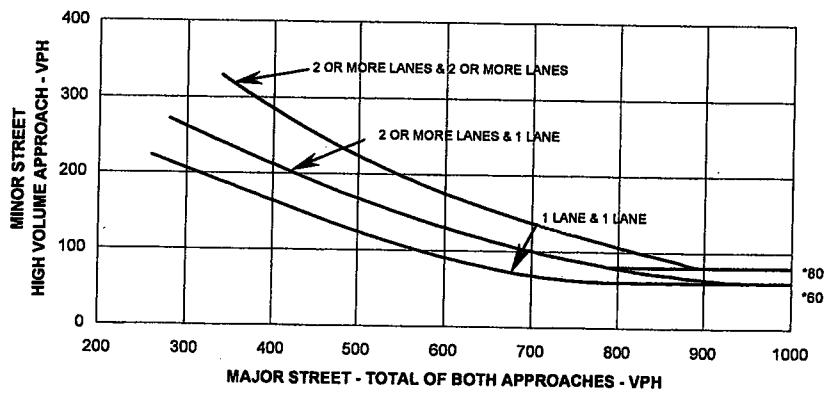
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	1243	107
8:00	1333	87
16:00	1099	160
17:00	1258	285

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1285	285

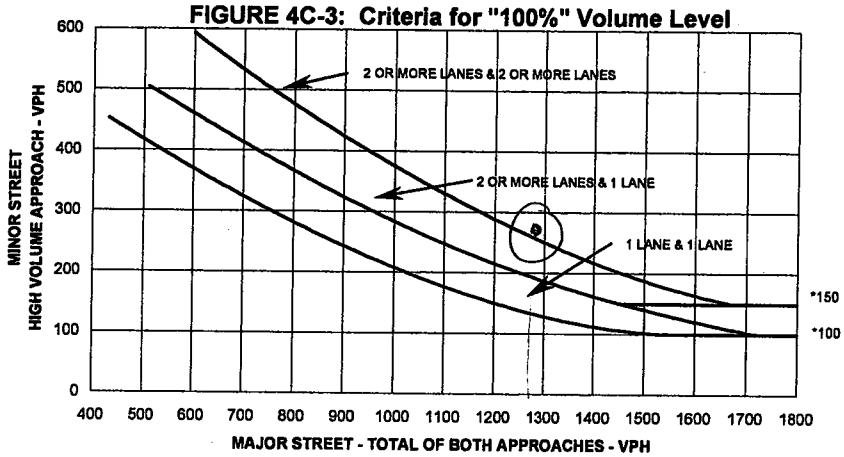
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

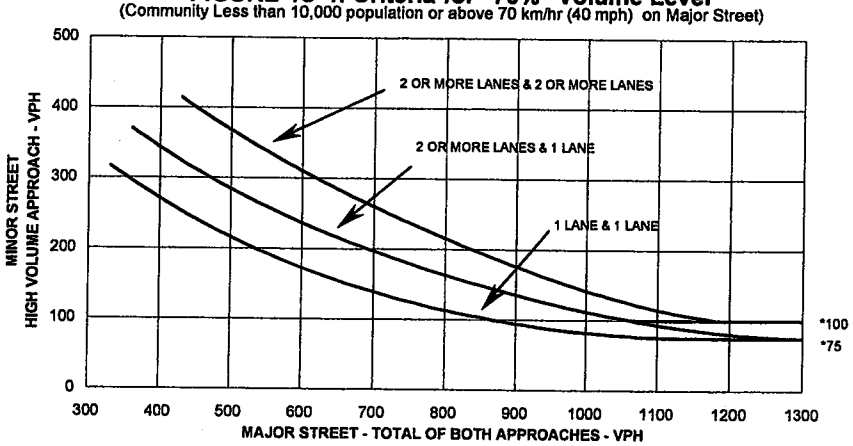
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St. Lanes: 2
Minor Street: Pump House Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	18			X
	1100	13			
	1200	12			
	1500	12			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1543				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	N	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sill
Date: 12/9/08

Major Street: Haul Rd
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	218	202	206	179	231	246	295	469
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	260	266	138	107	129	153	146	181

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	218	202	206	179	231	246	295	469
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	260	266	138	107	129	153	146	181

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Hawl Rd
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

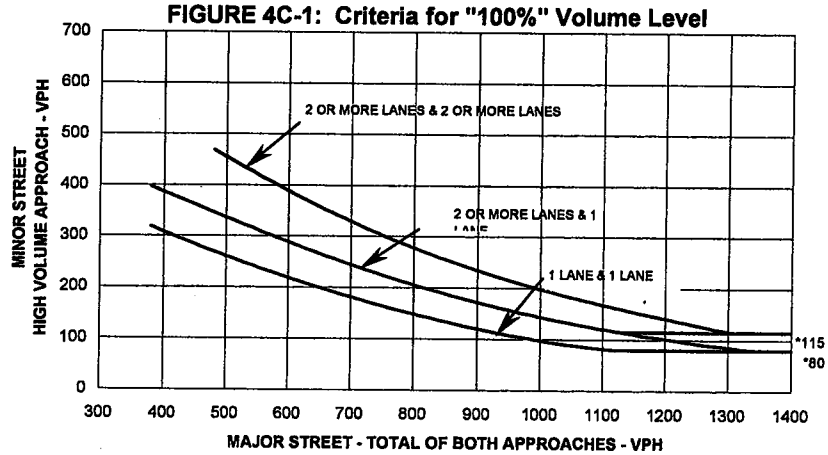
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

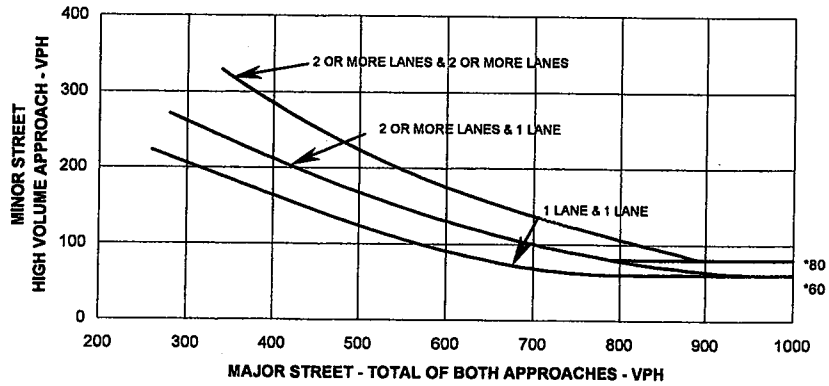
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	218	260
800	202	266
1600	295	146
1700	469	181

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Hull Rd
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	469	181

Criteria

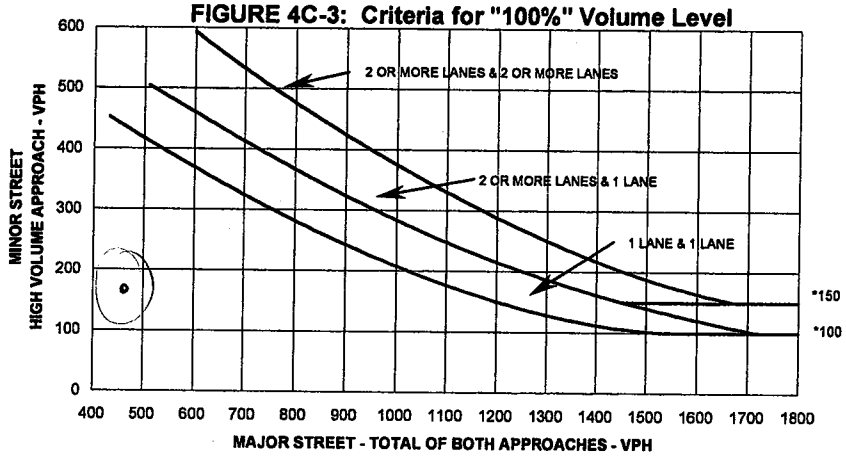
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	181	
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	650	
Fulfilled?: ☒ Yes	☐ No	

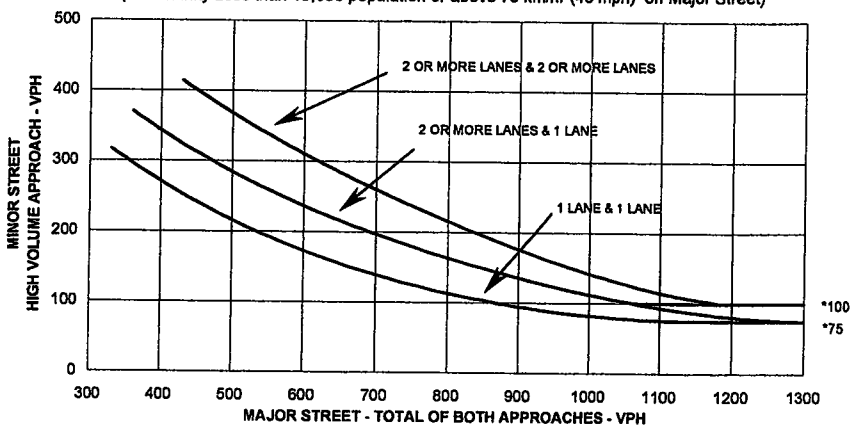
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Hall Rd
Minor Street: Pump House

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	5			X
	800	15			
	1200	5			
	1700	5			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/9/08
Major Street: Hawl Rd
Minor Street: Pump House
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			0		X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 650				X		X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA			← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1005	1178	871	855	846	936	1013	1196
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	430	418	409	310	353	427	451	561

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1005	1178	871	855	846	936	1013	1196
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	430	418	409	310	353	427	451	561

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: D. Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

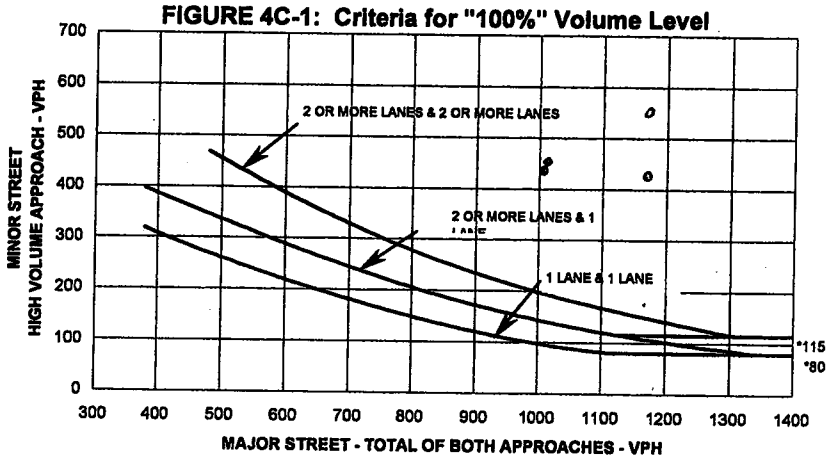
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

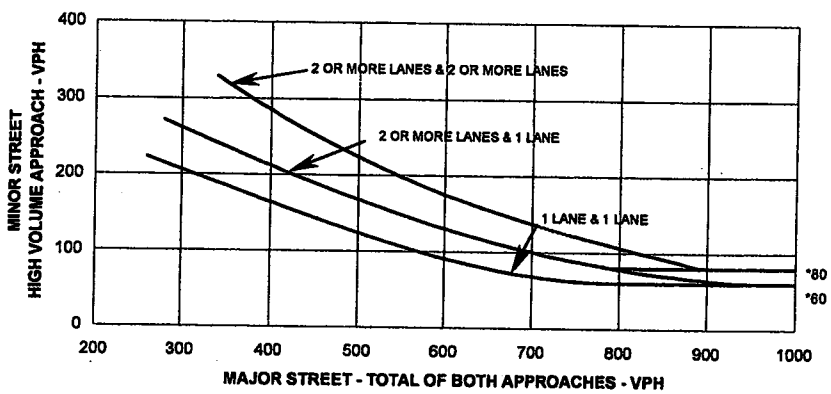
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1005	430
800	1178	418
1600	1013	451
1700	1196	561

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1196	561

Criteria

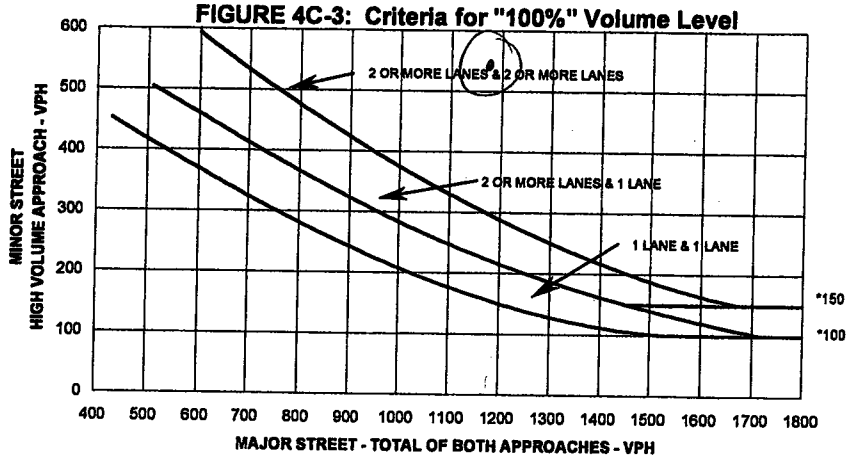
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

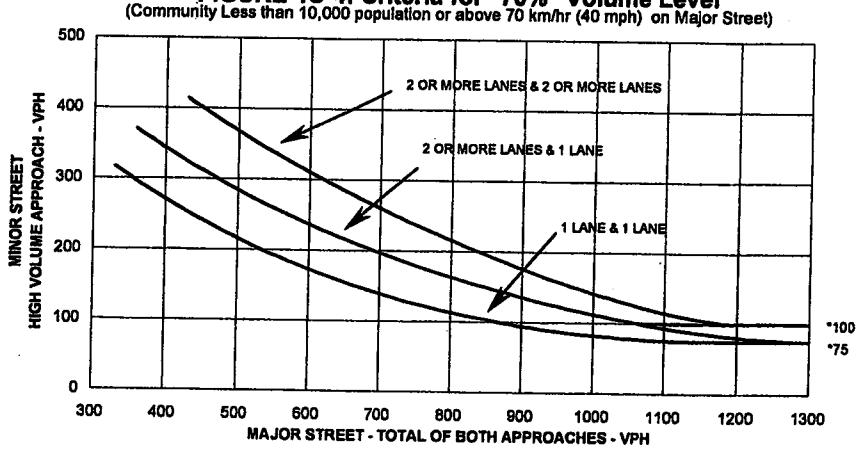
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St.
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	9:00	55			X
	12:00	122			
	13:00	68			
	17:00	49			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Summer St
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	10			X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2040				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: I-90 Ramp

Lanes: 2
Lanes:

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420								
Highest Approach on Minor Street	150 (120)	105	200 (160)	140								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☐ Yes ☒ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☐ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630								
Highest Approach on Minor Street	75 (60)	53	100 (80)	70								

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☒

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☒

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: I-90 Ramp

Lanes: 2
Lanes: ____

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

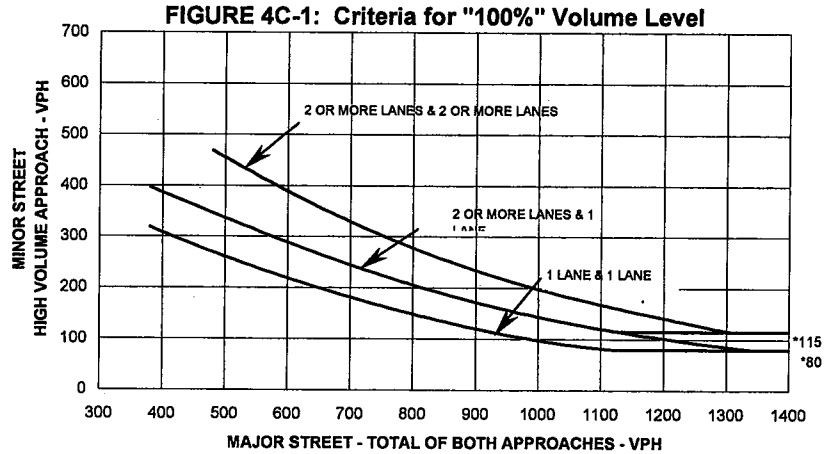
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

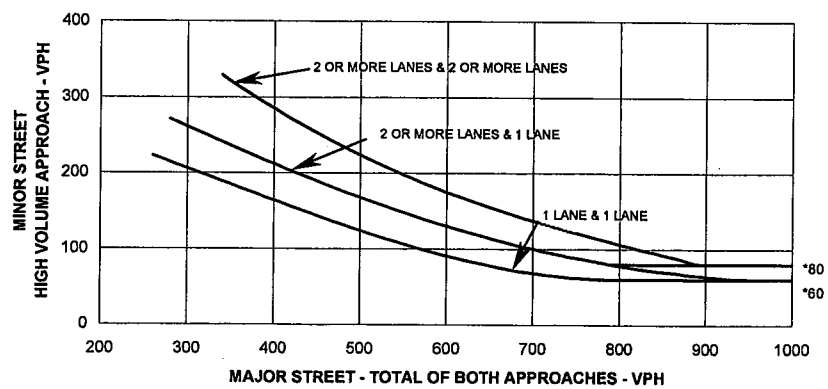
Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/9/08
Major Street: D Street
Minor Street: I-90 Ramps
Lanes: 2
Lanes:
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

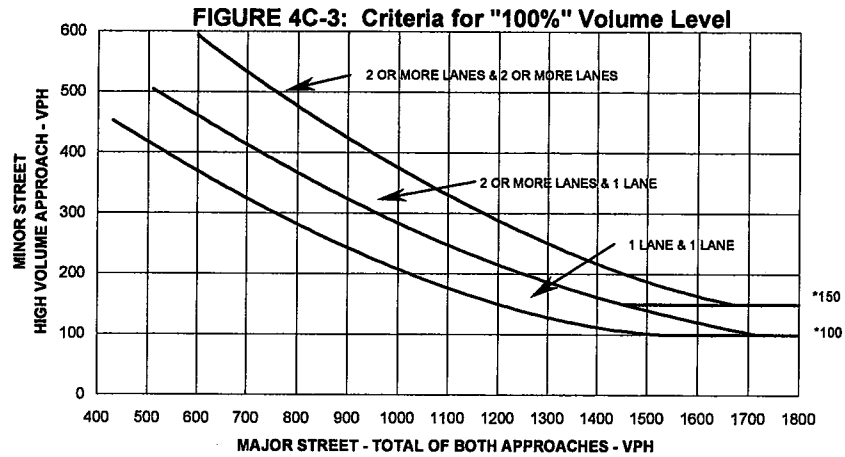
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

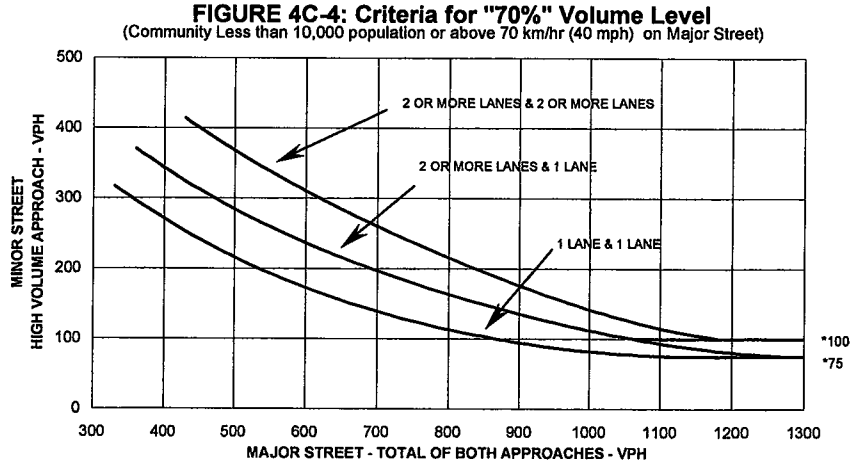
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/9/08
Major Street: D Street
Minor Street: I-90 Ramp
Lanes: 2
Lanes:
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	4			X
	800	10			
	1200	5			
	1300	7			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: I-90 Ramp

Lanes: 2
Lanes:

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	1				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: Transitway

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	946	1007	792	685	779	914	1044	1405
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	32	30	24	22	13	25	36	37

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	946	1007	792	685	779	914	1044	1405
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	32	30	24	22	13	25	36	37

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: Transitway

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

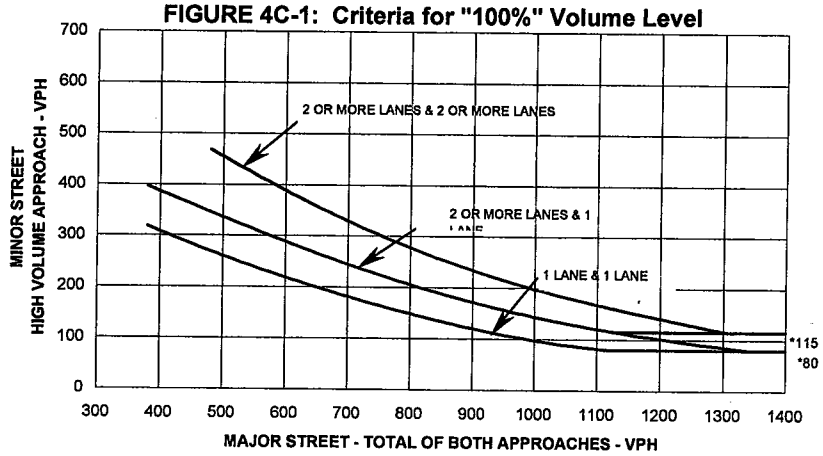
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

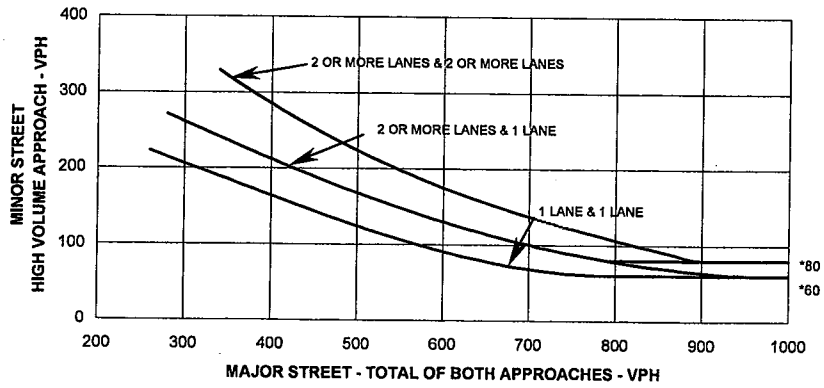
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	946	32
8:00	1007	30
16:00	1044	36
17:00	1405	37

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: Transitway

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1405	37

Criteria

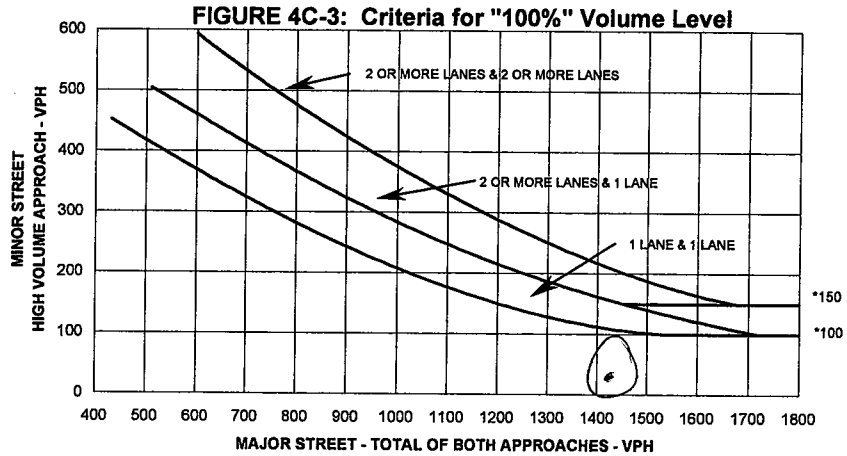
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	37	
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1471
Fulfilled?: ☒ Yes ☐ No		

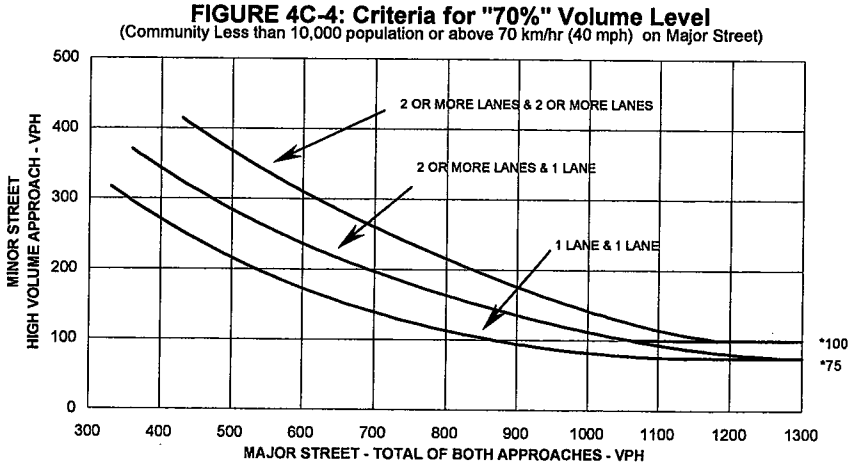
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/9/08
Major Street: D Street
Minor Street: Transitway
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	8			X
	1300	15			
	1500	10			
	1700	7			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: D Street
Minor Street: Transitway

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			2		X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1471			X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Congress St.
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	732	797	626	439	514	555	633	822
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	389	460	311	281	307	328	351	530

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	732	797	626	439	514	555	633	822
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	389	460	311	281	307	328	351	530

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Congress St
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

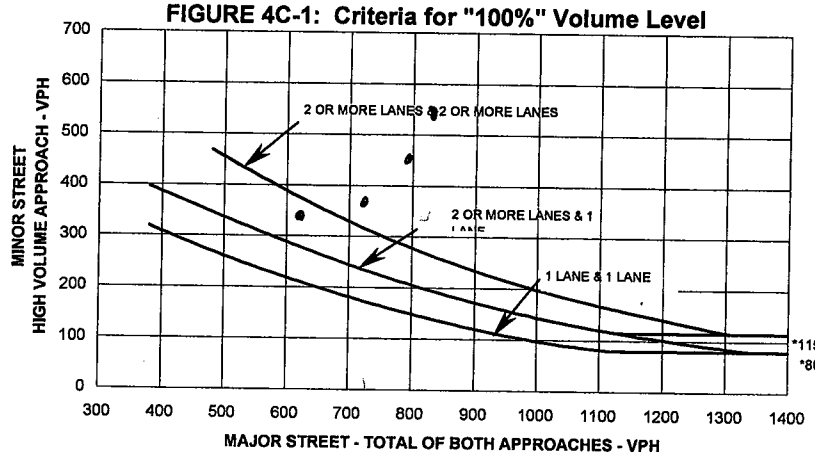
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

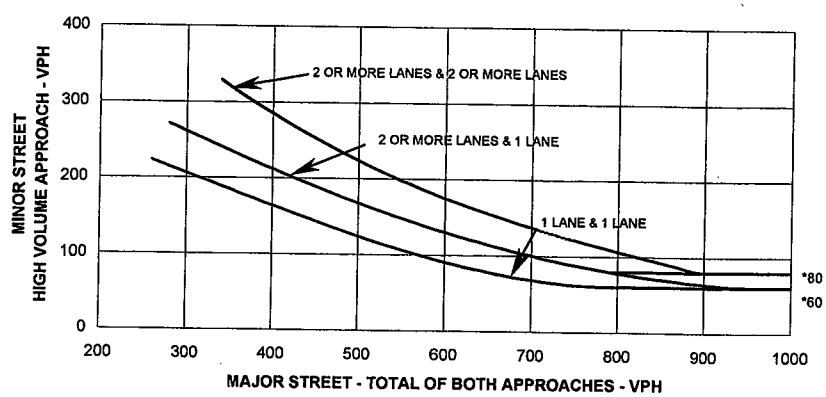
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	732	389
8:00	797	460
16:00	633	351
17:00	822	581

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Congress St.
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	822	536

Criteria

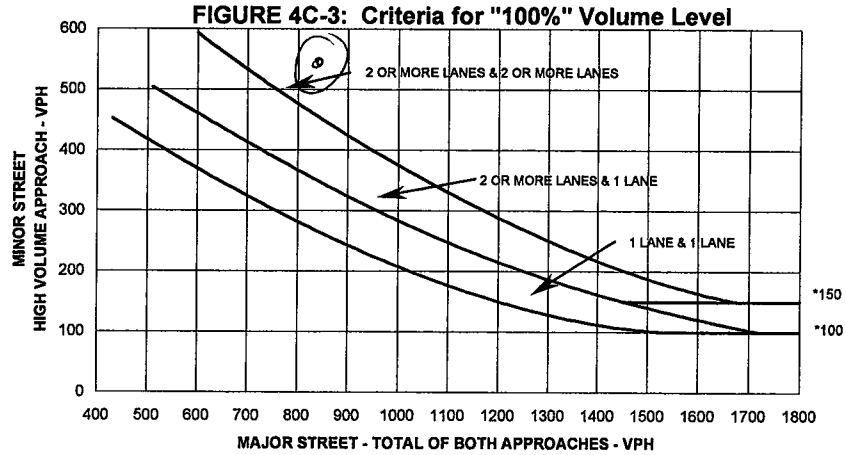
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		536
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1818
Fulfilled?: ☒ Yes ☐ No		

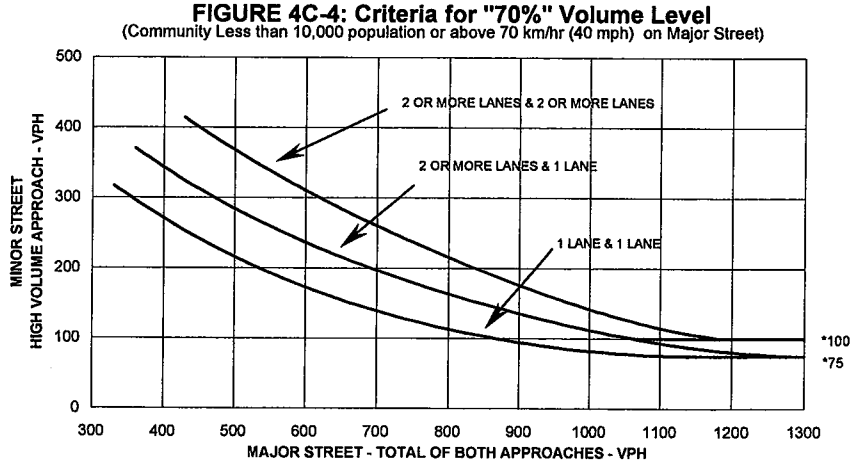
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Congress Street
Minor Street: D Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	71			X
	1200	108			
	1300	105			
	1700	55			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/9/08

Major Street: Congress Street
Minor Street: DV Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	4				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1818				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	N	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)		NO DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-90 Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	907	970	703	507	538	690	922	1242
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	837	924	590	395	354	438	506	420

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	907	970	703	507	538	690	922	1242
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	837	924	590	395	354	438	506	420

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-90 Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

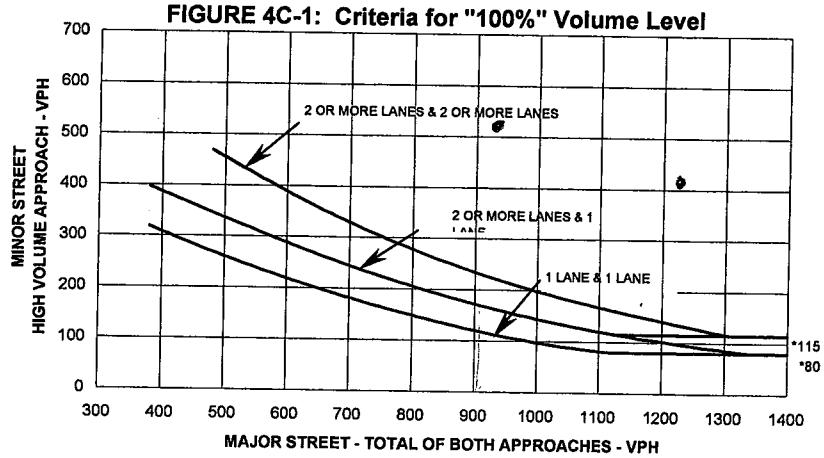
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

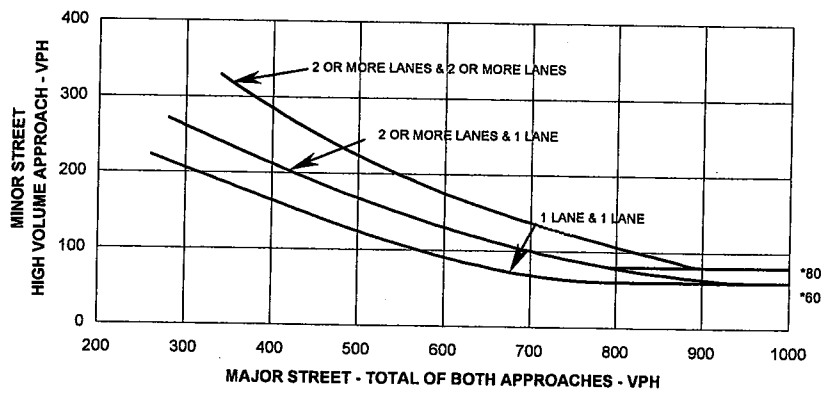
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	907	837
8:00	970	924
16:00	922	506
17:00	1242	420

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/10/08
Major Street: Congress St. Lanes: 2
Minor Street: I-90 Ramps Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1242	420

Criteria

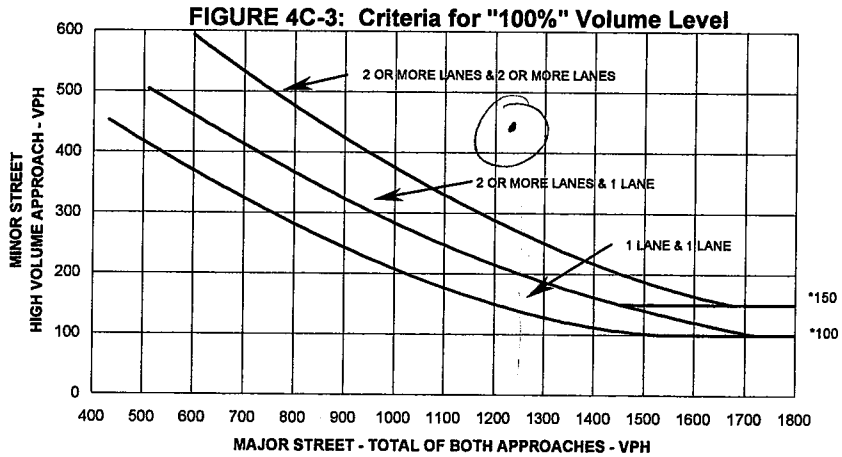
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		420
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1960
Fulfilled?: ☒ Yes	☐ No	

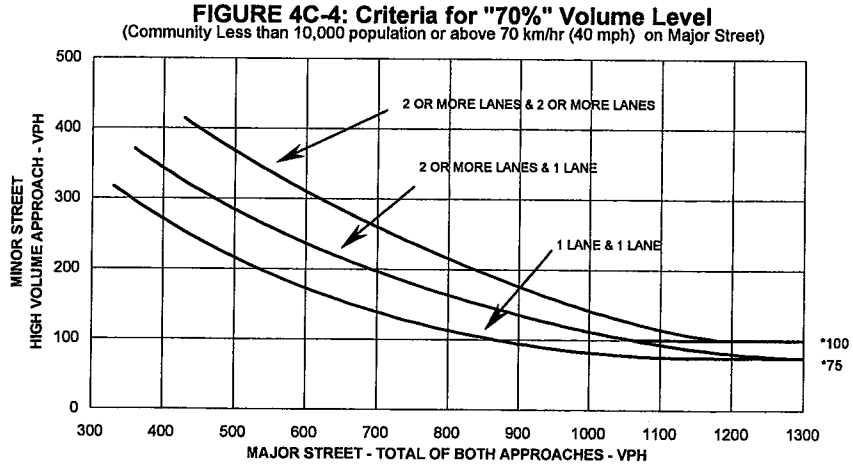
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-90 Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	25			X
	800	43			
	1600	29			
	1700	25			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-90 Ramps

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		X
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1960			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-93 Ramp. / ESR.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	458	508	432	317	369	368	497	642
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	650	719	474	171	111	117	162	309

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	458	508	432	317	369	368	497	642
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	650	719	474	171	111	117	162	309

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-93 / ESR

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

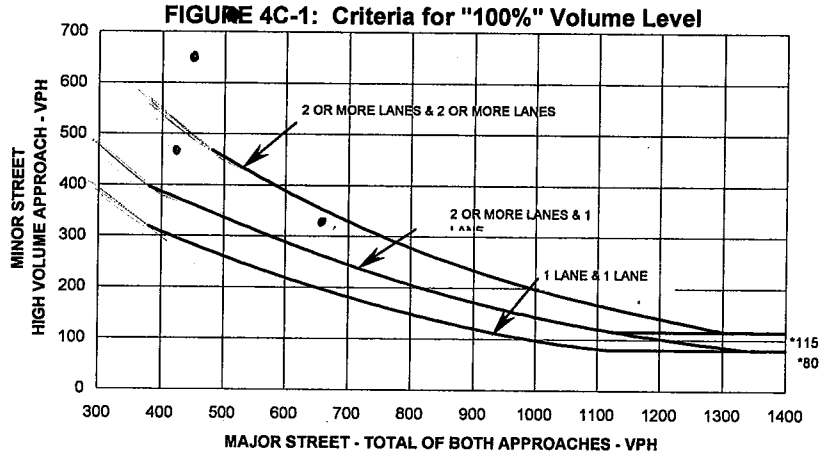
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

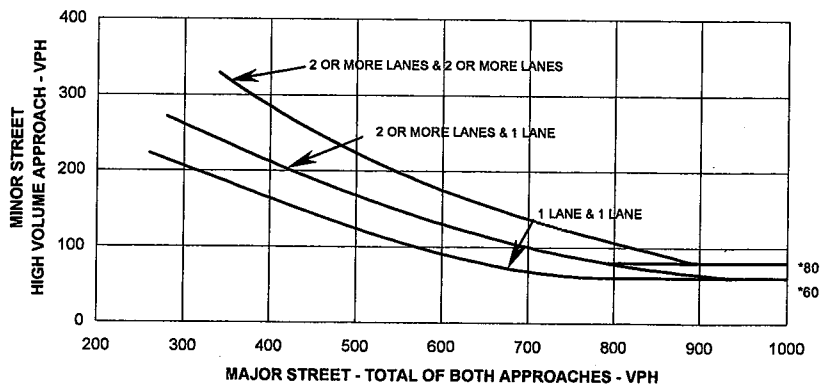
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	458	650
800	508	719
900	432	474
1700	642	309

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-93 Ramp / ESR

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour	
8:00	508 #19

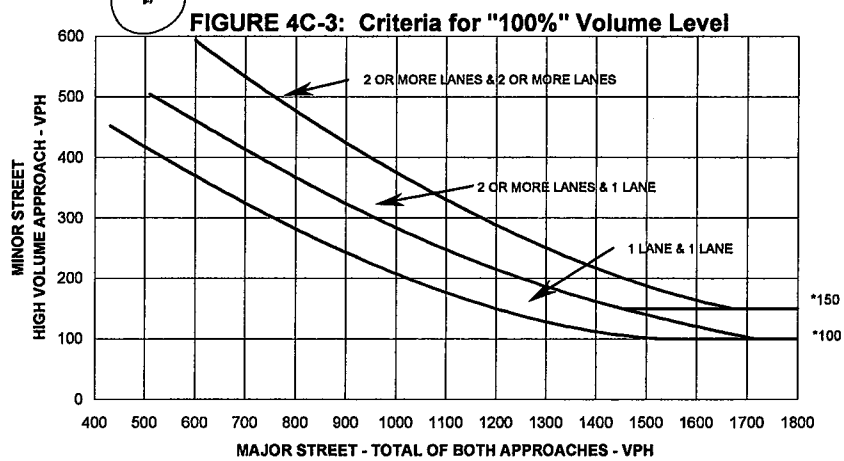
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

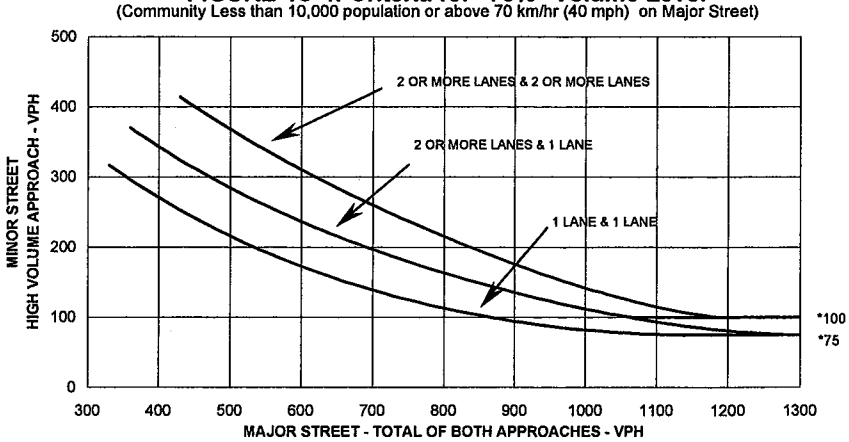
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-93 Ramp / ESR

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	2			X
	1000	2			
	1600	3			
	1700	8			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: I-93 Ramp/ESK

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			0		X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1815				X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks: _____

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St. Lanes: 2
Minor Street: Boston Wharf Rd (WSR) Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	500 (400)	350	600 (480)	420	628	740	627	460	544	531	768	823
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	160	200	139	125	149	159	252	348

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	750 (600)	525	900 (720)	630	628	740	627	460	544	531	768	823
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	160	200	139	125	149	159	252	348

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress Street
Minor Street: Boston Wharf Rd (WSR)

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

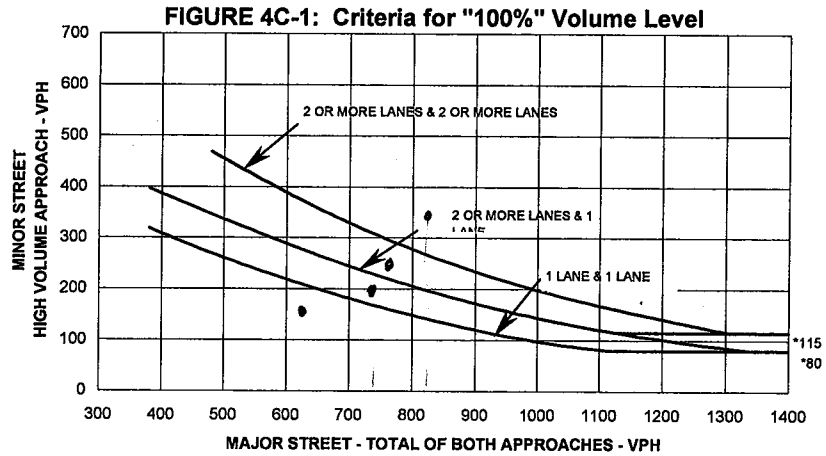
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

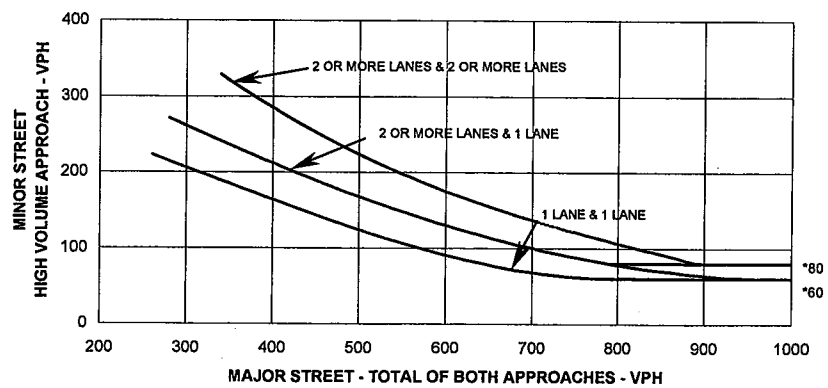
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	628	160
800	740	200
1600	768	252
1700	823	348

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St. Lanes: 2
Minor Street: Boston Wharf Rd (WSR) Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	823	348

Criteria

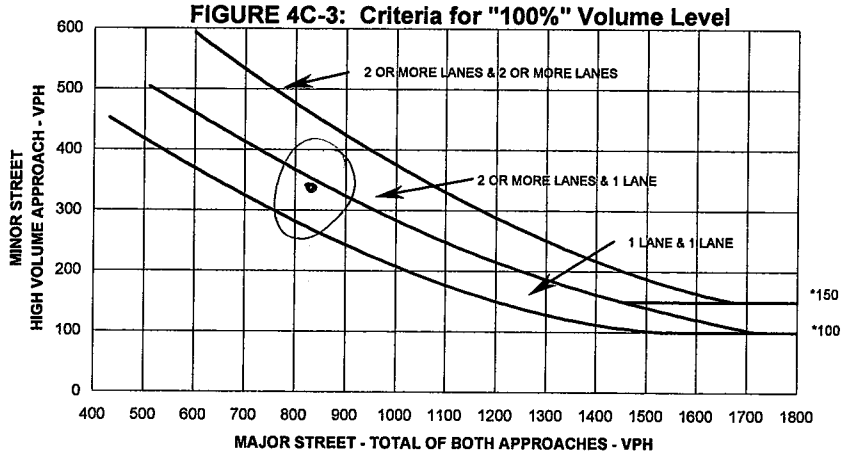
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*	207	
Fulfilled?: ☒ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	348	
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		823
Fulfilled?: ☒ Yes	☐ No	

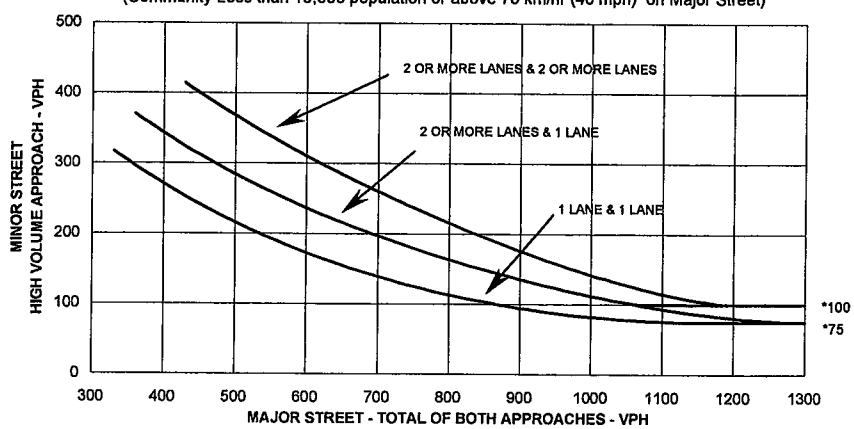
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Boston Wharf Rd. (WSR)

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	10			X
	1500	4			
	1600	21			
	1700	22			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St. Lanes: 2
Minor Street: Boston Wharf Rd. (WSP) Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1224				X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3			X		
		Satisfied?:	N	N	N					
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA						← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave.
Minor Street: B Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	1000	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1179	1251	1399	1156	1180	1185	1190	1336
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	420	259	400	320	328	313	303	378

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		800	1000	1200	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1179	1251	1399	1156	1180	1185	1190	1336
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	420	259	400	320	328	313	303	378

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sin
Date: 12/10/08

Major Street: Northern Ave
Minor Street: B Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

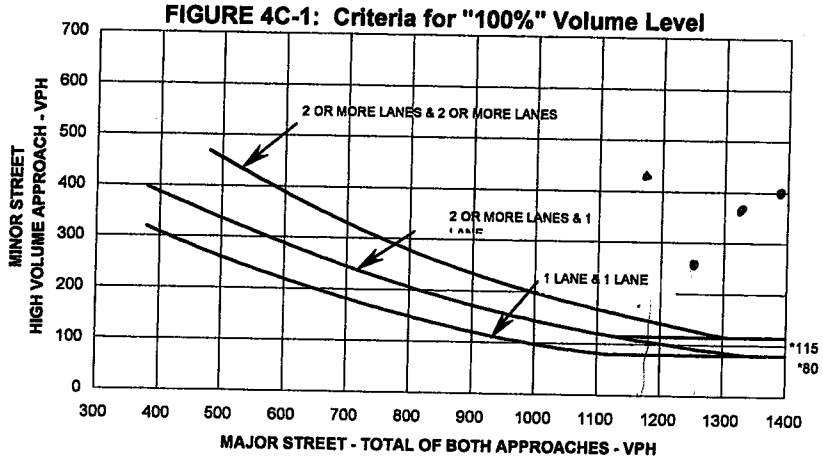
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

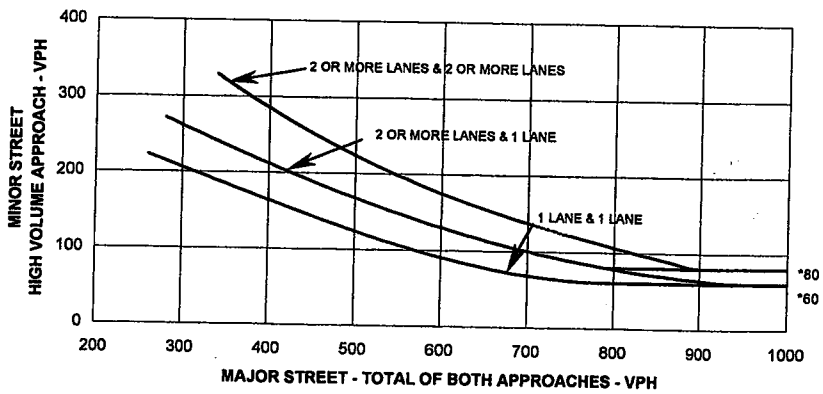
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1179	420
10:00	1251	259
12:00	1399	400
17:00	1336	378

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/10/08
Major Street: Northern Ave
Minor Street: B Street
Lanes: 2
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1200	1399	400

Criteria

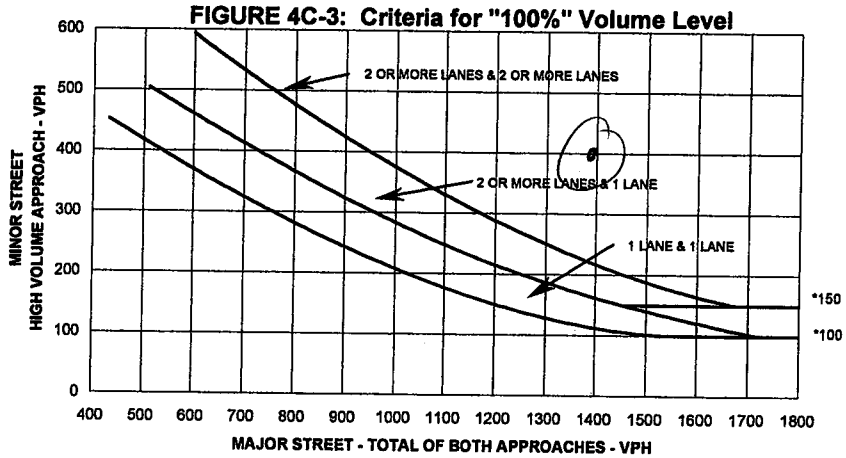
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		400
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1799	1930
Fulfilled?: ☒ Yes ☐ No		

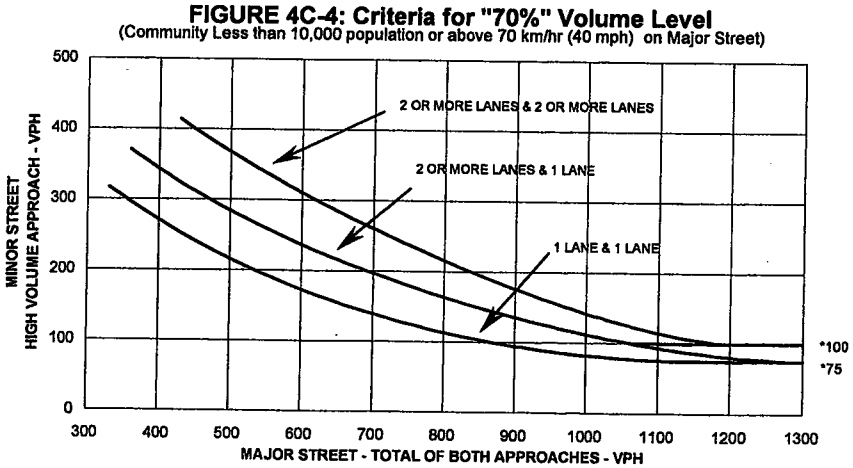
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave.
Minor Street: B Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	359			
	1300	237			
	1400	265			
	1500	212			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave
Minor Street: B Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X			
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		2			X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1799			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave. / Seaport Blvd. Lanes: 2
Minor Street: East Service Rd. Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	12:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1201	1352	1150	1173	1255	1277	1254	1371
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	444	634	480	499	455	455	241	335

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	12:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1201	1352	1150	1173	1255	1277	1254	1371
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	444	634	480	499	455	455	241	335

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave / Seaport Blvd — Lanes: 2
Minor Street: East Service Rd — Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

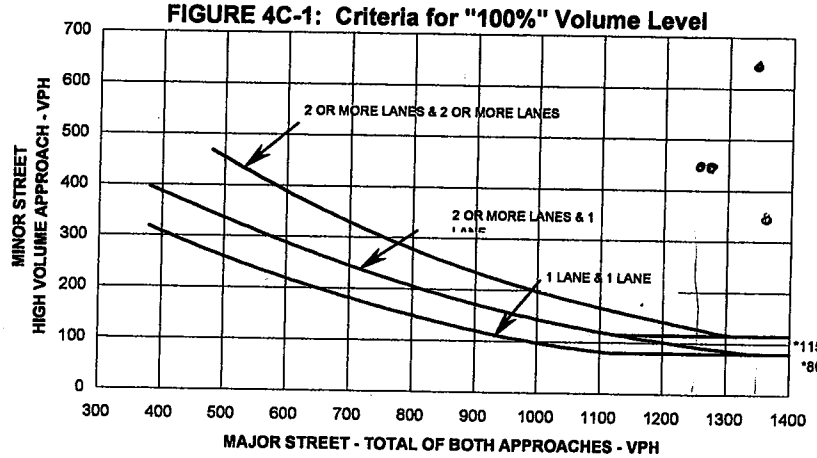
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

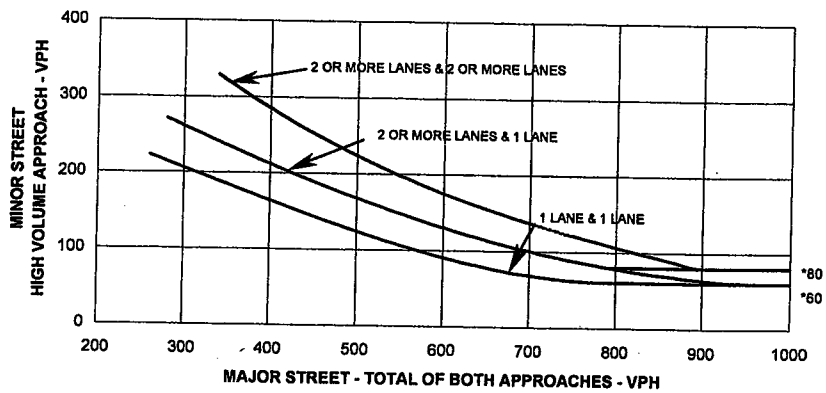
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1352	634
11:00	1255	455
12:00	1277	455
17:00	1371	335

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave/Seaport Blvd
Minor Street: East Service Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	1352	634

Criteria

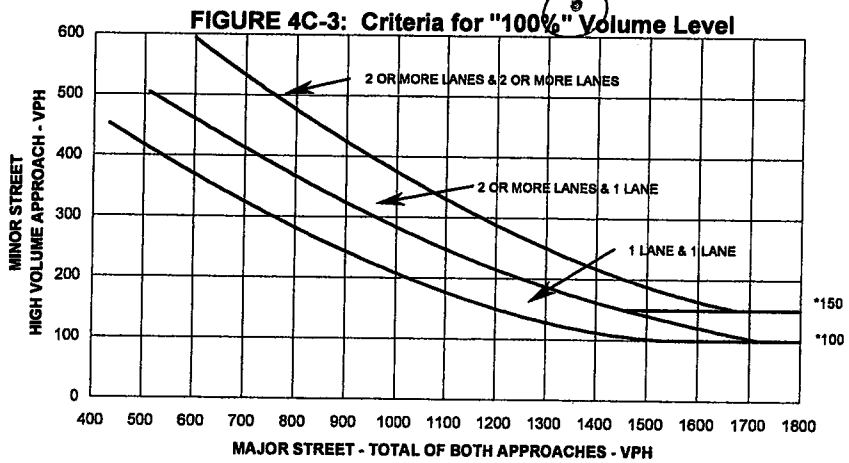
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		634
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		2036
Fulfilled?: ☒ Yes ☐ No		

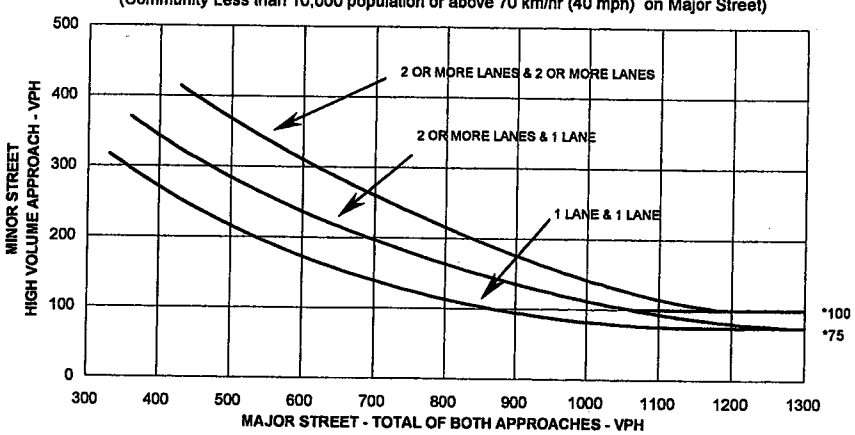
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave/Seaport Blvd
Minor Street: East Service Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1100	29			X
	1400	35			
	1600	42			
	1700	97			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Northern Ave / Seaport Blvd. Lanes: 2
Minor Street: East Service Rd. Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2036			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Seaport Blvd.
Minor Street: Sleeper St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1411	1604	1357	958	938	939	999	1177
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	85	83	68	69	240	229	254	257

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1411	1604	1357	958	938	939	999	1177
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	85	83	68	69	240	229	254	257

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Seaport Blvd.
Minor Street: Sleeper St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

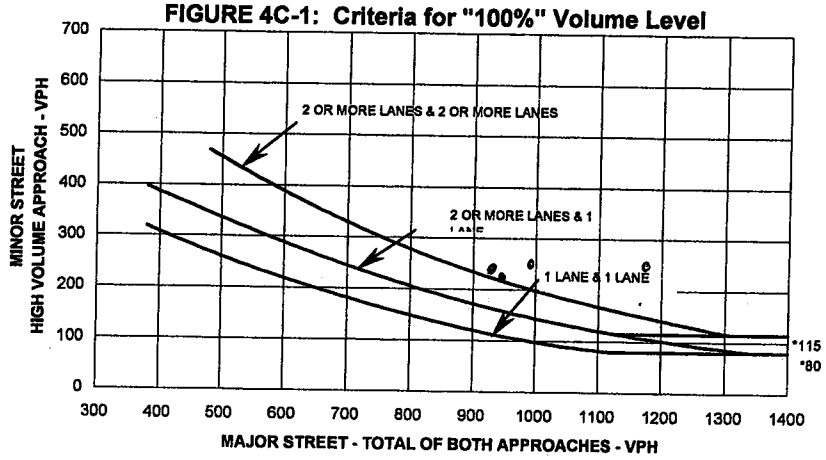
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

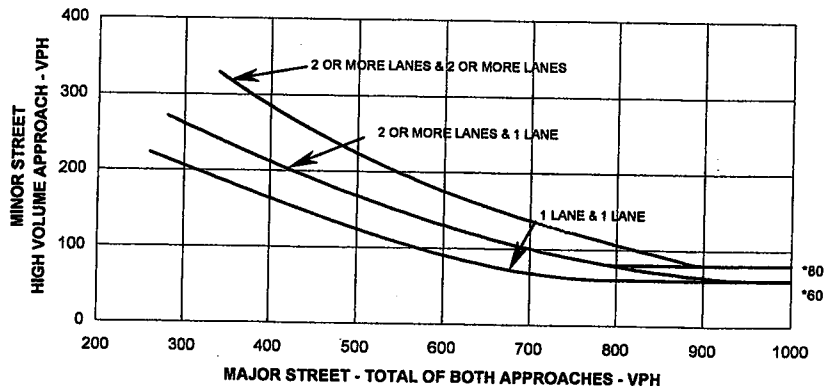
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	938	240
1500	939	229
1600	999	254
1700	1177	257

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Seaport Blvd
Minor Street: Sleeper St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1900	1177	257

Criteria

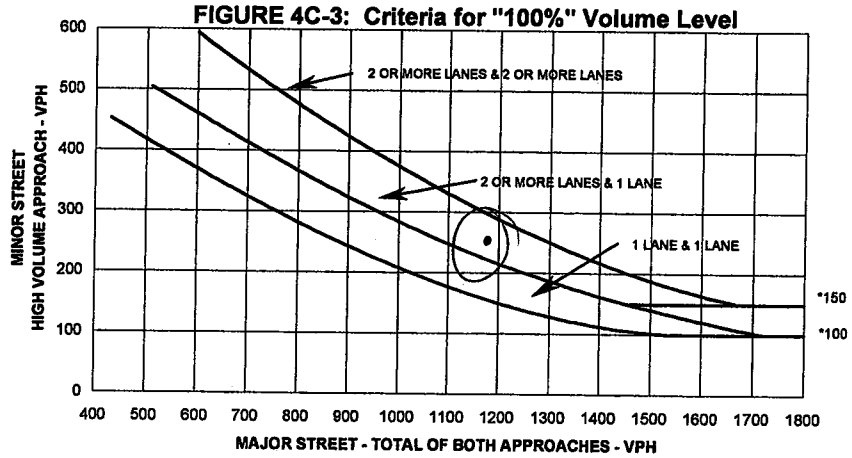
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	257	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1453
Fulfilled?: ☒ Yes ☐ No		

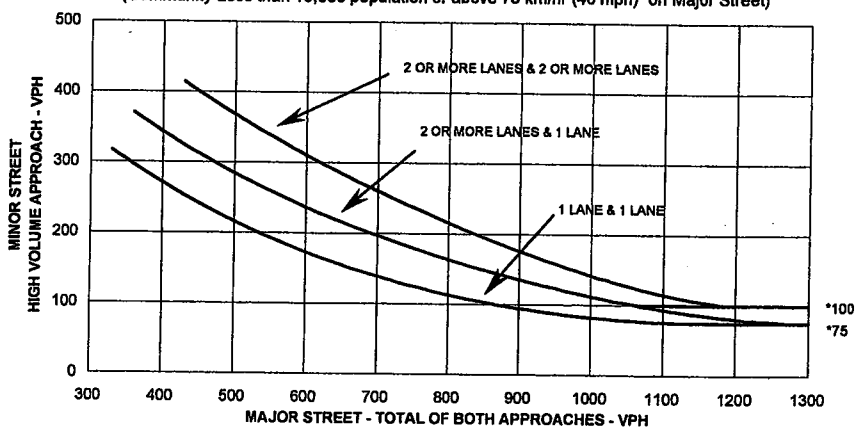
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Seaport Blvd
Minor Street: Sleeper St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1200	83			X
	1300	79			
	1400	83			
	1700	74			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Seaport Blvd
Minor Street: Sleeper St.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 706		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	N	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		8:00	9:00	10:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	811	825	726	694	678	768	892	912
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	277	200	161	154	178	196	244	263

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		8:00	9:00	10:00	11:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	811	825	726	694	678	768	892	912
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	277	200	161	154	178	196	244	263

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

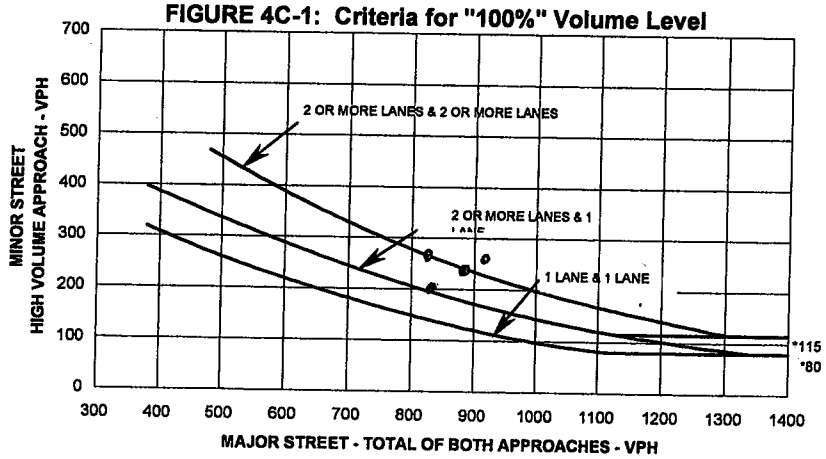
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

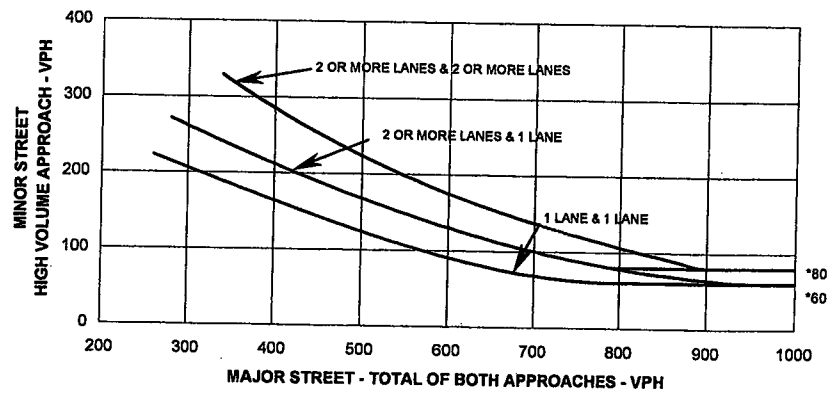
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	811	277
900	825	200
1600	892	244
1700	912	263

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	912	263

Criteria

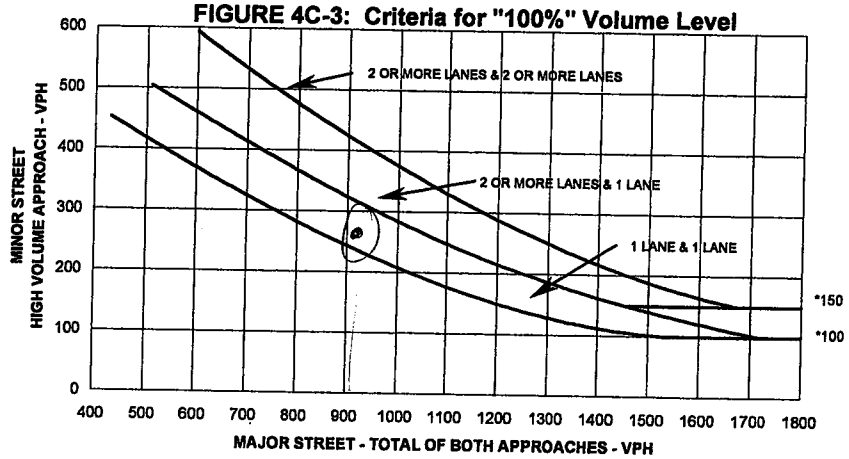
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*	5.77	
Fulfilled?: ☒ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	263	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1175	
Fulfilled?: ☒ Yes ☐ No		

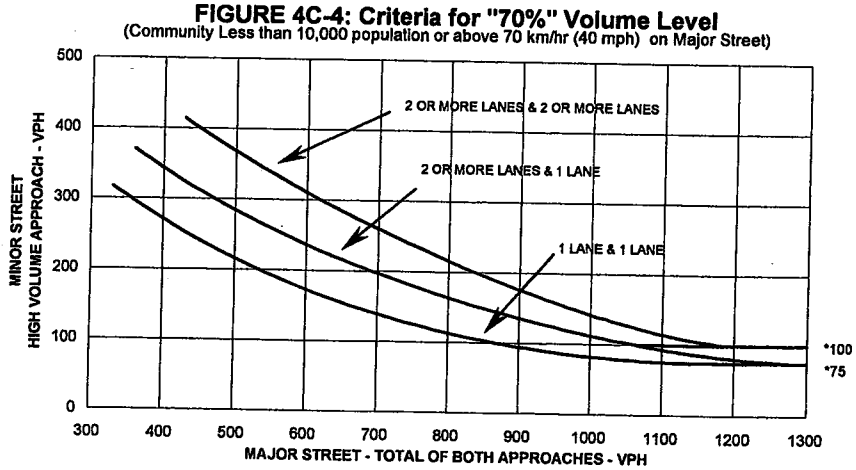
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Dorchester Ave.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	1400	56			X
	1500	84			
	1600	112			
	1700	106			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: Dorchester Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1175				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: A Street

Lanes: 1
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	701	812	605	550	572	644	707	810
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	239	255	215	189	206	336	320	343

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1300	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	701	812	605	550	572	644	707	810
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	239	255	215	189	206	336	320	343

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: A Street

Lanes: 1
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

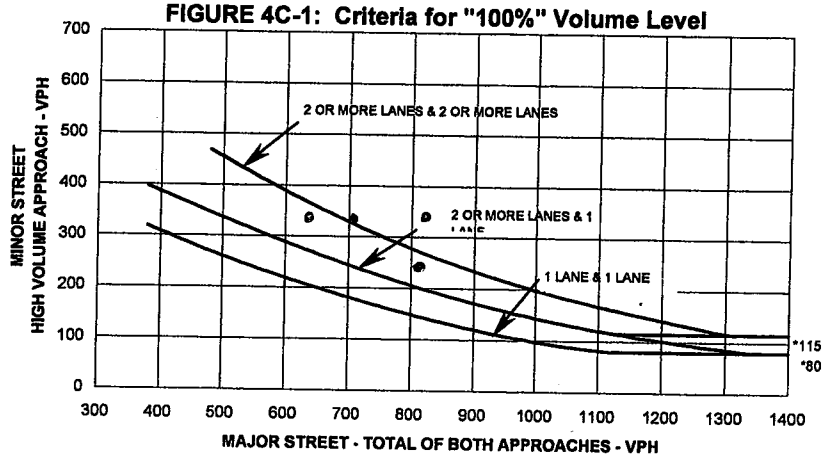
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

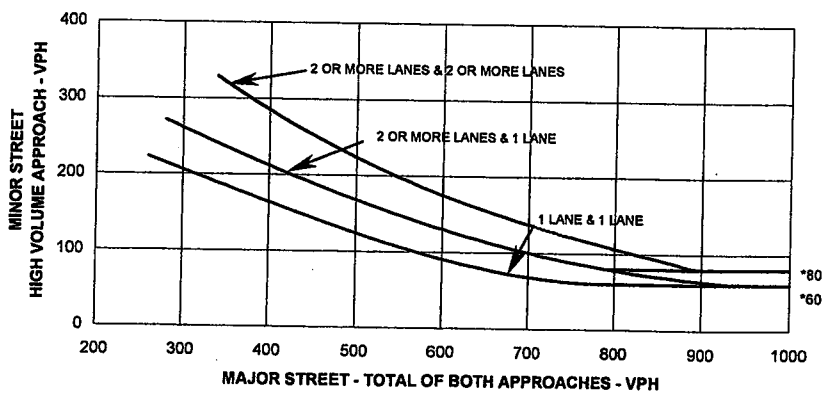
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	812	255
1500	644	336
1600	707	320
1700	810	343

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: A Street

Lanes: 1
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	910	343

Criteria

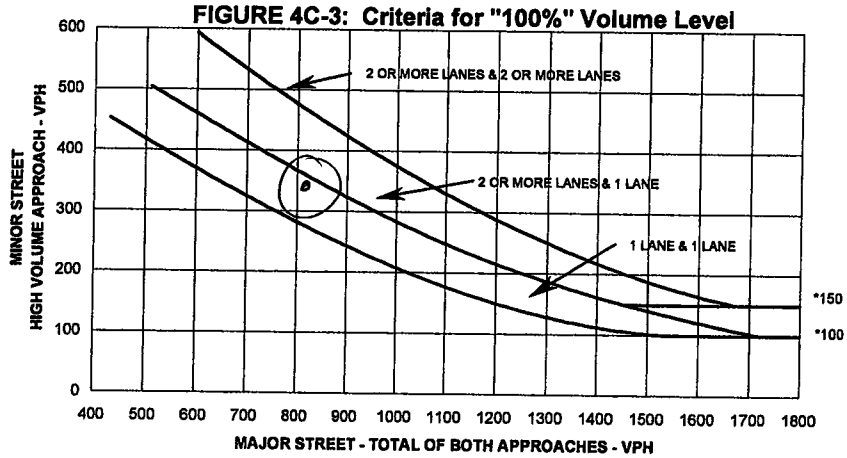
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	343	
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		1182
Fulfilled?: ☒ Yes ☐ No		

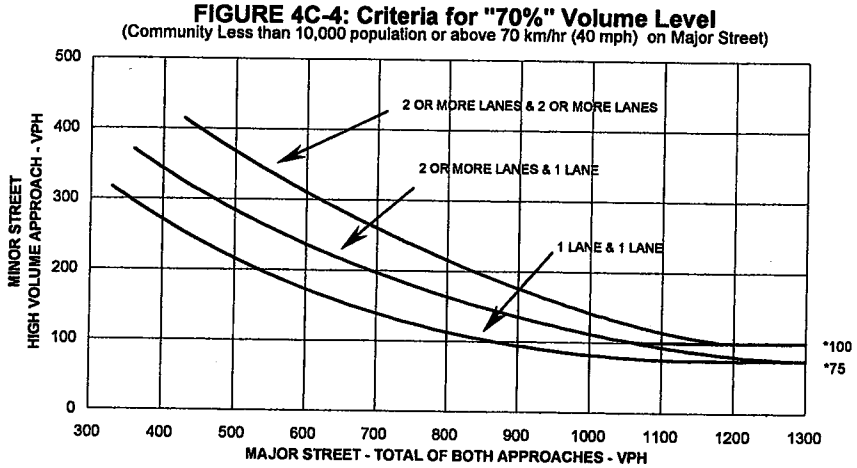
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: A Street

Lanes: 1
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	35			X
	1200	67			
	1300	86			
	1700	48			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Congress St.
Minor Street: A Street

Lanes: 1
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			3		X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1192			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X			
			Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA				← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: West Side Dr.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	782	970	819	805	769	898	939	1092
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	4	8	11	25	33	39	35	44

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	782	970	819	805	769	898	939	1092
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	4	8	11	25	33	39	35	44

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 12/10/08
Major Street: Summer St.
Minor Street: West Side Dr.
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

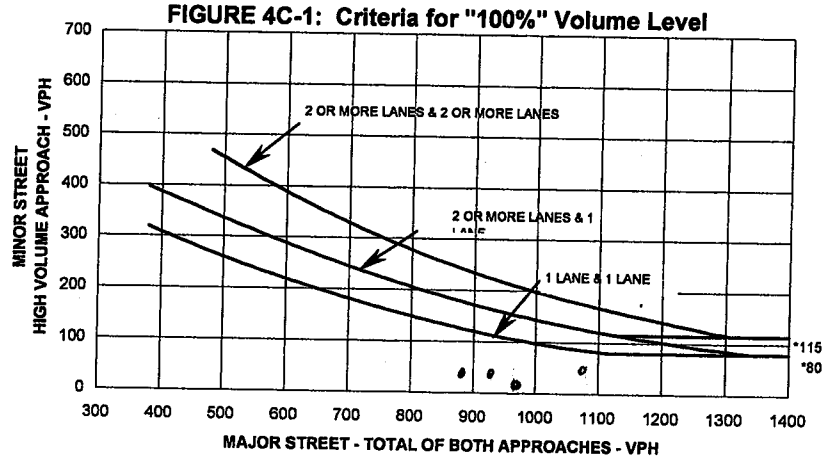
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

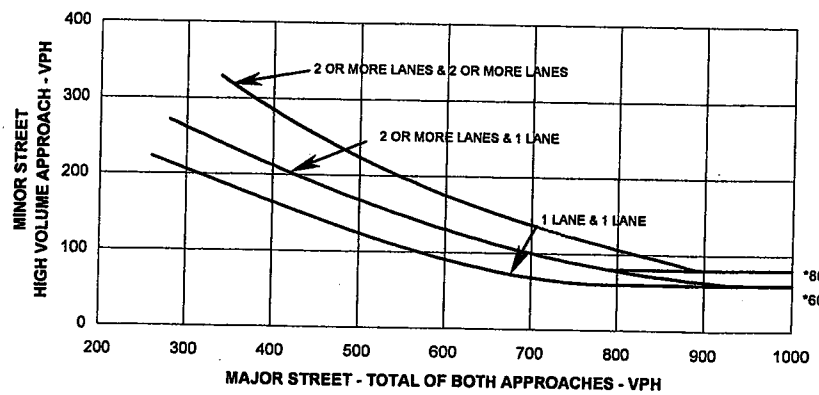
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	976	8
1500	898	39
1600	939	35
1700	1092	44

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: West Side Dr.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1092	44

Criteria

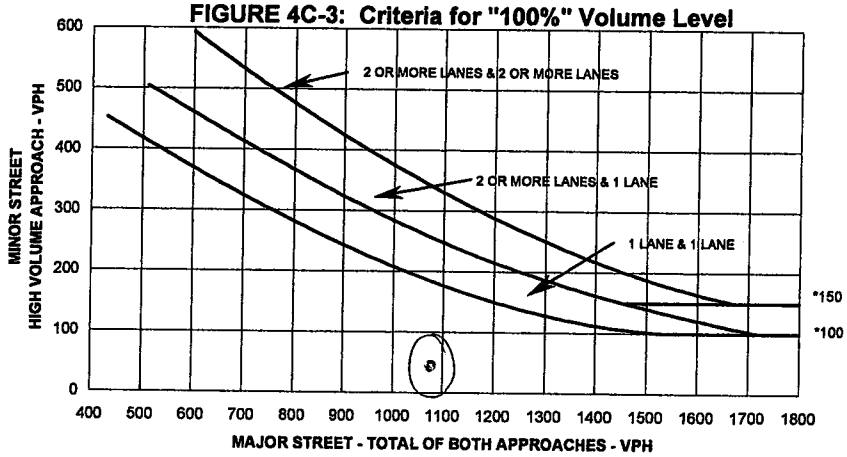
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☒ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	44	
Fulfilled?: ☐ Yes	☒ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1136	
Fulfilled?: ☒ Yes	☐ No	

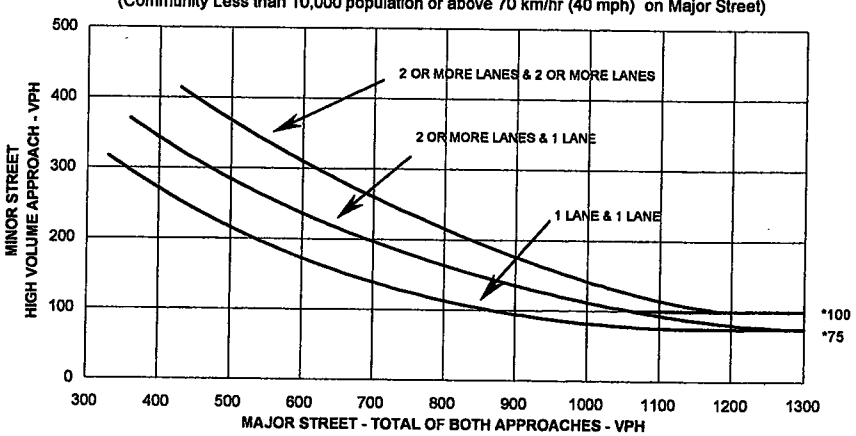
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/09

Major Street: Summer St.
Minor Street: West Side Dr.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	35			X
	1100	8			
	1600	8			
	1700	40			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: West Side Dr.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		X
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:			1		X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria			Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1136	X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant: 1 2 3 Satisfied?: N N N		X		
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA	← Hour ← Volume				

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: World Trade Center

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	797	996	814	818	779	919	977	1185
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	46	57	52	49	53	41	63	90

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	797	996	814	818	779	919	977	1185
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	46	57	52	49	53	41	63	90

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: World Trade Center Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

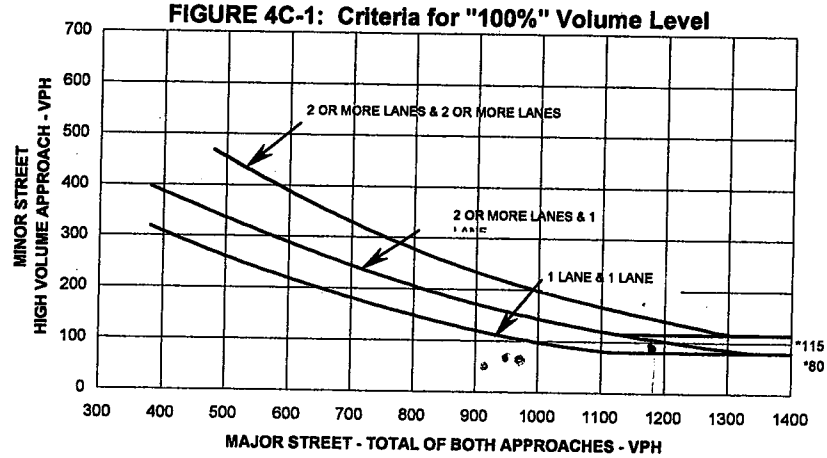
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

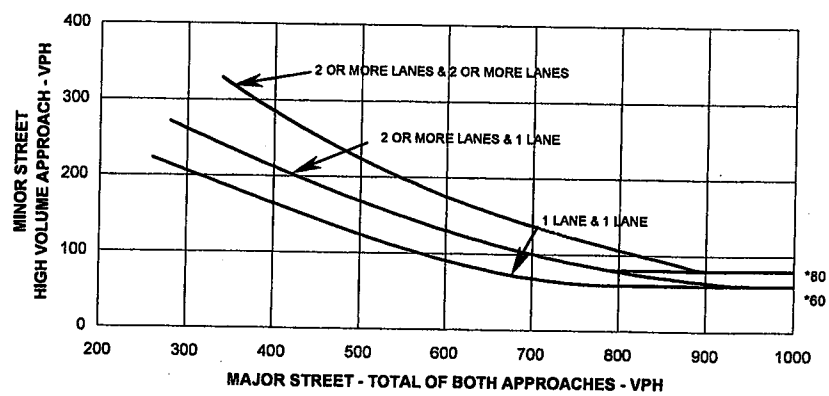
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	996	57
1500	919	41
1600	977	63
1700	1185	90

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A.S.U.
Date: 12/10/08

Major Street: Summer St.
Minor Street: World Trade Center Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1185	90

Criteria

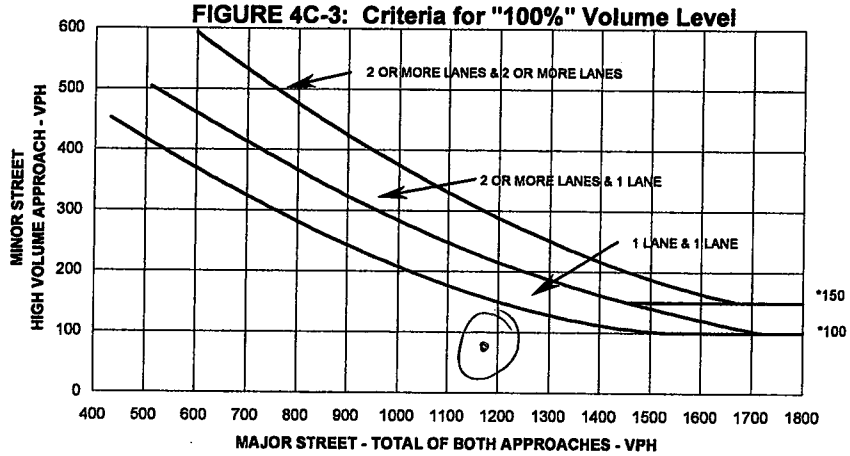
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	90	
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1315	
Fulfilled?: ☒ Yes ☐ No		

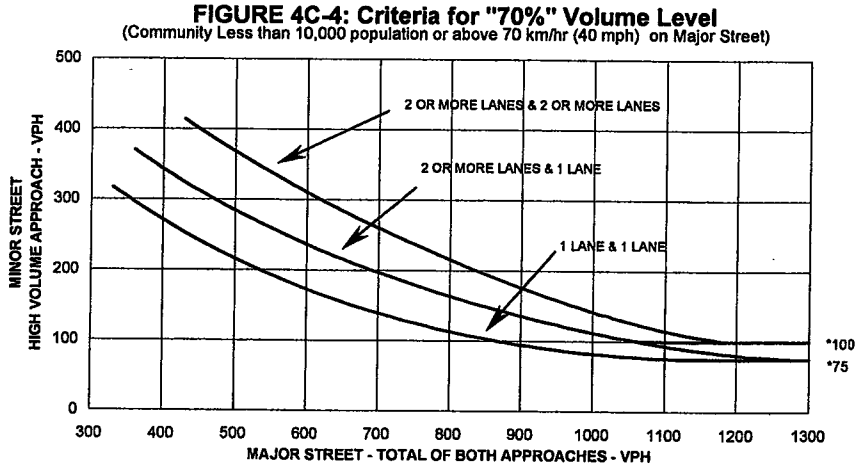
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: World Trade Center Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	469			
	1100	292			
	1400	287			
	1600	193			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/10/08

Major Street: Summer St.
Minor Street: World Trade Center Ave

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1315		X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/4/2009

Major Street: Seaport Blvd
Minor Street: West Service Road

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	14:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1033	1368	1280	1003	821	828	827	1085
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	45	48	63	70	69	58	129	166

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	14:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1033	1368	1280	1003	821	828	827	1085
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	45	48	63	70	69	58	129	166

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/4/2009

Major Street: Seaport Blvd
Minor Street: West Service Road

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

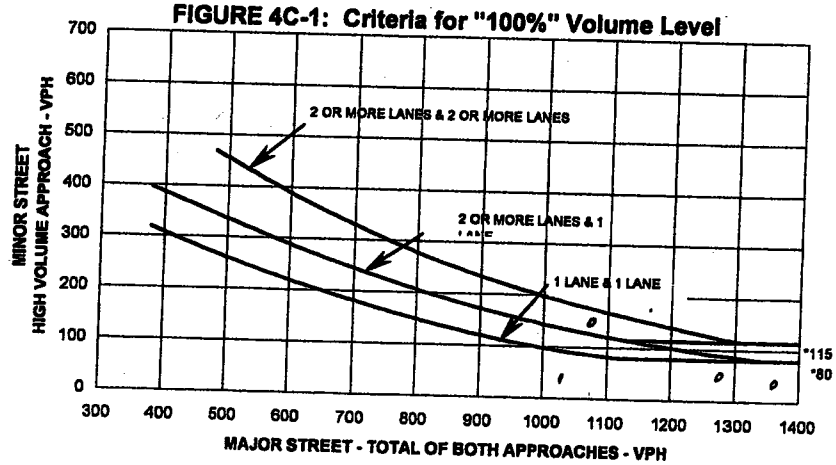
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

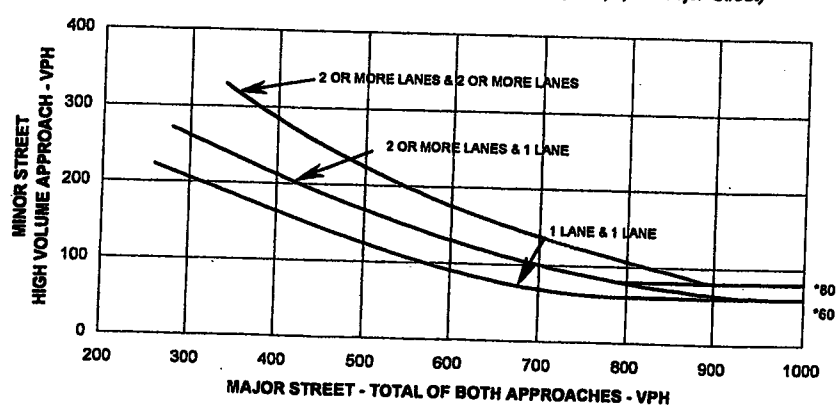
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1033	45
800	1368	48
900	1280	63
1700	1085	166

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/4/2009

Major Street: Seaport Blvd
Minor Street: West Service Rd.

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	1368	48

Criteria

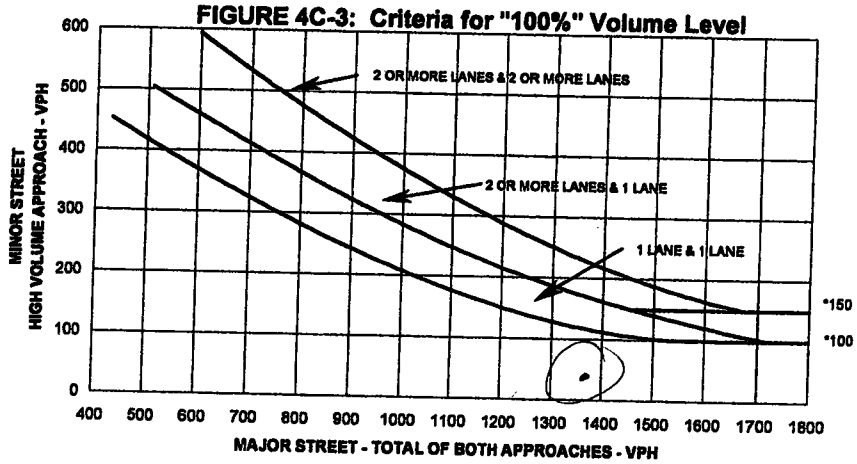
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	270	
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1416	
Fulfilled?: ☒ Yes ☐ No		

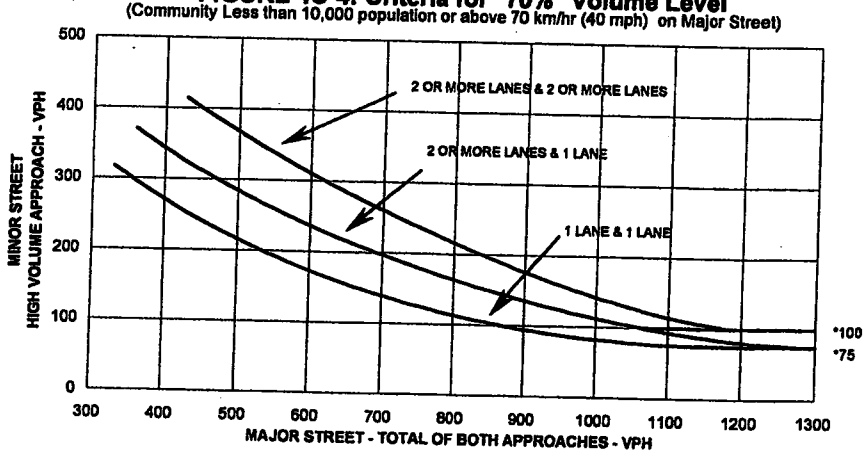
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 7/4/2009
Major Street: Seaport Blvd.
Minor Street: West Service Rd
Lanes: 2
Lanes: 1
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	12			X
	900	15			
	1000	16			
	1200	10			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/4/2009

Major Street: ~~West~~ Seaport Blvd
Minor Street: West Service Rd

Lanes: 2
Lanes: 1

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)						
	Warrant 1, Condition B (80% satisfied)						
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour						
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA					← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: SSCONN

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	604	575	657	659	826	1145	1071	1299
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	57	66	66	62	58	74	89	104

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	604	575	657	659	826	1145	1071	1299
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	57	66	66	62	58	74	89	104

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: SSCONN

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

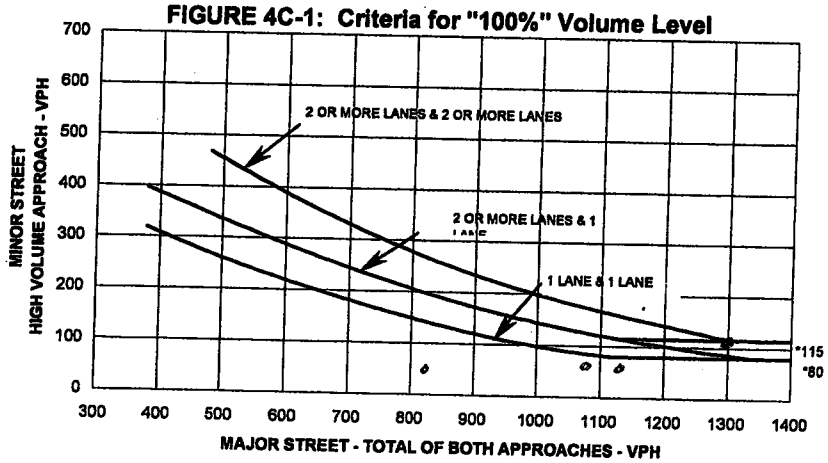
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

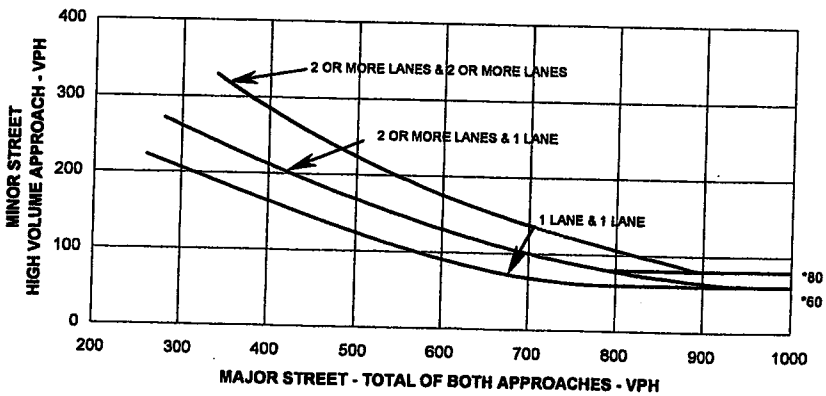
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	826	58
1500	1145	74
1600	1071	89
1700	1299	104

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: SSCONN

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	1299	104

Criteria

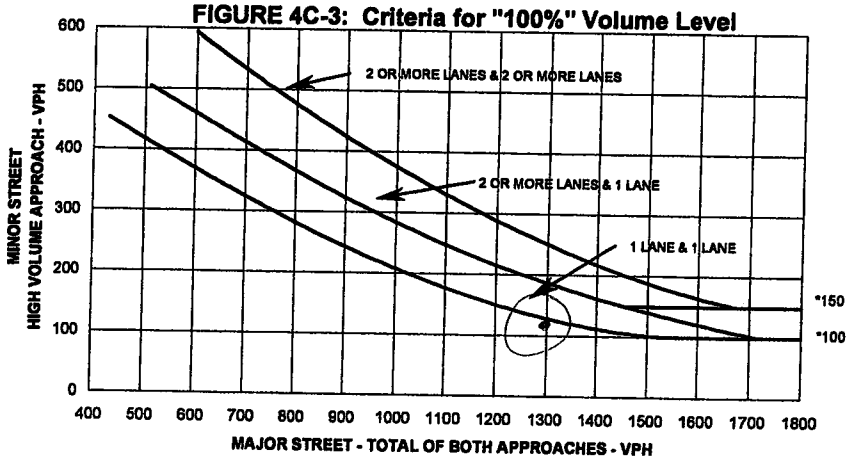
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		104
Fulfilled?: ☐ Yes	☒ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1299	
Fulfilled?: ☒ Yes	☐ No	

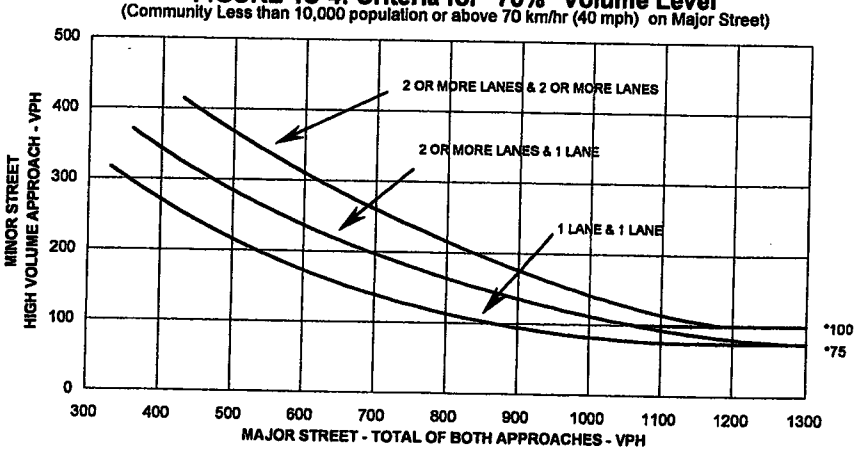
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Sconn

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		0			X
		0			
		0			
		0			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: SSCOWN

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1299				X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3		X		
		Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Broadway
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1501	1637	1213	1051	1228	1545	1303	1397
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	725	761	666	642	679	913	780	620

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1501	1637	1213	1051	1228	1545	1303	1397
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	725	761	666	642	679	913	780	620

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Broadway
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

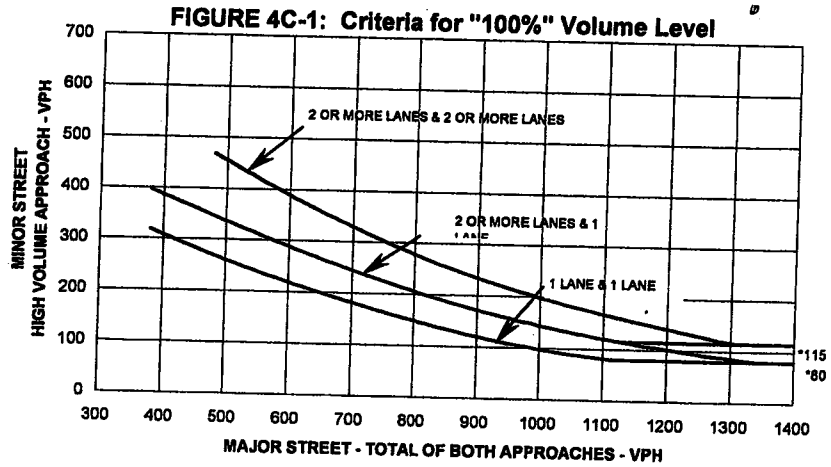
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

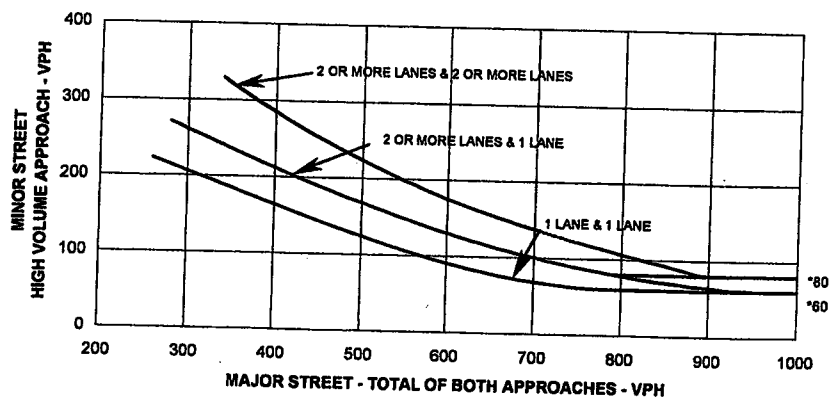
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1501	725
800	1637	761
1500	1545	913
1600	1363	780

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Broadway
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1500	1545	913

Criteria

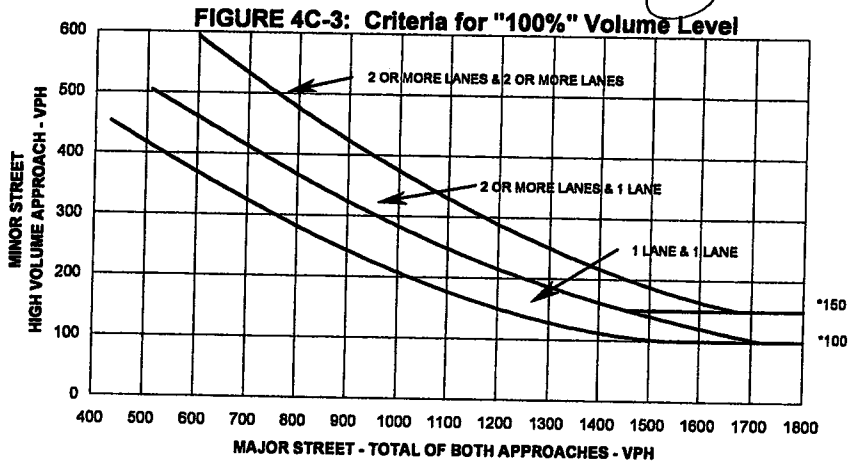
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

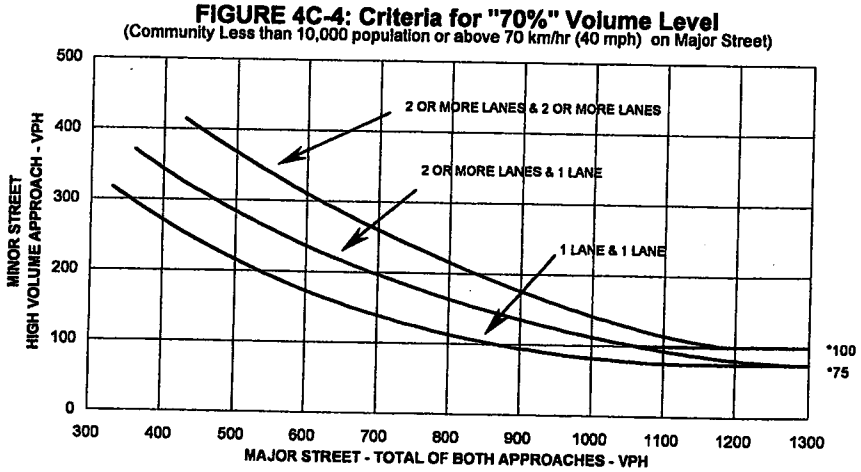
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Broadway
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	9			X
	1500	8			
	1600	17			
	1700	25			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Broadway
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 23				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 2458			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Bennington Street
Minor Street: Neptune Road

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1437	1583	1123	1040	1284	1236	1307	1065
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	430	322	334	405	445	503	529	527

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1437	1583	1123	1040	1284	1236	1307	1065
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	430	322	334	405	445	503	529	527

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Bennington Street
Minor Street: Neptune Road

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

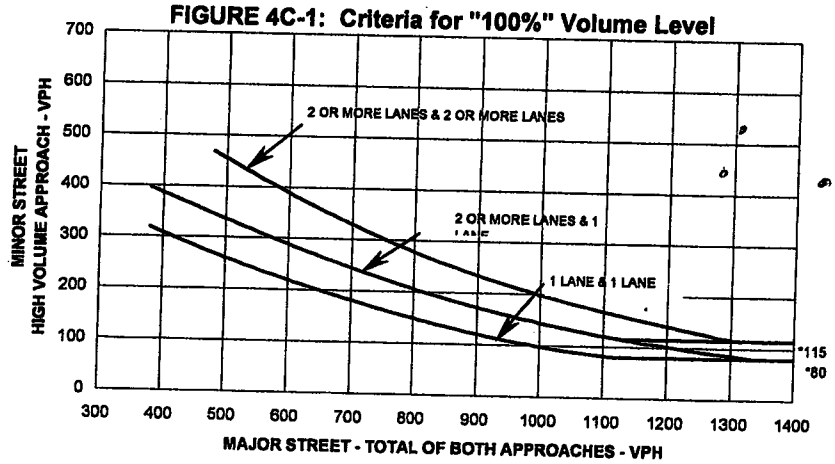
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

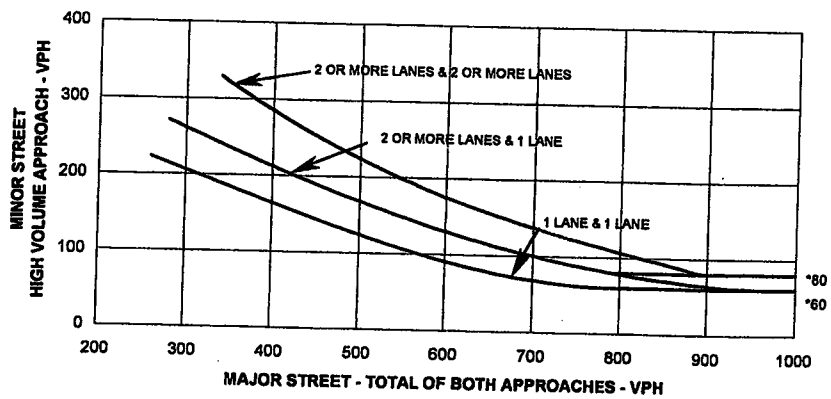
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1437	430
800	1583	322
1400	1284	445
1600	1307	529

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Bennington Street
Minor Street: Neptune Road

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	383	322

Criteria

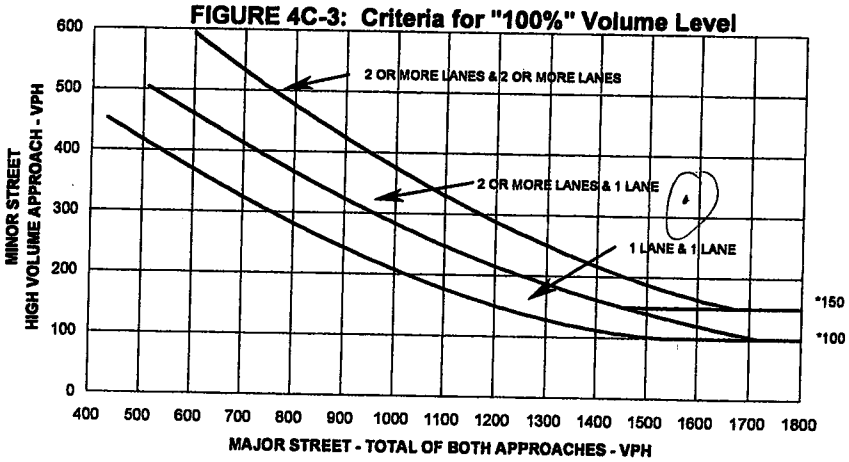
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		322
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		2667
Fulfilled?: ☒ Yes	☐ No	

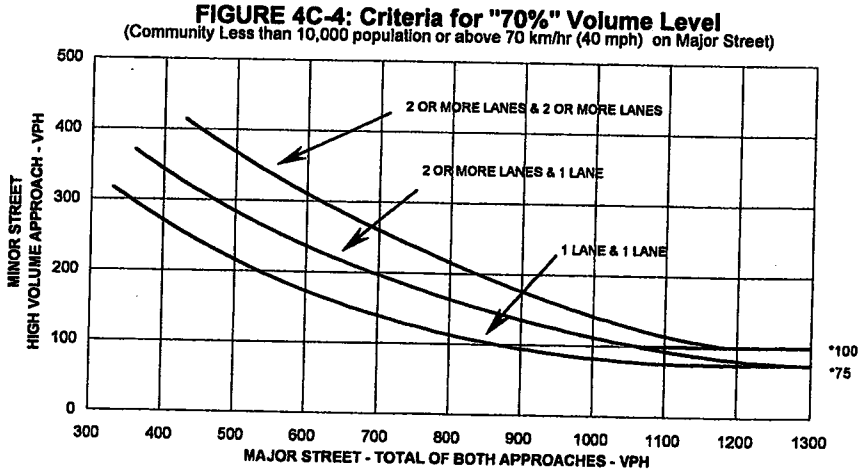
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Bennington Street
Minor Street: Neptune Road

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	21			X
	1200	19			
	1500	18			
	1600	27			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Bennington Street
Minor Street: Neptune Road

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		7		X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 2067			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X			
			Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Ramps / Kneeland St.
Minor Street: SSCONN

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	110	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	937	997	937	810	681	483	516	581
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	45	55	55	55	50	184	134	172

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1100	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	937	997	937	810	681	483	516	581
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	45	55	55	55	50	184	134	172

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Ramps / Kneeland St.
Minor Street: SSCONN

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

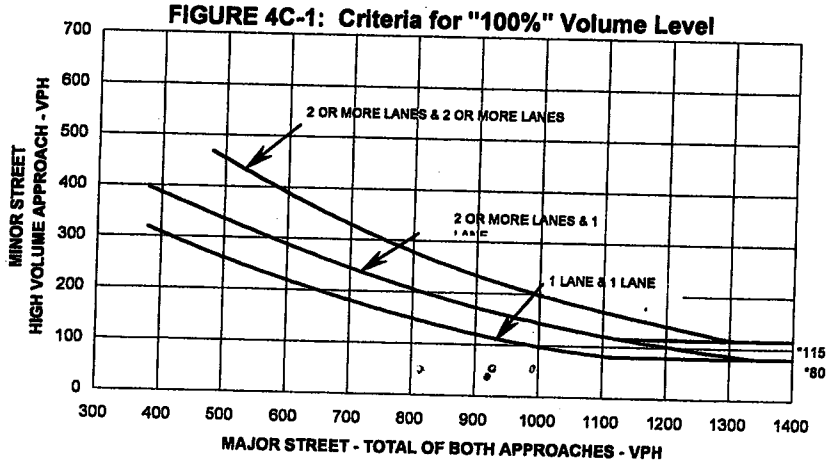
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

* All points below line

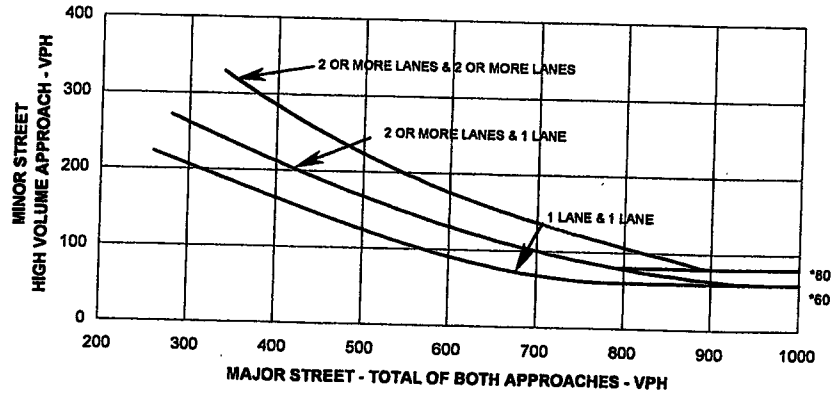
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	937	45
800	997	55
900	937	55
1000	810	55

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Ramps / Kneeland St.
Minor Street: SSCONN

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	997	55

Criteria

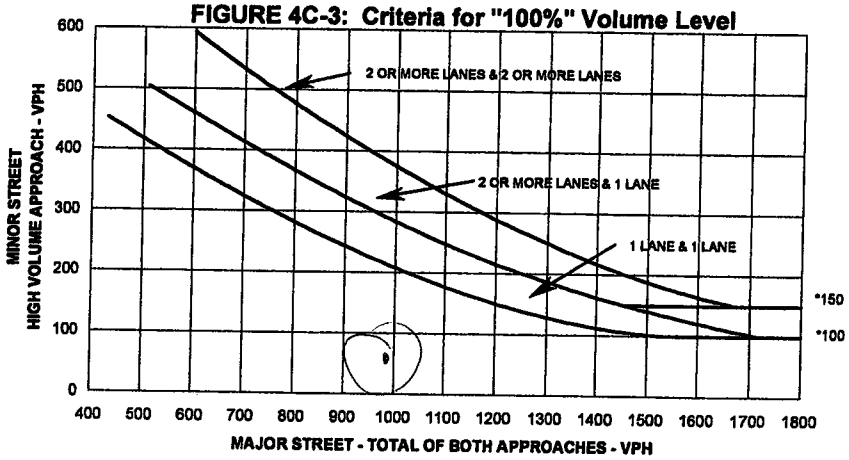
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☒ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		997
Fulfilled?: ☒ Yes ☐ No		

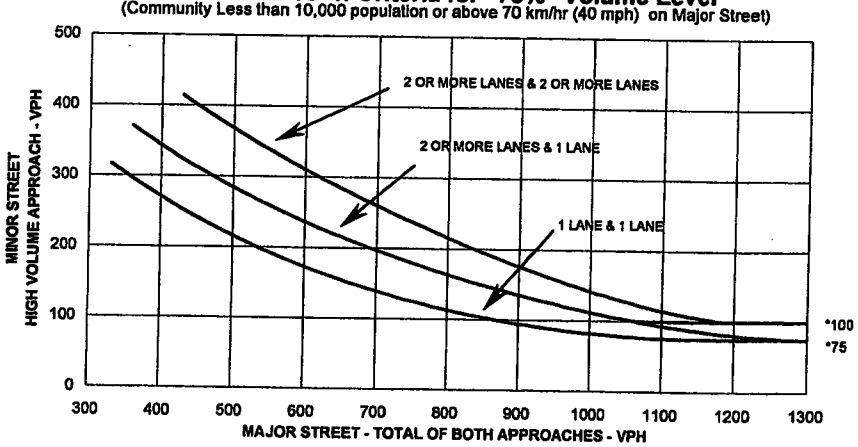
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Ramps / Kneeland St.
Minor Street: SSCONN

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		0			X
		2			
		2			
		0			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Ramps / Kneeland St. Lanes: 2
Minor Street: SSCOND N Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		X
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 0					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1078			X			X
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3		X		
			Satisfied?:	N	N	N				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA						← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Major Street: West 4th St
Minor Street: Albany Street

Engineer: A. Siu
Date: 12/29/08
Lanes: 3
Lanes: 3
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1344	1386	1028	852	745	788	872	1084
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	585	686	701	612	575	786	561	673

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1344	1386	1028	852	745	788	872	1084
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	585	686	701	612	575	786	561	673

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: W. 4th St.
Minor Street: Albany St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

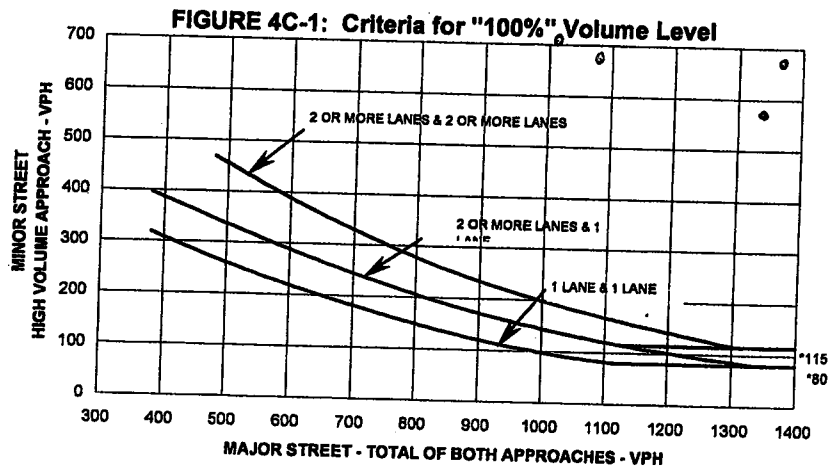
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

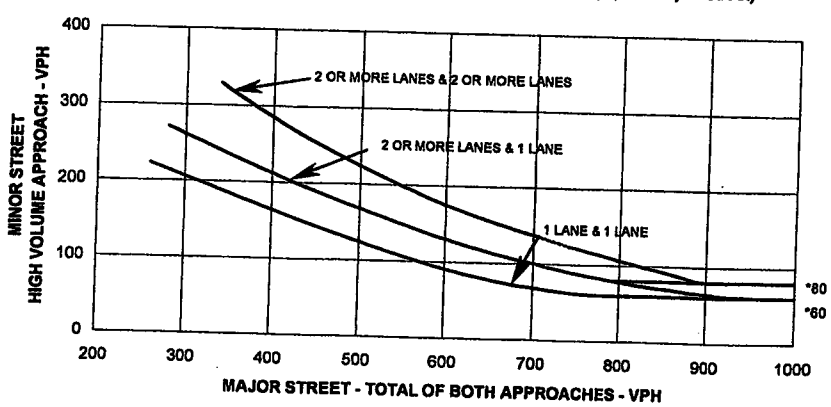
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1344	585
800	1386	686
900	1028	701
1700	1084	673

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: W. 4th St.
Minor Street: Albany St.

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	1386	1086

Criteria

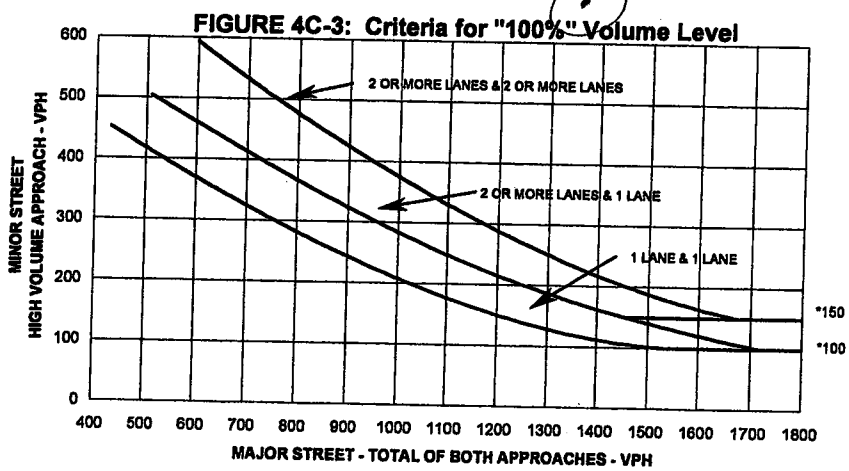
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

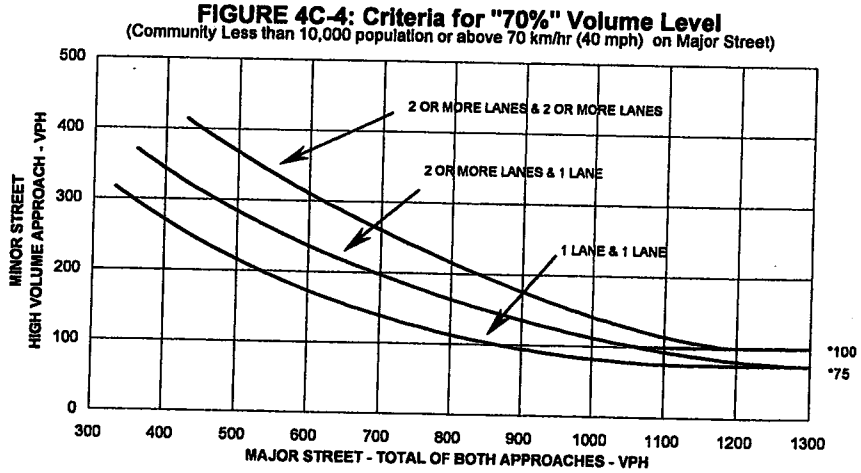
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: W. 4th St
Minor Street: Albany St

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	23			X
	1100	24			
	1500	22			
	1700	22			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: W. 4th St. — Lanes: 3
Minor Street: Albany St. — Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 2					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2072				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

(61b)

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Frontage Road
Minor Street: West 4th

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1289	1400	1206	1118	1051	1427	1380	1294
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	912	972	667	540	571	633	673	834

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1289	1400	1206	1118	1051	1427	1380	1294
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	912	972	667	540	571	633	673	834

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Frontage Rd.
Minor Street: W. 4th

Lanes: 2
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
8:00	1400	972

Criteria

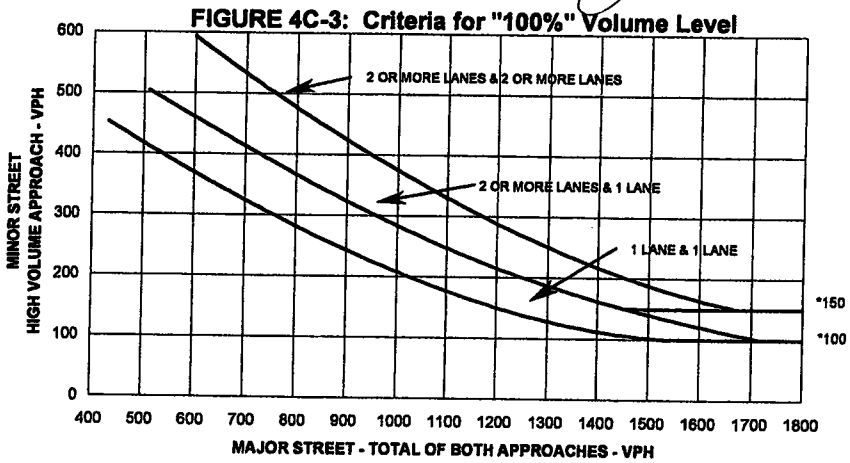
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

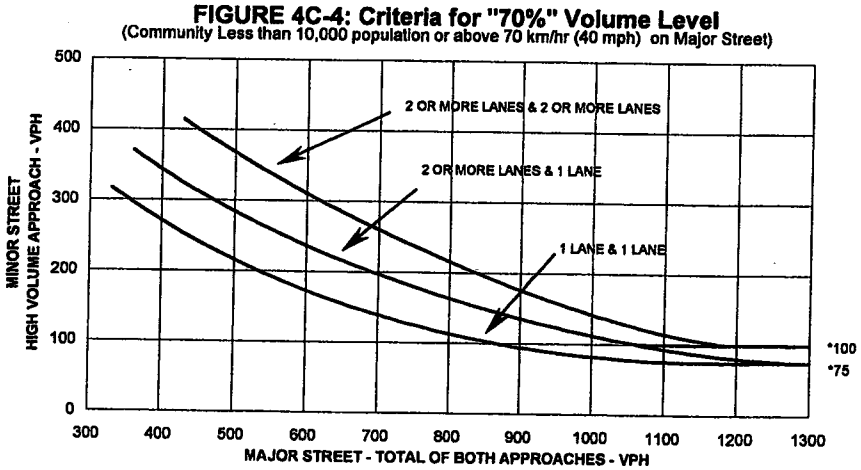
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Frontage Rd
Minor Street: W 4th

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	61			X
	900	70			
	1500	60			
	1700	60			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Frontage Rd
Minor Street: W 4th

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 25				X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2372				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany Street
Minor Street: Travelers Street

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1216	1283	1278	1108	1203	1529	1239	1412
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	120	154	141	161	154	234	202	256

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1216	1283	1278	1108	1203	1529	1239	1412
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	120	154	141	161	154	234	202	256

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Traveler St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

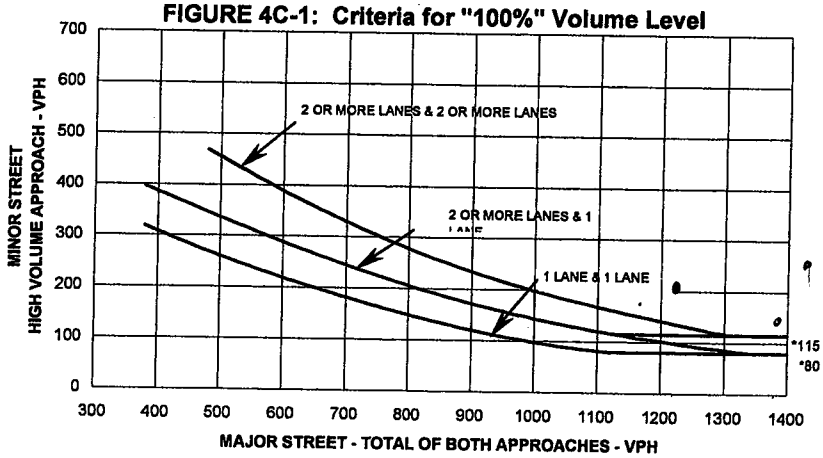
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

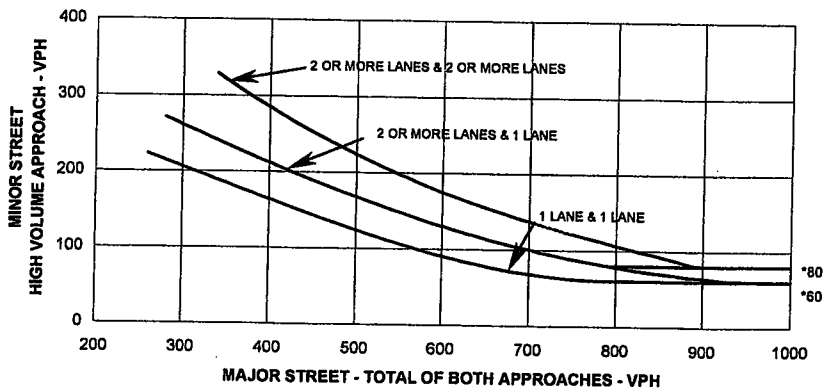
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	1383	154
15:00	1529	234
16:00	1239	202
17:00	1412	256

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Traveller St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1500	1529	234

Criteria

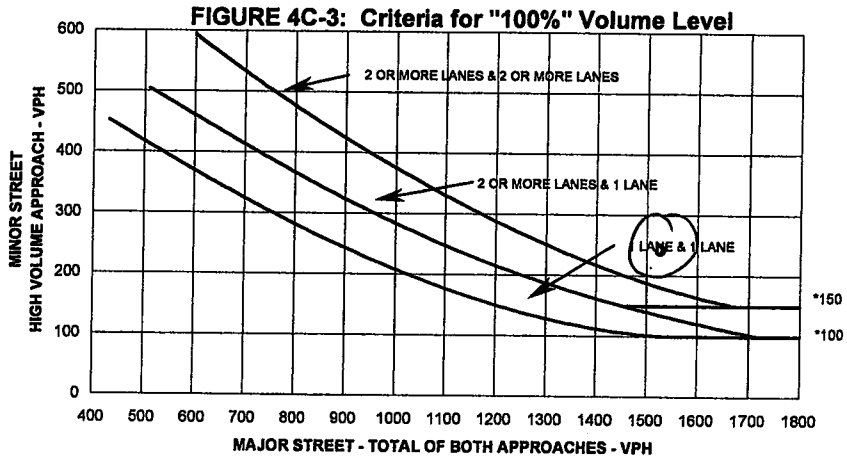
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

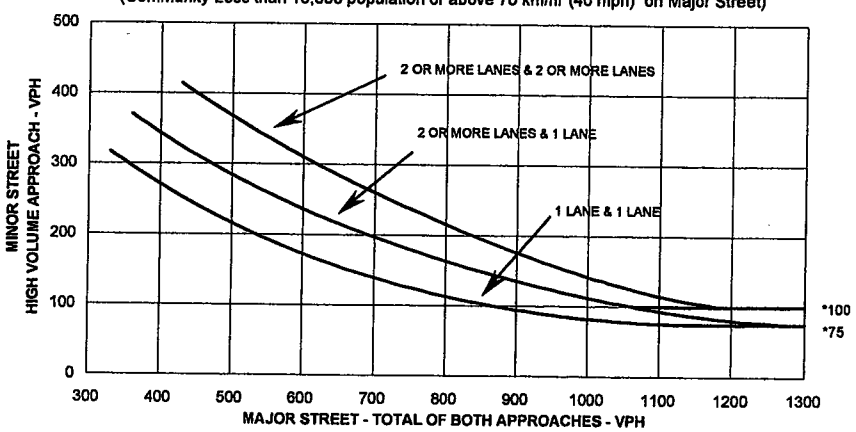
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Traveler St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	22			X
	800	26			
	1500	24			
	1700	44			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Traveler St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X	X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 1763			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO	DATA				← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany Street
Minor Street: Herald Street

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1121	1154	1045	932	1036	1315	1033	927
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	792	718	791	879	1075	1307	1254	1103

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	1000	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1121	1154	1045	932	1036	1315	1033	927
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	792	718	791	879	1075	1307	1254	1103

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Herald St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

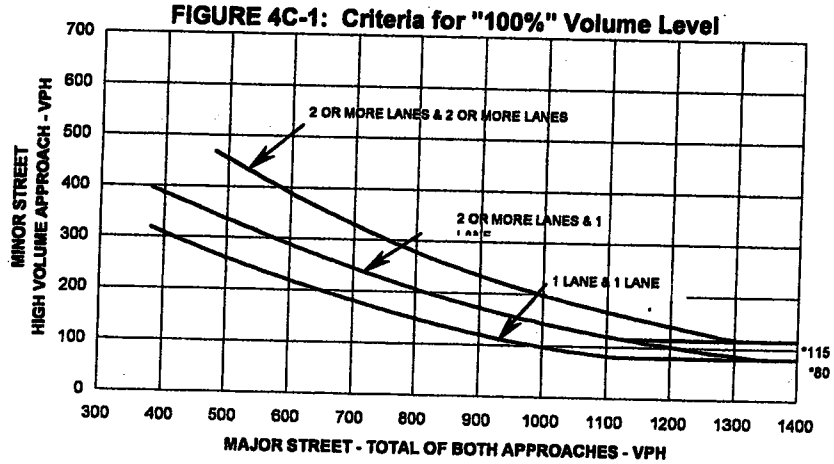
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

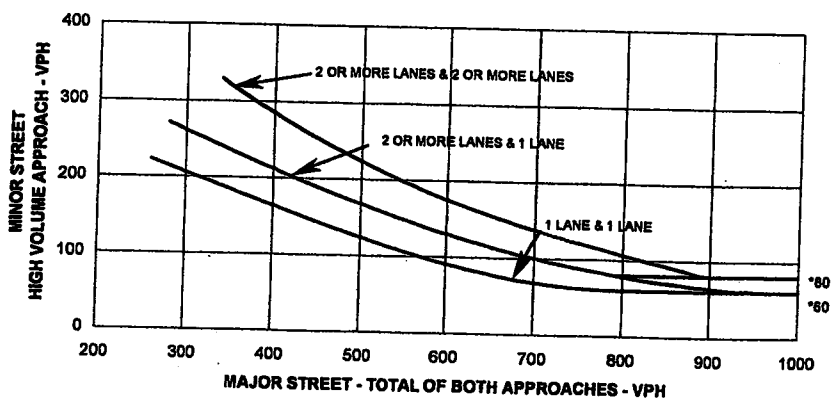
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	1036	1075
1500	1315	1307
1600	1033	1254
1700	927	1103

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Herald St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1500	1315	1307

Criteria

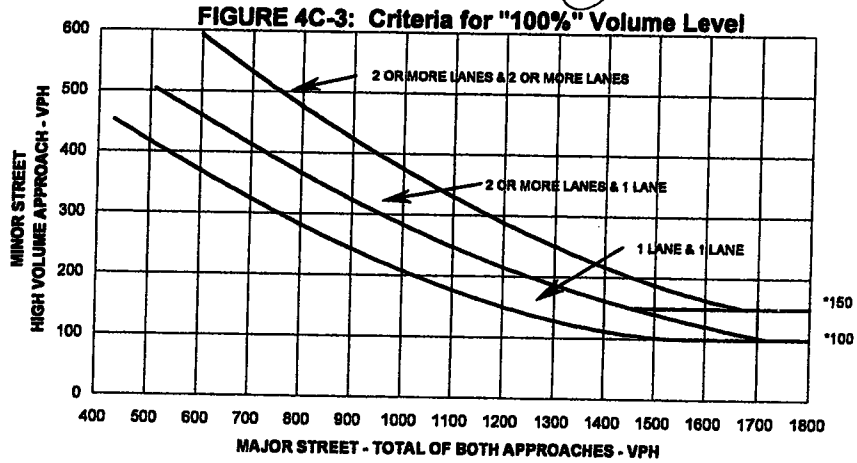
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes	☐ No	

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes	☐ No	

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes	☐ No	

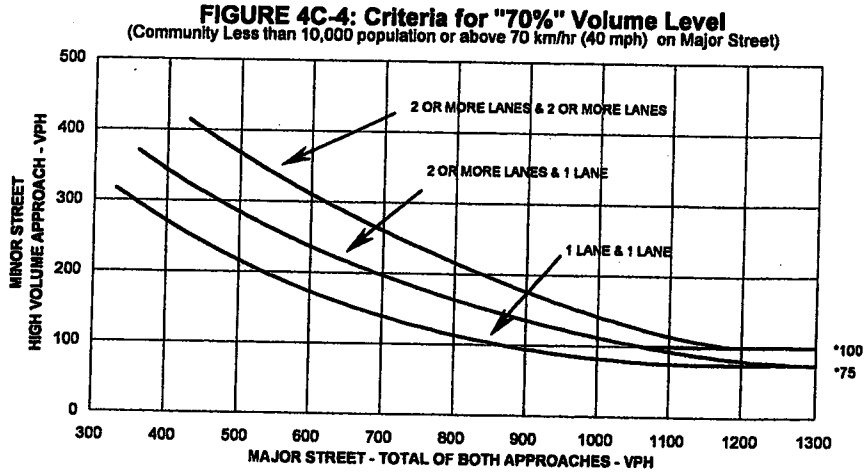
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Heath St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	900	5			X
	1100	13			
	1300	5			
	1400	11			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Albany St.
Minor Street: Herald St.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		11		X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria			Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 2622	X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant: 1 2 3 Satisfied?: Y Y Y	X			
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA	← Hour ← Volume				

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				X
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Albany St. SB / Frontage
Minor Street: Albany ~~SEB~~ NEB

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	800	900	900	1300	1400	1500	1600	1700
Both Approaches on Major Street	500 (400)	350	600 (480)	420	769	815	727	676	724	999	921	816
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	400	521	416	381	521	713	807	742

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	700	800	900	1300	1400	1500	1600	1700
Both Approaches on Major Street	750 (600)	525	900 (720)	630	769	815	727	676	724	999	921	816
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	400	521	416	381	521	713	807	742

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 2/12/09
Major Street: Albany SB / Frontage
Minor Street: Albany NEB
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

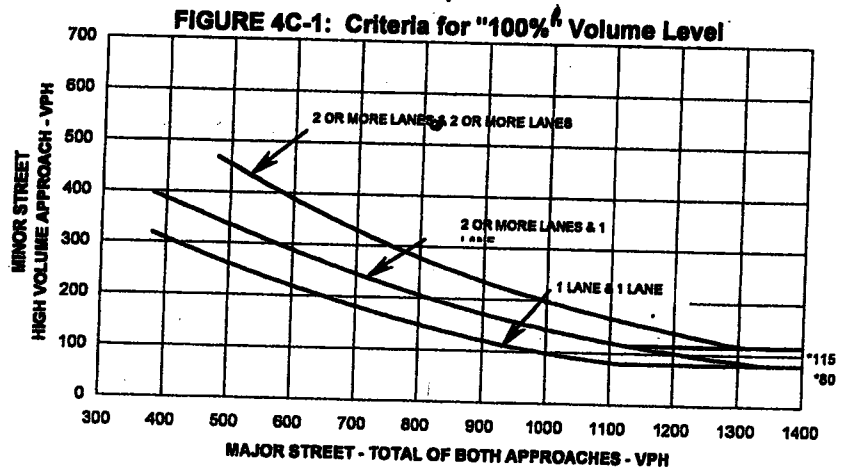
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

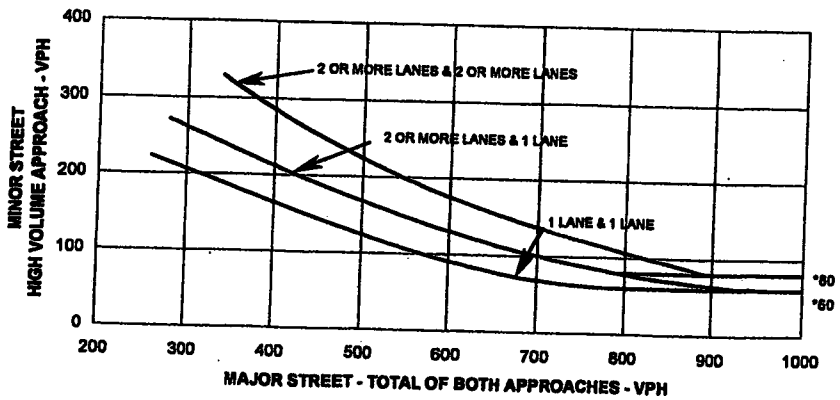
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	815	521
15:00	999	713
16:00	921	807
17:00	816	742

FIGURE 4C-1: Criteria for "100%" Volume Level



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 threshold for a minor street approach with one lane.

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Albany SB/Frontage
Minor Street: Albany NEB

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1600	92	807

Criteria

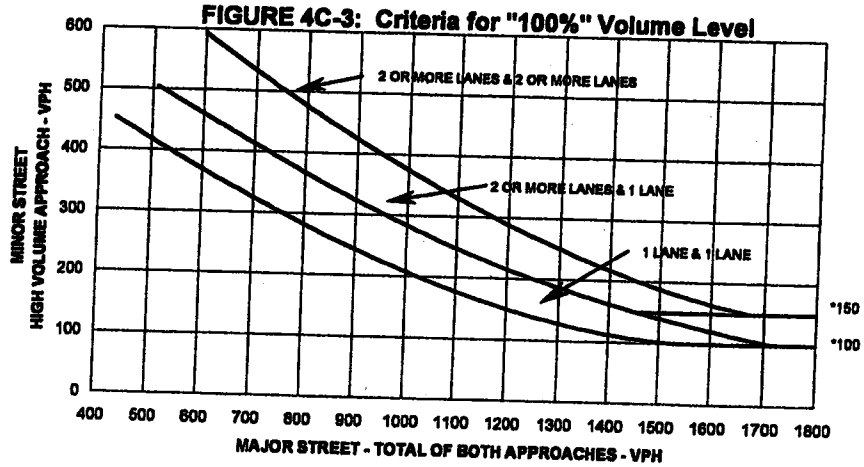
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		807
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1749	
Fulfilled?: ☒ Yes ☐ No		

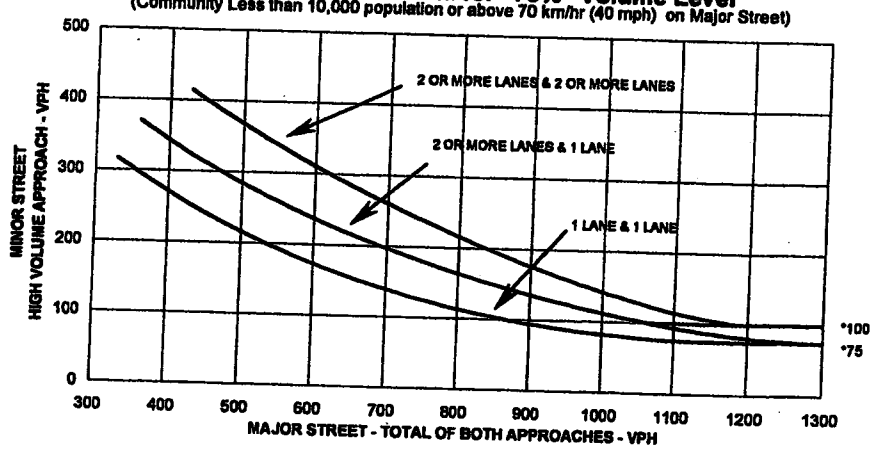
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk
Engineer: A. Siu
Date: 2/12/09
Major Street: Albany SB / Frontage
Minor Street: Albany NB
Lanes: 3
Lanes: 2
Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	20			X
	800	26			
	900	28			
	1000	6			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Albany SB/Frontage
Minor Street: Albany NEB

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	1				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 1749				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: I-93 SB off Ramp
Minor Street: Frontage Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1300	1400	1500	1600
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1547	1498	1417	1316	1165	1383	1326	1306
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	356	266	271	321	330	452	451	377

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1300	1400	1500	1600
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1547	1498	1417	1316	1165	1383	1326	1306
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	356	266	271	321	330	452	451	377

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: I-93 SB Ramps
Minor Street: Frontage Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

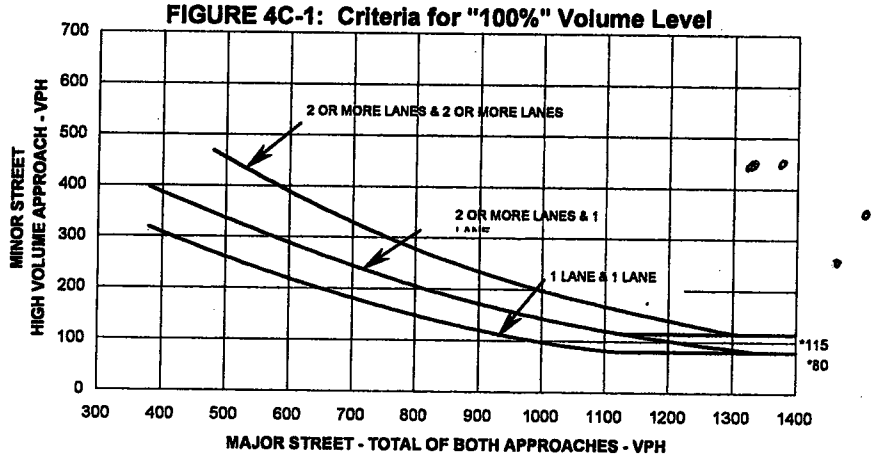
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

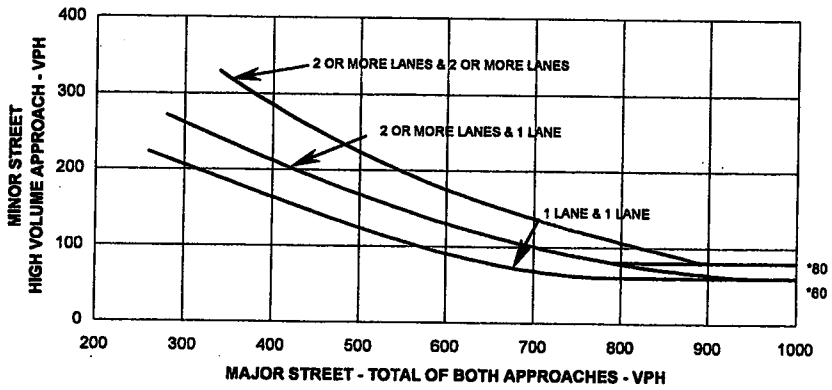
Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00	1547	356
8:00	1498	266
14:00	1383	452
15:00	1326	451

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: I-93 SB Ramp
Minor Street: Frontage Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		0			X
		0			
		0			
		0			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: I-93 SB Ramps
Minor Street: Frontage Rd

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
700	1547	356

Criteria

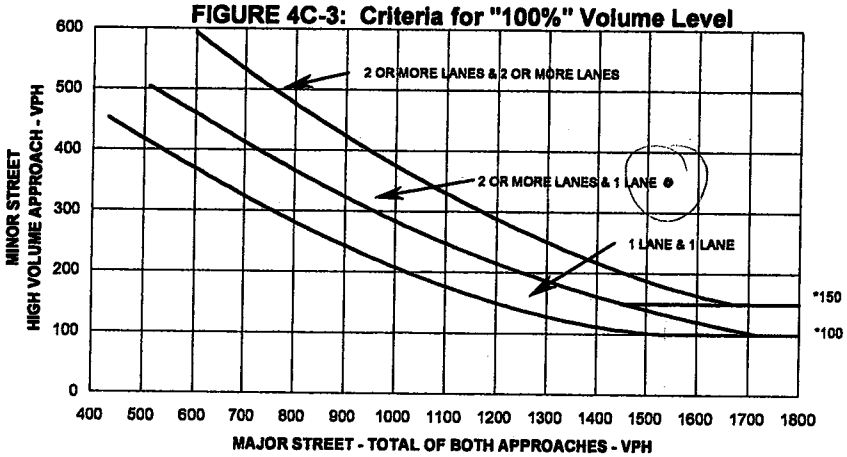
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		356
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	903	
Fulfilled?: ☒ Yes ☐ No		

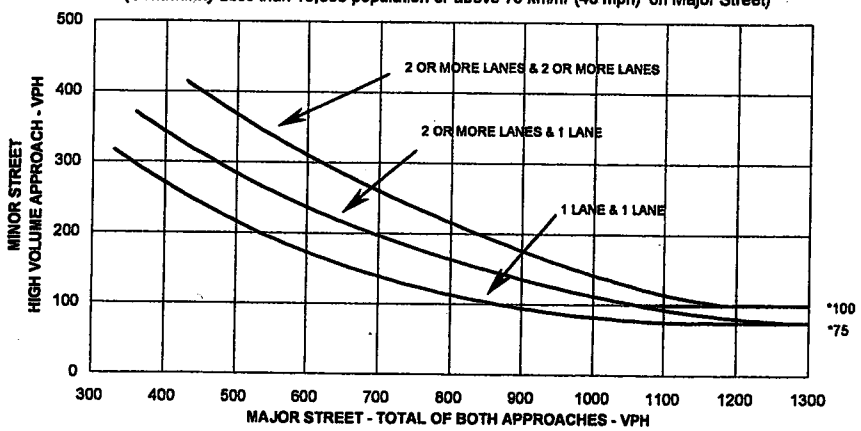
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: I-93 SB Ramps
Minor Street: Frontage Rd.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X			
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X	X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months: 3					X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1903		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA			← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

66

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/30/09

Major Street: Martha Road
Minor Street: Nashua Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	14:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	548	756	612	475	441	405	478	569
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	269	421	412	329	273	340	347	620

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	10:00	11:00	14:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	548	756	612	475	441	405	478	569
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	269	421	412	329	273	340	347	620

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/29/08

Major Street: Frontage Rd
Minor Street: W. 4th

Lanes: 3
Lanes: 3

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

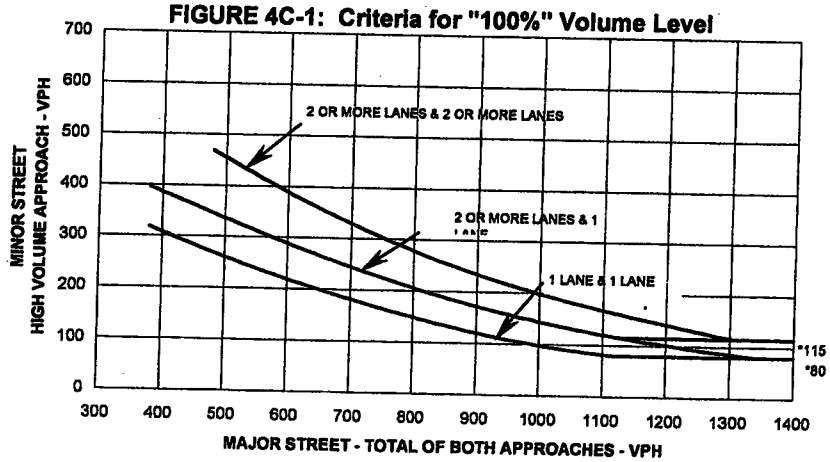
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

*All points above line

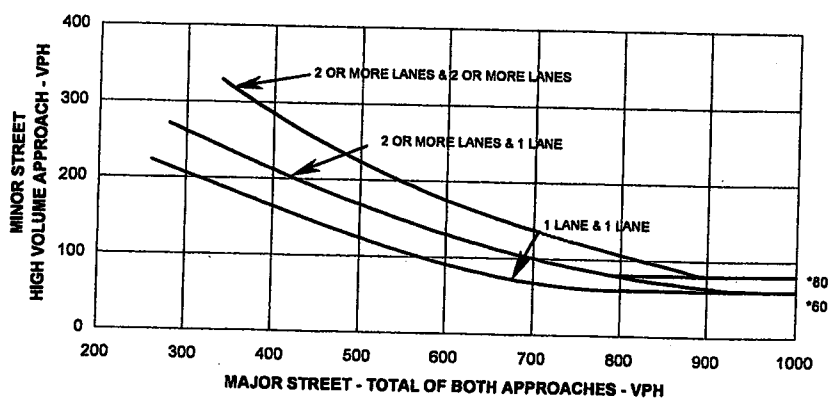
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	1289	912
800	1400	972
1500	1427	633
1700	1294	834

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Sin
Date: 1/30/09

Major Street: Martha Road
Minor Street: Nashua Street

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

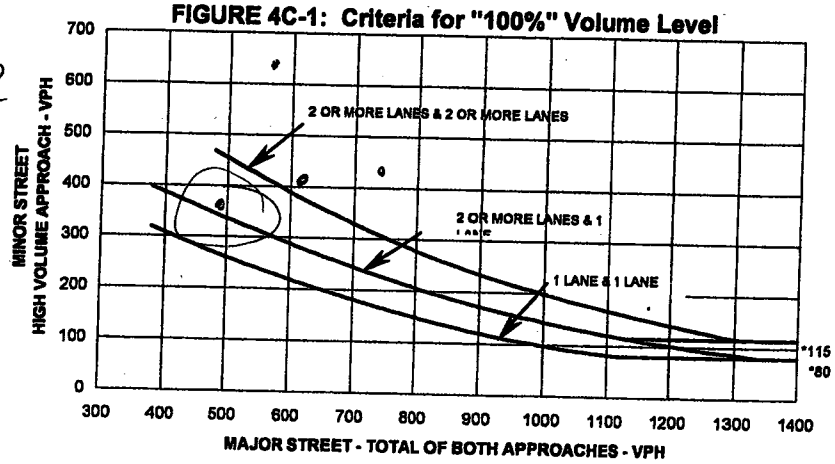
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

*all but one point above line

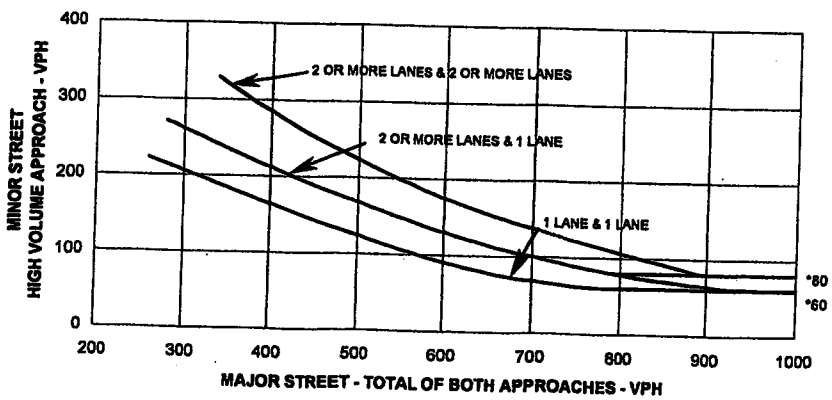
Four Highest Hours	Volumes	
	Major Street	Minor Street
8:00	756	421
9:00	612	412
16:00	478	347
17:00	569	620

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/30/09

Major Street: Martha Road
Minor Street: Nashua St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1700	15691	626

Criteria

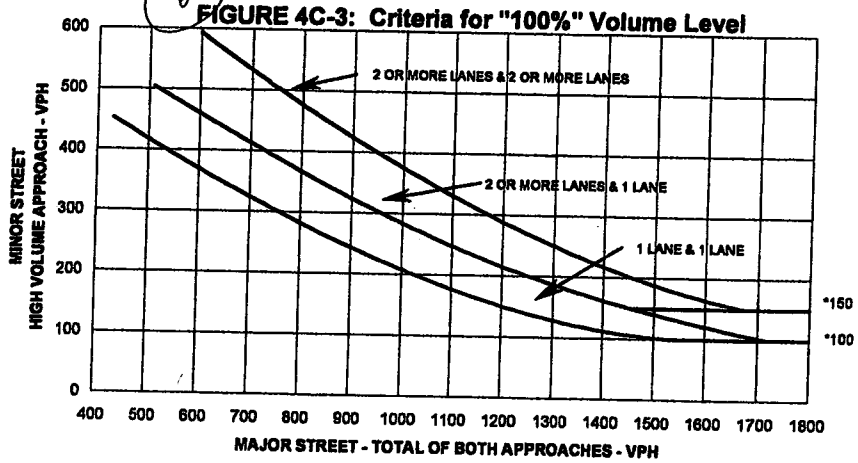
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		626
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	1189	
Fulfilled?: ☒ Yes ☐ No		

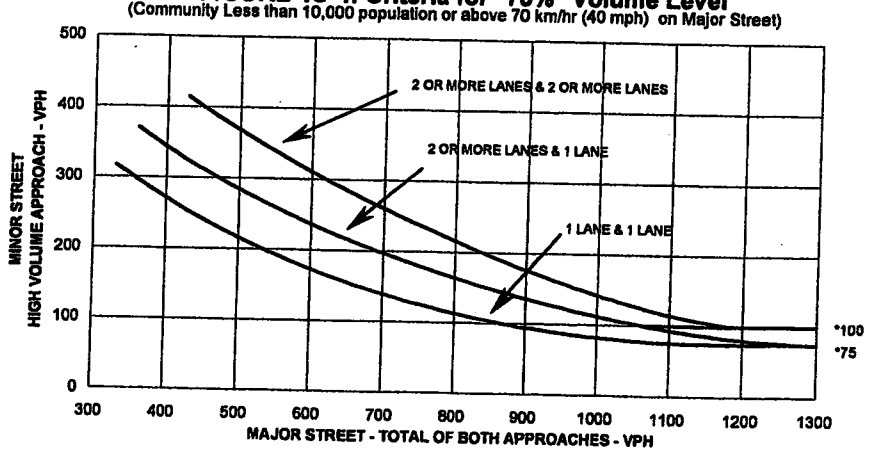
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/30/09

Major Street: Martha Rd
Minor Street: Nashua St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No
pending gap study

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	110		X	
	1500	107			
	1600	213			
	1700	214			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/30/09

Major Street: Martha Rd
Minor Street: Nashua St.

Lanes: 2
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)				X		
	Warrant 1, Condition B (80% satisfied)				X		
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour			X		X	
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:	0				X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:	189		X			
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3	X			
			Satisfied?:	N	N	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO		DATA				← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X		X	
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/8/09

Major Street: Rutherford Ave
Minor Street: Chelsea St

Lanes: 4
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	2743	3127	2680	2132	2526	2716	2783	3032
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	886	1058	741	733	726	808	997	1079

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		7:00	8:00	9:00	13:00	14:00	15:00	16:00	17:00
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	2743	3127	2680	2132	2526	2716	2783	3032
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	886	1058	741	733	726	808	997	1079

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/8/09

Major Street: Rutherford Ave
Minor Street: Chelsea St

Lanes: 4
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

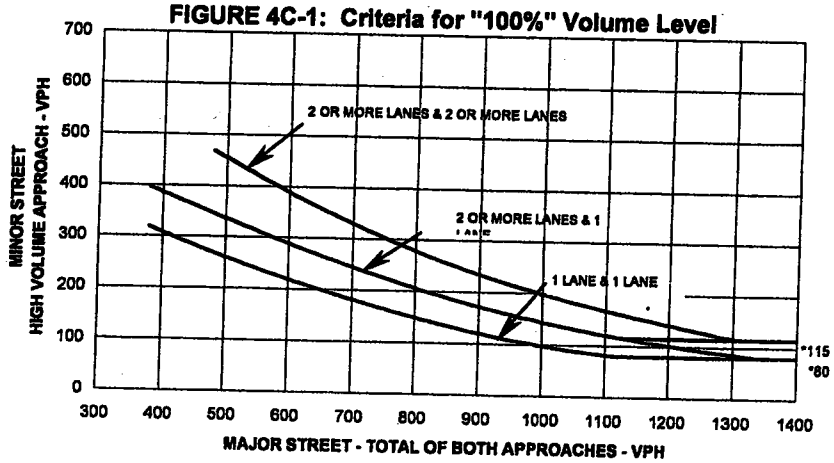
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

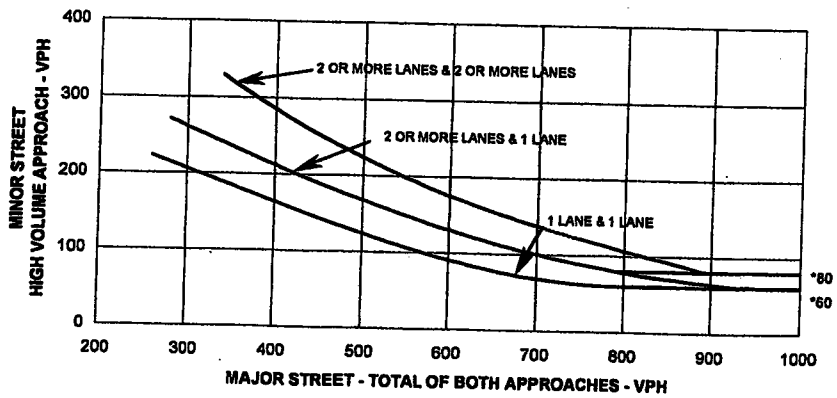
Four Highest Hours	Volumes	
	Major Street	Minor Street
700	2743	886
800	3127	1058
1600	2783	997
1700	3032	1079

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/8/09

Major Street: Rutherford Ave
Minor Street: Chelsea St.

Lanes: 4
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
800	3124	1058

Criteria

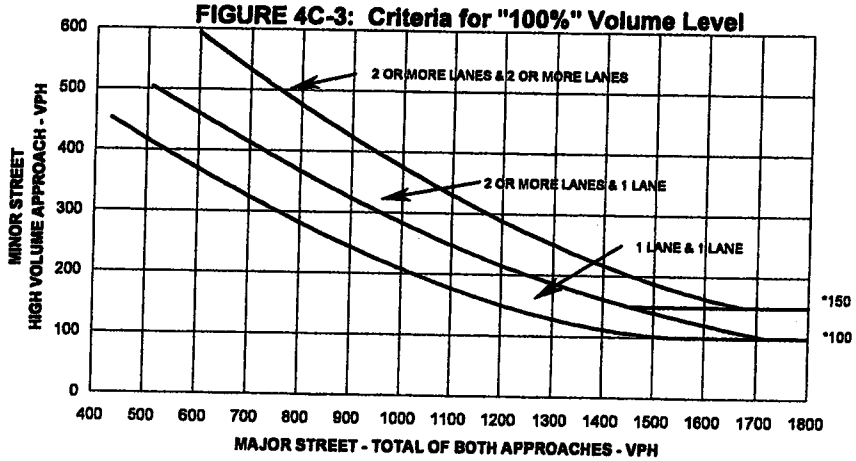
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		1058
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	4185	
Fulfilled?: ☒ Yes ☐ No		

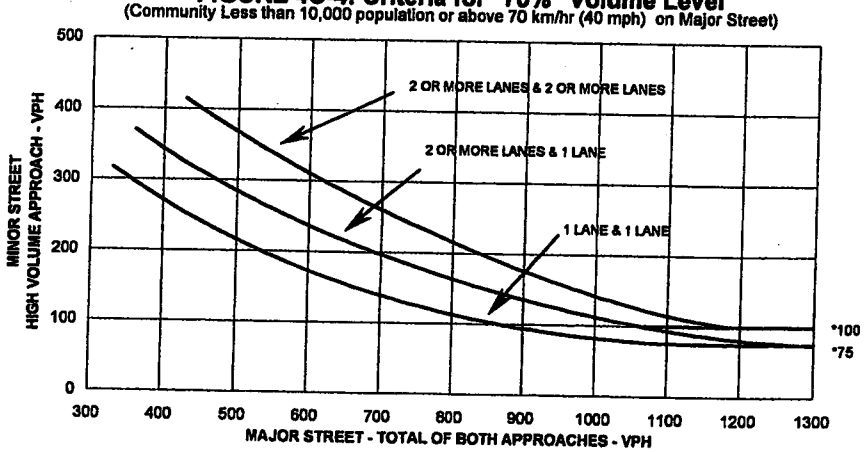
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/9/09

Major Street: Rutherford Ave
Minor Street: Chelsea St.

Lanes: 4
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	800	49			X
	1400	36			
	1500	40			
	1700	63			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 1/8/09

Major Street: Rutherford Ave
Minor Street: Chelsea St

Lanes: 4
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		8		X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.		Entering Volume: 4185			X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)						← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:	X			
	Minor Street:	X			
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:	X			
	Minor Street:	X			
3. Appears as a major route on an official plan.	Major Street:	X			
	Minor Street:	X			

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: Rutherford Ave
Minor Street: Rt 1 Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	500 (400)	350	600 (480)	420	2244	2503	2351	2699	3184	3430	3806	3681
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	760	890	837	307	395	369	411	464

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00	8:00	9:00	12:00	14:00	15:00	16:00	17:00
Both Approaches on Major Street	750 (600)	525	900 (720)	630	2244	2503	2351	2699	3184	3430	3806	3681
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	760	890	837	307	395	369	411	464

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: Rutherford Ave
Minor Street: Rt 1 Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

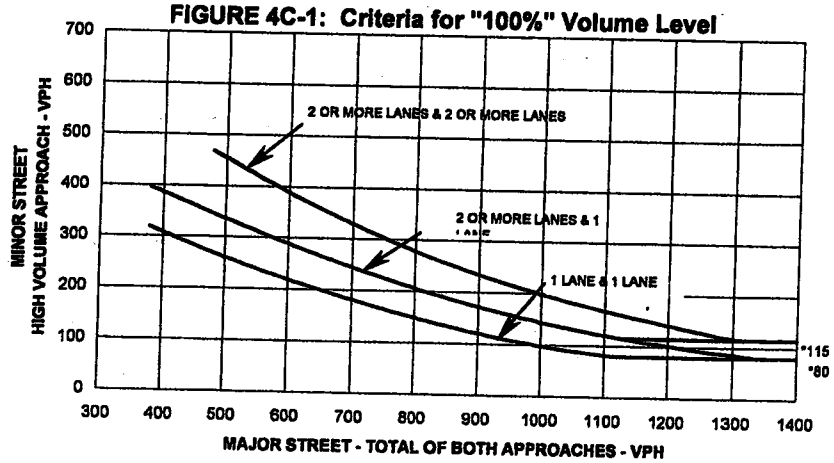
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

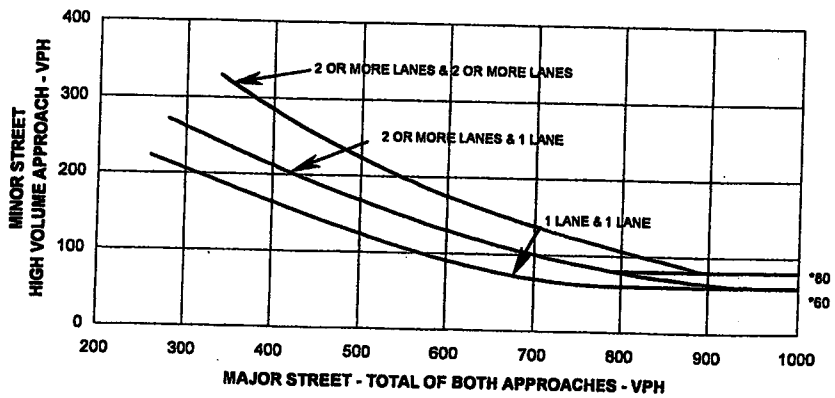
Four Highest Hours	Volumes	
	Major Street	Minor Street
1400	3184	395
1500	3430	369
1600	3806	411
1700	3681	464

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: Rutherford Ave
Minor Street: Rt 1 Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1600	3806	411

Criteria

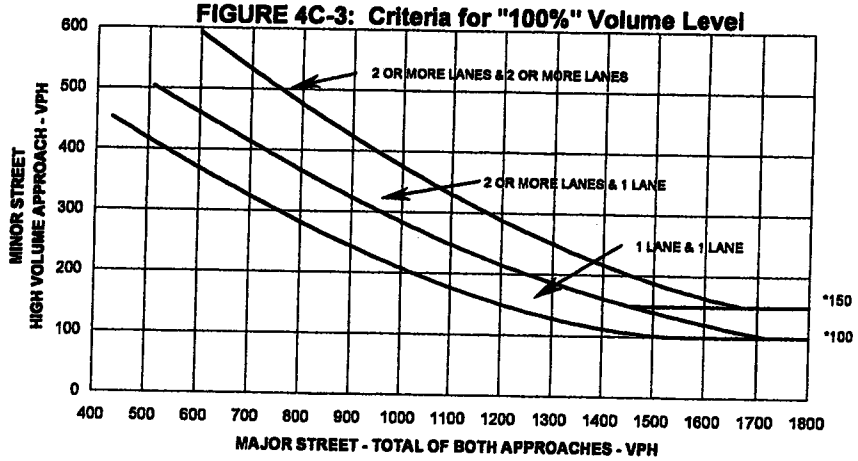
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

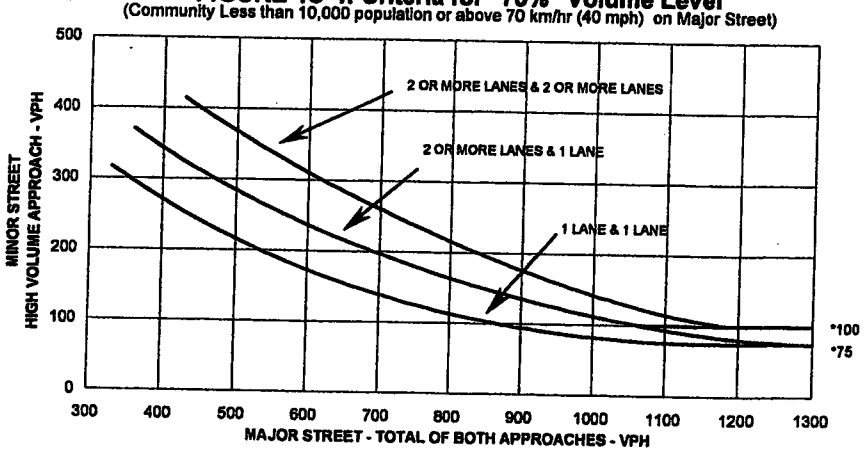
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: Rutherford Ave
Minor Street: Rt 1 Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.		1			X
		1			
		5			
		2			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 12/30/08

Major Street: Rutherford Ave
Minor Street: Rt 1 Ramps

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		1			X

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.	Entering Volume: 4217				X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks:

Source: Revised from NCHRP Report 457

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 6

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Frontage Road NB
Minor Street: Frontage Extension

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1600	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1126	1254	1077	927	918	1037	934	924
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	517	616	571	497	665	859	960	904

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more		700	800	900	1000	1400	1500	1600	1700
Volume Level	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1126	1254	1077	927	918	1037	934	924
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	517	616	571	497	665	859	960	904

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Delay is not excessive.

Not Applicable: ☐

WARRANT 3 - PEAK HOUR

This signal warrant shall be applied only in unusual cases. Such cases include manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Not Applicable: ☐

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Frontage NB
Minor Street: Frontage Ext.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

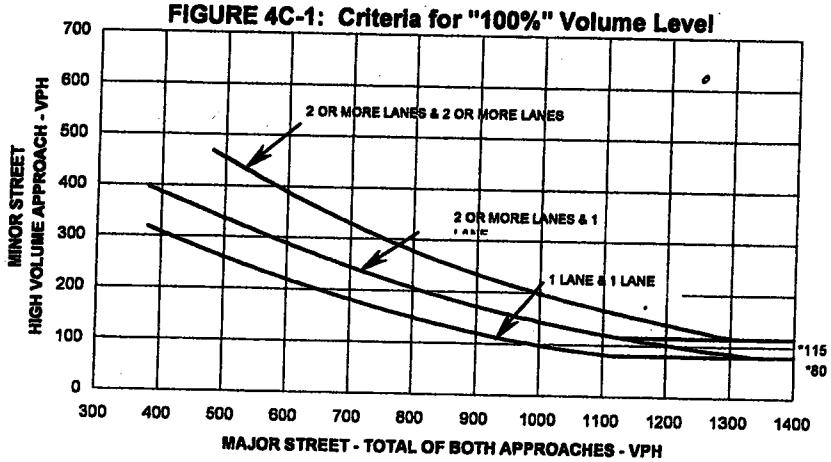
Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Plot four volume combinations on the applicable figure below.

* All points above line

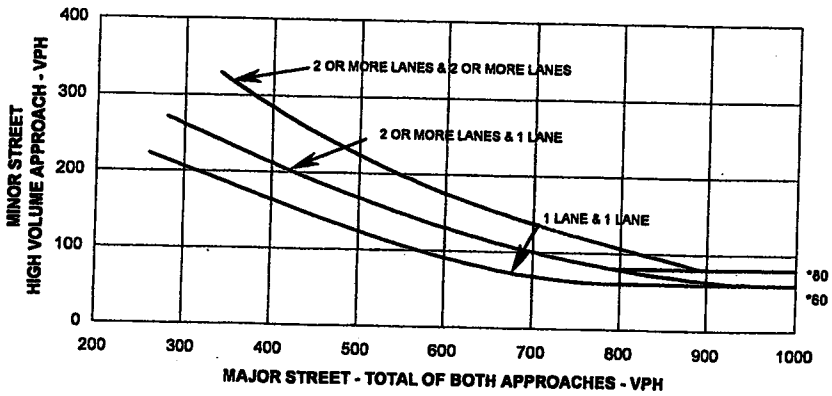
Four Highest Hours	Volumes	
	Major Street	Minor Street
800	1254	616
1500	1037	859
1600	934	960
1700	924	904

FIGURE 4C-1: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-2: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Frontage NB
Minor Street: Frontage Ext.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

0

Plot volume combination on the applicable figure below.

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		
1500	1037	854

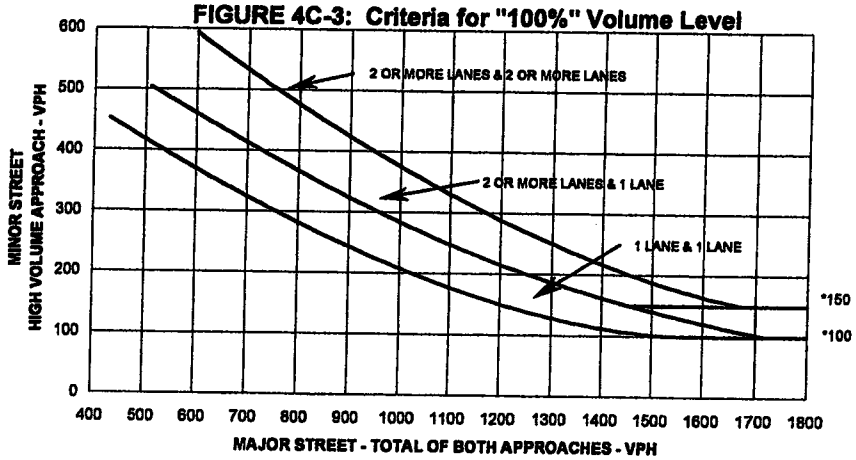
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☒ Yes ☐ No		

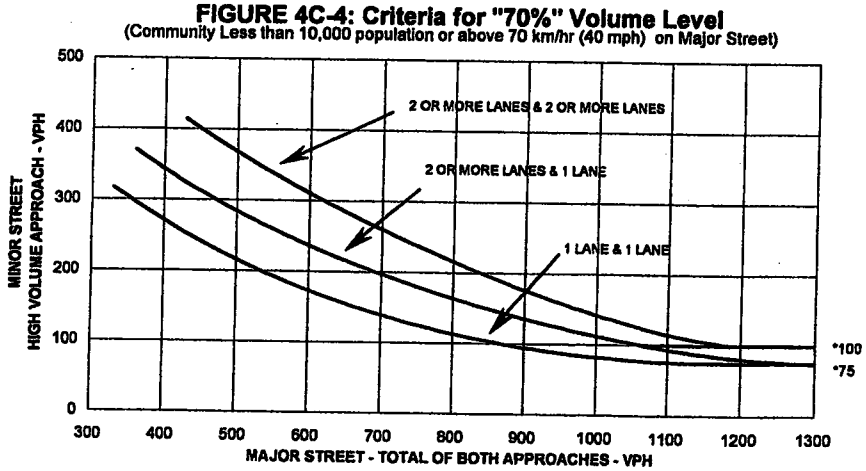
3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☒ Yes ☐ No		

FIGURE 4C-3: Criteria for "100%" Volume Level



** 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 threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (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 threshold for a minor street approach with one lane.*

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Frontage NB
Minor Street: Frontage Ext.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 4 - PEDESTRIAN VOLUME

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.	700	26			X
	800	29			
	900	39			
	1000	70			
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					X
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.				X	

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: Boston
County: Suffolk

Engineer: A. Siu
Date: 2/12/09

Major Street: Frontage NB
Minor Street: Frontage Ext.

Lanes: 3
Lanes: 2

Critical Approach Speed: 30

WARRANT 7 - CRASH EXPERIENCE

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☐ No

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)			X		X	
	Warrant 1, Condition B (80% satisfied)			X			
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour				X		
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:		6		X	

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Criteria						Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1953		X		X	
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	Warrant:	1	2	3	X			
		Satisfied?:	Y	Y	Y				
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)	NO DATA					← Hour			
						← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:			X	
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐☐☐☐☐☐☐☐

Remarks:

Source: Revised from NCHRP Report 457