

SIGNAL WARRANT ANALYSIS

**BAYVIEW AVENUE
AT
MAPLE STREET**

Town of North Hempstead

June 2017

N & P JOB NO. 17112

Nelson and Pope has performed a signal warrant analysis in accordance with the most recent version of the Federal Manual of Uniform Traffic Control Devices (MUTCD) for the intersection of Bayview Avenue and Maple Street in Manhasset, New York. The following is a summary of relevant information and the evaluation of each of the warrants.

Roadway Network

Bayview Avenue is a collector roadway with a general north/south orientation in the vicinity of the study location. Bayview Avenue provides one travel lane per direction, has a speed limit of 30 miles per hour and is primarily fronted by residential properties. The section of Bayview Avenue between East Shore Road and Maple Street is under the jurisdiction of Nassau County. North of Maple Street, Bayview Avenue is under the jurisdiction of the Town of North Hempstead.

Maple Street is also a collector roadway and is under the jurisdiction of the Town of North Hempstead. It has a general northwest/southeast orientation but will be referred to as east/west for the purpose of this analysis. It provides one travel lane in each direction and the speed limit is 30 miles per hour. Maple Street is fronted by recreational and municipal land uses. Maple Street intersects Bayview Avenue at its western terminus to form a “Y” shaped all-way stop controlled intersection.

Traffic Data

Automatic Traffic Recorder (ATR) machines were installed on all three approaches to the study intersection for a period of seven (7) days (May 18, 2017 – May 26, 2017) to collect hourly volumes. The ATR data were utilized to conduct the warrant analyses.

Turning movement counts were conducted at the study intersection and at the intersection of Bayview Avenue and East Shore Road during the weekday AM peak hours (7-9AM), weekday PM peak hours (4-6PM) and during the Saturday midday peak hours (11AM-3PM).

The turning movement counts were tabulated, peak hour factors calculated and the volumes adjusted for seasonal variation. Future traffic volumes were developed for the turning movement counts and ATR data by applying the LITP 2000 annual background growth rate for the Town of North Hempstead which is 0.5% per year. The volumes were grown for 3 years, to the year 2020 and other planned developments in the area were also accounted for. At the time this study was conducted, Avalon Bay Apartments was the only planned project in the vicinity of the study intersection. This development consists of 191 apartment units to be constructed on the northeast corner of East Shore Road and Vista Hill Road, in the Village of Great Neck.

Evaluation of Warrants

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

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

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. However, the signal warrant is a threshold that should be met in order to consider the installation of a traffic control signal.

*Of the eight warrants listed above, warrants 1, 2, 3, and 7 were considered applicable for evaluation for this location. Bayview Avenue will be considered the major street and Maple Street will be considered the minor street.

The 4 applicable warrants were analyzed under the following conditions:

2017 Weekday Existing Traffic Volumes – This condition presents the warrant analyses on a typical weekday with the existing intersection geometry and traffic volumes collected in May 2017.

2017 Saturday Existing Traffic Volumes – This condition presents the warrant analyses on a typical Saturday with the existing intersection geometry and traffic volumes collected in May 2017.

2020 Weekday Future Traffic Volumes – This condition presents the warrant analyses on a typical weekday with the existing intersection geometry and traffic volumes forecast to the year 2020.

2020 Saturday Future Traffic Volumes – This condition presents the warrant analyses on a typical Saturday with the existing intersection geometry and traffic volumes forecast to the year 2020.

A description and analysis of each applicable warrant is provided below and the detailed analyses are presented in the attachments:

Warrant 1, Eight Hour Vehicular Volume

Warrant 1 is applicable under two conditions: The Minimum Vehicular Volume Condition (Condition A) and the Interruption of Continuous Traffic Condition (Condition B). It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then the criterion for Warrant 1 is satisfied and an evaluation of Condition B and the combination of Conditions A and B are not needed. This is similar for Condition B.

The Minimum Vehicular Volume Condition (Condition A) - *This applies where volume of*

intersecting traffic is the principal reason for consideration of a traffic signal. The warrant is satisfied when, for each of any 8 hours of an average day, a minimum of 500 vehicles exists on the artery road (one lane) and a minimum of 150 vehicles exists on either approach of the side road (one lane). The artery and side road volumes must be for the same, but not necessarily consecutive 8 hours. When the 85th percentile speed of artery traffic exceeds forty miles per hour, the 8-hour minimum vehicular volumes are 70% of those above or 350 vehicles on the artery and 105 vehicles on either side road approach. Tables showing a detail description of this warrant is included in the Warrant analyses summary work sheets.

Interruption of Continuous Traffic (Condition B) - This applies where traffic volume on an artery is so heavy that side road traffic suffers excessive delay or hazard in entering or crossing the artery. The warrant is satisfied when, for each of any 8 hours of an average day, a minimum of 750 vehicles exists on the artery road and a minimum of 75 vehicles exists on either approach of the side road. The installation of a signal must not seriously disrupt progressive traffic flow. The artery and side road volumes must occur for the same 8 hours. When the 85th percentile speed of artery traffic exceeds forty miles per hour, the 8-hour minimum vehicular volumes are 70% of those listed above or 525 vehicles on the artery and 53 vehicles on either side road approach.

Evaluation of Warrant 1

A review of the requirements indicates that the traffic volumes on the artery of Bayview Avenue and the minor approach, Maple Street, meet the minimum volume requirements of Warrant 1 during all of the time periods evaluated. **Therefore, Warrant 1 is met during the Weekday Existing, Weekday Future, Saturday Existing and Saturday Future Conditions.**

Warrant 2, Four Hour Vehicular Volume

This warrant applies where volume of intersecting traffic is the principal reason for consideration of a traffic signal. The warrant is satisfied when, for each of four hours of an average day, a point representing the number of vehicles on the artery (in both directions) and the number of vehicles on the higher-volume side road (one direction only) is plotted on a graph. All four points must fall above the appropriate curve (Figure 4C-1) in the MUTCD). The artery and side road volumes are for the same four hours but do not need to be four consecutive hours. When the 85th percentile speed of artery traffic exceeds forty miles per hour, the 4-hour volumes are plotted on a second curve (Figure 4C-2 in the MUTCD). These curves are included in the attached Warrant analyses summary work sheets.

Evaluation of Warrant 2

Based on an interpretation of Figure 4C-1 in the MUTCD, the volumes required to meet this warrant on Bayview Avenue and on Maple Street fall above the curve for at least 4 hours during all of the time periods evaluated. During the Weekday Existing and Future conditions the volumes fall above the curve for all 12 hours studied. During the Saturday Existing condition the volumes fall above the curve for 8 of the 12 hours studied. During the Saturday Future condition the volumes fall above the curve for 9 of the 12 hours studied. **Therefore, Warrant 2 is met during the Weekday Existing, Weekday Future, Saturday Existing and Saturday**

Future Conditions.

Warrant 3, Peak-Hour

This warrant applies at locations where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exists for the same 1 hour (any four consecutive 15-minute periods) of an average day:*
 - 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for one-lane approach; or 5 vehicle-hours for a two-lane approach, and*
 - 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and*
 - 3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.*
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figures 4C-3 in the MUTCD for the existing combination of approach volumes. When the 85th percentile speed of artery traffic exceeds forty miles per hour, the peak hour volumes are plotted on a second curve (Figure 4C-4 in the MUTCD). These curves are included in the attached Warrant analyses summary work sheets.*

Evaluation of Warrant 3

Based on an interpretation of Figure 4C-3 in the MUTCD, the volumes required to meet this warrant on Bayview Avenue and on Maple Street fall above the curve for at least one hour under the Weekday Existing, Weekday Future and Saturday Future conditions. Under the Weekday Existing condition 9 of the 12 hours studied plot above the curve. Under the Weekday Future condition 10 of the 12 hours studied plot above the curve. Under the Saturday Future condition 2 hours plot above the curve. **Therefore, Warrant 3 is met during the Weekday Existing, Weekday Future and Saturday Future Conditions.**

Warrant 7, Crash Experience

The accident experience warrant is satisfied when:

- A. Adequate trial of alternatives with satisfactory observance and enforcement, has failed to reduce crash frequency; and*
- B. Five or more reported crashes, of types susceptible of correction by a traffic control signal, have occurred within a twelve-month period, each crash involving*

- personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and*
- C. *For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80% columns of Condition A in Table 4C-1 (see section 4C.02 of the MUTCD) or the vph in both of the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or volume of pedestrian traffic is not less than 80% of the requirements specified in the Pedestrian Volume Warrant. The Major Street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 peak hours.*

Evaluation of Warrant 7

Accident data was obtained from the New York State Department of Transportation for the period from March 1, 2014 to February 28, 2017 (3-year period). Two (2) accidents were reported at this intersection during the three-year analyzed period, which equates to an average of 0.66 accidents per year and is below the accident threshold. It should also be noted that this considers all accidents, not just those that are susceptible to correction by the installation of a traffic signal. **Therefore, Warrant 7 is not met.**

Warrant Summary

The results of the signal warrant analysis based on the guidelines provided in the MUTCD demonstrates that Warrants 1 and 2 were satisfied under all 4 of the study conditions. Warrant 3 was satisfied under the Weekday Existing, Weekday Future and Saturday Future conditions. Therefore, the intersection of Bayview Avenue and Maple Street satisfies 3 signal warrants and may be investigated further for the installation of a traffic signal.

Manhasset Valley Park

Based upon conversations with the Town, it is our understanding that the Town is exploring the possibility of acquiring a parcel of the Nassau County Highway property to provide additional parking for the athletic operations of the Manhasset Valley Park. The parcel is located south of the County's maintenance garage opposite the exit of the park's parking lot.

General observations were made on a weekday evening and Saturday morning when the athletic facilities were in operation. The following issues were observed:

- It appeared that additional parking is required. Vehicles were utilizing the existing parking that was available, as well as the grass areas north of the parking lot. Secondly, motorists were parking on the sidewalk along the south side of Maple Street.
- If the Town acquires the additional parking area on the north side of Maple Street utilizing the County property, the access should be located opposite the current access of the Town parking lot.

- Gaps in traffic were present on Maple Street that would allow pedestrians adequate time to cross with minimum difficulty. However, the Town should provide a crosswalk and sign appropriately according to the MUTCD.

Conclusions

1. The intersection of Bayview Avenue at East Shore Road is signalized with pedestrian signals. Traffic data indicates minimal pedestrian activity.
2. Based upon general observations of the Manhasset Valley Park, additional parking would be desirable. If the Town pursues the additional parking utilizing the County property on the east side of Maple Street, the Town should install a crosswalk and appropriate pedestrian crossing signs.
3. The existing traffic control at Bayview Avenue and Maple Street is a three-way stop with minimal accident history and low pedestrian activity.
4. The intersection of Bayview Avenue and Maple Street meets several warrants of the MUTCD. Although, the location meets several warrants and therefore could be considered for the installation of a traffic signal, field observations indicate the location works well under the existing all-way stop control. There is virtually no accident history and minimal pedestrian activity. If a traffic signal were installed, determining the phasing and operation could be problematic and may result in less efficient operation that is provided by the existing all-way stop control. It appears that there is insufficient right-of-way to provide exclusive turn lanes which would allow a signal to operate with maximum efficiency. Also, during off-peak periods, it is very likely that motorists will experience longer delay at a traffic signal than with the existing all-way stop control.