WEST AVENUE AND NEW ROAD
TRAFFIC STUDY

CITY OF LINWOOD
ATLANTIC COUNTY, NEW JERSEY

August 16, 2005

PREPARED FOR:

City of Linwood
400 Poplar Avenue
Linwood, NJ 08221

PREPARED BY:

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I. INTRODUCTION

Concord Atlantic Engineers / Dixon Associates has been commissioned by the City of Linwood to prepare a traffic impact analysis to study the feasibility of closing the eastern of leg or West Avenue at New Road (U.S. Route 9). West Avenue intersects New Road at approximately a 30-degree angle. (See Figure 1) The eastern leg of the intersection has been identified by the City of Linwood as a potential unsafe area, due to limited sight distance and the transition from a 40 MPH roadway (New Road) to a 25 MPH roadway. The alignment of West Avenue with New Road provides drivers traveling northbound on New Road and turning right onto West Avenue, with a means of negotiating the turn at a perceived higher than acceptable speeds. West Avenue is a residential neighborhood, however, it also provides an alternate route to the City's Intermediate School (Belhaven School).

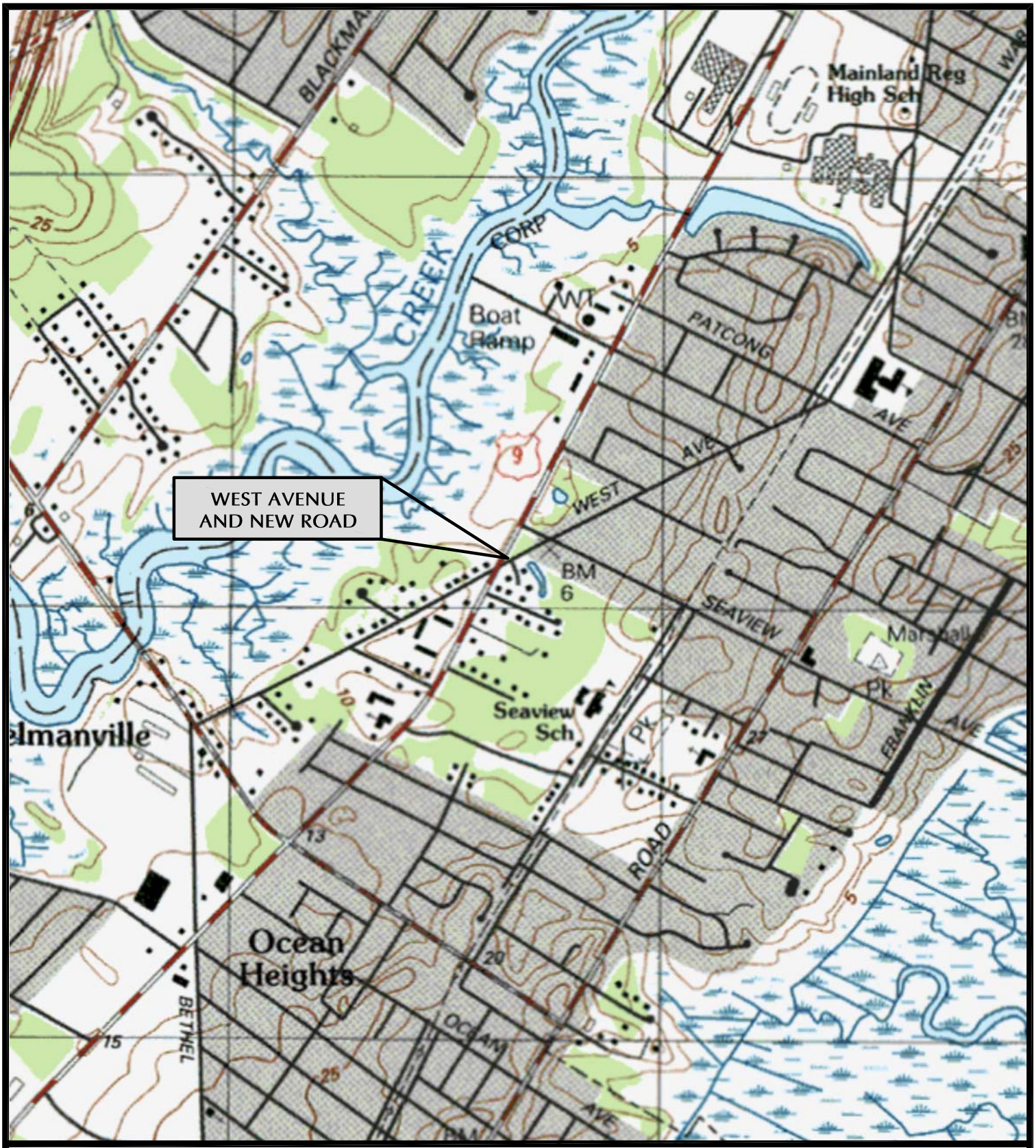
The purpose of this traffic impact analysis is twofold, including:

1. To evaluate the impact to traffic on surrounding roadways, should the eastern leg of West Avenue be closed at New Road, including:

   A. Existing Traffic Conditions with No Changes.

   B. Anticipated Traffic Conditions with West Avenue Closure

2. A speed study on West Avenue to evaluate the severity of resident's complaints.



LOCATION MAP

SCALE: 1"=1000'

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FIG. 1

II. EXISTING CONDITIONS

A review of the existing conditions in the study area was conducted to provide the basis for the assessment of the traffic impact of the West Avenue closure. This included investigation of the surrounding roadways and intersections and collection of traffic volume data.

A. Study Area Roadways

The following roadways in the City of Linwood were included in this study:

1. New Road (U.S. Route 9) - New Road in the study area is north/south, two-lane roadway with one 12-foot travel lane in each direction. Approximately 7-foot wide shoulders are provided. The speed limit through the study area is 40 MPH south of West Avenue and 45 MPH north of the study area. New Road is the primary route used for North / South travel through the City of Linwood and the adjacent communities of Northfield to the North and Somers Point to the South.

2. West Avenue – West Avenue as discussed in Section I of this report serves as access to residential dwellings and by statute is a 25 MPH roadway. Its width through the study area is approximately 30 feet.

3. Seaview Avenue – Seaview Avenue is a 25 MPH roadway through the study area and also is approximately 30 feet wide. Seaview Avenue is classified by the New Jersey Department of Transportation as an Urban Collector and is one of five roads in the City of Linwood of that provides a direct route between New Road and Shore Road. Shore Road is the secondary route for North / South travel through the City of Linwood.

NJDOT 2005 straight-line diagrams for New Road and Seaview Avenue are provided in Appendix A of this report. NJDOT straight-line diagrams are not available for West Avenue.

B. Intersection Study Locations

The following three intersections have been identified as intersections that would be directly impacted by the West Avenue Closure.

1. New Road and West Avenue – This four-leg intersection provides one travel lane on each approach with the West Avenue approaches being stop-controlled. As discussed in Section I of this report, West Avenue intersects New Road at approximately a 30-degree angle.
2. New Road and Seaview Avenue – This three-leg intersection provides one travel lane on each approach with the Seaview Avenue approach being stop-controlled. Seaview Avenue intersects New Road at approximately a right angle.
3. Seaview Avenue and West Avenue – This four-leg intersection provides one travel lane on each approach with the Seaview Avenue approaches being stop-controlled.

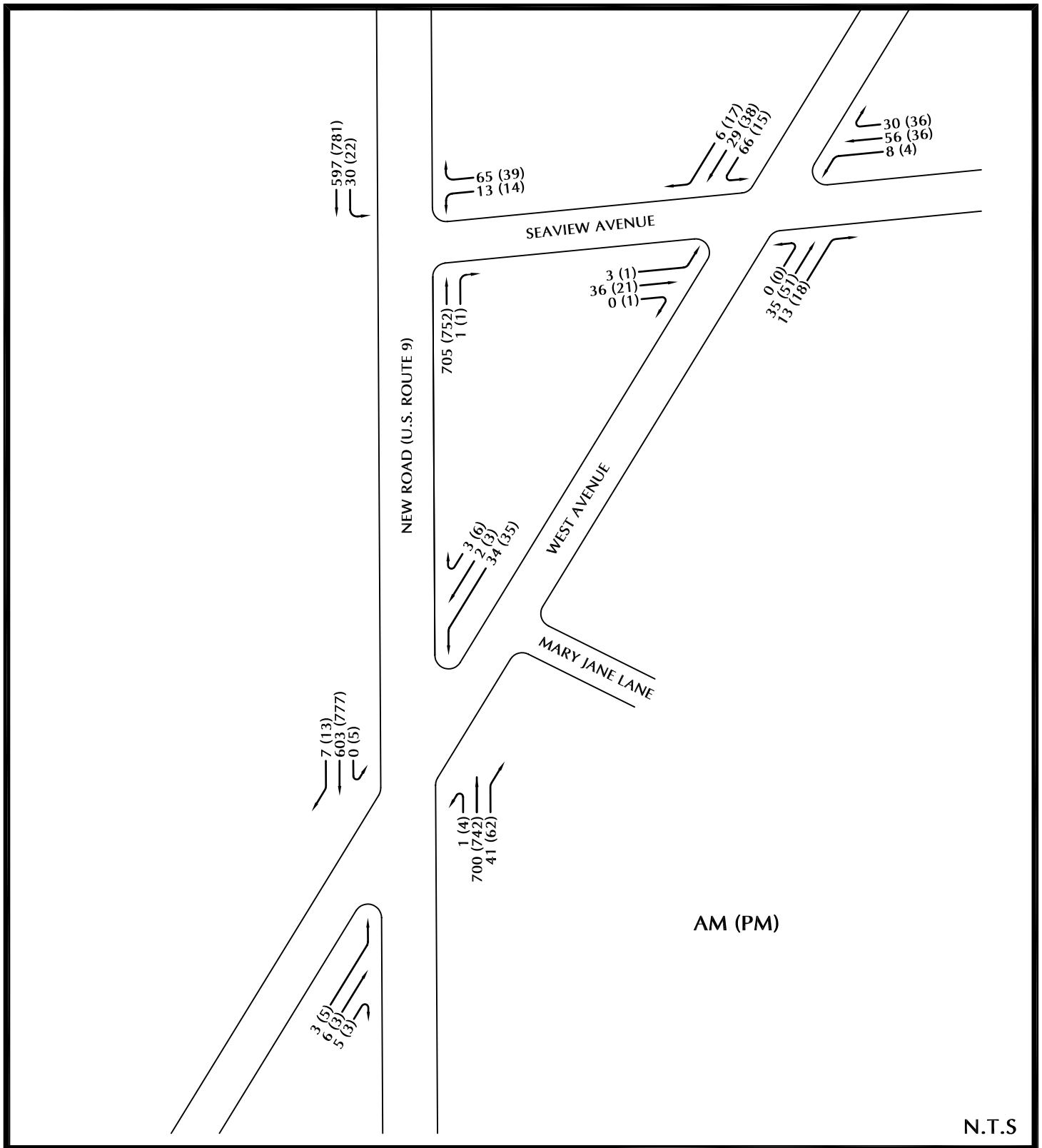
C. Existing Traffic Volumes

Traffic volume data was collected at all three of the identified intersections. These traffic counts were done from 7:00 to 9:00 AM and from 3:00 to 6:00 PM for the two New Road intersections. The AM and PM peak hours were determined from the counts to be from 8:00 to 9:00 AM and 3:00 to 4:00 PM, respectively. Traffic counts were conducted at the West Avenue and Seaview Avenue intersection during those peak hours. All counts were conducted on a typical weekday while school was in session in March of 2005. Copies of all traffic count data are provided in Appendix B of this report. Figure 2 illustrates the weekday AM and PM peak hour traffic volumes.

D. Speed Study

A speed study was conducted on West Avenue between New Road and Seaview Avenue. As noted previously in the report, one of the purposes of this study is determining the severity of residential complaints of speeding on West Avenue. As discussed drivers traveling northbound of New Road who turn right onto West Avenue, are not required by the existing roadway geometry to substantially reduce their speed in negotiating the turn.

The speed study was conducted from 11:00 AM on July 31, 2005 to 1:00 PM on August 5, 2005 using an automatic traffic recorder. The results of the speed study are summarized in Table I below.



2005 PEAK HOUR TRAFFIC VOLUMES

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FIG. 2

Table I
Speed Study – West Avenue
Between New Road and Seaview Avenue

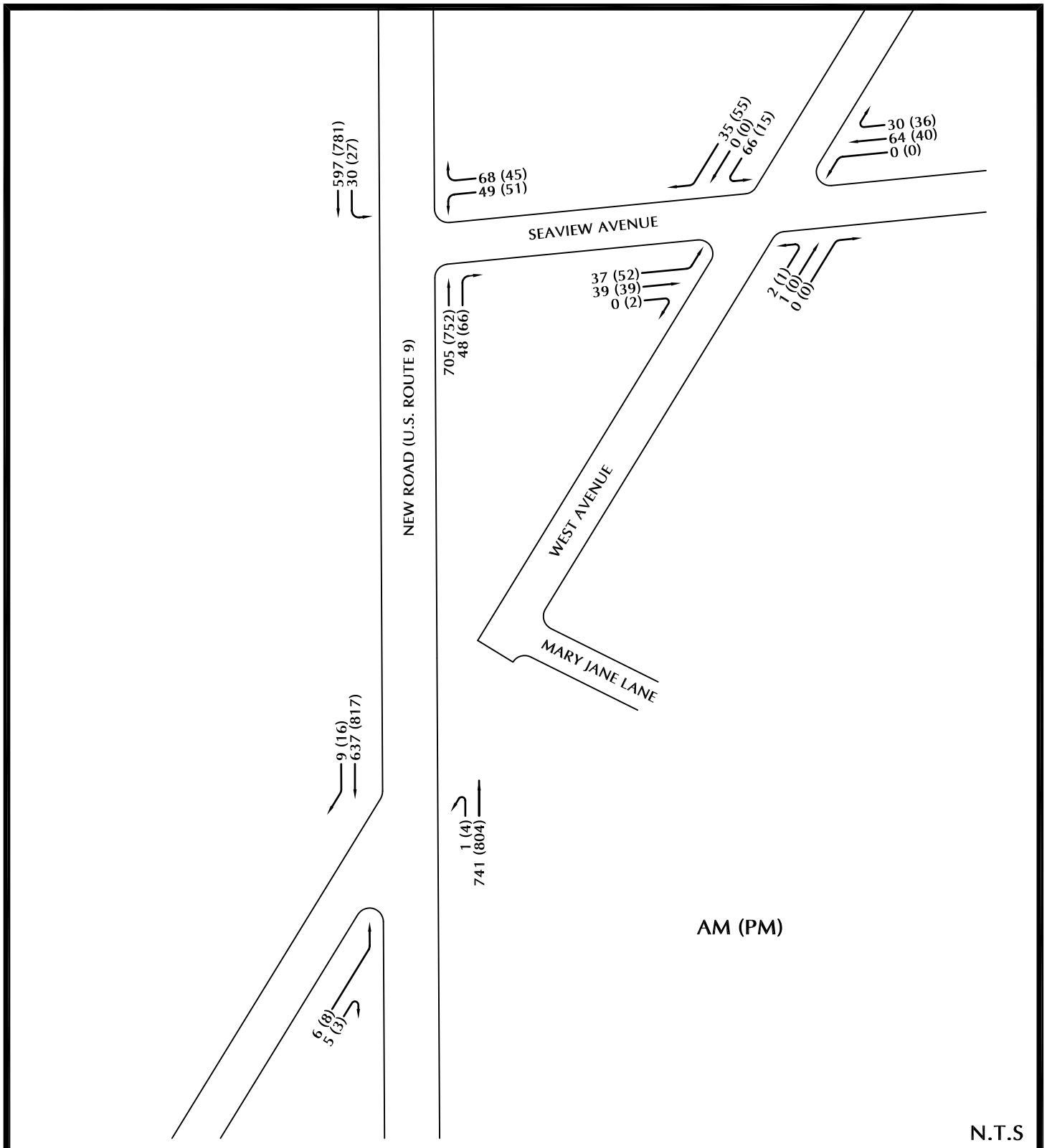
Direction	Average Speed	85th Percentile Speed	% Vehicles Exceeding 25 MPH	% Vehicles Exceeding 35 MPH
Northbound	30 MPH	34 MPH	88.9 %	6.6 %
Southbound	26 MPH	30 MPH	56.7 %	0.4 %
Total	38 MPH	34 MPH	78.4 %	4.6 %

As shown in Table I vehicles are generally (almost 89%) violating the statutory speed limit of 25 MPH in the Northbound direction. Additionally almost 7% of all vehicles traveling northbound are exceeding the speed limit by more than 10 MPH. Given the limited sight distance at the intersection of Mary Jane Lane and West Avenue, these speeds create a safety issue along the section of West Avenue between New Road and Seaview Avenue.

Observations on West Avenue confirm that the vehicles are turning right onto West Avenue from northbound New Road and continuing at the speeds recorded in the speed study. This confirms and validates the resident concerns regarding speeding on West Avenue. The speed study data is provided in Appendix C of this report.

III. WEST AVENUE CLOSURE AT NEW ROAD

The primary purpose of this study was to determine the impact that closing the eastern leg of West Avenue at New Road would have on the existing and proposed traffic circulation at the three study intersections. For the purpose of this study and in order to provide a worst-case scenario it was assumed that all traffic entering and exiting to/from the eastern leg of West Avenue at New Road would be diverted to the New Road and Seaview Avenue intersection. Traffic was then redistributed at the intersection of Seaview Avenue and West Avenue accordingly. Figure 3 illustrates the traffic volumes during the AM and PM peak hours with the West Avenue closure.



2005 PEAK HOUR TRAFFIC VOLUMES - WITH ROAD CLOSURE

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FIG. 3

The section of West Avenue between New Road and Seaview Avenue would ultimately become a dead end street with four homes having access. As such traffic on the street would be greatly reduced and essentially would consist of traffic generated by the four homes that have access to West Avenue. One home located at the southeast corner of West Avenue and Seaview Avenue has its access on West Avenue and three other homes are located off a private roadway (Mary Jane Lane) that accesses West Avenue just east of New Road.

A review of the site conditions on this section of West Avenue confirmed that the residents on both Mary Jane Lane as well as the other resident have difficulty safely exiting onto West Avenue due to the configuration of the West Avenue and New Road.

The section of Seaview Avenue between New Road and West Avenue would experience an increase in traffic due to the road closure, however; only three lots front this block of Seaview Avenue. The lot bounded by New Road, West Avenue, and Seaview Avenue, is a City owned lot that is not developable due to environmental constraints. One of the two remaining lots is also undeveloped, however, the lot may also be un-developable due to environmental constraints. The third lot is a single-family lot with access on Seaview Avenue, just west of West Avenue.

IV. VOLUME / CAPACITY ANALYSIS

While traffic volumes provide an important measure of activity on a roadway system, evaluating how well the road accommodates those volumes is also important -- i.e., a comparison of peak traffic volumes with available roadway capacity. By definition, capacity represents the maximum number of vehicles that can be accommodated, given the constraints of the roadway geometry, environment, traffic characteristics, and controls.

In analyzing stop controlled intersections, it is assumed that the through movement on the major street and the right turns from the major street are unimpeded and have the right-of-way over all side street traffic and left turns from the major street. A descriptive mechanism, level of service (LOS), has been developed for stop controlled intersections that indicates average delay at the intersection on a scale from “a” indicating an average delay of 10 seconds or less, to “f”

indicating an average delay greater than 50 seconds. Table II lists the level of service ranges criteria for stop-controlled intersections

Table II

Level of Service and Expected Delay for Stop-Controlled Intersections[1]

Level of Service	Average Control Delay (sec/veh)
A	0 – 10
B	>10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

In urban areas such as the City of Linwood, levels of service from A to C are generally considered acceptable. Level of service D is marginally acceptable, and levels of service E and F are unacceptable.

Detailed volume/capacity analyses were performed to assess traffic operations for each of the study periods. The computer program Highway Capacity Software 2000 Version 4.1e (HCS2000)[2] was used for all calculations. HCS2000 uses all of the methods for calculating volume/capacity as described in the Highway Capacity Manual, 2000. HCS worksheets are provided in Appendix D of this report.

Table III summarizes the level of service analysis for all three study intersections. As shown in Table III the westbound West Avenue approach to New Road fails during both the AM and PM peak hour. The Seaview Avenue approach to New Road does not operate a good level of service during the existing conditions. If West Avenue were to be closed as desired the Seaview Avenue approach would fail with delay of almost three and half minutes per vehicles. This delay would cause a queue of seven to eight vehicles on Seaview Avenue during the peak hours. This means

[1] Transportation Research Board, Highway Capacity Manual 2000 (HCM2000), Washington D.C., 2000.

[2] Highway Capacity Software 2000 (HCS2000) Version 4.1e, McTrans Center, University of Florida, Copyright 2000.

that vehicles would back up almost to West Avenue. Increases in traffic over time both on New Road and the local streets would eventually cause further delays and an even greater queue on Seaview Avenue.

Table III

Level of Service Comparison

Movement	Level of Service (Delay)			
	2005 w/o Closure		2005 w/ Closure	
	AM	PM	AM	PM
New Road (N/S) and West Avenue (E/W)				
EB Approach	D (32.6)	F (67.7)	D (26.7)	F (51.6)
WB Approach	F (75.7)	F (180.8)	---	---
NB Left	A (9.0)	A (9.7)	A (9.2)	A (9.9)
SB Left	A (9.3)	B (10.3)	---	---
New Road (N/S) and Seaview Avenue (E/W)				
WB Approach	D (26.0)	E (47.0)	F (81.4)	F (201.0)
SB Left	A (9.4)	B (10.1)	A (9.6)	B (10.5)
West Avenue (N/S) and Seaview Avenue (E/W)				
EB Approach	B (14.0)	C (15.5.)	B (10.3)	B (11.2)
WB Approach	B (14.2)	B (13.1)	B (10.2)	A (9.9)
NB Left	A (7.4)	A (7.4)	A (7.4)	A (7.4)
SB Left	A (7.6)	A (7.4)	A (7.4)	A (7.2)

V. RECOMMENDATIONS AND CONCLUSIONS

Dixon Associates has found through this study that should the City of Linwood close the eastern leg of West Avenue at New Road that long delays would occur at the intersection of New Road and Seaview Avenue. Typical driver behavior would suggest rather than wait in excessive delays; drivers may seek an alternate route. For drivers traveling westbound on West Avenue to access New Road, alternative routes, would be to use Forest Drive, Joseph Avenue, Hamilton Avenue, or Patcong Avenue. A much more detailed origin-destination study would be necessary to fully evaluate if driver routes would be altered to that extent.

Dixon Associates, recommends that should the City of Linwood still desire to close the eastern leg of West Avenue at New Road, that a temporary barricade be installed in compliance with the Manual of Uniform Traffic Control Devices, and that any altered traffic patterns be observed and evaluated prior to a full scale closure.

Alternates to a road closure should also be explored including increasing site distances at West Avenue and New Road and at Mary Jane Lane and West Avenue.

If the City should desire to move forward with the road closure it is recommended that the stop controls at the intersection of Seaview Avenue and West Avenue be changed to stop West Avenue traffic rather than Seaview Avenue traffic.

With regards to vehicles speeds on West Avenue, this study has confirmed resident concerns regarding excessive speeds on the roadway. This higher rate of speed may be attributed to the fact that drivers turning right from northbound New Road onto West Avenue are not required by the intersection's geometry slow down in the way a driver would at a right angle intersection. As such, it is likely that if West Avenue was closed at New Road and drivers were diverted to Seaview Avenue that speeds would be reduced on West Avenue.

APPENDIX A

2005 NJDOT Straight Line Diagrams

APPENDIX B

Traffic Count Data

APPENDIX C

Speed Study Data

APPENDIX D

Highway Capacity Software Worksheets