Congestion Management Process

Syracuse Metropolitan Planning Area
2011

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CONGESTION MANAGEMENT PROCESS (CMP)

Final Document
2011

Syracuse Metropolitan Transportation Council

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EXECUTIVE SUMMARY

Introduction

The Syracuse Metropolitan Transportation Council's (SMTC) Congestion Management Process (CMP) is designed to identify and monitor congestion at locations throughout the SMTC Metropolitan Planning Area (MPA) and is required by federal legislation in metropolitan areas with populations greater than 200,000. This process aids in identifying road segments or intersections that may need improvements to relieve congestion. The CMP has been structured to align with the eight steps suggested by the Federal Highway Administration for completing a CMP:

- Develop Congestion Management Objectives;
- Identify Area of Application;
- Define System or Network of Interest;
- Develop Performance Measures;
- Institute System Performance Monitoring Plan;
- Identify and Evaluate Strategies;
- Implement Selected Strategies and Manage Transportation System; and
- Monitor Strategy Effectiveness.

The locations analyzed in the 2010-2011 CMP process are based on an initial site identification using outputs from the SMTC's travel demand model. The CMP Working Group, which consisted of representatives from the City of Syracuse, the New York State Department of Transportation (NYSDOT) and the Onondaga County Department of Transportation suggested that model road segments with a volume to capacity (v/c) ratio of 0.75 and above be used for the initial analysis. From here, these travel demand model identified road segments then underwent an additional analysis as noted below.

Analysis and Results

There are two tiers of analysis involved in evaluating congestion on road segments identified in the CMP report. The first level of analysis, Tier 1, consists of performance measures that are used to determine the volume to capacity (v/c) ratios during the morning and evening peak intervals. The CMP Working Group determined that if the v/c ratio was greater than (>) 0.90, the location was considered to be congested. The CMP analysis revealed that thirty-seven road segments were congested in the PM peak hour.

Tier 2 analysis is a more detailed analysis that further examines congested locations that have been identified as having a v/c ratio > 0.90. The Transportation Research Board defines excess delay as "the amount of time spent at a given location that exceeds the maximum amount of time that is generally considered acceptable." The excess delay formula utilizes speed limits, PM peak hour volumes, and directional capacity to determine the extent of the congestion. This formula was applied to the fifty-five congested road segment locations identified in the Tier 1 analysis. The four road segments with the highest level of congestion (known as excess delay) are listed below. Please note that the magnitude of excess delay did not rate as significant for any of these locations:

- I-690 from Access to West Street to Access I-81 southbound
- I-690 from Access to I-81 southbound to Access McBride St eastbound

- I-690 from Access I-81 to Access Teall Ave.
- I-81 from Junction E. Adams St. to Access I-690.

In addition to the congested road segments noted above, eight intersections were determined to have a Level of Service (LOS) E in the morning and/or evening peaks, and six intersections were found to have a LOS F in the morning or evening peak periods. While LOS E is an acceptable level of service for most intersections, it can indicate that an intersection is congested. A LOS F indicates that an intersection is failing. Some intersections showed LOSs of both E and F (depending on the whether it was during the AM or PM peak period).

Through the 2010-2011 CMP report, the SMTC also obtained speed information by performing a number of travel time studies along various arterials within the MPA and by assembling information from the NYSDOT. The relationship between these speed counts and the traffic volume congestion analysis is best shown along Interstate 481 between Interchanges 3 (Genesee Street) and 4 (Interstate 690), where forty-two percent of vehicles are shown as traveling five miles per hour or more below the posted speed limit during the PM peak hour. The v/c ratio on this road segment is 1.48, further supporting that there is congestion here.

Conclusion

Various improvement projects that will most likely benefit the identified congested areas have been included on prior municipal capital programs and the SMTC Transportation Improvement Program. Also, planning for such future improvements can take place through the SMTC Unified Planning Work Program. Once completed, these projects should help to alleviate some of the congestion that has been identified through the CMP. As congestion in the SMTC MPA is generally considered peak period and/or incident based, strategies focused on the reduction of single occupancy vehicles are recommended for implementation. Additionally, as development patterns continue to expand outside of the urban core into the suburban and rural localities of the SMTC planning area, a greater emphasis should be created to promote more sustainable and efficient transportation and land use patterns.

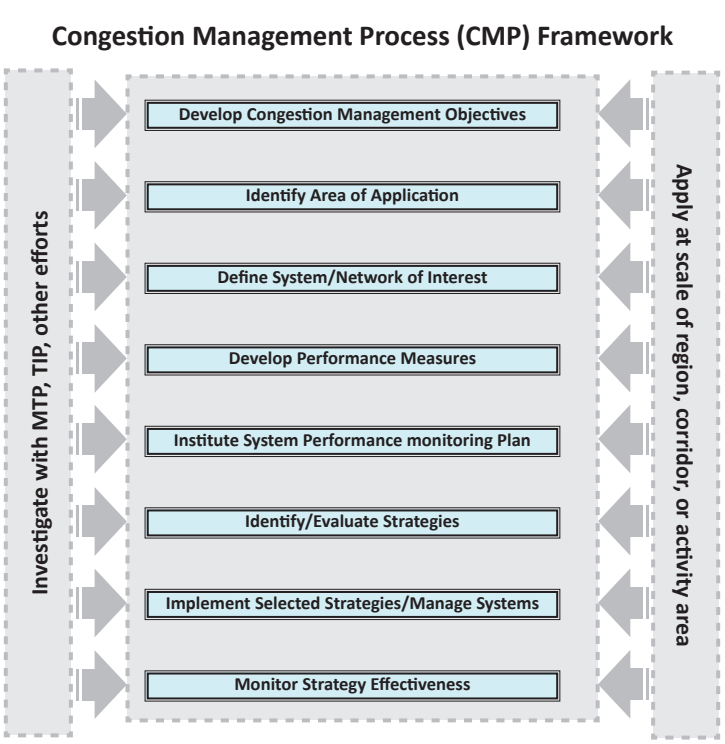
The Congestion Management Process is an ongoing project that should be completed as conditions warrant. The findings of this analysis are similar to previous congestion management documents that stated there are only a small number of segments within the SMTC MPA that are considered congested. These localized, peak period segments are identified primarily during the morning and evening commute times along interstate segments in the City of Syracuse, and a few roadways to the east and north of the City where the majority of households exist. Moving forward, the SMTC's enhanced travel demand model will be similarly utilized to identify road segments in the SMTC MPA with a v/c ratio that surpasses an agency identified congested threshold.

1 INTRODUCTION

1.1 Overview (SMTC and CMP)

The Congestion Management Process (CMP) was completed by the Syracuse Metropolitan Transportation Council (SMTC) as part of the 2010-2011 Unified Planning Work Program (UPWP). This CMP report aligns with the eight steps below that have been identified by the Federal Highway Administration (FHWA) for completing a CMP:

- Develop Congestion Management Objectives;
- Identify Area of Application;
- Define System or Network of Interest;
- Develop Performance Measures;
- Institute System Performance Monitoring Plan;
- Identify and Evaluate Strategies;
- Implement Selected Strategies and Manage Transportation System; and
- Monitor Strategy Effectiveness.



According to the FHWA, a CMP is a "systematic approach to addressing congestion through effective management and operation."[1] A CMP is required by federal legislation in metropolitan areas with populations greater than 200,000, also known as Transportation Management Areas (TMAs). This process aids in identifying locations that may need improvements to relieve congestion. The SMTC will offer assistance to its member agencies to establish strategies for addressing congestion at the identified locations. These strategies could be included in various municipal capital programs, the SMTC's Transportation Improvement Program (TIP), or the Unified Planning Work Program (UPWP). Federal transportation legislation (i.e., 23 CFR Part 450.320(d)) also underscores the importance of a CMP and its relation to the TIP in areas identified as maintenance or non-attainment for the purposes of transportation conformity. Onondaga County, as designated by the Environmental Protection Agency in 1993, is a carbon monoxide maintenance area; therefore, the CMP plays an important role in the development of capital projects for consideration of surface transportation funding.

[1] Report No. FHWA-HOP-09-2008, "An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning", February 2008, Glossary, p C-2.

Congestion is described in 23 CFR Part 500.109 as "the level at which transportation system performance is unacceptable due to excessive travel times and delays."

CONGESTION MANAGEMENT DEFINED

"**Congestion management** means the application of strategies to improve system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods in a region. A **CMP** is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system operations and performance and assesses alternative strategies for congestion management that meet State and local needs."
Federal Register 23CFR Part 500.109

A Working Group was formed to guide the study. Representatives from the City of Syracuse, New York State Department of Transportation (NYSDOT), and the Onondaga County Department of Transportation (OCDOT) were included in the Working Group.

There are two tiers of analysis involved in the SMTC 2010/2011 CMP process. The first level of analysis, Tier 1, consists of performance measures that are used to determine the volume to capacity (v/c) ratios at peak hour intervals. The second level of analysis, Tier 2, consists of a more detailed performance measure, excess delay. These criteria are explained in more detail in later sections.

1.2 Background (History)

The Syracuse Metropolitan Transportation Council's CMP is an evolving document, borne out of the 2004-2005 Congestion Management System (CMS). As of the passage of the SAFETEA-LU legislation in August 2005, Congress replaced the requirement for a "congestion management system that provides for effective management" with a requirement for a "congestion management process (CMP) that provides for effective management and operation".[2] Prior to the passing of SAFETEA-LU, previous versions of the SMTC's CMP were known as Congestion Management Systems.

The SMTC's 2004-2005 CMS was designed to identify and monitor congestion biennially at selected locations throughout Onondaga County. At that time, the SAC discussed and agreed that the CMS should be improved to function as a more useful tool for the SMTC and its member agencies. To that end, the SMTC hosted a collaborative effort with all of the New York State Metropolitan Planning Organizations (NYSMPOs) to work with a consultant to complete an examination of CMSs. For the smaller and medium-sized MPOs, such as the SMTC, the CMS had not developed a close fit with existing planning practices. Where congestion was a marginal or absent issue, the CMS appeared to offer limited benefits while consuming staff and member agency time and resources. In addition, a lack of federal guidance on this subject exacerbated the burden of satisfying the CMS requirement. Because the NYSMPOs and their member agencies were interested in making the CMS requirement more useful as a planning tool, the NYSMPOs

[2] Interim Guidance for Implementing Key SAFETEA-LU Provisions on Planning, Environment, and Air Quality for Joint FHWA/FTA Authorities, September 2, 2005, http://wwwcf.fhwa.dot.gov/hep/igslpja.htm (February 1, 2007).

determined that undertaking a Shared Cost Initiative (SCI) relative to CMS best practices and products would be beneficial. The purpose of the SCI was to seek out examples from around the country of innovative approaches to satisfying the CMS requirement in which auxiliary benefits of the tasks and products associated with the CMS could be capitalized on. The study was contracted, administered, and managed by the SMTC but served the interests of all the NYSMPOs. This effort resulted in the writing of the *Congestion Management Process (CMP) Innovation: A Menu of Options*, which was completed on February 24, 2006.

This Menu provides information on innovative approaches to congestion management activities that are relevant for complying with Federal requirements and for increasing the value of congestion management activities within the transportation planning process, including support for regional transportation goals that go beyond addressing congestion. One of the options contained within the SCI document was the utilization of travel demand models to assist in the identification of congested road segments within a respective planning area. The SMTC, through consultation with the CMP Working Group, determined that the SMTC's travel demand model should be used for CMP analysis purposes.

1.3 Objectives

The SMTC Long-Range Transportation Plan (LRTP) contains several objectives, which directly or indirectly, relate to congestion in the metropolitan area. These are:

1. To enhance the safety of the people using the transportation system.
2. To improve the mobility options for people within the Syracuse Metropolitan Planning Area
   -to improve LOS of at least the ten top most congested sections and intersections between 1990 and 2020.
3. To provide a clean and environmentally sound transportation system for current and future residents.
4. To enhance the area's economic competitiveness, thereby increasing opportunities for employment.
5. To promote the development of an efficient urban area and a sense of community through transportation planning.
6. To provide safe, clean, well-maintained, and efficient transportation infrastructure.

SAFETEA-LU also requires that LRTPs consider two management and operation elements in the transportation planning process:

- ❖ Consideration of management and operations to promote efficient system management and operation; and
- ❖ Operational and management strategies to improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods.

1.4 Area of Application & System Definition

The Syracuse Metropolitan Planning Area (MPA) was used as the geographic extent for the CMP Analysis. The SMTC MPA consists of Onondaga County and small portions of Oswego and Madison counties. The road network within the planning area, Figure 1, contains over 3,500 centerline miles of road, the majority of which are under the ownership of the NYSDOT. Of the approximate 3,500 centerline miles, 30% are classified as federal-aid eligible. Additionally, public transit in the SMTC MPA is served to a high degree by the Central New York Regional Transportation Authority (CNYRTA). The CNYRTA service area consists of four counties (i.e., Cayuga, Oneida, Onondaga and Oswego) and provides numerous transit routes and paratransit service throughout the area. Within the SMTC MPA, approximately 85% of the population is directly served, or within reasonable proximity to available public transit service. Figure 2 depicts the numerous CNYRTA routes that traverse through the SMTC MPA.

Study Area - SMTC MPA

Congestion Management Process

Figure 1

SMTC
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www.smtcmpo.org

Data Sources: SMTC, NYSDOT, 2001
Prepared by SMTC, 12/2010

0 1 2 4 Miles

This map is for presentation purposes only.
The SMTC does not guarantee the accuracy or completeness of this map.

- Interstates
- Roads
- Parks
- Village
- Syracuse
- Town
- Onondaga Nation

* Routes as of Summer 2010

Centro Routes in the MPA

Congestion Management Process

Figure 2

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- Centro Routes
- Interstates
- Roads
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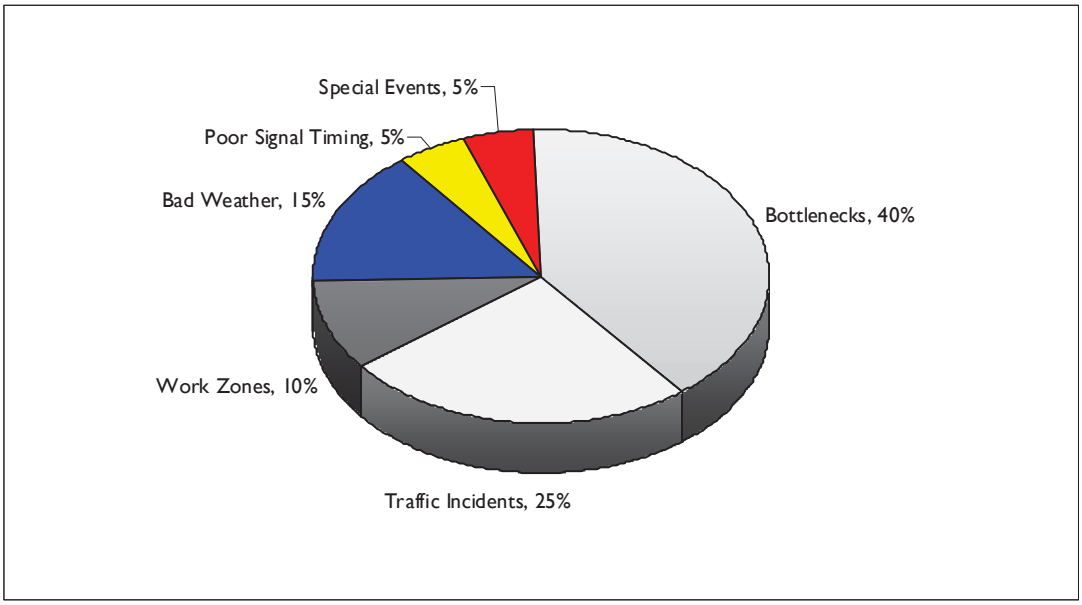
2 PERFORMANCE MEASURES

2.1 Congestion Types

The CMP document incorporates congested road segments from two classifications of congestion, 1) peak period based and 2) non-recurring. Peak period congestion generally occurs daily along road segments or intersections during the traditional work week morning (i.e., 7:00-9:00 A.M.) and evening (i.e., 4:00-6:00 P.M.) peak hours. In terms of other congestion factors, the FHWA identifies six primary causes of congestion; 1) bottlenecks; 2) traffic incidents; 3) work zones; 4) bad weather; 5) poor traffic signal timing; and 6) special events. Non-recurring congestion, as the name implies is not specific to a single road segment or intersection. Congestion under this classification occurs primarily due to incident based occurrences such as vehicle crashes or weather related.

Traffic in the Village of Liverpool



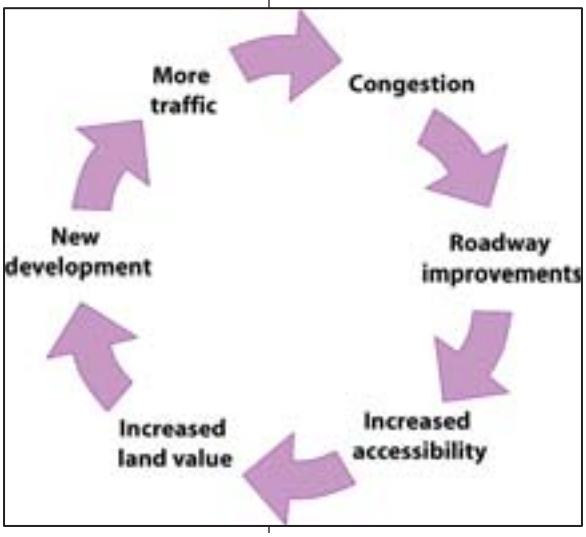
Source: FHWA

As reported in prior congestion management documents, contributing factors to congestion associated with several areas and classifications of roadways in the Syracuse metropolitan area include those identified above and:

- High single occupancy vehicle usage;
- Closely spaced expressway/freeway interchanges; and
- Lack of interconnected land uses.

In regards to commuting patterns specific to the SMTC MPA, the single occupancy vehicle continues to be the preferred mode of travel to work for persons in Onondaga County. Based on information contained in the 2000 Census, 75.2% of workers in Onondaga County drove alone to work. This percentage captures a large volume of drivers that presumably contribute to the peak-period-based congestion found in the area. The Census figures also indicated that 12.2% of Onondaga County workers carpooled to work, and 4.5% utilized public transportation as their mode of travel to work. Local efforts currently underway by various groups and organizations in the SMTC MPA are focused on increasing the two latter travel mode percentage shares. Appendix A outlines typical congested conditions, by facility type, and lists a number of contributing factors for congestion.

The Syracuse MPA has seen an extensive amount of growth in Onondaga County, particularly the towns of Clay and Cicero. Several housing and large scale commercial developments have been constructed in close proximity of the New York Route 31 corridor that traverses through these towns. These municipalities have seen the majority of new housing stock within Onondaga County be developed in their towns as well. Development pressures have also extended the urban area to points west in the town of Camillus. Similar to the northern suburbs, various pockets of large scale commercial development have occurred.



Transportation/Land Use Cycle

The graphic on the left provides an example of the inter-relationship that transportation and land use have with each other. In the transportation/land use cycle, congestion generally leads to road widening to increase carrying capacity, which provides some temporary relief. This relief invites more development that in turn results in more congestion. Facility owners in the past have relied on road widening as the primary measure to relieve congestion. This CMP document attempts to establish other measures for consideration prior to the implementation of road widening projects.

2.2 Performance Measures

This CMP analysis, as with all previous congestion management reports required by federal transportation legislation, adheres to and mirrors the goals and objectives established within the MPO's LRTP. The current metropolitan transportation plan (*Long Range Transportation Plan 2007 Update*), and the 2011 Update under development, do not explicitly identify performance measures since the documents are an update to the original 1995 plan. Looking forward, subsequent LRTPs developed by the SMTC will incorporate performance measures in support of the goals and objectives. However, for the purposes of this 2010/2011 CMP analysis, Level of Service (LOS), v/c ratios, excess delay and average speeds were used as the

basic performance measures. Tables and maps associated with these performance measures are provided throughout this analysis.

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3 MONITORING

3.1 Identifying Congestion

As mentioned in Section 1, this document utilized the SMTC's travel demand model that is calibrated for 2003 conditions to aid in the initial identification of congested road segments. The travel demand model used by the SMTC is a traditional four-step model and provides outputs for three time periods: 24-hour, A.M. and P.M. peaks over various years (i.e., 2003 (base year) and 2027 (horizon year)). Using model outputs from the 2003 base year, the CMP Working Group determined that road segments with a v/c ratio greater than 0.75 were considered at or nearing congestion. These initial travel demand model locations are shown in Table 1 and contain road name, congested segment, road ownership, FHWA-approved functional classification and estimated travel demand model v/c ratios for the A.M. and P.M. peak periods. Additionally, a final weighted maximum v/c ratio is provided. These initial locations are also shown in Figures 3 and 4.

The next step in the process was to verify and evaluate the level of congestion at all of the count locations by examining the v/c ratios for both the A.M. and P.M. peak hours through a Tier 1 analysis. The Level of Service was derived for both the A.M. and P.M. peak hours as well. The Institute of Transportation Engineers (ITE) defines Level of Service as "the operational conditions within a traffic stream as perceived by users of the facility." Level of Service factors range from A - F. Level of Service A represents a free flow with individual vehicles unaffected by other vehicles, while a Level of Service E represents operating conditions at capacity, and a Level of Service F defines a breakdown in the flow of traffic.

The following information from ITE's Transportation Planning Handbook depicts each Level of Service and the corresponding average delay range for traffic signal controlled intersections:

A -	*Little or No Delay*	*(<= 10.0 sec)*
B -	*Minor, Short Delay*	*(10.1 to 20.0 sec)*
C -	*Average Delays*	*(20.1 to 35.0 sec)*
D -	*Long, but Acceptable Delays*	*(35.1 to 55.0 sec)*
E -	*Long, Approaching Unacceptable Delays*	*(55.1 to 80.0 sec)*
F -	*Long, Unacceptable Delays*	*(> 80.0 sec.)*

A LOS 'a' for stop controlled approaches indicates good levels of operations with a motorist experiencing very little, if any delay. A LOS 'f' indicates that, on average, a motorist is experiencing delays in excess of 50 seconds. Based on experience with other municipalities, a LOS 'e' or better in an urban/developed area is considered acceptable.

The following depicts each Level of Service and the corresponding average delay range for stop controlled intersections:

a -	*(<= 10.0 sec)*
b -	*(10.1 to 15.0 sec)*
c -	*(15.1 to 25.0 sec)*
d -	*(25.1 to 35.0 sec)*
e -	*(35.1 to 50.0 sec)*
f -	*(> 50.0 sec.)*

The Level of Service for each road segment location was determined by using the table in Appendix B. Highway Capacity Software (HCS) and Synchro, as well as information from the Florida Department of Transportation, was used to create this table.

Table 1
Initial Final V/C Ratios from Travel Demand Model
(sorted by owner)

Entire Seg Length	Road Name	Route	From Road	To Road	Fun_Class*	Ownership	Max VC AM	Max VC PM	Final VC WA
0.0300	CAROUSEL CENTER DR		HARBORSIDE DR/CAROUSEL CENTER DR	WEST HIAWATHA BLVD	Collector	City of Syracuse	0.6054	1.3512	1.3512
0.0800	E JEFFERSON ST	unk	SOUTH SALINA ST	S WARREN ST	Collector	City of Syracuse	1.0571	0.7611	0.7396
0.0800	GLENWOOD AVE	unk	MCDONALD RD	SOUTH GEDDES ST	Collector	City of Syracuse	0.6752	0.8217	0.8217
0.1100	HARBORSIDE DR		CAROUSEL CENTER DR	PARK ST	Collector	City of Syracuse	0.4803	0.7788	0.7788
0.0400	GRANT BLVD	unk	BUTTERNUT ST	HIGHLAND ST	Minor Arterial	City of Syracuse	0.6571	1.2005	0.9549
0.0900	EAST CATHROP AVE	unk	SOUTH SALINA ST	RMP E CALTHROP TO IN81	Minor Arterial	City of Syracuse	1.6030	1.1653	1.3692
0.1400	EAST COLVIN ST	unk	RMP E COLVIN ST TO IN81	MOORE AVE	Minor Arterial	City of Syracuse	0.6626	0.7271	0.7271
0.1900	EAST COLVIN ST	unk	SOUTH STATE ST	RMP E COLVIN ST TO IN81	Minor Arterial	City of Syracuse	0.8523	0.9603	0.8953
0.0800	HARRISON ST	unk	ALMOND ST	C-D RD	Minor Arterial	City of Syracuse	0.2461	0.8769	0.8769
0.1200	IRVING AVE	unk	UNIVERSITY PL	VANBUREN ST	Minor Arterial	City of Syracuse	0.5698	0.7558	0.7558
0.0300	N WARREN ST	unk	JAMES ST	ERIE BLVD WEST	Minor Arterial	City of Syracuse	0.3417	0.8243	0.8243
0.1200	OLD STATE FAIR BLVD	unk	WEST HIAWATHA BLVD	RMP STATE FAIR BLVD TO IN690	Minor Arterial	City of Syracuse	0.5847	0.8118	0.8118
0.2300	PARK ST	NY370	PARK ST	PARK ST	Minor Arterial	City of Syracuse	0.5197	1.2912	1.1960
0.1600	RMP I81 TO CLINTON/SALINA STS	unk	I81 SB	NORTH SALINA ST	Minor Arterial	City of Syracuse	1.4209	0.6164	0.8815
0.0600	S WARREN ST	unk	E WASHINGTON ST	EAST FAYETTE ST	Minor Arterial	City of Syracuse	0.2129	0.7042	0.7042
0.7200	SOUTH AVE	NY175	VALLEY DR	CORTLAND AVE	Minor Arterial	City of Syracuse	0.9741	1.1171	0.7874
0.7900	SOUTH AVE	NY175	BROAD RD	VALLEY DR	Minor Arterial	City of Syracuse	0.8000	0.9030	0.8311
0.2300	SOUTH SALINA ST	US11	W GLEN AVE	DAWES AVE	Minor Arterial	City of Syracuse	0.6198	0.7478	0.7451
0.2400	WEST HIAWATHA BLVD	unk	SOLAR ST	LODI ST	Minor Arterial	City of Syracuse	0.5556	0.7613	0.7613
0.1200	WEST HIAWATHA BLVD	unk	RMP W HIAWATHA TO IN690	SPENCER ST	Minor Arterial	City of Syracuse	0.7786	0.6857	0.7786
0.7500	WEST HIAWATHA BLVD	unk	SPENCER ST	SOLAR ST	Minor Arterial	City of Syracuse	0.7924	0.8107	0.7915
0.3200	WEST SENECA TPK	NY173	VALLEY DR	MIDLAND AVE	Minor Arterial	City of Syracuse	0.6866	0.7738	0.7738
0.0400	SUNSET AVE	NY298	RAMP TO 81	COURT ST	Principal Arterial	City of Syracuse	0.7071	0.9535	0.9535
0.7200	HARRIS RD	unk	SPLIT ROCK RD	HOWLETT HILL RD	Collector	Local	0.8640	0.9381	0.9381
0.1800	RMP I-90 TO I-690 EB	unk	I-690	I-90	Principal Arterial	NYSDOT	0.5579	1.2457	1.2457
1.0400	RMP I81 S TO 936F	unk	I81 SB	936F	Minor Arterial	NYSDOT	0.7622	0.7451	0.7622
0.0700	RMP N GENANT DR TO 81SB	unk	GENANT DR	I81 SB ON-RAMP	Principal Arterial	NYSDOT	0.7943	0.8810	0.8810
0.7100	IN690	IN690	RMP I81 TO I690	RMP TEALL AVE TO I690	Principal Arterial	NYSDOT	0.7049	0.7565	0.7565
0.5500	IN690	IN690	RMP WEST ST ART TO IN690	IN81	Principal Arterial	NYSDOT	0.8149	0.7342	0.7842
0.3400	IN690	IN690	RMP WEST ST - 690	RMP I81 TO I690	Principal Arterial	NYSDOT	0.5091	0.8228	0.8228
0.1600	RMP I690 TO N TOWNSEND ST	IN690	I690 WB	NORTH TOWNSEND ST	Principal Arterial	NYSDOT	0.7951	0.2848	0.7951
0.4700	RMP I81 NB TO I690 WB	IN690	RMP WEST ST - I690	N TOWNSEND ST	Principal Arterial	NYSDOT	0.6214	0.9645	0.8896
0.3800	IN81	IN81	RMP PEARL ST TO IN81	N TOWNSEND ST	Principal Arterial	NYSDOT	0.5220	0.7579	0.7579
0.2200	IN81	IN81	RAMP 81 TO N GENANT DR	NORTH SALINA ST	Principal Arterial	NYSDOT	0.8219	0.6949	0.7867
0.3200	IN81	IN81	NORTH CLINTON ST	RMP I81 TO I690	Principal Arterial	NYSDOT	0.8044	0.8565	0.8565
0.3400	IN81	IN81	RAMP 81 TO N GENANT DR	RAMP 81 TO N GENANT DR	Principal Arterial	NYSDOT	0.9662	0.8359	0.9662
0.2500	IN81	IN81	RMP N GENANT DR TO NY298	RAMP 81 SB TO N GENANT DR	Principal Arterial	NYSDOT	0.9999	0.8498	0.9999
0.0800	EAST SENECA TPK	NY173	NORTH ST	POMPEY RD	Minor Arterial	NYSDOT	0.7492	0.9954	0.9954
0.0300	ONONDAGA RD	NY173	FAY RD	SPLIT ROCK RD	Minor Arterial	NYSDOT	0.9647	1.0492	1.0492
0.4800	WEST SENECA TPK	NY175	HARRIS RD	ABBEY RD	Minor Arterial	NYSDOT	0.6830	0.7512	0.7512
0.3700	RMP NY690 TO NY31/370	NY31	NY690 NB	NY31/370	Principal Arterial	NYSDOT	0.5478	1.2251	0.9513
0.3000	RMP NY690 TO NY31/370	NY31	NY690 SB	NY31/370	Principal Arterial	NYSDOT	1.0619	0.8448	1.0619

Table 1
Initial Final V/C Ratios from Travel Demand Model
(sorted by owner)

Entire Seg Length	Road Name	Route	From Road	To Road	Fun_Class*	Ownership	Max VC AM	Max VC PM	Final VC WA
0.4200	ONONDAGA PKWY	NY370	81	81	Minor Arterial	NYSDOT	1.0339	0.7699	1.0339
0.3100	RMP B/W OLD LPOOL RD & PARK ST	NY370	OLD LIVERPOOL RD	PARK ST	Minor Arterial	NYSDOT	1.0779	0.9363	1.0325
0.1200	EAST GENESEE ST	NY5	ERIE BLVD EAST	RMP NY5 TO IN481	Principal Arterial	NYSDOT	0.3166	0.7894	0.7894
0.3700	W GENESEE TPKE - NY5	NY5	EB RAMP FROM E GENESEE ST TO NY5	EB RAMP FROM E GENESEE ST TO NY5	Principal Arterial	NYSDOT	1.4267	1.3182	1.3655
0.8800	RMP IN690 TO NY695	NY695	OFF RAMP FROM 690	NY 695	Principal Arterial	NYSDOT	0.4520	0.8441	0.8252
0.2500	RMP NY695 TO IN690	NY695	STATE FAIR BLVD IS UNDER	IN690 EB	Principal Arterial	NYSDOT	0.7904	0.5547	0.7904
0.1800	936F	unk	RMP FROM 81 SB	RMP TO HIAWATHA	Minor Arterial	NYSDOT	0.7947	0.6805	0.7947
0.2100	936F	unk	RMP FROM CAROUSEL CENTER DR TO 936F	BEAR ST	Principal Arterial	NYSDOT	0.7887	0.9131	0.9131
0.3200	I81 RMP 936E TO 370	unk	936E	370	Minor Arterial	NYSDOT	1.1029	1.5762	1.2351
0.2000	RMP E BRIGHTON TO IN81	unk	EAST BRIGHTON AVE	RMP I481 TO I81	Principal Arterial	NYSDOT	1.1245	0.7649	1.1205
0.1900	RMP FROM HIAWATHA TO I81 NB	unk	HIAWATHA BLVD	I81 NB	Minor Arterial	NYSDOT	0.8693	1.1619	1.1619
0.2000	RMP NY930J TO NY481	unk	NY481	BEAR RD	Principal Arterial	NYSDOT	1.6505	1.1982	1.1966
1.9600	WEST SENECA TPK	NY175	ABBEY RD	EAST AVE	Minor Arterial	NYSDOT	0.8507	0.9326	0.8162
0.2600	IN690 SERVICE RD	IN690	690 E ON RAMP	690	Principal Arterial	NYSDOT	0.6120	0.8374	0.8172
0.8500	IN81	IN81	DYER CT	JUST N OF E COLVIN ST	Principal Arterial	NYSDOT	0.7614	0.5695	0.7614
0.0300	GENANT DR	NY298	BEAR ST	RMP N GENANT DR TO NY298	Principal Arterial	NYSDOT	0.7849	0.8561	0.8561
0.2300	BENNETTS CORNERS RD	NY321	FORWARD RD	FLAT ROCK RD	Minor Collector	NYSDOT	0.6291	0.8311	0.8311
0.2200	EAST GENESEE ST	NY5	EDWARDS DR	LYNDON RD	Principal Arterial	NYSDOT	0.8341	0.6406	0.8341
0.8800	IN481	IN481	RMP IN81 TO IN481	RMP I481 TO NORTHERN BLVD	Principal Arterial	NYSDOT	0.4516	0.7831	0.7831
0.8000	IN690	IN690	RMP I81 TO I690	TEALL AVE	Principal Arterial	NYSDOT	0.6384	0.7713	0.7712
2.1600	IN690	IN690	WEST HIAWATHA BLVD	NY 297	Principal Arterial	NYSDOT	0.8945	0.6257	0.7923
2.8700	IN690	IN690	WEST HIAWATHA BLVD	RMP TO 695	Principal Arterial	NYSDOT	0.4581	0.9576	0.8286
0.0400	RMP I690 TO MIDLER AVE	IN690	RMP I690 EB TO MIDLER AVE	SOUTH MIDLER AVE/598	Minor Arterial	NYSDOT	0.7664	0.9283	0.9283
0.1100	RMP IN690 TO NY936C	IN690	I690 EB	936C	Principal Arterial	NYSDOT	0.9865	1.1088	1.1088
0.1300	RMP IN690 TO RT 936D	IN690	I690 WB	RT 936D	Principal Arterial	NYSDOT	0.8076	0.6113	0.8076
0.2100	RMP NY936D TO IN690 WB	IN690	RMP TO 635 S	I690 WB	Principal Arterial	NYSDOT	0.6221	0.7972	0.7871
0.6600	IN81	IN81	7TH NORTH ST	RMP I90 TO I81	Principal Arterial	NYSDOT	0.4742	0.8667	0.7940
0.5000	IN81	IN81	ONON LAKE PKWY/I81	RMP N GENANT DR TO NY298	Principal Arterial	NYSDOT	0.8004	0.6284	0.8004
1.2900	IN81	IN81	E ADAMS ST	RMP IN81 TO S STATE ST	Principal Arterial	NYSDOT	0.4284	0.9935	0.8307
1.2200	IN81	IN81	81	RMP PEARL ST TO IN81	Principal Arterial	NYSDOT	0.6499	1.0391	0.9018
0.1700	RMP IN81 TO NY31	IN81	IN81 NB OFF RAMP	NY31	Principal Arterial	NYSDOT	0.3244	0.9540	0.9540
1.3000	WEST SENECA TPK	NY175	CEDARVALE RD	HARRIS RD	Minor Arterial	NYSDOT	0.8296	0.9070	0.8581
1.3600	MANLIUS CENTER RD	NY290	BASILE ROWE	BOWMAN RD	Minor Arterial	NYSDOT	0.8548	0.9409	0.9154
0.1100	CARRIER PKWY	NY298	CARRIER PKWY RMP TO I90	OLD COLLAMER RD S	Minor Arterial	NYSDOT	0.4828	0.7513	0.7513
0.8400	COLLAMER RD	NY298	RMP I481 TO NY298	FREMONT RD	Collector	NYSDOT	0.7210	0.9662	0.9383
0.9200	RT 298	NY298	NORTHERN BLVD	CARRIER PKWY	Minor Arterial	NYSDOT	0.6772	0.8624	0.8287
0.1200	OSWEGO ST	NY370	2ND STREET	ONONDAGA PKWY	Principal Arterial	NYSDOT	0.7321	0.7804	0.7683
0.4700	NY48	NY48	E/W GENESEE ST	DOWNER ST	Minor Arterial	NYSDOT	0.7523	0.8662	0.8549
1.1900	EAST AVE	NY49	MALLORY ST	RAMP NY49 TO IN81	Minor Arterial	NYSDOT	1.3387	1.9845	1.0127
0.2900	EAST GENESEE ST	NY5	LIMESTONE PLAZA	SALT SPRINGS ST	Minor Arterial	NYSDOT	0.7845	0.9187	0.8746
1.4500	GENESEE TPK	NY5	BENNETTS CORNERS RD	EAST ALMOST TO IKE DIXON RD	Principal Arterial	NYSDOT	0.5795	0.8775	0.8775
0.7600	W GENESEE TPKE - NY5	NY5	W GENESEE TPK- NY5	.77 MILES NORTH OF W GENESEE	Principal Arterial	NYSDOT	0.5161	0.9835	0.8433

Table 1
Initial Final V/C Ratios from Travel Demand Model
(sorted by owner)

Entire Seg Length	Road Name	Route	From Road	To Road	Fun_Class*	Ownership	Max VC AM	Max VC PM	Final VC WA
0.7700	HIGH BRIDGE RD	NY92	HIGHBRIDGE ST	CLARK LANE	Principal Arterial	NYSDOT	0.6956	0.7753	0.7535
1.9700	HIGH BRIDGE RD	NY92	EAST GENESEE ST	HIGHBRIDGE ST	Principal Arterial	NYSDOT	0.9317	0.8924	0.8657
0.0900	RT 936 D	SR936D	RMP I690 TO RT 936 D	BRIDGE ST	Principal Arterial	NYSDOT	0.6793	0.7368	0.7368
0.1000	RMP BUTTERNUT ST TO IN81	unk	BUTTERNUT ST	I81	Minor Arterial	NYSDOT	0.3710	0.9326	0.9326
0.1700	RMP CO103 TO IN481	unk	IN481	JAMESVILLE TOLL RD	Collector	NYSDOT	0.9562	0.9372	0.9562
0.1100	RMP E COLVIN ST TO IN81	unk	E COLVIN ST	I81 NB	Minor Arterial	NYSDOT	0.8345	0.8364	0.8364
0.3700	RMP I481 TO I90	unk	RMP IN90 TO IN481 (34A)	RMP I481 TO I90	Principal Arterial	NYSDOT	0.7508	0.7807	0.7807
0.3500	RMP I-690 TO I-90	unk	I-690	I-90	Principal Arterial	NYSDOT	0.7130	1.0017	0.9364
0.1300	RMP I690 TO JOHN GLENN BLVD	unk	IN690 WB	JOHN GLENN BLVD	Principal Arterial	NYSDOT	1.3519	1.7034	1.7034
0.1400	RMP I-690 TO JONES RD	unk	I-690 EB	JONES RD	Minor Arterial	NYSDOT	0.8757	0.9158	0.9158
0.1800	RMP I81 N FROM ALMOND TO ADAMS	unk	ALMOND	ADAMS	Principal Arterial	NYSDOT	0.9038	0.3943	0.9038
0.1600	RMP I81 TO 7TH NORTH ST	unk	I81 NB	7TH NORTH ST	Minor Arterial	NYSDOT	0.9729	1.1862	1.1862
0.1200	RMP 7TH NORTH ST TO I81SB	unk	7TH NORTH ST	I81 SB	Minor Arterial	NYSDOT	1.3174	1.2767	1.3174
0.1500	RMP IN481 TO CO103	unk	IN481 NB	JAMESVILLE TOLL RD	Collector	NYSDOT	0.5329	1.0818	1.0793
0.2600	RMP IN481 TO CO53	unk	IN481 NB	KIRKVILLE RD WB	Minor Arterial	NYSDOT	0.7573	0.3841	0.7573
0.1900	RMP IN481 TO NY5	unk	IN481 SB	NY 5 EB	Principal Arterial	NYSDOT	1.2738	1.4447	1.4447
0.1600	RMP IN690 TO NY635	unk	936C	THOMPSON RD NB	Principal Arterial	NYSDOT	0.9676	0.8058	0.9676
0.2400	RMP IN81 TO BARTELL RD	unk	I81 NB	BARTELL RD	Collector	NYSDOT	0.5366	1.3605	0.9448
0.1300	RMP IN81 TO BUTTERNUT ST	unk	BUTTERNUT ST	I81 SB	Minor Arterial	NYSDOT	0.7743	0.6691	0.7743
0.0900	RMP IN81 TO HARRISON ST	unk	IN81 SB	RMP IN81 TO ALMOND ST	Principal Arterial	NYSDOT	1.3063	0.5624	1.3063
0.2400	RMP IN81 TO IN481	unk	IN81 SB	I481 SB	Principal Arterial	NYSDOT	1.2012	1.3524	1.3524
0.2800	RMP IN81 TO IN481	unk	IN81 NB	NY 481NB	Principal Arterial	NYSDOT	0.9503	1.3836	1.3836
0.0500	RMP N STATE ST TO IN81	unk	81	NORTH STATE ST	Minor Arterial	NYSDOT	0.1219	0.7995	0.7995
0.2100	RMP NY31 TO IN81 SB ON RMP	unk	NY31	IN81 SB	Principal Arterial	NYSDOT	0.7720	0.3593	0.7720
0.1500	RMP NY635 TO IN690	unk	690 RAMP	690 RAMP	Principal Arterial	NYSDOT	0.6065	1.1073	1.1073
0.0700	RMP PEARL ST TO IN81	unk	PEARL ST	IN81 NB	Principal Arterial	NYSDOT	0.5217	1.3425	1.2986
0.1000	RMP FRANKLIN TO WEST ST ART	unk	N FRANKLIN ST	WEST ST ART	Minor Arterial	NYSDOT	0.5516	0.7760	0.7760
0.0300	7TH NORTH ST	CO45	7TH NORTH ST	ELECTRONICS PKWY	Minor Arterial	OCDOT	0.5086	0.9010	0.9010
0.2300	BARTELL RD	CO166	MILLER RD	RMP IN81 TO BARTEL RD	Collector	OCDOT	0.7555	1.0924	0.8398
0.8200	BENNETTS CORNERS RD	NY321	GENESEE TPK	FORWARD RD	Minor Collector	OCDOT	0.6471	0.9023	0.8931
0.6600	CAUGHDENOY RD	CO49	LAWTON RD	BREWERTON RD/RT11	Collector	OCDOT	0.8178	0.4273	0.7497
0.4300	EAST MOLLOY RD	CO71	CORPORATE DR	KINNE ST	Minor Arterial	OCDOT	1.7262	1.9065	0.7426
0.6000	EAST TAFT RD	CO18	IN481	FREMONT RD	Collector	OCDOT	0.4664	0.8374	0.8374
1.4700	FACTORY AVE	CO93	LEMOYNE AVE	TOWN LINE RD	Minor Arterial	OCDOT	0.8404	0.9074	0.8673
0.3300	FAY RD	CO39	ONONDAGA RD	ABBE DR	Minor Arterial	OCDOT	0.7000	0.6557	0.7000
0.3100	HIGHBRIDGE RD (sweet)	CO109	HIGHBRIDGE RD (woodchuck)	SWEET RD (troop K)	Collector	OCDOT	0.6492	0.7270	0.7270
0.2200	HINSDALE RD	CO209	MILTON AVE	RMP NY5 TO CO 190	Minor Arterial	OCDOT	0.7766	0.7540	0.7694
0.4500	HOWLETT HILL RD	CO110	SHERWOOD DR	HARRIS RD	Collector	OCDOT	0.7191	0.7883	0.7883
0.5400	KIRKVILLE RD	CO53	FREMONT RD	.5 MILE EAST OF FREMONT RD	Collector	OCDOT	0.5466	0.7463	0.7463
1.1600	KIRKVILLE RD	CO53	FREMONT RD	481 RAMP	Minor Arterial	OCDOT	0.7483	0.9397	0.9361
0.3300	MORGAN RD	CO46	CARAWAY DR	HERITAGE DR	Collector	OCDOT	1.7128	1.6910	1.1125
0.6500	NEWPORT RD	CO36	MAIN ST	RMP CO36 TO NY5	Collector	OCDOT	0.7964	0.7519	0.7964

Table 1
Initial Final V/C Ratios from Travel Demand Model
(sorted by owner)

Entire Seg Length	Road Name	Route	From Road	To Road	Fun_Class*	Ownership	Max VC AM	Max VC PM	Final VC WA
0.0900	NEWPORT RD	CO36	RMP CO36 TO NY5	RMP CO36 TO NY5	Collector	OCDOT	0.6776	0.9552	0.9552
0.8700	NORTH ST	CO6	JAMESVILLE RD	EAST SENECA TPK	Minor Arterial	OCDOT	0.6151	0.8354	0.8288
0.0800	NORTHERN BLVD	CO82	KINNE ST	RT 298	Minor Arterial	OCDOT	0.3053	0.8102	0.8102
0.3500	SOUTH BAY RD	CO208	EAST TAFT RD	PLEASANT AVE	Minor Arterial	OCDOT	0.7367	0.8315	0.7009
0.1700	SPLIT ROCK RD	CO39	ONONDAGA RD	HARRIS RD	Collector	OCDOT	0.8640	0.9381	0.8944
	NOTES:								
	Max V/C AM & Max V/C PM: note the maximum v/c ratio within the road segment in the AM and PM respectively								
	Final V/C WA: notes the final v/c ratio of the road segment. WA stands for "weighted average" (the v/c ratios were multiplied by the pieces making up the segment)								

* V/C Ratio calculated from SMTC's Travel Demand Model

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(315) 422-5716
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0 1 2 4 Miles

Data Sources: SMTC, NYSDOT, 2001
Prepared by SMTC, 12/2010

Initial Road Segment Locations by Volume/Capacity Ratio

MPA

Congestion Management Process

Figure 3

This map is for presentation purposes only.
The SMTC does not guarantee the accuracy or completeness of this map.

V/C ratio (weighted average)
- 0.750 to 0.7999
- 0.800 to 0.8999
- 0.900 to 0.9999
- 1.0 and above
- Village
- Syracuse
- Town
- Onondaga Nation

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0 0.25 0.5 1 Miles

Initial Road Segment Locations by Volume/Capacity Ratio

City of Syracuse

Congestion Management Process

Figure 4

This map is for presentation purposes only.
The SMTC does not guarantee the accuracy or completeness of this map.

V/C ratio
- 0.750 to 0.7999
- 0.800 to 0.8999
- 0.900 to 0.9999
- 1.0 and above
- Parks
- Village
- Syracuse
- Town
- Onondaga Nation

Overall, nineteen intersections are included in the organization's monitoring and evaluation of congestion management. Turning movement counts were gathered for thirteen intersections throughout the area of application in 2010. The remaining six intersections rely on turning movement data compiled within the last four-year timeframe. The A.M. and P.M. peak hour intersection counts were recorded and compiled into Table 2, Intersection Traffic Counts. The counts were entered into either HCS or Synchro traffic signal timing software to determine the existing Level of Service that each intersection was operating at for both the A.M. and P.M. peak hours. As noted, the Level of Service for intersections is based on seconds of vehicle delay. Appendix C contains the HCS and Synchro calculations and printouts for each of the eighteen intersections for both the A.M. and P.M. peak hours.

The Tier 2 analysis is a more detailed analysis that further examines congested locations that are identified as having a v/c ratio greater than or equal to 0.90. Tier 2 uses the concept of "excess delay" as a performance measure for congestion.

The Transportation Research Board defines excess delay as "the amount of time spent at a given location that exceeds the maximum amount of time that is generally considered acceptable." The following formula was applied to various congested road segment locations identified in the Tier 1 analysis:

$$ExcessDelay^{**}_{segment} = FreeflowTime * (1 + 0.15 * (\frac{DirectionalVolume}{DirectionalCapacity_{LOS"C"***}})^4 - 1.366)$$

**The excess delay equation was not used to determine the values for intersections because HCS and Synchro compute a more accurate result with the data given.

***Segment capacities at LOS "C" are 80% of the LOS D/E thresholds shown in the Excess Delay Thresholds chart on the following page.

Free flow Time = Speed limit of the road segment
Directional Volume = PM Peak Hour Volume
Directional Capacity = Number of lanes x (.80)(Excess Delay Threshold)

Excess Delay Thresholds	
Facility Type	Excess Delay Threshold, LOS D/E
Freeway	1500 vehicles/lane, one direction/hour
Multi-lane arterial w/ median	1400 vehicles/lane, one direction/hour
Multi-lane arterial w/o median	1250 vehicles/lane, one direction/hour
Two-lane arterial and collector	1000 vehicles/direction/hour
Local (residential) road	625 vehicles/direction/hour

Magnitude of PM Peak Hour Excess Delay	
Magnitude	Qualifications
0	0.0 hours excess delay
1	0.01 – 29.9 hours
2	30.0 – 59.9 hours
3	60.0 – 199.9 hours
4	200 or more hours
A value of 2 rates as significant A value of 3 or 4 rates as critical	

TABLE 2

INTERSECTION TRAFFIC COUNTS

Intersection	Signal Owner	Year of Traffic Counts	Min Std	AM PEAK												Total AM Peak Hr Intersection Volume	AM Peak Hour LOS	PM PEAK												Total PM Peak Hr Intersection Volume	PM Peak Hour LOS
				Southbound			Westbound			Northbound			Eastbound					Southbound			Westbound			Northbound			Eastbound				
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Midler Ave @ James St	City	2010	D	124	252	62	37	320	67	150	260	72	16	351	101	1,812	C	156	313	77	33	500	104	203	248	84	23	478	113	2,332	D
Butternut @ Lodi St	City	2010	D	120	186	22	28	152	57	13	117	23	24	216	15	973	B	107	182	43	63	312	135	44	193	59	62	169	28	1,397	C
Genesee St @ Erie Blvd West	City	2010	D	41	114	129		391	28	47	7			885	175	1,817	B	23	54	211		941	77	225	17			573	66	2,187	C
S Salina St @ Seneca Tpke	City	2010	D	25	126	98	76	408	28	115	240	147	95	528	109	1,995	D	66	276	179	185	629	26	99	470	124	152	217	124	2,547	E
W Onondaga St @ Geddes St	City	2010	D	27	549	29	38	141	22	7	245	32	5	45	5	1,145		38	309	4	47	88	13	13	475	74	13	157	7	1,238	
S Geddes St @ Bellevue Ave	City	2010	D	39	209	18	7	41	49	4	537	31	29	60	16	1,040		45	416	48	13	96	50	15	272	6	37	56	13	1,067	
Henry Clay Blvd @ Wetzel Rd	OCDOT	2010	D	76	484	32	29	84	57	59	124	16	15	122	63	1,161	C	122	157	19	33	231	159	150	418	91	48	177	59	1,664	E
Henry Clay Blvd @ Buckley Rd	OCDOT	2010	D	36	452	55	62	253	22	163	137	49	25	329	338	1,921	F	40	205	41	47	368	55	440	625	99	88	393	171	2,572	E
Buckley Rd @ 7th North St	OCDOT	2010	D	262	131	29	93	430	373	66	172	109	57	400	33	2,155	E	327	212	75	170	624	350	167	386	87	70	640	61	3,169	F
Buckley Rd @ Morgan Rd	OCDOT	2010	D	206	554	161	90	274	36	149	144	38	17	305	362	2,336	C	132	248	169	130	626	163	440	625	99	88	393	171	3,284	E
Old RT 57@John Glenn Blvd	OCDOT	2010	D	94	1418	472	165	425	68	127	521	106	365	539	317	4,617	F	100	948	422	146	419	106	361	1589	159	695	583	159	5,687	F
James St @ Teall Ave	City	May-09	D	6	372	141	68	374	10	122	295	77	86	239	76	1,866	B	21	437	100	104	295	8	104	398	84	178	381	127	2,237	C
Adams St @ Almond	State	May-10	D	708	835	122	0	0	0	0	923	357	421	475	213	4,054	C	331	1022	85	0	0	0	0	749	107	1378	301	712	4,685	F
Harrison St @ Almond St	City	May-10	D	0	1569	43	96	230	452	435	907	124	0	0	0	3,856	C	0	1103	48	335	224	1293	117	2046	49	0	0	0	5,215	D
SR 5 @ SR 257	State	May-07	D	33	103	10	33	486	46	539	136	42	26	316	10	1,780	D	71	193	28	35	498	46	344	150	48	32	556	8	2,009	E
SR 5 @ SR 635 (Erie/Thompson)	State	Jul-06	D	332	287	331	29	176	160	52	320	34	119	159	11	2,010	B	660	493	347	83	535	439	60	236	81	284	387	16	3,621	C
SR 257 @ Salt Springs Road	State	May-07	D	38	111	0	10	0	398	0	327	14	2	117	126	1,143	B	58	141	0	26	1	241	0	361	23	18	359	146	1,374	C
SR 290 @ SR 635 (James/Thompson	State	Jul-06	D	90	765	140	114	184	100	54	988	52	210	240	11	2,948	D	134	960	227	127	375	96	93	784	151	161	397	37	3,542	D
SR 370 @ Old Liverpool Rd	State	Apr-06	D	377	1758	2	48	25	224		543	43		53	44	3,117	C	389	841	6	45	85	578		1773	54		121	54	3,946	E

***** and ******: The intersections of W Onondaga St @ Geddes St and Bellevue Ave @ Geddes St operate with a flashing traffic light, red flashing on W Onondaga St and Bellevue Ave and yellow flashing on Geddes St. Because of the flashing traffic lights, the intersections essentially operate as unsignalized two-way stop intersections. Therefore, each intersection was evaluated as an unsignalized two-way stop intersection using HCS software. In HCS, Level of Service (LOS) for unsignalized intersections is determined for each approach, not for the intersection as a whole. In addition, for unsignalized intersections in HCS, the software only gives a LOS for conflicting movements. All other movements are considered to be free flow movements.

* W Onondaga St @ Geddes St:

AM Peak LOS for W Onondaga St Westbound: F — PM Peak LOS for W Onondaga St Westbound: F

AM Peak LOS for W Onondaga St Eastbound: F — PM Peak LOS for W Onondaga St Eastbound: F

** Bellevue Ave @ Geddes St:

AM Peak LOS for Bellevue Ave Westbound: E — PM Peak LOS for Bellevue Ave Westbound: F

AM Peak LOS for Bellevue Ave Eastbound: F — PM Peak LOS for Bellevue Ave Eastbound: F

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3.2 Extent of Congestion

Tier 1 Results

Of the approximate one hundred and thirty road segment locations analyzed, fifty-five had a v/c ratio greater than or equal to 0.75 for the P.M. peak hour. Table 3, Congested Road Segment Locations, lists these fifty-five locations and Figure 5 displays the location of these road segments. The P.M. peak hour was analyzed to determine congestion in lieu of the A.M. peak hour, as a majority of the locations had higher traffic volumes during the P.M. peak hour.

According to the chart below, the majority of road segments with a v/c ratio over 0.75 in the P.M. peak hour are under the ownership of the NYSDOT. Approximately 39 centerline miles have been identified from this CMP analysis as at or nearing congestion. As a comparison, there are over 3,500 centerline miles of road in the SMTC area. Over 50% of these roads are owned and maintained by towns and villages, none of which are at, or near the 0.75 threshold.

Congested Centerline Miles by Facility Owner			
Road Owner	**Congested Miles**	**Total Miles**	**Percent Congested**
NYSDOT	25.52	620	4%
OCDOT	8.83	811	1%
Syracuse	3.76	432	<1%
Total	38.11	1,863	2%

Source: SMTC GIS

TABLE 3

ROAD SEGMENT
TRAFFIC COUNTS

Road #	Link Name	From/To	Year of DOT Counts	Exist Road*	Functional Class	Factored AM Peak Hour NB	SB	EB	WB	Total	Factored PM Peak Hour NB	SB	EB	WB	Total	Existing Road Service Volume "D"	PM PK V/C Ratio	PM Peak Hour LOS	Excess Delay
State Locations																			
I 481		Jamesville Rd to NY 5/92	2007	4UF	PA	1,422	1,204			2,626	1,358	1,606			2,964	3,671	0.81	C-D	
I 481		NY 5/92 to I690	2006	4UF	PA	2,868	1,934			4,802	2,287	3,154			5,441	3,671	1.48	F	-7.69
I 481		81I/481I Interchange - Northern Blvd Ramps	2007	4UF	PA	891	2,225			3,116	2,128	1,042			3,170	3,671	0.86	C-D	
I 690	I 690 EB off ramp	I690 EB off ramp/Teall Ave	2008	2UF	PA			1,105		1,105			995		995	7,415	0.13	A-B	
I 690	Int 6/CSB	West Hiawatha Blvd/Rt 297	2005	6UF	PA			5,178	1,942	7,120			2,256	5,194	7,450	5,506	1.35	F	-12.61
I 690	I 690	West Hiawatha Blvd/Rmp to 695	2009	6UF	PA			3,664	1,202	4,866			2,023	2,850	4,873	5,506	0.89	C-D	
I 690	Int 10/Int 11	Acc Geddes St Half Int/Acc West St	Oct-05	6UF	PA			4,330	1,697	6,027			2,044	4,213	6,257	5,506	1.14	E	-12.62
I 690	Int 11/81 SB OFF	Acc West St/Acc 81I SB	Jul-02	4UF	PA			3,084	2,477	5,561			2,891	3,863	6,754	3,671	1.84	F	12.21
I 690	81 SB OFF/Int 13	Acc 81 SB/Acc McBride St EB	Nov-03	6UF	PA			3,236	2,532	5,768			3,124	3,455	6,579	5,506	1.19	F	7.35
I 690	Int 13/81 NB ON	Acc McBride St EB/Acc 81I SB	Apr-01	6UF	PA			3,102	3,905	7,007			3,918	4,620	8,538	5,506	1.55	F	-3.82
I 690	81 NB On/Int 14	Acc 81I SB/Acc Teall Ave	Nov-03	6UF	PA			4,073	4,176	8,249			4,886	4,575	9,461	5,506	1.72	F	4.47
I 690	Int 14/Int 15	Acc Teall Ave/Acc Midler Ave	Apr-02	6UF	PA			3,473	3,843	7,316			4,722	3,786	8,508	5,506	1.55	F	-4.04
I 690	Int 15/Int 16	Midler Ave/Syracuse City Line	Oct-05	6UF	PA			2,801	3,571	6,372			4,014	3,540	7,554	5,506	1.37	F	-10.13
I 81	I 81	7th North St/Rmp I90 to I81	2004	6UF	PA	1,723	3,735			5,458	3,545	2,411			5,956	5,506	1.08	F	-19.22
I 81	Int 17/Int 18	Jct Colvin St/Jct E Adams St	2004	6UF	PA	3,271	2,189			5,460	3,024	3,512			6,536	5,506	1.19	F	-14.53
I 81	Int 18/Int 19	Jct E Adams St/Acc 690I	Nov-01	4UF	PA	2,371	3,424			5,795	4,016	2,808			6,824	3,671	1.86	F	11.10
I 81	Int 19/Int 22	Acc Rt 690I/Jct Rt 298 Bear St	Sep-01	6UF	PA	2,491	5,082			7,573	5,301	2,990			8,291	5,506	1.51	F	-5.62
I 81	Int 22/Int 23	Onondaga Lake Pkwy/Rt 298	2006	6UF	PA	2,508	4,877			7,385	5,781	2,779			8,560	5,506	1.55	F	-3.65
I 81	CSB/Int 25A	Syracuse N City Ln/Jct Rt 90I	Sep-04	6UF	PA	1,702	3,735			5,437	3,545	2,411			5,956	5,506	1.08	E	-19.22
I 81	Int 25A/Int 26	Jct Rt 90I/Jct Rt 11	Apr-05	6UF	PA	2,292	4,185			6,477	4,558	2,935			7,493	5,506	1.36	F	-12.35
I 81	Int 26/Int 27	Jct Rt 11/Airport Rd Jct	Apr-05	6UF	PA	1,569	3,643			5,212	3,580	2,010			5,590	5,506	1.02	E	-20.25
I 81	Int 27/Int 28	Airport Rd Jct/Taft Rd Jct	May-09	6UF	PA	1,543	4,643			6,186	4,288	1,932			6,220	5,506	1.13	E	-18.36
I 81	Int 29/Int 30	I481 to NY 31	Sep-07	6UF	PA	1,256	3,611			4,867	3,220	1,608			4,828	5,506	0.88	C-D	
I 81	Int 31/Int 32	County Line to NY 49	Jul-06	6UF	PA	1,053	2,086			3,139	2,271	1,215			3,486	5,506	0.63	C-D	
US 11	Salina St	RT 173/Acc I81	Sep-03	2UU-I	MA	410	472			882	413	652			1,065	1,267	0.84	C-D	
US 11	Brewerton Rd	Acc 81I/Taft Rd	Jun-08	2UU-I	MA	683	747			1,430	917	692			1,609	1,267	1.27	E	-16.29
US 11	Brewerton Rd	Taft Rd/SR 931H	Jul-06	2UU-I	MA	538	496			1,034	615	554			1,169	1,267	0.92	C-D	-16.42
US 11	Brewerton Rd	SR 931H/Caughdenoy Rd	May-06	4UU-I	MA	923	1,215			2,138	1,472	1,103			2,575	2,692	0.96	C-D	-15.31
US 11	Brewerton Rd	Caughdenoy Rd/SR 31	Apr-06	4UU-U	MA	718	628			1,346	986	715			1,701	2,692	0.63	C-D	
SR 290	Manlius Center Rd	Basil Rowe/Bowman Rd	2006	2UU-I	MA			504	847	1,351			904	598	1,502	1,267	1.19	E	-9.98
SR 298	Carrier Pkwy	Collamer Rd	2007	2UU-U	MA			1,000		1,000			964		964	4,039	0.24	A-B	
SR 298	Collamer Rd	Acc 481I/Fremont Rd	2007	2UU-U	C			269	724	993			820	290	1,110	1,267	0.88	C-D	
SR 31	Genesee St	Rt 48/ End 370 OLAP	Jun-07	2UU-I	PA			761	705	1,466			851	792	1,643	1,267	1.30	E	-7.97

TABLE 3

ROAD SEGMENT
TRAFFIC COUNTS

Road #	Link Name	From/To	Year of DOT Counts	Exist Road*	Functional Class	Factored AM Peak Hour NB	SB	EB	WB	Total	Factored PM Peak Hour NB	SB	EB	WB	Total	Existing Road Service Volume "D"	PM PK V/C Ratio	PM Peak Hour LOS	Excess Delay
SR 31	Belgium Rd	End 370 OLAP/Old RT 57	May-08	2UU-I	PA			837	663	1,500			939	1,070	2,009	1,267	1.59	E	-17.13
SR 31	Route 31	CR 91 Old Rt 57/Acc SR 481	May-08	4UU-I	PA			895	842	1,737			1,087	1,299	2,386	2,692	0.89	C-D	
SR 31	Route 31	Acc Rt 481/Euclid Morgan Rd	May-08	4UU-I	PA			580	642	1,222			919	918	1,837	4,039	0.45	C-D	
SR 31	Route 31	Rt 11 Cicero/Jct Rt 81I	Jun-06	4UU-I	PA			861	1,000	1,861			1,014	1,215	2,229	2,692	0.83	C-D	
SR 31	Route 31	Jct Rt 81I/S Bay Rd	Apr-09	4UU-I	MA			460	459	919			677	486	1,163	2,692	0.43	A-B	
SR 321	Bennetts Corners Rd	Forward Rd/Flatrock Rd	2007	2UU-U	MC	318	242			560	289	348			637	1,267	0.50	C-D	
SR 370	Oswego St	2nd St/Onondaga Pkwy	Aug-04	2UU-U	PA			450	546	996			507	668	1,175	1,267	0.93	C-D	-10.90
SR 48	Syracuse St	Genesee St/Downer St	2007	2UU-U	MA	552	572			1,124	669	600			1,269	4,039	0.31	E	
SR 49	East Ave	US 11/Acc Rt 81I	2007	2UU-U	MA			652	453	1,105			530	730		7,415	0.00	A-B	
SR 5	Genesee Tpke	Jct Bennetts Cor/Ike Dixon Rd	2006	6UF	PA			1,084	632	1,716			670	1,056	1,726	4,039	0.43	E	
SR 5	Genesee St	Start Rt 92 OLAP Dewitt/Acc Rt 481I	Oct-05	4UD-I	PA			1,044	1,353	2,397			1,689	1,495	3,184	3,172	1.00	E	-9.17
SR 5	Genesee St	Acc 481I/End Rt 92 OLP Lyndon	Nov-03	4UU-I	PA			1,660	2,391	4,051			2,648	1,777	4,425	2,692	1.64	F	-5.65
SR 5	Genesee St	End Rt 92 OLP Lyndon/N Burdick St	Nov-08	4UU-I	MA			781	942	1,723			1,207	892	2,099	2,692	0.78	C-D	
SR 5	Genesee St	Limestone Plaza/Salt Springs Rd	2007	4UU-I	MA			765	905	1,670			1,271	757	2,028	2,692	0.75	C-D	
SR 92	Highbridge Rd	East Genesee St/Highbridge St	2009	2UU-U	PA			604	1,318	1,922			1,207	754	1,961	1,267	1.55	E	-1.38
SR 92	Highbridge Rd	Highbridge St/Clark Ln	2008	2UU-U	PA			517	1,134	1,651			1,070	748	1,818	1,267	1.43	E	-5.80
SR 695		NY 5 to I690	Sep-07	6UF	PA	2,801	1,444			4,245	1,738	2,576			4,314	5,506	0.78	F	
	Shonnard St Ext	West St/930C	Apr-07	1UU-U	L			903		903			338		338	4,039	0.08	A-B	
SR 931G	Old Route 57	Jct Rts 370-57/Onondaga Co Vill of Liverpoo	Jul-06	4UU-I	PA			1,139	573	1,712			651	1,208	1,859	2,692	0.69	C-D	
	I81 NB on ramp	Butternut St/I81	2005	1UF	MA	409				409	987				987	7,415	0.13	C-D	
	I481 NB on ramp	Rockcut Rd/I481 NB	2008	1UF	C	395				395	453				453	7,415	0.06	A-B	
	I81 NB on ramp	East Colvin St/I81 NB	2008	1UF	MA	438				438	559				559	7,415	0.08	A-B	
	I81 NB on ramp	East Colvin St/I81 NB	2008	1UF	MA	438				438	559				559	7,415	0.08	A-B	
	I690 Ext 2	Jones Rd/Ramp I690 WB to I90 on	2008	1UF	PA				254	254				136	136	7,415	0.02	A-B	
	I690 WB off ramp	I690 WB off ramp/John Glenn Blvd	2008	1UF	PA				433	433				835	835	7,415	0.11	A-B	
	I690 EB off ramp	I690 EB off ramp/Jones Rd	2008	1UF	MA			151		151			297		297	7,415	0.04	A-B	
	I690 EB off ramp	I690 EB off ramp/Midler Ave	2008	2UF	MA			960		960			963		963	1,872	0.51	A-B	
	I81 NB off ramp	I81 NB off ramp/Adams St	2005	1UF	PA	997				997	430				430	7,415	0.06	A-B	
	I81 NB off ramp	I81 NB off ramp/7th N St	2008	1UF	MA	457				457	391				391	7,415	0.05	A-B	
	I81 SB on ramp	I81 SB on ramp/7th N St	2008	1UF	MA		419			419		429			429	7,415	0.06	A-B	
	I481 NB off ramp	I481 NB off ramp/Rock Cut Rd	2008	1UF	C	148				148	250				250	7,415	0.03	A-B	
	I481 NB off ramp	I481 NB off ramp/Kirkville Rd WB	2008	1UF	MA				573	573				228	228	7,415	0.03	A-B	
	I481 SB off ramp	I481 SB off ramp/Rts 5/92 EB	2008	1UF	PA			828		828			1,627		1,627	7,415	0.22	C-D	
	936C EB to NY 635 NB	936C EB to NY 635 NB	2008	1UF	PA	586				586	557				557	7,415	0.08	A-B	
	RMP IN690 TO NY936	I690EB off ramp to 936C	2008	1UF	PA			1,587		1,587			1,800		1,800	7,415	0.24	C-D	

TABLE 3

ROAD SEGMENT
TRAFFIC COUNTS

Road #	Link Name	From/To	Year of DOT Counts	Exist Road*	Functional Class	Factored AM Peak Hour NB	SB	EB	WB	Total	Factored PM Peak Hour NB	SB	EB	WB	Total	Existing Road Service Volume "D"	PM PK V/C Ratio	PM Peak Hour LOS	Excess Delay
	I690 WB off ramp	I690 WB off ramp/Bridge St	2008	1UF	PA				597	597				305	305	7,415	0.04	A-B	
	I81 NB off ramp	I81 NB off ramp/Bartell Rd	2008	1UF	C	192				192	564				564	7,415	0.08	A-B	
	I81 SB off ramp	I81 SB off ramp/Butternut St	2006	1UF	MA		585			585		336			336	7,415	0.05	A-B	
	I81 SB off ramp	I81 SB off ramp/Harrison/Almond Sts	2005	1UF	PA		1,304			1,304		635			635	7,415	0.09	A-B	
	I81 SB off ramp	I81 SB off ramp/Exts23A,23B,22	2005	1UF	PA		1,229			1,229		914			914	7,415	0.12	A-B	
	I81 SB off ramp	I81 SB off ramp/I481 SB	2008	1UF	PA		790			790		280			280	7,415	0.04	A-B	
	I81 NB off ramp	I81 NB off ramp/Rt 481 NB	2008	1UF	PA	618				618	1,546				1,546	7,415	0.21	C-D	
	I81 NB off ramp	I81 NB off ramp/Rt 31	2006	1UF	PA	389				389	851				851	7,415	0.11	A-B	
	State St to I81 NB	I81 NB on ramp/State St	2005	1UF	MA	409				409	987				987	7,415	0.13	C-D	
	I81 SB on ramp	Rt 31/I81 SB on ramp	2006	1UF	PA		889			889		447			447	7,415	0.06	A-B	
	I690 WB Ext 16S	Rt 635/936D WB	2008	1UF	PA				186	186				308	308	7,415	0.04	A-B	
	I690 Ext 3	I690 WB/NY 48	2008	1UF	L				94	94				185	185	7,415	0.02	A-B	
	I690 WB Ext 16	936D WB/I690 WB on	2008	1UF	PA				1,397	1,397				1,958	1,958	7,415	0.26	E	
	I690 WB Ext 13	I690 WB off ramp/Townsend St	Nov-09	1UF	PA				1,458	1,458				662	662	7,415	0.09	A-B	
	I81 NB on ramp	Pearl St/I81 NB on ramp	2006	1UF	PA	491				491	1,085				1,085	7,415	0.15	C-D	
	I481 Ext 6	I481 SB off ramp/I90	2008	1UF	PA		200			200		260			260	7,415	0.04	A-B	
	SB Ext ramp	I81 SB/Carousel Center	Nov-05	2UD-U	L		178			178		188			188	7,415	0.03	A-B	
SR 298	Rt 298	Kinne St/Northern Blvd	2007	4UU-I	MA			549	861	1,410			970	543	1,513	7,415	0.20	C-D	
SR 936D	963D	936D/Bridge St	2008	1UF	PA				597	597				305	305	7,415	0.04	A-B	
SR 5	Rt 5 Bypass WB	W Genesee Tpke/.76 miles north of Genesee	2008	2UF	PA				531	531				848	848	1,872	0.45	A-B	
SR 175	Rt 175	Cedarvale Rd/Harris Rd	2006	2UU-U	MA			605	198	803			259	493	752	7,415	0.10	A-B	
US 11	US 11	Washington St/CR 37	2006	2UU-U	MA	397	611			1,008	877	491			1,368	7,415	0.18	C-D	
	City Locations																		
	West Fayette St	Geddes St/West St	2005	2UU-I	MA			644	527	1,171			577	898	1,475	1,267	1.16	E	-7.73
	Midler Ave	Burnet Ave/James St	2004	2UU-I	MA	587	462			1,049	637	548			1,185	1,267	0.94	C-D	-9.63
	E Colvin St	Comstock Ave/Skytop Rd	2005	2UU-I	MA			466	624	1,090			615	704	1,319	1,267	1.04	E	-8.90
	Teall Ave	James St/Grant Blvd	2008	2UU-I	PA	449	420			869	557	439			996	1,267	0.79	C-D	
	Harrison St	Salina St/Almond St	2006	4UU-I	PA				1,178	1,178				653	653	2,692	0.24	C-D	
	Adams St	Almond St/Irving Ave	2006	2UU-I	MA			1,424		1,424			965		965	1,267	0.76	C-D	
	Adams St	US 11 to Almond St	2006	3UU-I	MA			1,061		1,061			1,588		1,588	4,039	0.39	E	
	South Ave	Valley Dr/Cortland Ave	2008	2UU-I	MA			534	248	782			368	502	870	1,267	0.69	C-D	
	South Ave	Broad Rd/Valley Dr	2007	2UU-I	MA			568	292	860			363	532	895	1,267	0.71	C-D	
	W Onondaga St	Seymour St/Gifford St	2006	4UU-U	L			333	344	677			276	632	908	4,039	0.22	C-D	
SR 173	Seneca Tpke	Valley Dr/Midland Ave	2006	2UU-U	MA			781	573	1,354			838	752	1,590	4,039	0.39	E	

TABLE 3

ROAD SEGMENT
TRAFFIC COUNTS

Road #	Link Name	From/To	Year of DOT Counts	Exist Road*	Functional Class	Factored AM Peak Hour NB	SB	EB	WB	Total	Factored PM Peak Hour NB	SB	EB	WB	Total	Existing Road Service Volume "D"	PM PK V/C Ratio	PM Peak Hour LOS	Excess Delay
County & Town Locations																			
CR 91	Oswego St	Tulip St/N Village Ln	2007	2UU-I	PA	540	688			1,228	840	462			1,302	1,267	1.03	E	-9.01
	Old Route 57	N Village Ln/Liverpool Bypass	2003	4UU-I	PA	591	1,249			1,840	1,149	662			1,811	2,692	0.67	E	
	Old Route 57	Liverpool Bypass/John Glenn Blvd	2002	4UU-I	PA					0	1,012	1,140			2,152	2,692	0.80	E	
	Old Route 57	John Glenn Blvd/Blackberry Rd	2002	4UU-I	PA					0	1,108	1,010			2,118	2,692	0.79	E	
	Old Route 57	Blackberry Rd/Wetzel Rd	2002	4UU-I	PA					0	1,170	955			2,125	2,692	0.79	E	
	Old Route 57	Wetzel Rd/Soule Rd	2007	4UU-I	PA	958	1,271			2,229	1,329	1,013			2,342	2,692	0.87	E	
	Old Route 57	Soule Rd/Gaskin Rd	2008	4UU-I	PA	477	466			943	749	641			1,390	2,692	0.52	E	
	Morgan Rd	Wetzel Rd/RT 31	2008	2UU-U	MA	304	542			846	661	388			1,049	4,039	0.26	C-D	
	Soule Rd	Old RT 57/RT 31	2006	2UU-I	C	387	321			708	570	530			1,100	1,267	0.87	C-D	
	Buckley Rd	Taft Rd/Hopkins Rd	2004	2UU-U	MA	457	494			951	631	599			1,230	4,039	0.30	C-D	
	Caughdenoy Rd	Lawton Rd/US 11	2008	2UU-U	C			821	286	1,107			509	683	1,192	1,267	0.94	A-B	-9.59
	Bennetts Crnrs Rd	Rt 5/Forward Rd	2006	2UU-U	MC	436	275			711	288	375			663	1,267	0.52	A-B	
	Hinsdale Rd	Milton Ave/Rmp Rt 5 to CR 190	2006	2UU-U	MA	909	503			1,412	637	919			1,556	1,267	1.23	A-B	-10.88
	Mud Mill Rd	Caughdenoy Rd/US 11	2009	2UU-U	L			49	74	123			119	76	195	1,267	0.15	A-B	
	Factory Ave	LeMoyne Ave/Town Line Rd	2007	2UU-I	MA					0					0	4,039	0.00	A-B	
	Howlett Hill	Sherwood Dr/Harris Rd	2007	2UU-U	C					0					0	1,267	0.00	A-B	
	Kirkville Rd	Fremont Rd/0.5 mi. E of Fremont Rd	2008	2UU-U	C					0					0	1,267	0.00	A-B	
	Kirkville Rd	Fremont Rd/I481 ramps	2008	2UU-U	MA			433	814	1,247			1,085	461	1,546	1,267	1.22	A-B	-10.59
	North St	Rt 173/Solvay Rd	2007	2UU-U	MA					0					0	1,267	0.00	A-B	
	Old Rt. 31	Plainville Rd/Rt 31	2007	2UU-U	L					0					0	1,267	0.00	A-B	
	Harris Rd	Howlett Hill/Split Rock Rd	2007	2UU-U	C					0					0	1,267	0.00	A-B	
	Bear Rd	north of Taft Rd	2010	2UU-I	MA	155	364			519	419	219			638	4,039	0.16	A-B	
	Thompson Rd	Boss Rd/Carrier Circle	2010	2UU-U	L	686	429			1,115	535	649			1,184	1,267	0.93	A-B	-9.63
	Highbridge Rd	Woodchuck Rd/Highbridge St	2010	2UU-U	L			117	391	508			382	198	580	1,267	0.46	A-B	
	Highbridge St	Highbridge Rd/Troop K Rd	2010	2UU-U	C	544	398			942	319	653			972	1,267	0.77	A-B	
	7th North St	7th North St WB R slip ramp to Electronics	2010	1UU-U	MA				385	385				446	446	4,039	0.11	A-B	
	Old Liverpool Rd	slip ramp from Old Liverpool to Electronics	2010	1UU-U	MA				315	315				409	409	4,039	0.10	A-B	
	Northern Blvd NB	Kinne St/RT 298	2010	1UU-U	MA	296				296	715				715	4,039	0.18	A-B	

* The first value represents the number of lanes. The second value represents whether the roadway is Urbanized "U" or a Transitional area "T". The third value indicates whether the roadway segment is a Freeway "F", Undivided "U", or Divided "D". The fourth value, separated by a dash, indicates whether the segment is Uninterrupted "U" or Interrupted "I". Example: 4UU-I is a 4 lane, urban, undivided, interrupted (signalized), roadway segment

** PA = Principal Arterial
MA = Minor Arterial
C = Collector

*** Maximum values were obtained from Appendix A, Level of Service Tables

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LYSANDER

VAN BUREN

CLAY

CICERO

SULLIVAN

SALINA

CAMILLUS

GEDDES

MANLIUS

ONONDAGA

DEWITT

MARCELLUS

POMPEY

Baldwinsville

North Syracuse

Liverpool

City of Syracuse

East Syracuse

Minoa

Solvay

Camillus

Fayetteville

Manlius

Marcellus

SMTC MPA

* Based on PM peak

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0 0.5 1 2 Miles

Tier 1 Locations by Volume/Capacity Ratio

Congestion Management Process

Figure 5

This map is for presentation purposes only.
The SMTC does not guarantee the accuracy or completeness of this map.

V/C Ratio
- 0.750 - 0.799
- 0.800 - 0.899
- 0.900 - 0.999
- 1.0 and above

- Interstates
- Roads
- Village
- Syracuse
- Town
- Onondaga Nation

Of the nineteen standard intersection count locations, eight were determined to have a Level of Service (LOS) E in the AM. or P.M. peak and six have a LOS F in the morning or evening peak as indicated in Table 2. These intersections are also listed in Table 4, Intersection LOS by Approach. Also, nine additional intersections analyzed throughout Onondaga County from previous SMTC efforts are included for informational purposes and are identified with an asterisk. A number of intersections showed traffic operations of both E and F, depending on whether it was during the A.M. or P.M. peak period. According to the ITE Transportation Planning Handbook, LOS E indicates that long delays, from about 55 to 80 seconds per vehicle, occur at these intersections. While LOS E could be considered an acceptable level of service for most intersections, it can indicate that an intersection is congested.

7th North St at Buckley Rd eastbound
Salina, NY

The following intersections have a LOS E:

- Buckley Rd/Morgan Rd, Town of Clay (during the P.M. peak)
- Buckley Rd/7th North St, Town of Salina (during the A.M. peak)
- E Molloy Rd/Kinne Rd* , Town of DeWitt (during the A.M. peak)
- E Molloy Rd/National Guard Entrance*, Town of DeWitt (during the P.M. peak)
- Fay Rd/Onondaga Blvd/Terry Rd*, Town of Onondaga (during the A.M. peak)
- John Glenn Blvd/Long Branch Rd/Farrell Rd*, Town of Salina (during the P.M. peak)
- Henry Clay Blvd/Wetzel Rd, Town of Clay (during the P.M. peak)
- Henry Clay Blvd/Buckley Rd, Town of Clay (during the P.M. peak)
- Old Rt. 57/Long Branch Rd*, Town of Clay (during the A.M. peak)
- S Salina St/Seneca Tnpk, City of Syracuse (during the P.M. peak)
- Bellevue Ave/Geddes St, City of Syracuse (during the A.M. peak on Bellevue Ave westbound)
- SR 370/Old Liverpool Rd, Village of Liverpool (during the P.M. peak)
- SR 5/SR 257, Village of Fayetteville (during the P.M. peak)

Seneca Tnpk at Salina St westbound
Syracuse, NY

A LOS F indicates that an intersection is failing. Based on the LOS analyses, the following intersections are considered to be failing:

Adams St/Almond St at I-81 off ramp
Syracuse, NY

- Adams St/Almond St, City of Syracuse (during the P.M. peak)
- Bellevue Ave/Geddes St, City of Syracuse (during the P.M. peak on Bellevue Ave westbound and the A.M. and P.M. peaks on Bellevue Ave eastbound)
- Buckley Rd/Bear Rd*, Town of Clay (during the P.M. peak)
- Buckley Rd/7th North St, Town of Salina (during the P.M. peak)
- E Molloy Rd/Kinne Rd*, Town of DeWitt (during the P.M. peak)
- Henry Clay Blvd/Buckley Rd, Town of Clay (during the A.M. peak)
- Kirkville Rd/Kinne Rd*, Town of DeWitt (during the P.M. peak)
- Old Rt. 57/John Glenn Blvd, Town of Clay (during both the A.M. and P.M. peaks)
- Old Rt. 57/Gaskin Rd*, Town of Clay (during the P.M. peak)
- W Onondaga St/Geddes St, City of Syracuse (during both A.M. and P.M. peaks on W Onondaga St)

Figure 6, Congested Intersections, displays the above intersections that are congested or failing.

TABLE 4

INTERSECTION LEVEL OF SERVICE (LOS) BY APPROACH

Intersection	Signal Owner	Year of Traffic Counts	Min Std	AM PEAK LOS by Approach				AM Peak Entire Intersection	PM PEAK LOS by Approach				PM Peak Entire Intersection
				Southbound	Westbound	Northbound	Eastbound		Southbound	Westbound	Northbound	Eastbound	
Midler Ave @ James St	City	Jun-10	D	C	B	C	C	C	C	D	D	C	D
Butternut @ Lodi St	City	Jun-10	D	B	B	B	B	B	B	D	B	C	C
Genesee St @ Erie Blvd West	City	Jun-10	D	C	B	D	B	B	C	C	C	B	C
S Salina St @ Seneca Tpke	City	Jun-10	D	C	C	D	D	D	E	F	D	D	E
W Onondaga St @ Geddes St	City	Jun-10	D	*	F	*	F	*	*	F	*	F	*
S Geddes St @ Bellevue Ave	City	Jun-10	D	*	E	*	F	*	*	F	*	F	*
Harrison St @ Almond St	City	May-10	D	C	C	C		C	C	E	C		D
James St @ Teall Ave	City	May-09	D	B	B	C	B	B	B	C	C	C	C
Morgan Road @ Buckley Road	County	Jun-10	D	C	C	D	C	C	C	D	F	D	E
Wetzel Rd@Henry Clay Blvd	County	Jun-10	D	D	B	B	B	C	B	C	F	C	E
Buckley Rd@Henry Clay Blvd	County	Jun-10	D	F	F	C	D	F	D	F	D	F	E
7th North St@Buckley Rd	County	Jun-10	D	F	D	D	D	E	F	F	E	F	F
Old Rt 57@John Glenn Blvd	County	Apr-10	D	F	D	C	F	F	F	D	F	F	F
SR 370 @ Old Liverpool Rd	State	Apr-06	D	B	F	D	B	C	E	F	E	D	E
SR 5 @ SR 635 (Erie/Thompson)	State	Jul-06	D	B	B	C	C	B	C	C	D	D	C
Route 635 @ Route 290	State	Jul-06	D	C	C	D	E	D	E	D	D	D	D
NY 5 @ NY 257	State	May-07	D	D	D	C	C	D	F	D	D	D	E
NY 257 @ Salt Springs Rd	State	May-07	D	B	A	C	A	B	D	B	D	B	C
Adams St @ Almond St	State	May-10	D	B		C	C	C	C		C	F	F

***** The intersections of W Onondaga St @ Geddes St and Bellevue Ave @ Geddes St operate with a flashing traffic light, red flashing on W Onondaga St and Bellevue Ave and yellow flashing on Geddes St. Because of the flashing traffic lights, the intersections essentially operate as unsignalized two-way stop intersections. Therefore, each intersection was evaluated as an unsignalized two-way stop intersection using HCS software. In HCS, Level of Service (LOS) for unsignalized intersections is determined for each approach, not for the intersection as a whole. In addition, for unsignalized intersections in HCS, the software only gives a LOS for conflicting movements. All other movements are considered to be free flow movements.

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Prepared by SMTC, 12/2010

Congested Intersections

(Overall LOS of either E or F)

Congestion Management Process

Figure 6

This map is for presentation purposes only.
The SMTC does not guarantee the accuracy or completeness of this map.

- Congested Intersections
- Interstates
- Roads
- Village
- Syracuse
- Town
- Onondaga Nation

Tier 2 Results

Of the fifty-five road segment locations identified in the Tier 1 analysis, thirty-seven segments had a v/c ratio at or above 0.9, indicating a congested segment. Of these thirty-seven congested segments, four locations experienced excess delay during the P.M. peak:

- I-690 from Access to West Street to Access I-81 southbound
- I-690 from Access to I-81 southbound to Access McBride St eastbound
- I-690 from Access I-81 to Access Teall Ave.
- I-81 from Junction E. Adams St. to Access I-690

Figure 7 displays the four locations experiencing excess delay. According to the Magnitude of P.M. peak Hour Excess Delay chart on the previous pages, each of these four locations has a magnitude of '1', indicating less substantial excess delay time than if the locations received a magnitude score greater than '1' *(*refer to the highlighted locations in Table 3*)*.

Interstate 690 looking east
Syracuse, NY

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Segments that Experienced Excess Delay

Congestion Management Process

Figure 7

* Based on PM peak

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0 0.25 0.5 1 Miles

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- Excess Delay
- Interstates
- Roads
- Parks
- Village
- Syracuse
- Town
- Onondaga Nation

3.3 Speed Data

The last performance measure included in this analysis examines segments where speed data are available based on either travel time studies conducted by the SMTC or information provided by the NYSDOT as part of their annual traffic count program. This measure provides an additional view of the extent of perceived congestion in the area. Speed interval information is displayed for thirteen road segments historically included in the CMP:

1) Interstate 81 between Interchanges 25A and 26.
2) Interstate 81 between Interchanges 27 and 28.
3) Interstate 81 between Interchanges 29 and 30.
4) Interstate 81 between Interchanges 31 and 32.
5) Interstate 481 between Interchanges 2 and 3.
6) Interstate 481 between Interchanges 3 and 4.
7) Interstate 690 between Interchanges 8 and 9.
8) Interstate 690 between Interchange 17 and Interstate 481.
9) NY 5 between the Hinsdale Road and NY 173 interchanges.
10) NY 92 between Woodchuck Hill Rd and the Village of Manlius
11) NY 298 between Midler Avenue Extension and NY 635 (between GM Circle and Carrier Circle).
12) NY 695 between the NY 5 interchange and the Interstate 690 interchange.
13) SR 930P (Bridge Street in DeWitt) between NY 5 and Interstate 690

Segments 1, 2, 3, 4, 5, 6, 9, and 12 are urban freeways with four or more lanes and a 65-mile per hour (mph) speed limit. Segments 7 and 8 are urban freeways with four or more lanes and a 55 mph speed limit. Segment 10 is an undivided arterial with two lanes and a 50 mph speed limit. Segment 11 is a divided arterial with four or more lanes and a 55 mph speed limit. Segment 13 is an undivided arterial with four or more lanes and a 45 mph speed limit. Charts 1 - 13 of Appendix D display the percentage of vehicles traveling within a certain speed interval. These percentages are shown for the A.M. peak (7-9) and the P.M. peak (4-6) for both directions on each roadway.

Three of these road segments have been identified in the Tier 1 analysis as having a v/c ratio above 0.90. This indicates that there may be congestion at these three locations, which include the Segments 1, 2, and 6. The relationship between these speed counts and the traffic volume congestion analysis is best shown at Segment 6, Southbound Interstate 481, where forty-two percent of vehicles are shown as traveling more than five miles per hour below the posted speed limit during the P.M. peak hour. The v/c ratio on this road segment is 1.48, further supporting that there is congestion here.

The speeds for the above segments are based on the NYSDOT's Automatic Traffic Recorder (ATR) count data. As part of the SMTC's travel demand model enhancements, staff undertook a travel time study along numerous roadways in the SMTC planning area where speed data was not readily available. The data collection methodology differs from the State count process since the travel time accounts for actual time of travel as impacted by conditions along the segment. These travel times

were then converted to an average speed utilizing the time and distance traveled. The NYSDOT information averages speeds over a fixed point (i.e., vehicles traveling over a tube strewn across the roadway). Table 5 provides average speeds for the thirteen segments noted above, while Table 6 shows travel time average speeds computed by the SMTC. Additionally, locations where speed data are below the posted speed limit are shown in Figures 3.6 and 3.7. Figure 8 displays seven of the 15 segments with an average speed below the various posted limits. Similarly, Figure 9 highlights thirty-seven segments driven as part of the travel time study where either the morning or evening calculated speeds are below posted speed limits. Several of these segments, primarily located within the Central Business District and the University Hill area of the City of Syracuse, are sixty percent or more below the speed limit.

The two speed tables indicate that most speeds are within an acceptable tolerance of the posted speeds. This tolerance is based on three variables 1) segment above posted speed, 2) within one to ten percent for the ATR counts, and 3) within one to fifteen percent for the morning and evening counts. For those areas that are excessively below the posted speeds according to their speed differential, the primary reduction in speeds are likely caused by the number of vehicles traveling through a particular corridor or intersection in the morning and evening peaks.

Table 5
Automatic Traffic Recorder Average Speeds

Route	Segment	Dir1 Avg Speed	Dir2 Avg Speed	Posted Speed	% Above or Below Posted Speed*
Interstate 81	Exit 25A to Exit 26	66.5	66.0	65	-1.9%
Interstate 81	Exit 27 to Exit 28	67.6	67.4	65	-3.8%
Interstate 81	Exit 29 to Exit 30	67.7	68.2	65	-4.5%
Interstate 81	Exit 31 to Exit 32	66.1	67.6	65	-2.8%
Interstate 481	Exit 2 to Exit 3	65.8	65.2	65	-0.8%
Interstate 481	Exit 3 to Exit 4	63.7	60.0	65	4.8%
Interstate 690	Exit 8 to Exit 9	62.3	58.3	55	-9.6%
Interstate 690	Exit 17 to Interstate 481	62.7	60.1	55	-11.6%
NY 5	Hinsdale Rd to NY 173 interchange	66.0	62.6	65	1.1%
NY 5	Lyndon Rd to North Burdick St	37.7	22.5	40	24.8%
NY 92	NY 5 to Village of Manlius	43.4	45.6	50	11.0%
NY 31	Old Rt. 57 to Interstate 481	44.9	43.2	40	-10.1%
NY 31	Interstate 81 to South Bay Rd	35.4	38.9	40	7.1%
NY 298	Midler Ave to NY 635	48.8	51.6	45	-11.6%
NY 930P (Bridge St)	NY 5 to Interstate 690	27.6	24.5	45	42.1%
Dir1 = northbound or eastbound					
Dir2 = southbound or westbound					
*positive number represents average travel speed below the posted speed					

Table 6
Travel Speeds

Road	Segment	Posted Speed	Avg Speed: AM (7-9)	Avg Speed: PM (4-6)	% Above or Below Posted Speed*
I81	Colvin to Butternut	55		56	-1.8%
I81	Butternut to Hiawatha	55		58	-5.5%
I81	Hiawatha to 7th North St	55		63	-14.5%
I81	7th North St to US 11	65		62	4.6%
I81	US 11 to Airport/Taft Rd	65		63	3.1%
I81	Taft Rd to I481	65		76	-16.9%
I81	I481 to NY 31	65		69	-6.2%
I481	Brighton Ave to Jamesville Rd	65		70	-7.7%
I481	Jamesville Rd to NY 5/92	65		70	-7.7%
I481	I690 to Kirkville Rd	65		68	-4.6%
I481	Kirkville Rd to I90	65		72	-10.8%
I481	I90 to NY 298	65		55	15.4%
I481	NY 298 to Northern Bvd	65		73	-12.3%
I481	Northern Blvd to I81	65		66	-1.5%
I481	I81 to Circle Dr	65		48	26.2%
US 11	Colvin to Raynor	30	28		6.7%
US 11	Erie Blvd to Raynor	30		12	60.0%
US 11	7th North St to Taft Rd	40	33		17.5%
US 11	Taft Rd to Bear Rd	30	25		16.7%
US 11	Bear Rd to Caughdenoy Rd	35	22		37.1%
US 11	Caughdenoy Rd to NY 31	40	36		10.0%
Old RT 57	2nd St to Meyers Rd	30	26		13.3%
Old RT 57	Meyers Rd to John Glenn Blvd	40	26		35.0%
Old RT 57	John Glenn Blvd to Wetzel Rd	40	31		22.5%
Old RT 57	Wetzel Road to Soule Rd	40	35		12.5%
Old RT 57	Soule Rd to NY 31	40	42		-5.0%
NY 5	Elbridge to Bennetts Corners Rd	55		51	7.3%
NY 5	Bennetts Corners Rd to Bypass	55		46	16.4%
NY 5	Syracuse to Lyndon Rd	40	32		20.0%
NY 31	River Rd to Old RT 57	40		34	15.0%
NY 31	Old RT 57 to NY 481	40		27	32.5%
NY 92	NY 5 to Lyndon Rd	40	32		20.0%
NY 92	Lyndon Rd to Village of Manlius	50	37		26.0%
NY 92	Village of Manlius to NY 173	30	33		-10.0%
NY 92	NY 173 to Military Dr	30	24		20.0%

Data represents bi-directional information gathered on a morning or evening peak over a course of 3-4 travel runs on a single day. Data gathered and calculated by SMTC to represent typical travel speeds under normal conditions.

Table 6
Travel Speeds

Road	Segment	Posted Speed	Avg Speed: AM (7-9)	Avg Speed: PM (4-6)	% Above or Below Posted Speed*
Teall Ave	E Genesee to Burnett Ave	30		7	76.7%
Teall Ave	Burnett Ave to Grant Blvd	30		23	23.3%
Teall Ave	Grant Blvd to Court St	30		22	26.7%
Adams St	Onondaga St to Almond St	30		12	60.0%
Adams St	Almond St to Comstock Ave	30		13	56.7%
Harrison St	Almond St to Onondaga St	30		11	63.3%
Almond St	Van Buren to Adams St	30		22	26.7%
Almond St	Adams St to Burnet Ave	30		13	56.7%
Irving Ave	Van Buren to Adams St	30		14	53.3%
Irving Ave	Adams St to Fayette St	30		9	70.0%
Buckley Rd	Old Liverpool Rd to 7th North St	35		30	14.3%
Buckley Rd	7th North St to Taft Rd	35		28	20.0%
Buckley Rd	Taft Rd to Bear Rd	35		25	28.6%
Buckley Rd	Bear Rd to Morgan Rd	35		26	25.7%
Tulip St	Oswego St to Liverpool Bypass	30		24	20.0%
Morgan Rd	Liverpool Bypass to Buckley Rd	40		37	7.5%
Morgan Rd	Buckley Rd to Wetzel Rd	40		38	5.0%

*positive number represents average travel speed below the posted speed

Data represents bi-directional information gathered on a morning or evening peak over a course of 3-4 travel runs on a single day. Data gathered and calculated by SMTC to represent typical travel speeds under normal conditions.

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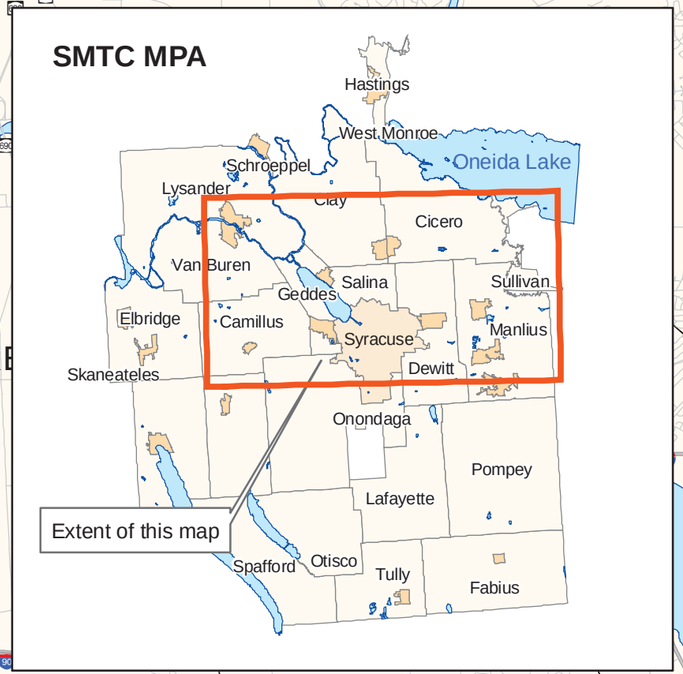

CLAY

CICERO

SULLIVAN

North Syracuse

SALINA

Liverpool

CAMILLUS

City of Syracuse

Solvay

East Syracuse

Minoa

MANLIUS

Camillus

GEDDES

Fayetteville

Manlius

ONONDAGA

DEWITT

* Based on PM peak

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0 0.5 1 2 Miles

Data Sources: SMTC, NYSDOT, 2001
Prepared by SMTC, 12/2010

Percent Below Posted Speed (24 Hour Average Percent)

Congestion Management Process

Figure 8

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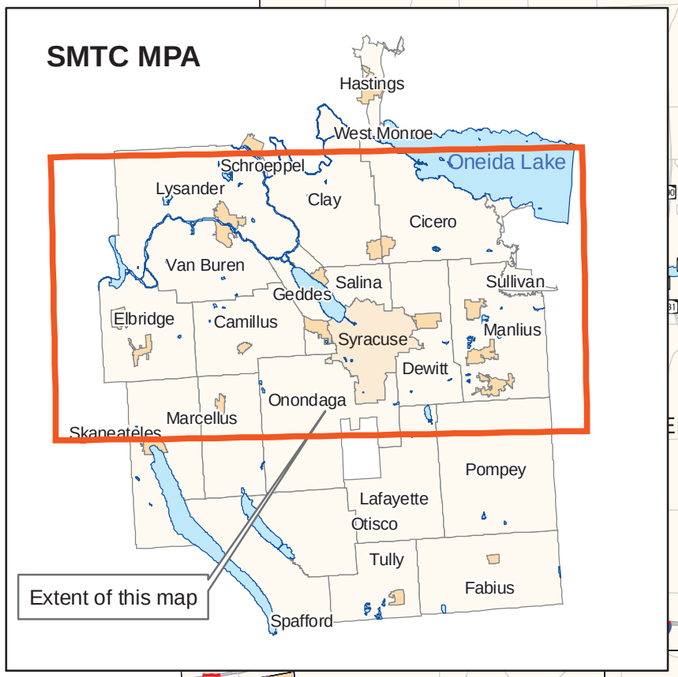
Percent Below Posted Speed
24 Hour
- 1 - 10%
- 11 - 20%
- 21 - 30%
- >30%

- Interstates
- Roads
- Village
- Syracuse
- Town



Phoenix
Baldwinsville
CLAY
CICERO
SULLIVAN
North Syracuse
Liverpool
SALINA
City of Syracuse
East Syracuse
Minoa
Solvay
GEDDES
MANLIUS
Fayetteville
Manlius
DEWITT
POMPEY
ONONDAGA
CAMILLUS
ELBRIDGE
Jordan
Elbridge
Camillus
SKANEATELES
MARCELLUS
Marcellus
Skaneateles

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0 0.5 1 2 Miles

Percent Below Posted Speed (AM/PM Average Percent)

Congestion Management Process

Figure 9

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Percent Below Posted Speed

PM	AM
1 - 15%	1 - 15%
16 - 30%	16 - 30%
31 - 45%	31 - 45%
46 - 60%	46 - 60%
>60%	>60%

- Interstates
- Roads
- Village
- Syracuse
- Town
- Onondaga Nation

4 STRATEGIES & IMPLEMENTATION

4.1 Toolbox/Strategies

The following strategies are suggested to SMTC member agencies and other facility owners where congestion has been identified via this analysis. As this 2010 CMP analysis focused on a v/c ratio of 0.75 as the initial threshold for site identification, subsequent analyses may adjust this criterion to a more feasible ratio. A v/c ratio of 0.80 is generally considered nearing capacity by transportation professionals. The SMTC should also utilize the enhanced travel demand model to identify road segments with v/c ratios that exceed a particular threshold established by the CMP SAC. This updated model has been calibrated with new base and horizon years (2007 and 2035 respectively).

Bike lane on Water St
Syracuse, NY

As congestion in the SMTC MPA is generally considered peak period and/or incident based, strategies focused on the reduction of single occupancy vehicles (SOV) are recommended for implementation. Individual organizations may benefit from the multitude of activities associated with Transportation Demand Management (TDM). Transportation Demand Management is "a general term for strategies that result in more efficient use of transportation resources. "[3]

TDM activities that could be implemented by varying employers, municipalities, and member agencies include, but are not limited to, such things as:

- Increase usage of fixed routes offered by the Central New York Regional Transportation Authority (CNYRTA);
- Increase usage and availability of park and ride facilities;
- Increase availability of bicycling facilities (i.e., lanes, lockers, racks);
- Ride share (carpool/van pool);
- Flexible work schedules;
- Freeway Incident Management Systems;
- Access Management; and
- Signal coordination/optimization.

Camillus Mall Park-n-Ride
Camillus, NY

Additionally, as development patterns continue to expand outside of the urban core into the suburban and rural localities of the SMTC planning area, a greater emphasis should be created to promote more sustainable and efficient transportation and land use patterns. The Syracuse-Onondaga County Planning Agency is currently undertaking a major update to their development guide with a desire to identify and

[3] Victoria Transport Policy Institute Online TDM Encyclopedia; http://www.vtpi.org/tdm/; accessed 11/29/10

initiate these smart growth type activities. The plan is to culminate in the creation of policy directives and strategies for County operations, planning principles and standards to be used in initiating and reviewing development and infrastructure projects, and educational materials to engage the municipalities and citizens of Onondaga County in implementing the vision.[4]

4.2 Implementation

As the SMTC is not an implementing organization, it is the responsibility of the Council's member agencies and municipalities to implement the strategies contained, and those not expressly noted, within this 2010 CMP report, should they be deemed appropriate as such by the facility owner. The SMTC will monitor and track strategy implementation through such activities as its capital improvement program (i.e., the TIP) and individual member agency or municipal capital programs. To date, the SMTC completed a signal optimization analysis for one-third of the traffic signals under Onondaga County ownership. The analysis completed for each intersection shows that improvements to overall traffic operations could be achieved should the optimized timing and phasing modifications be implemented. Additionally, the phase one documentation includes a variety of measures of effectiveness associated with various corridors. These measures include such items as total hours of delay, fuel usage, and travel time. Similar to signal timing improvements, these measures showed dramatic improvements to traffic operations following implementation. A second phase of the county optimization project will occur in 2011. All county-controlled signals will be analyzed in the coming years as part of the optimization project. In addition, the City of Syracuse has completed and is actively engaged in several signal interconnect projects. Like the County's project, optimized timing plans will be developed to improve travel time and reduce delays.

4.3 Follow up

Given that the CMP provides an avenue from which member agencies and municipalities can identify potential locations for capital program projects, the SMTC will track suggested strategies and recommendations through subsequent TIP development.

[4] Syracuse-Onondaga County Planning Agency; http://www.ongov.net/planning/plan_rfp.html; Accessed 1/13/2010

5 CONCLUSIONS

5.1 LRTP/TIP Connections

As previously mentioned, per federal guidelines, the CMP plays an important role in metropolitan transportation planning. For urbanized areas with a population over 200,000, such as the Syracuse metropolitan area, a CMP is a task that should aid in the identification of congested sites within a community, provide strategies to improve traffic operations and efficiencies, and play an integral role in capital programming selection. These requirements are codified in 23 CFR Section 450.320.

The implementation strategies listed in this document, and others not expressly identified, should be considered for implementation prior to any consideration of roadway expansion. Additional installation of lanes to increase carrying capacity under the auspices of traffic flow improvement/congestion management could be achieved through non-traditional implementation activities. As federal regulations state "…Federal funds may not be programmed for any project that will result in a significant increase in the carrying capacity for SOVs… unless the project is addressed through a congestion management process meeting the requirements of this section."[5] Furthermore, the non-capacity expanding strategies should be given initial precedence for the allocation of federal transportation funds, if these types of activities show a reduction in travel demand.

5.2 Conclusions

The findings of this analysis are similar to previous congestion management documents that stated there are only a small number of segments within the SMTC MPA that are considered congested. These localized peak period segments are identified primarily during the morning and evening commute times along interstate segments in the City of Syracuse, and a few roadways to the east and north of the City where the majority of households exist. This density of development, coupled with the City of Syracuse as the primary employment location, lends itself to general commuting patterns into and out of the City. As more municipalities engage and implement sustainable development practices, the identified corridors from this CMP analysis will be routinely monitored as conditions necessitate.

Moving forward, the SMTC's enhanced travel demand model will be similarly utilized to identify road segments in the SMTC MPA with a v/c ratio that surpasses an agency-identified congested threshold. The SMTC has established a traffic count program that will be utilized to periodically monitor traffic conditions throughout the SMTC MPA. Traffic counts and speed information where appropriate based on the site identifications from this analysis will be gathered under the program on a cyclical basis and assembled from various member agency traffic count programs,

[5] 23 CFR Section 450.320(d)

primarily the NYSDOT annual count program. These updated data will be useful to gauge significant changes in traffic operations in the area, identify recurring or new congested road segments, and provide input for subsequent calibrations to the SMTC's travel demand model. Additionally, those strategies noted earlier may also help to minimize congestion concerns as they're implemented by various SMTC member agencies and other facility owners.

APPENDIX A
Congestion Factors

IDENTIFYING TYPES AND CAUSES OF CONGESTION

In evaluating the performance of the system, it is critical to determine the "type" of congestion and its cause(s) in order to properly evaluate the potential benefit to be derived from different strategies. The following section outlines typical congested conditions, by facility type, and offers a variety of factors that may contribute to the congestion.

Congestion on Freeway/Thruway Facilities

- High volumes on the mainline
- Ramp Congestion
    - Off-ramp back-ups (where ramp intersects @ cross street)
    - On-ramp backups (congested volumes on mainline)
- Tollbooth back-ups - high approach volumes (usually during peak hour - PKHR)
- Mainline to Mainline merges & exits (weaving)
    - High volumes of traffic switching mainlines
    - Converging mainlines
    - Diverging mainlines
- Lane closures/ramp closures
    - Construction
    - Incidents (crashes/break-downs)

Contributing Factors

- Long distance commuting
- High SOV usage
- Interchanges too close together
- Inadequate signage
- Excessive "local" traffic on facility
- Excessive "through" traffic on facility
- Ramp length inadequate
- Signal timing/cycle length inadequate at off-ramp and cross street intersection

Congestion on Arterial Highways

- High volumes – mainline – commuter & daily volumes
- High volumes intersections (signalized)
- Unsignalized intersections
- Excessive side friction (adjacent parcel access)
- Incidents (crashes/break-downs)
- Construction areas
    - Lane closure
    - Detours
    - Reduced speed zones

Contributing Factors

- Lack of turn lanes at intersections
- Improper spacing of access points
- Access points too close to intersections
- Lack of deceleration lanes at major parcel access points
- Signal spacing inadequate
- Lack of signal coordination/interconnection
- Improper signal phase/cycle length
- Lack of interconnected land uses
- "Strip" commercial development

Congestion on Minor Arterial Highways and Collectors Streets

- High volumes – daily and peak hours
- High volume signalized intersections
- Multi-way stops
- "No Right Turn on Red" at intersection
- High volumes of pedestrian and bicycle traffic
- Incidents (crashes/breakdowns)
- Legal parking (parallel)
- Illegal parking (double parking, deliveries, etc.)
- Transit Stops
- Construction areas – lane closures, detours, etc.

Contributing Factors

- Lack of loading/unloading in business areas
- Lack of adequate off-street parking
- Improper spacing of access points
- Access points too close to intersections
- Signal spacing inadequate
- Lack of signal coordination/interconnections
- Improper signal phase/cycle length
- Lack of interconnected land uses
- "Strip" development patterns
- Improper/illegal pedestrian and bicycle movements

Source: 1997 SMTC Congestion Management System Report for Onondaga County

APPENDIX B
Level of Service Tables

Level of Service Tables

Maximum Service Volumes for AADT

Roadway Class	LOS A	LOS B	LOS C	LOS D	LOS E
Urban Freeways					
4 lane	20,300	32,500	48,800	61,800	74,500
6 lane	30,600	48,900	73,400	93,000	117,300
8 lane	40,800	65,200	97,900	124,000	156,300
Urban Divided Streets (interrupted flow)					
4 lane	*	*	26,250	33,400	34,900
6 lane	*	*	39,850	50,600	52,550
8 lane	*	*	48,900	61,900	64,350
Urban Undivided Streets (uninterrupted flow)					
2 lane	8,900	13,900	18,900	24,800	33,100
4 lane	15,450	25,875	35,850	42,750	49,725
Urban Undivided Streets (interrupted flow)					
2 lane	*	*	12,000	15,450	16,450
4 lane	*	*	19,688	25,050	26,175
Transition to Urban Areas					
Undivided Streets (uninterrupted flow)					
2 lane	8,400	13,000	17,700	23,300	31,000

Maximum Service Volumes for Peak Hour Traffic

Roadway Class	LOS A	LOS B	LOS C	LOS D	LOS E
Urban Freeways					
4 lane	1,223	1,957	2,926	3,671	4,139
6 lane	1,835	2,936	4,389	5,506	6,491
8 lane	2,447	3,914	5,852	7,415	8,741
Urban Divided Streets (interrupted flow)					
4 lane	1,120	1,867	2,612	3,172	3,825
6 lane	1,731	2,885	4,036	4,902	6,200
Urban Undivided Streets (uninterrupted flow)					
2 lane	89	354	709	1,267	2,553
4 lane	950	1,584	2,216	2,692	3,168
6 lane	1,426	2,377	3,325	4,039	4,153
Urban Undivided Streets (interrupted flow)					
2 lane	89	354	709	1,267	2,553
4 lane	950	1,584	2,216	2,692	3,168
6 lane	1,426	2,377	3,325	4,039	4,153
Transition to Urban Areas					
Undivided Streets (uninterrupted flow)					
2 lane -rolling	185	493	907	1,348	2,385
2 lane -level	247	574	984	1,647	2,745

* Volumes were obtained by averaging volumes for road segments with >0.00 to 2.49 signalized intersections per mile and segments with 2.50 to 4.50 signalized intersections per mile

Source: Florida Department of Transportation, 1995

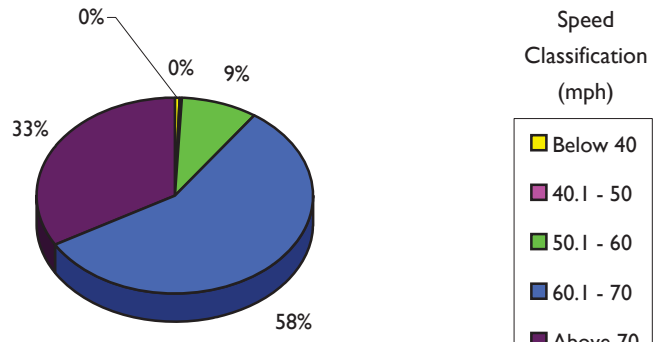
APPENDIX C
HCS/Synchro Intersection Analyses
Available Upon Request

APPENDIX D
Speed Interval Charts

Chart 1
Traffic Volume by Speed Classification

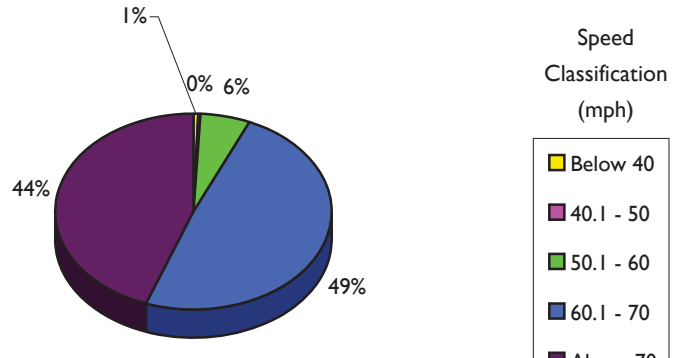
Interstate 81 between US 11 and Interstate 90

Northbound AM Peak



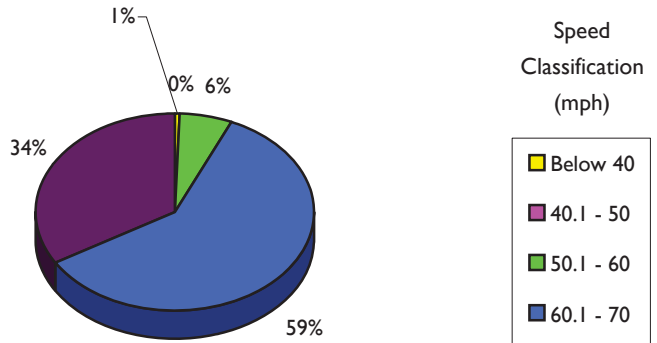
Posted Speed: 65
Total Number of Vehicles: 3,293

Northbound PM Peak



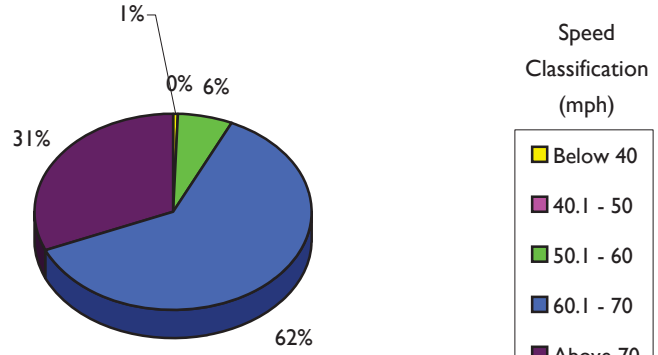
Posted Speed: 65
Total Number of Vehicles: 8,997

Southbound AM Peak



Posted Speed: 65
Total Number of Vehicles: 8,002

Southbound PM Peak

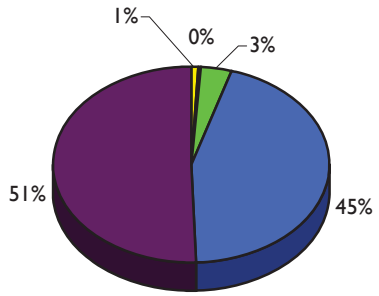


Posted Speed: 65
Total Number of Vehicles: 5,953

Chart 2
Traffic Volume by Speed Classification

Interstate 81 between Airport Rd and Taft Rd

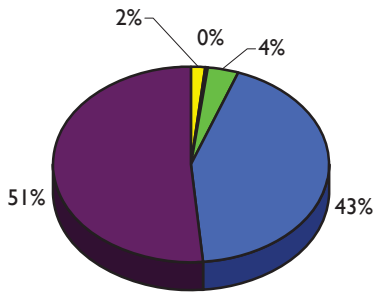
Northbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 1,960

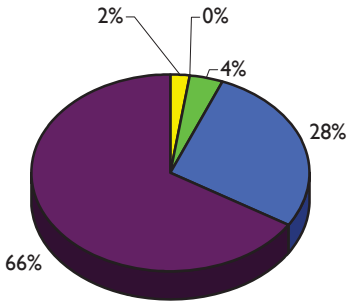
Northbound PM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 7,591

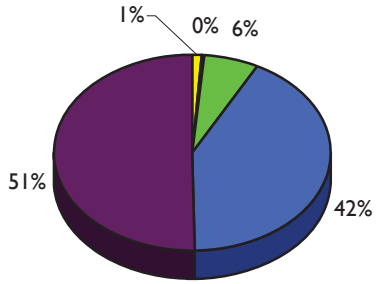
Southbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 7,429

Southbound PM Peak



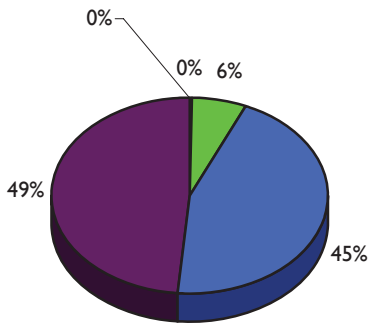
Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 3,682

Chart 3
Traffic Volume by Speed Classification

Interstate 81 between Interstate 481 and NY 31

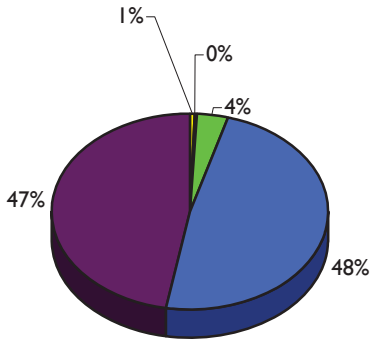
Northbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 1,828

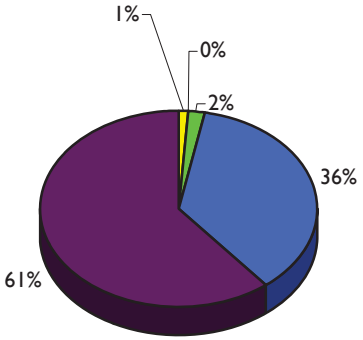
Northbound PM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 5,798

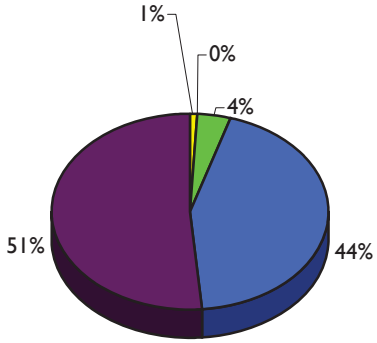
Southbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 5,947

Southbound PM Peak



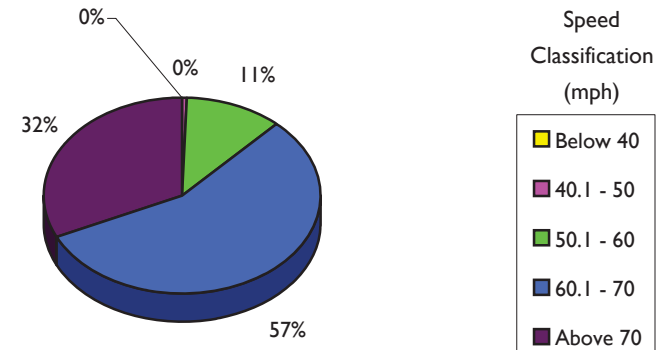
Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 3,143

Chart 4
Traffic Volume by Speed Classification

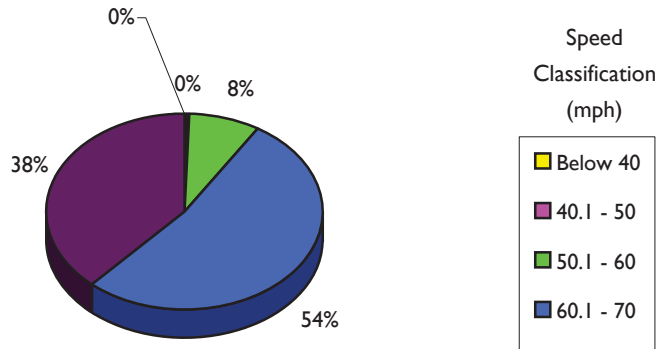
Interstate 81 between Bartel Rd and NY 49

Northbound AM Peak



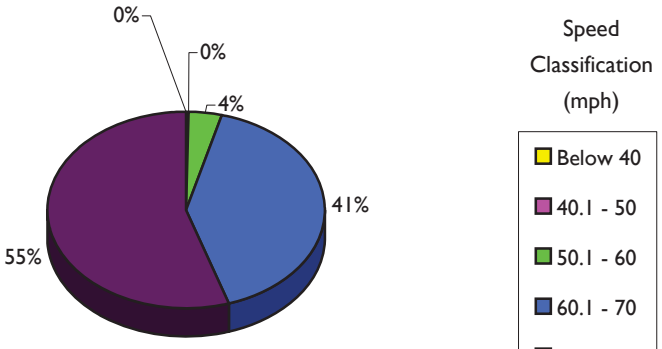
Posted Speed: 65
Total Number of Vehicles: 1,320

Northbound PM Peak



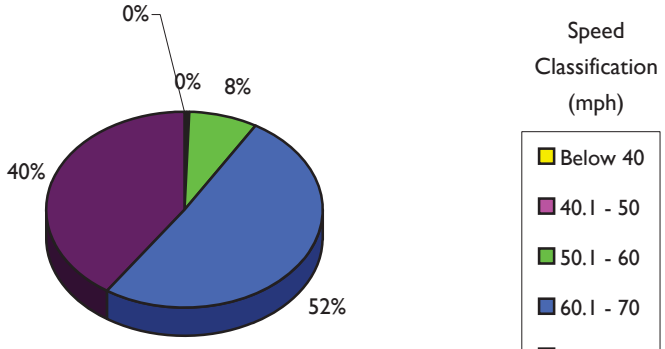
Posted Speed: 65
Total Number of Vehicles: 3,811

Southbound AM Peak



Posted Speed: 65
Total Number of Vehicles: 3,857

Southbound PM Peak

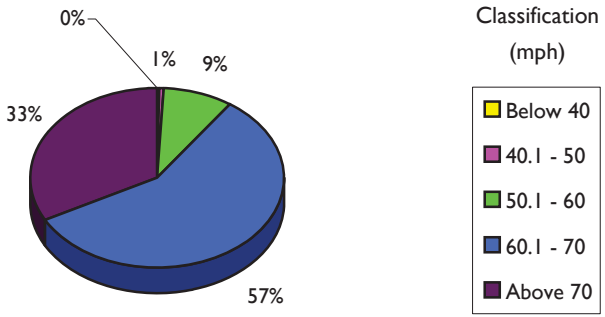


Posted Speed: 65
Total Number of Vehicles: 2,275

Chart 5
Traffic Volume by Speed Classification

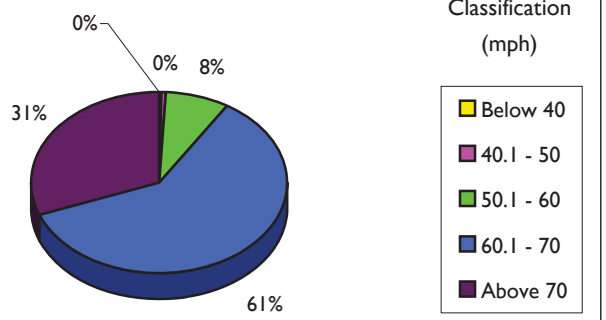
Interstate 481 between Jamesville Rd and NY 5/92

Northbound AM Peak



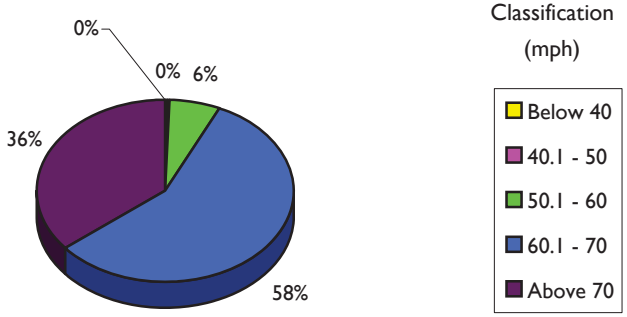
Posted Speed: 65
Total Number of Vehicles: 2,202

Northbound PM Peak



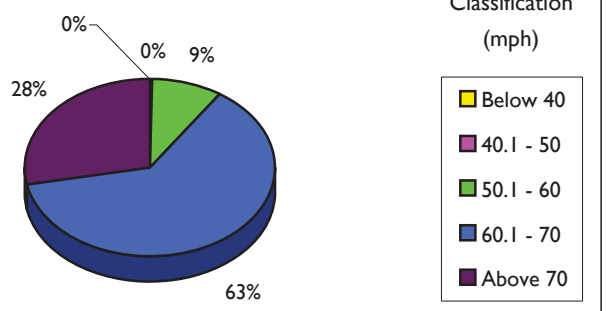
Posted Speed: 65
Total Number of Vehicles: 2,735

Southbound AM Peak



Posted Speed: 65
Total Number of Vehicles: 1,880

Southbound PM Peak

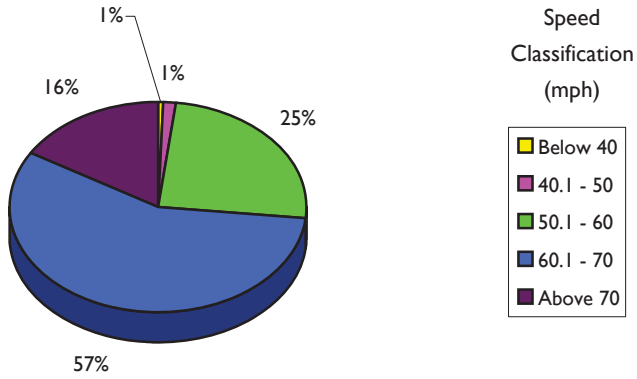


Posted Speed: 65
Total Number of Vehicles: 2,903

Chart 6
Traffic Volume by Speed Classification

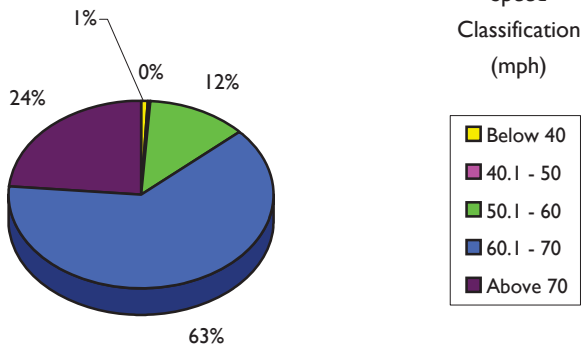
Interstate 481 between NY 5/92 and Interstate 690

Northbound AM Peak



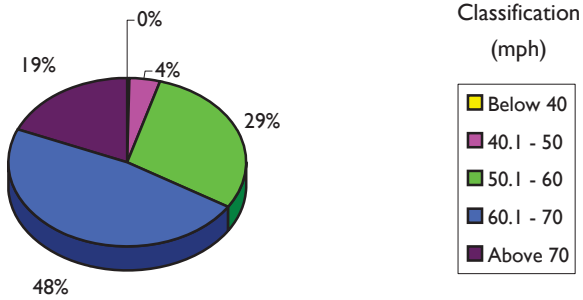
Posted Speed: 65
Total Number of Vehicles: 4,294

Northbound PM Peak



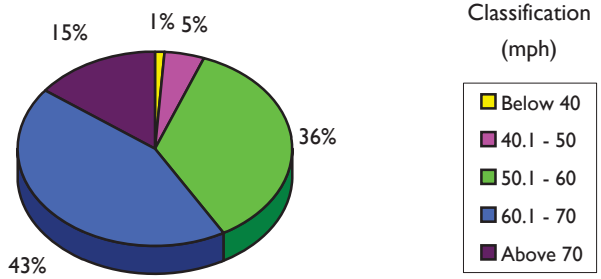
Posted Speed: 65
Total Number of Vehicles: 4,460

Southbound AM Peak



Posted Speed: 65
Total Number of Vehicles: 2,701

Southbound PM Peak

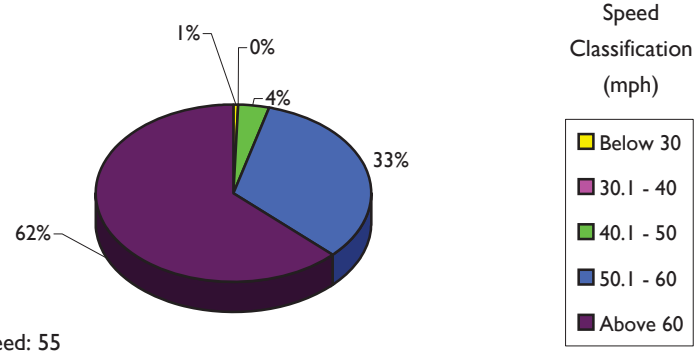


Posted Speed: 65
Total Number of Vehicles: 5,328

Chart 7
Traffic Volume by Speed Classification

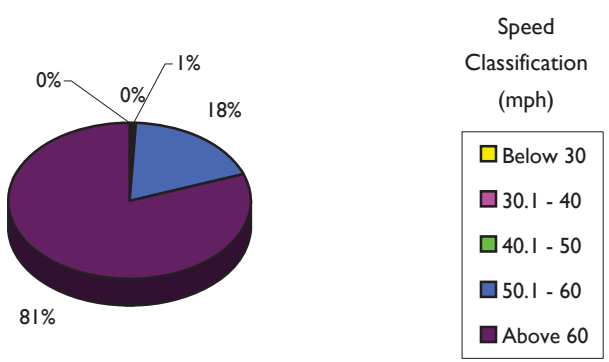
Interstate 690 between Hiawatha Blvd and NY 298

Eastbound AM Peak



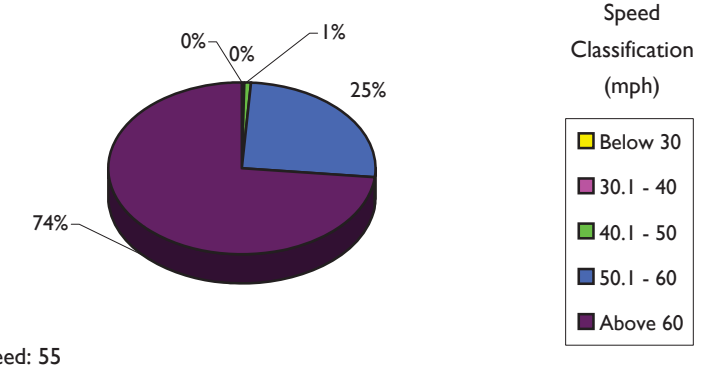
Posted Speed: 55
Total Number of Vehicles: 7,277

Eastbound PM Peak



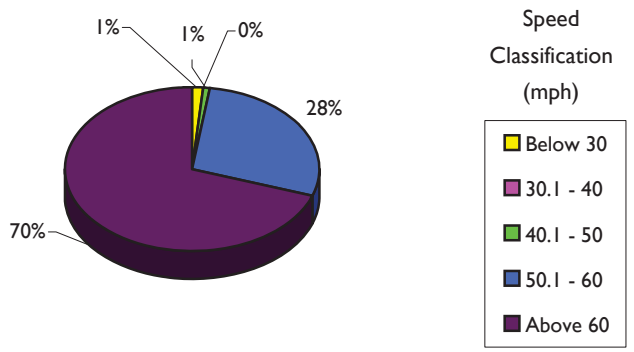
Posted Speed: 55
Total Number of Vehicles: 3,971

Westbound AM Peak



Posted Speed: 55
Total Number of Vehicles: 2,470

Westbound PM Peak

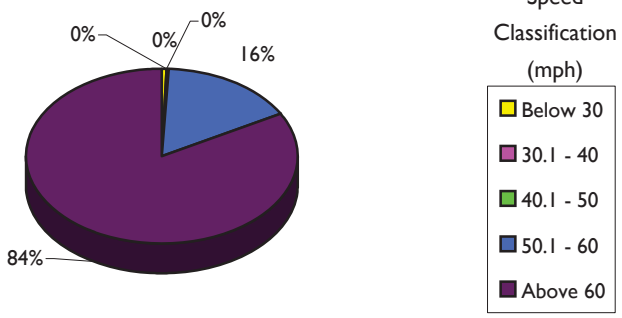


Posted Speed: 55
Total Number of Vehicles: 7,832

Chart 8
Traffic Volume by Speed Classification

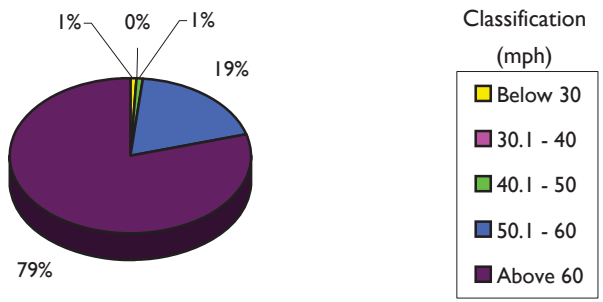
Interstate 690 between NY 635 and Interstate 481

Eastbound AM Peak



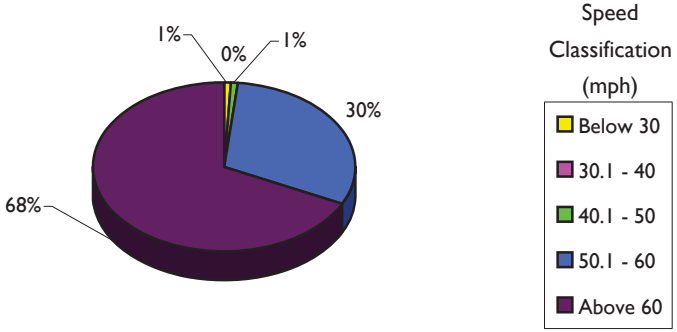
Posted Speed: 55
Total Number of Vehicles: 2,343

Eastbound PM Peak



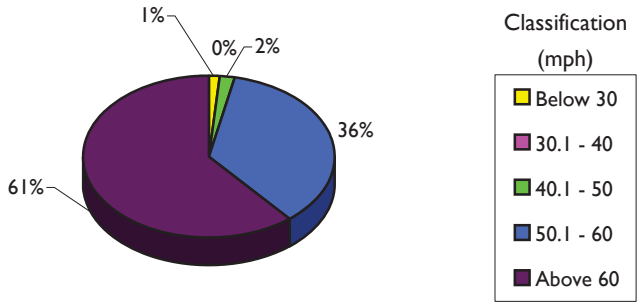
Posted Speed: 55
Total Number of Vehicles: 5,689

Westbound AM Peak



Posted Speed: 55
Total Number of Vehicles: 3,636

Westbound PM Peak

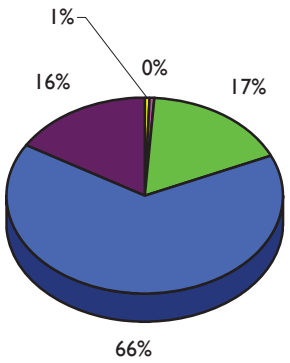


Posted Speed: 55
Total Number of Vehicles: 3,044

Chart 9
Traffic Volume by Speed Classification

NY 5 between Hinsdale Rd and NY 173

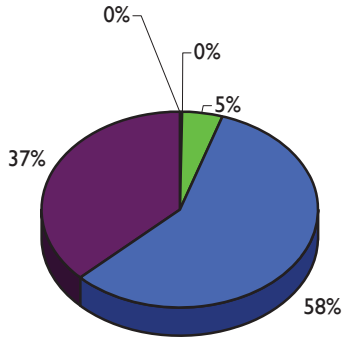
Eastbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 3,868

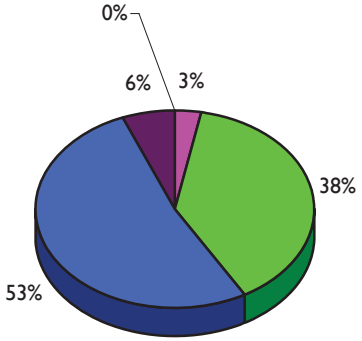
Eastbound PM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 2,413

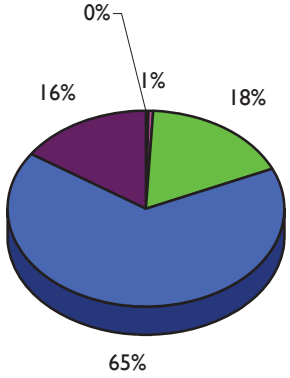
Westbound AM Peak



Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 1,477

Westbound PM Peak



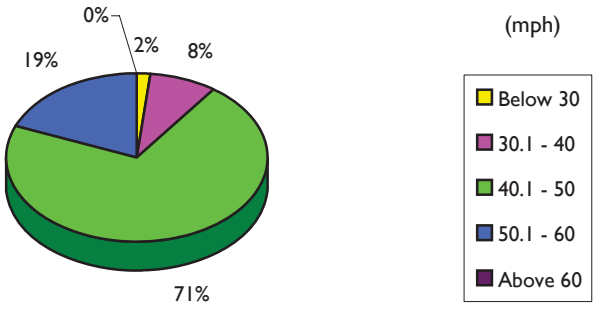
Speed Classification (mph)
- Below 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- Above 70

Posted Speed: 65
Total Number of Vehicles: 3,881

Chart 10
Traffic Volume by Speed Classification

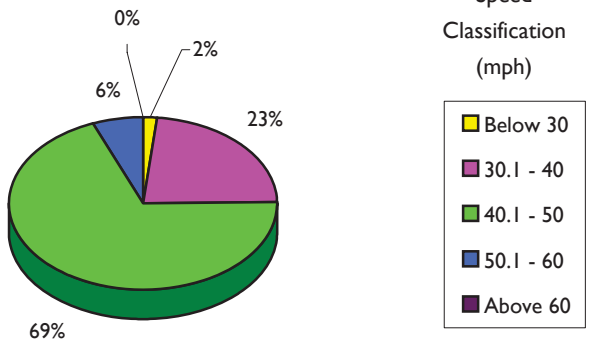
NY 92 between Woodchuck Hill Rd and Village of Manlius

Eastbound AM Peak



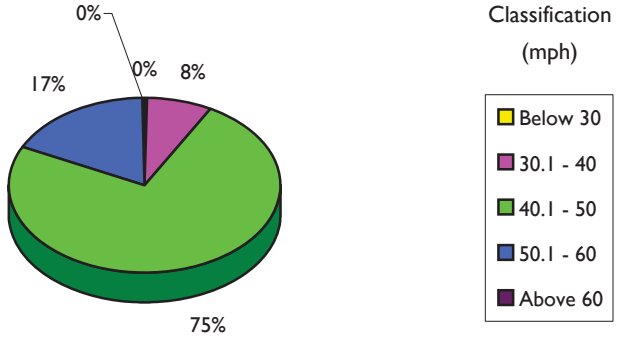
Posted Speed: 50
Total Number of Vehicles: 778

Eastbound PM Peak



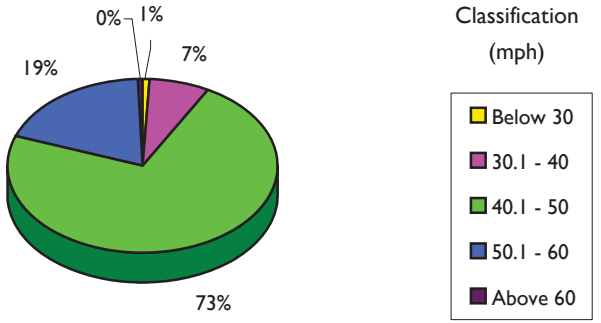
Posted Speed: 50
Total Number of Vehicles: 1,831

Westbound AM Peak



Posted Speed: 50
Total Number of Vehicles: 1,764

Westbound PM Peak

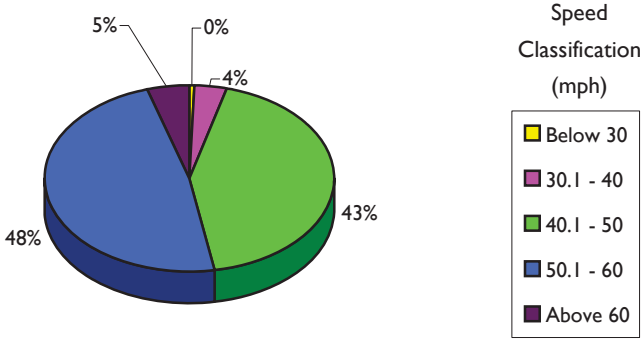


Posted Speed: 50
Total Number of Vehicles: 1,393

Chart 11
Traffic Volume by Speed Classification

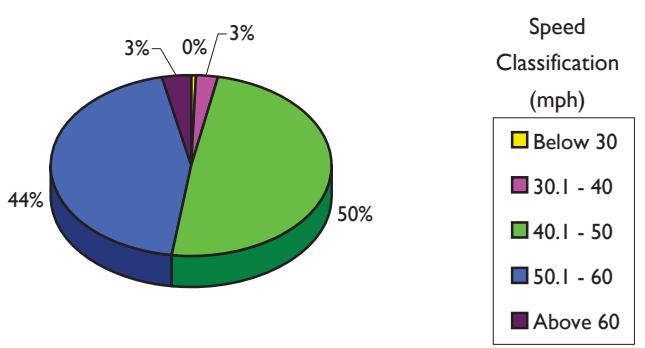
NY 298 between Midler Avenue Extension and NY 635

Eastbound AM Peak



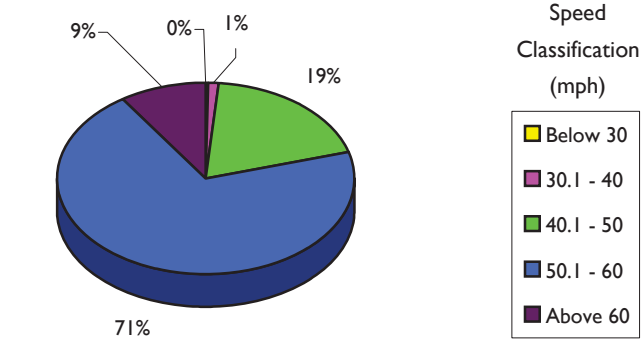
Posted Speed: 55
Total Number of Vehicles: 621

Eastbound PM Peak



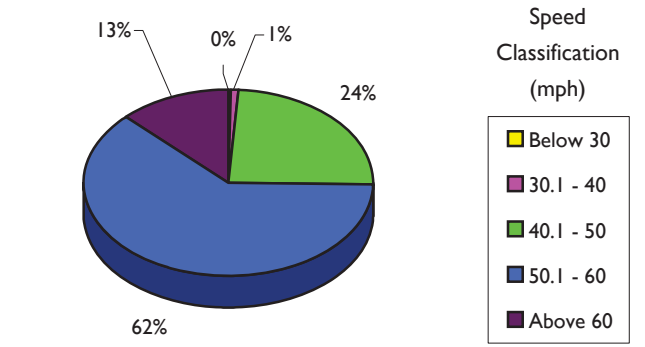
Posted Speed: 55
Total Number of Vehicles: 870

Westbound AM Peak



Posted Speed: 55
Total Number of Vehicles: 738

Westbound PM Peak

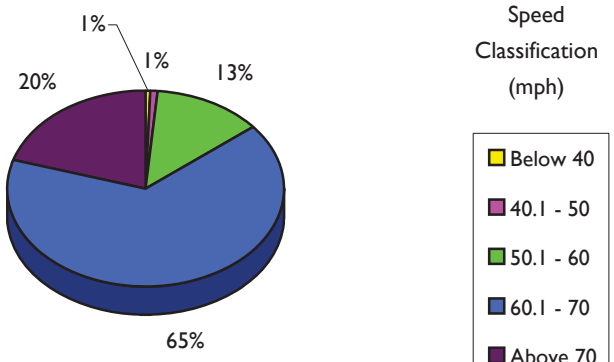


Posted Speed: 55
Total Number of Vehicles: 830

Chart 12
Traffic Volume by Speed Classification

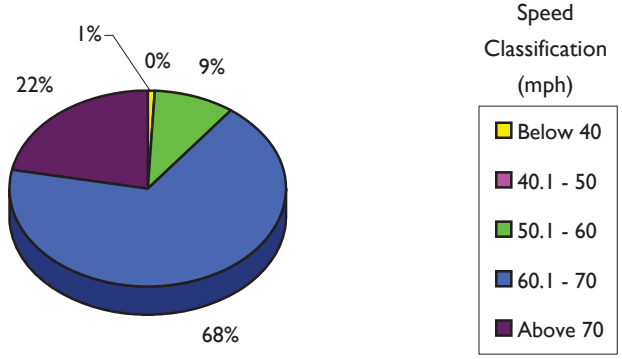
NY 695 between NY 5 and Interstate 690

Northbound PM Peak



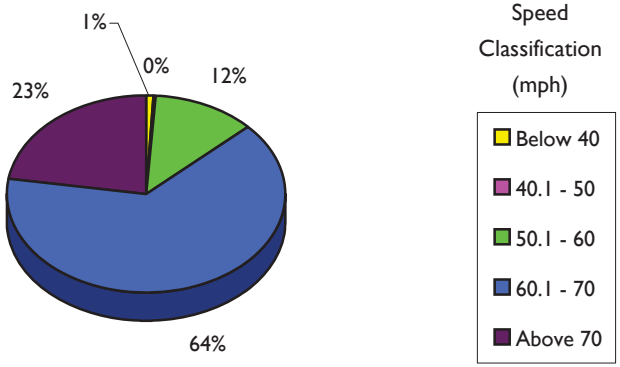
Posted Speed: 65
Total Number of Vehicles: 3,451

Northbound AM Peak



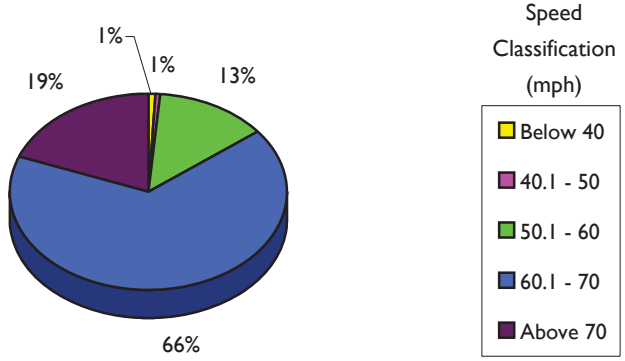
Posted Speed: 65
Total Number of Vehicles: 4,686

Southbound AM Peak



Posted Speed: 65
Total Number of Vehicles: 2,063

Southbound PM Peak

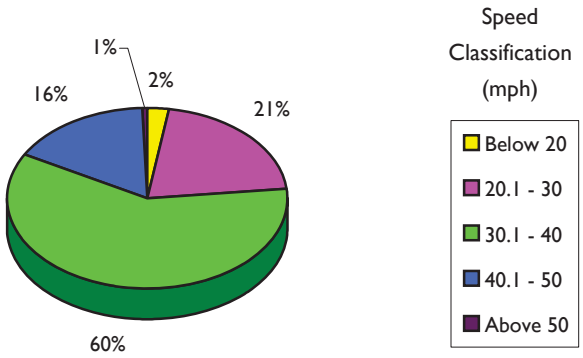


Posted Speed: 65
Total Number of Vehicles: 4,693

Chart 13
Traffic Volume by Speed Classification

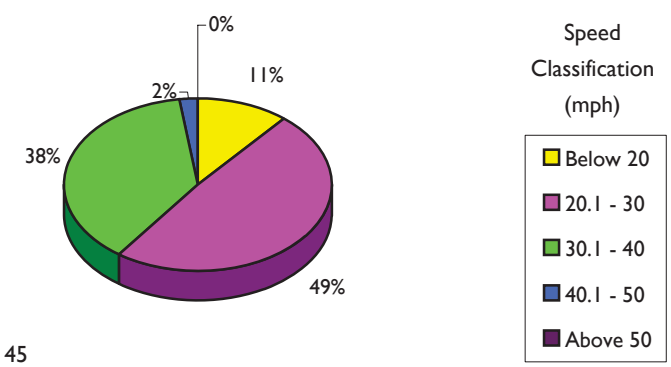
NY 930P between NY 5 and Interstate 690

Eastbound AM Peak



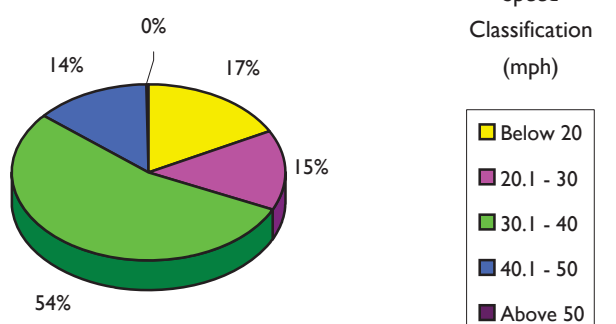
Posted Speed: 45
Total Number of Vehicles: 483

Eastbound PM Peak



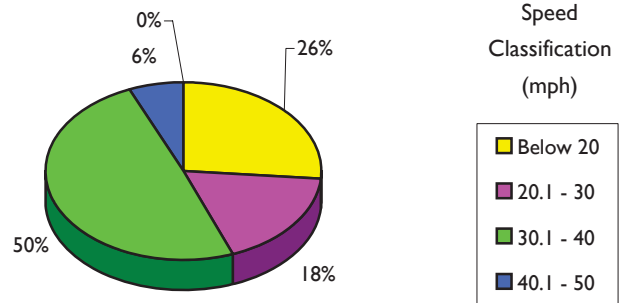
Posted Speed: 45
Total Number of Vehicles: 2,716

Westbound AM Peak



Posted Speed: 45
Total Number of Vehicles: 1,512

Westbound PM Peak



Posted Speed: 45
Total Number of Vehicles: 2,199