Mid-Hudson Valley TMA Travel Time Survey

Presentation: October 7, 2011

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Presentation Agenda

- Introduction
- Survey Design
- Sampling Plan
- Data Collection
- Data Summarization
- Key Findings
  - Ulster County
  - Dutchess County
  - Orange County
- Conclusions

Introduction

- Project Purpose – to collect GPS travel time data on major Mid-Hudson Valley TMA roadways to support the Congestion Management Process (CMP)
- Congestion Management Process (CMP)
  - Federal requirement for TMAs
  - The TMA CMP Step 2 Report identified congested roads using vc ratios from the Counties travel demand models to identify congested roadway segments
  - Concern that the travel demand models may miss some congested areas
  - Report suggested using travel time surveys on high-volume roads for a more realistic picture of congestion

Survey Design

- Counties identified roadway segments and the time periods each was to be surveyed
  - Ulster County – 15 segments
  - Dutchess County – 15 segments
  - Orange County – 46 segments
- Surveys were conducted on “typical” weekdays and some weekends during the following time periods
  - Weekday Morning (AM) – 6:00 AM to 9:00 AM
  - Midday/Off-Peak – 9:00 AM to 11:00 AM
  - Evening (PM) – 4:00 PM to 7:00 PM
  - Saturday – 9:00 AM to 3:00 PM
  - Sunday – 4:00 PM to 7:00 PM

Survey Design

- Each roadway ***section*** has a starting point and ending point and is divided into ***segments***.
- Segments are bound by traffic signals or the starting or ending point.
- Hybrid of the floating car and average speed methods to mimic “real-life” conditions
- Driver maintains average speed of the roadway, but *will* pass cars if he or she is being passed frequently
- Hybrid method is safer as the driver can more easily identify and respond to changing roadway conditions

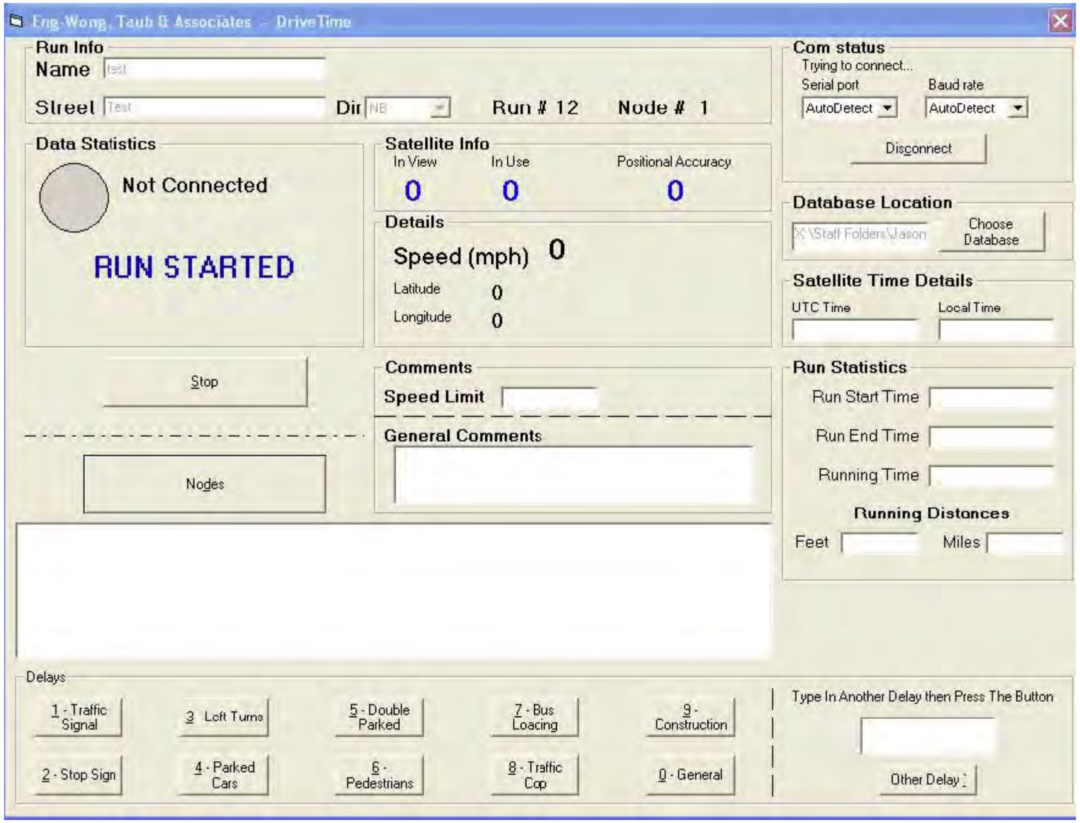
GPS and laptop captures real-time travel time data

Sampling Plan

- Performed a statistical analysis of the 75 routes to estimate the number of runs that are required for a statistically valid sample based on the *Travel Time Data Collection Handbook* published by FHWA in 1998
  - *http://www.fhwa.dot.gov/ohim/tvtw/natmec/00020.pdf*
- Each route was classified into one of the *Handbook's* Coefficient of Variation (c.v.) categories, to calculate sample size. Based on the c.v. value and the selected confidence interval of 80 percent, the number of runs needed per route per time period ranged from 3 to 10.
- *Handbook* also states that for planning and policy level studies a 10 percent error is commonly used

Data Collection

- USB GPS antenna was connected to a laptop computer
- EWT customized software, DRIVETIME, Collected latitude, longitude, speed and satellite information



Data Summarization - Terminology

- **Travel Time**: the time to travel from the beginning point of a route until the end point of the route *including any signal delays, congestion, stopped time* or other delays.
- **Congested Time**: the time spent traveling *slower than 20* miles per hour.
- **Stopped Time**: the time spent traveling *slower than 5 miles* per hour.
- **Free-Flow Travel Time**: the time to travel the route at the *posted speed limit*.
- **Peak Period Travel Time**: the time to travel the route during the weekday morning peak (6AM to 9AM), the midday/off-peak (9AM to 11AM), evening peak (4PM to 7PM), Saturday Peak (9AM to 3PM) or the Sunday peak (4PM to 7PM).
- **Travel Time Index**: the ratio of the peak period travel time to free-flow travel time.

Data Summarization -- Figures

- ***Average Travel Time Profiles*** – includes charts showing stopped time, congested time (speeds less than 20 miles per hour), and travel time by travel direction and route segment; charts showing the stopped, congested, and travel times by travel direction and time period, and a map depicting the segments along each route for reference.

- ***Average Speed Profiles*** – includes maps showing average speeds by segment, by travel direction, and survey time period; charts showing the average speed on the route by direction and time period and a map of speed limits.

Data Summarization – Average Travel Time

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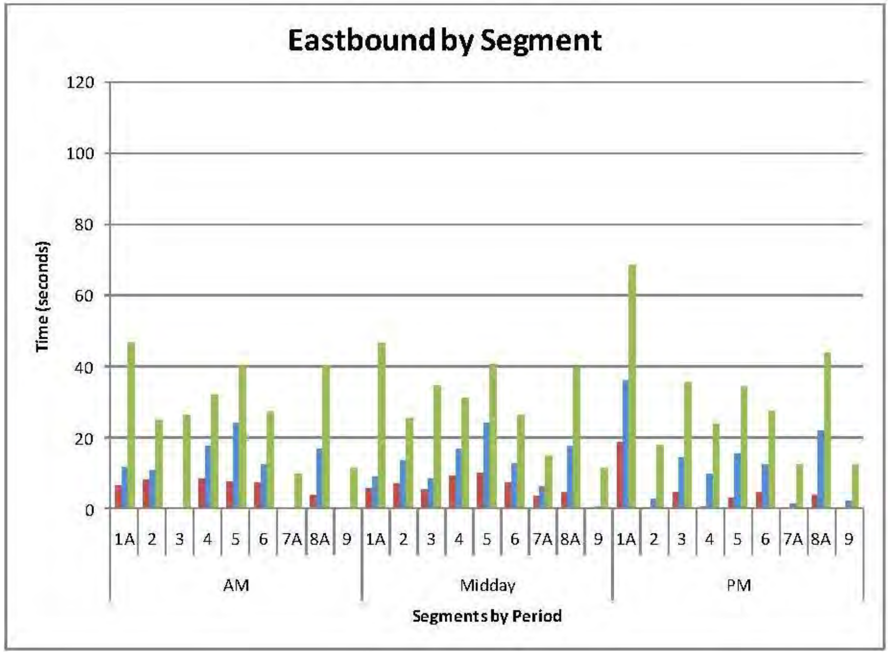

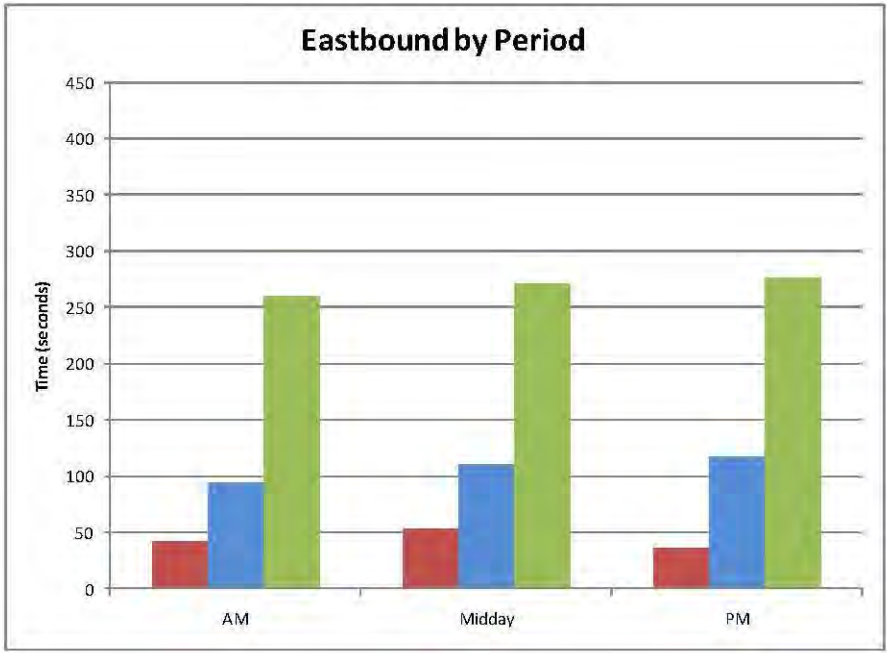

Legend

- Stop Time
- Congested Time
- Travel Time

Data Summarization – Average Speed

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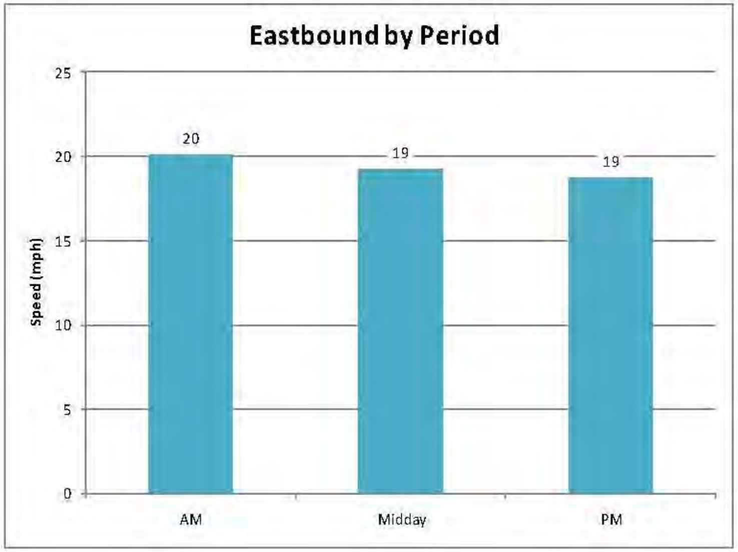
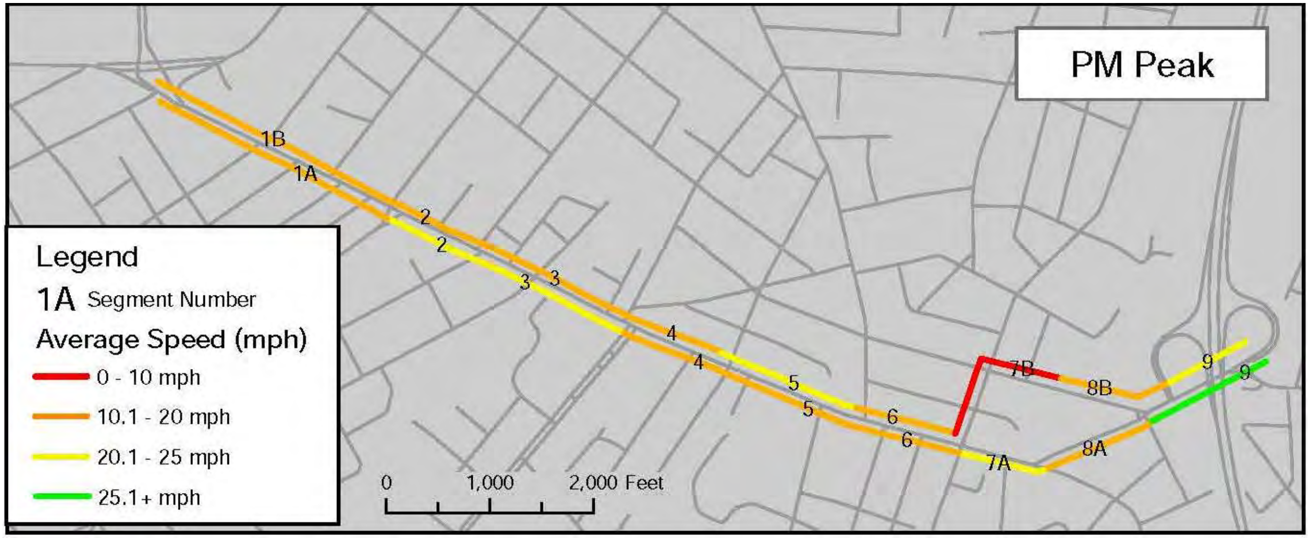




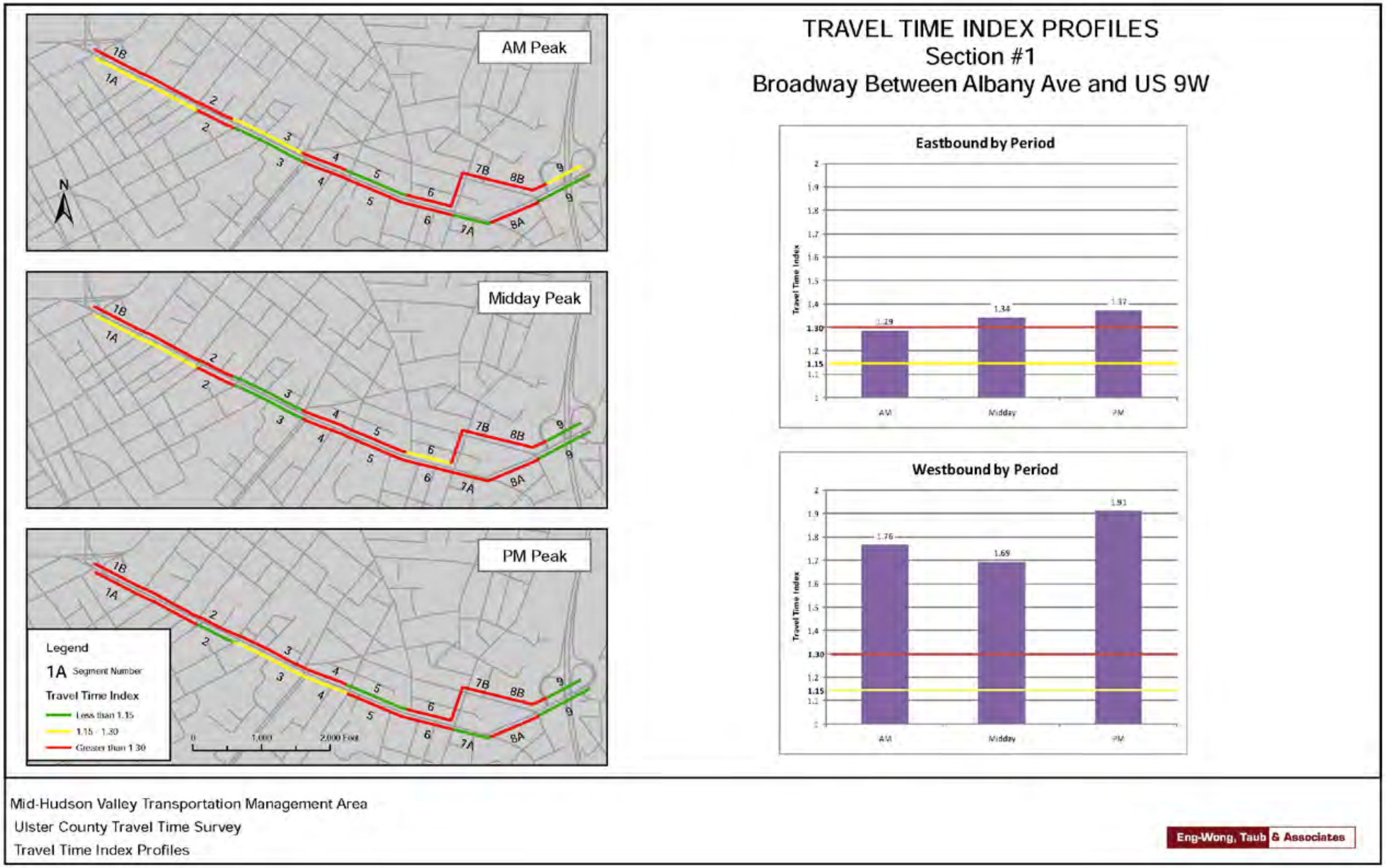
Data Summarization

- ***Travel Time Index Profiles*** – includes maps that show the travel time index (TTI) by travel direction, route segment, and time period, and charts showing the TTI for the route by travel direction and time period.

The TTI is the ratio of the travel time during the peak period to the time required to make the same trip at free-flow speeds.

A value of 1.30, for example, indicates a 30-minute free-flow trip requires 39 minutes during the peak period. Generally, a roadway is considered congested if the TTI exceeds 1.30.

Data Summarization – Travel Time Index



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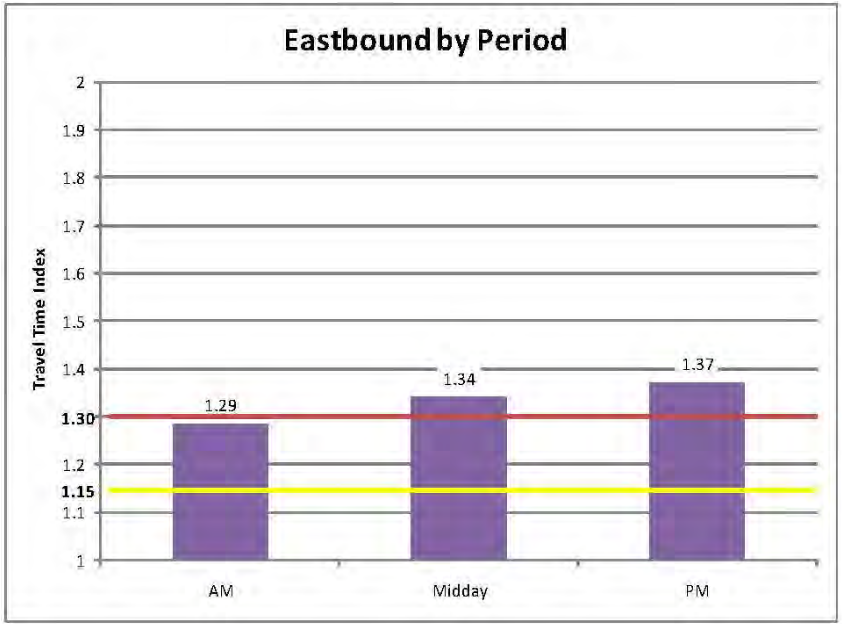
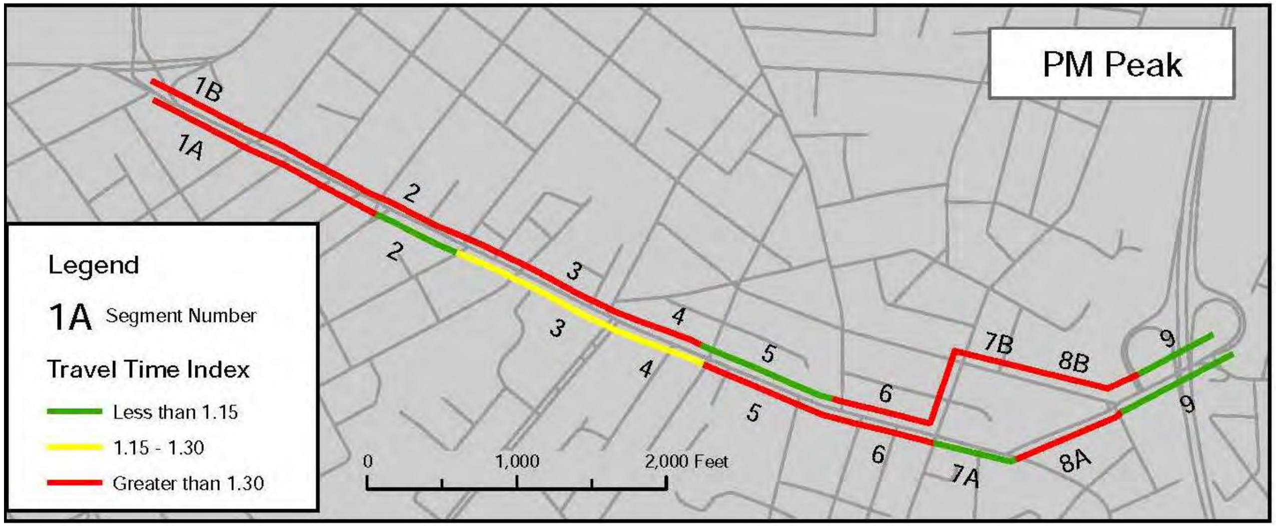


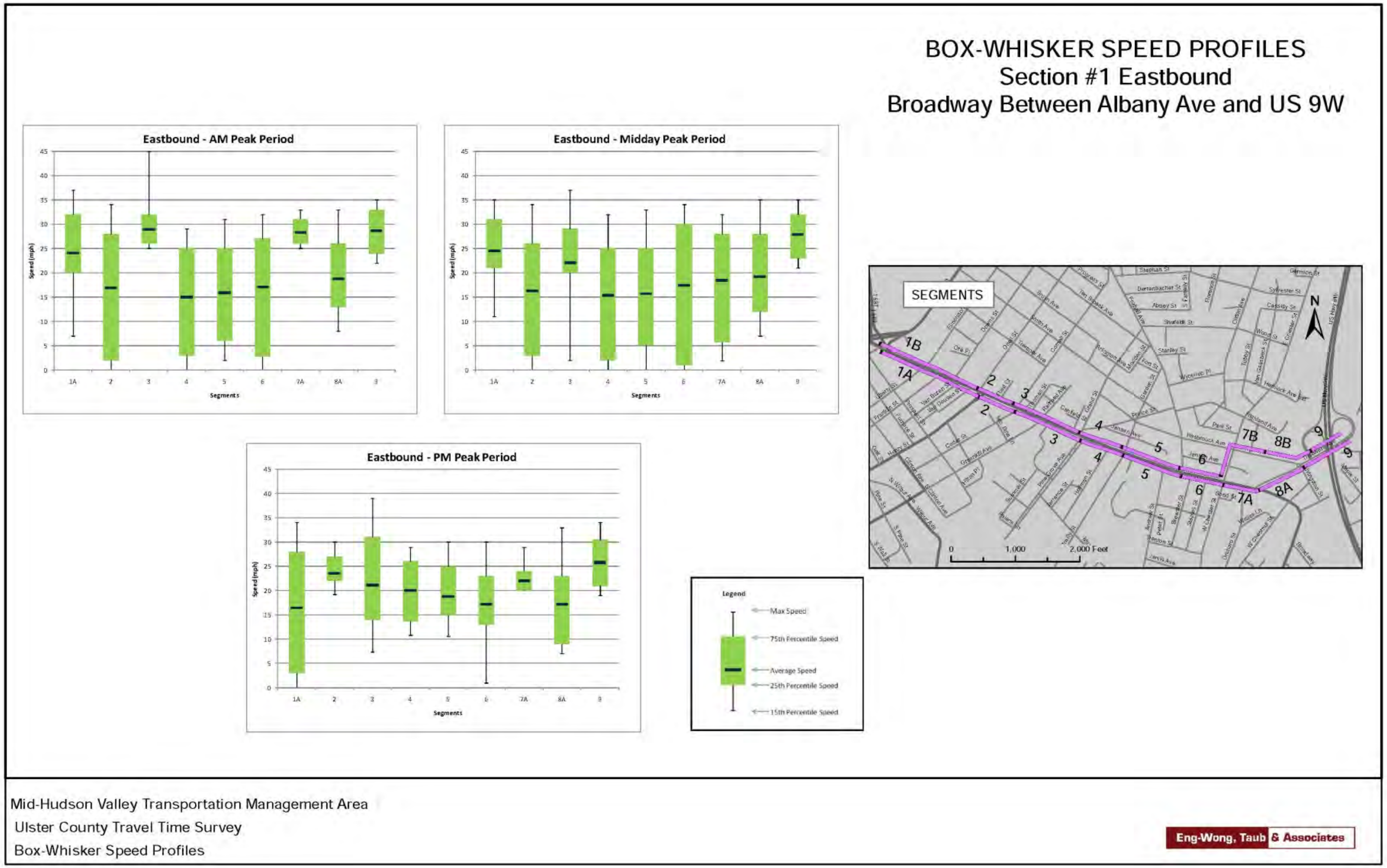


Data Summarization – Box-Whisker

- ***Box-Whisker Speed Plots*** – are charts that show the maximum, 75^{th} percentile, average, 25^{th}, and 15^{th} percentile speeds by route segment, direction, and time period.

  The spacing between the different parts of the box help indicate the degree of dispersion (spread) and skew in the data and identify outliers.

Data Summarization – Box-Whisker



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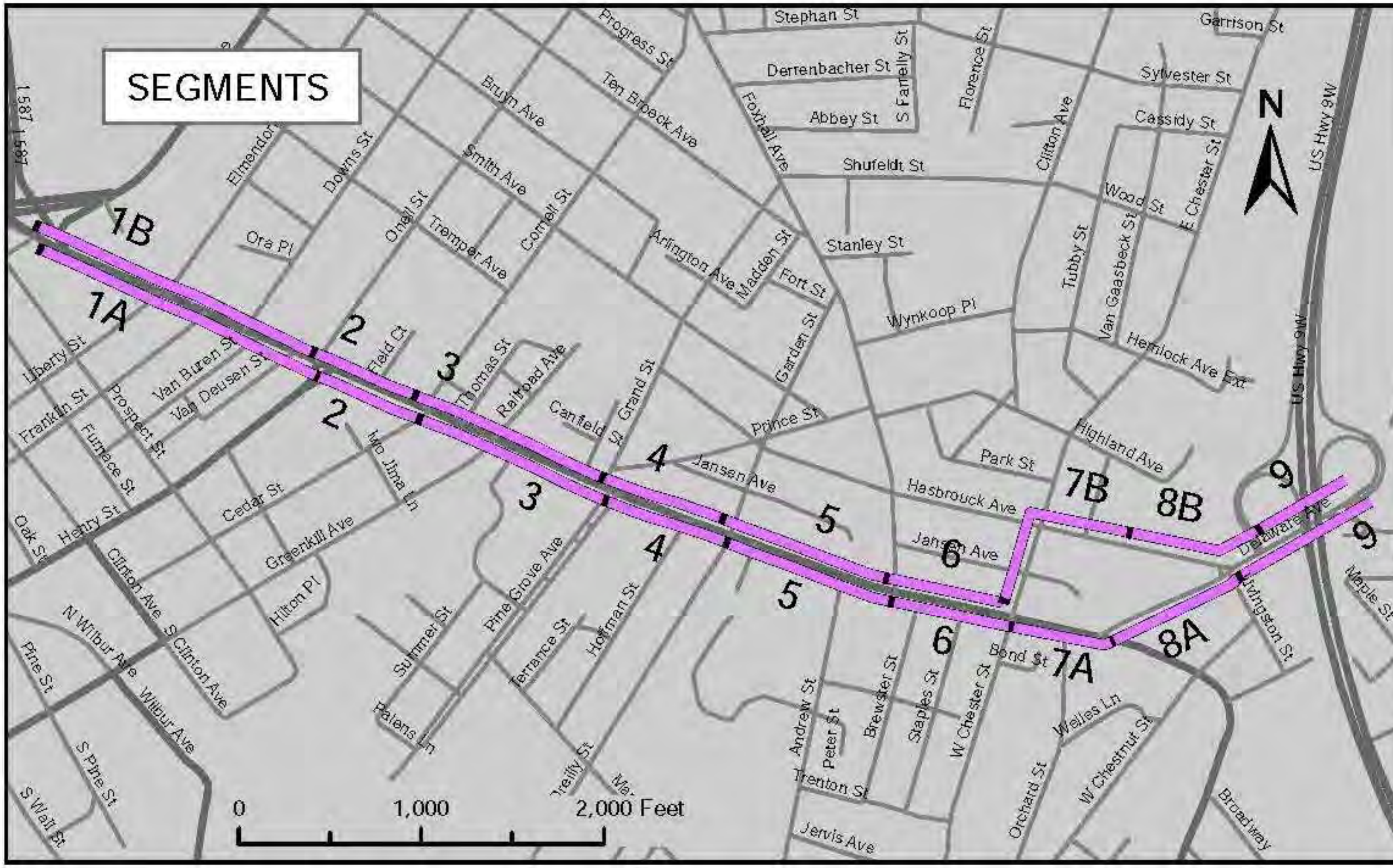

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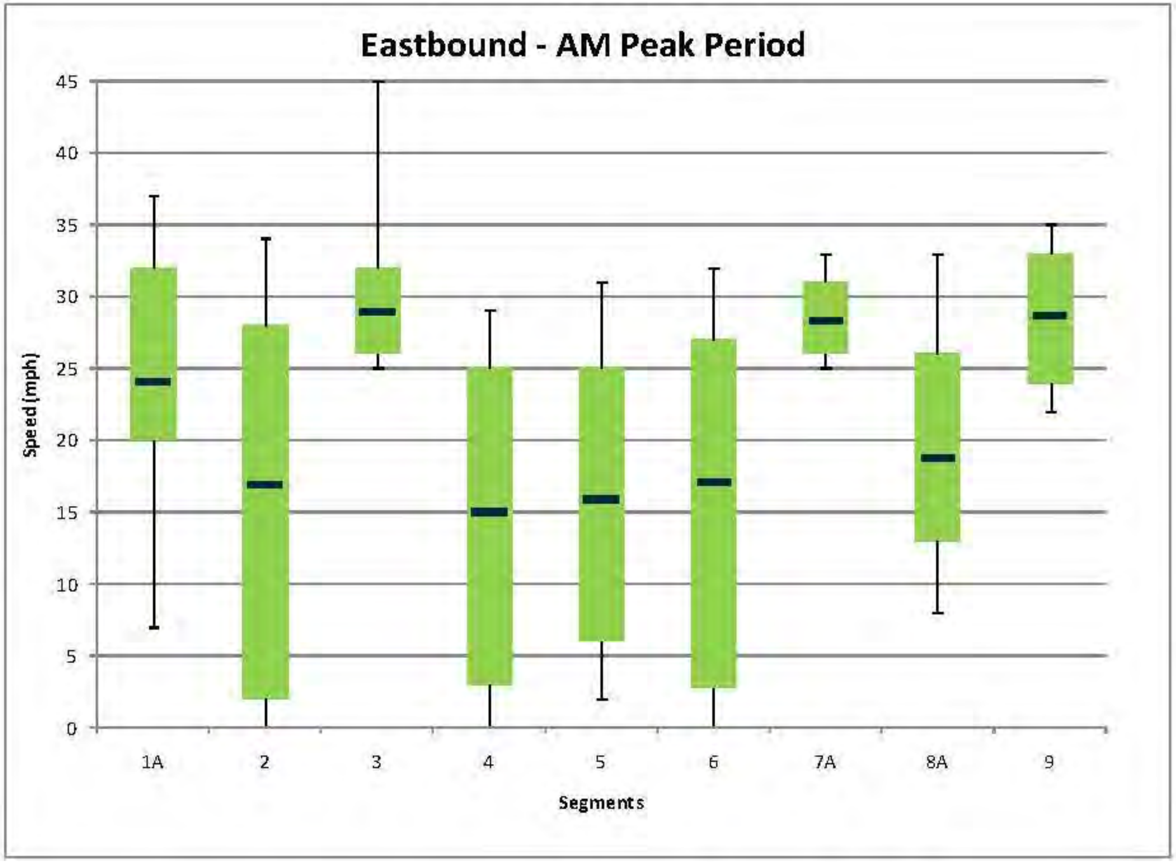
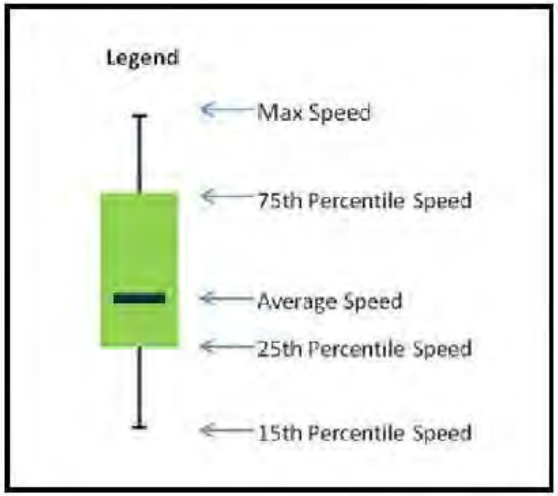
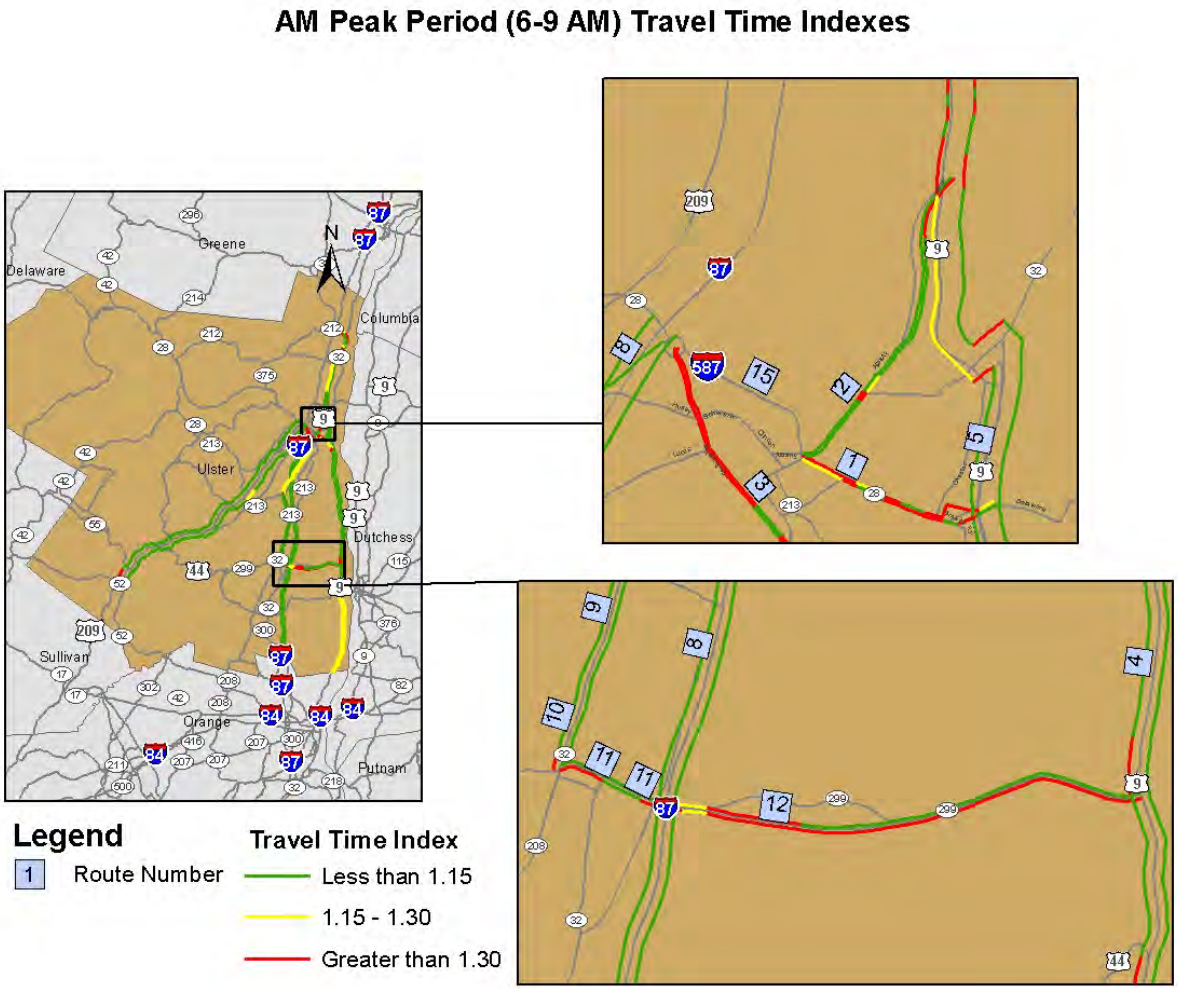




Key Findings – Ulster County



Key Findings – Ulster County

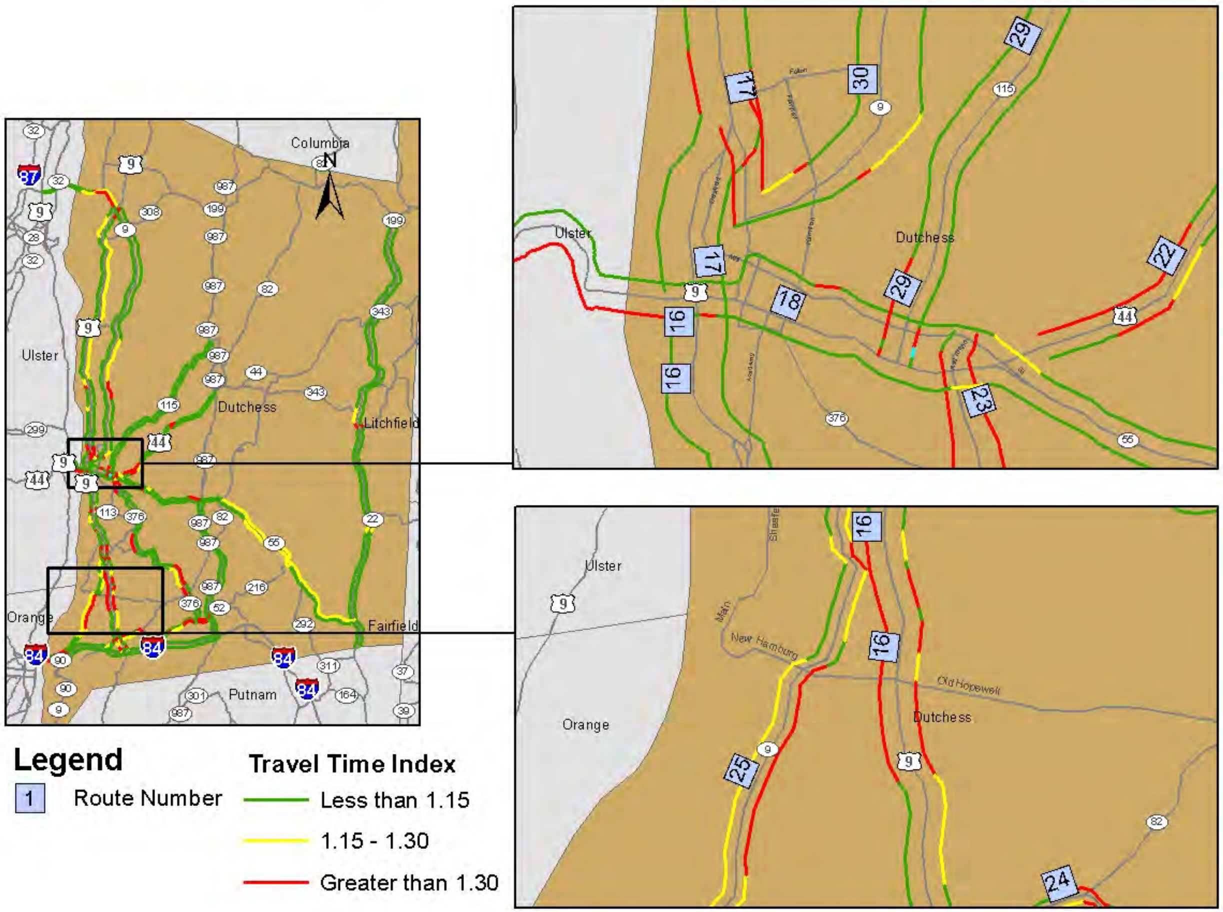
Travel Time Index (TTI)

Section	Roadway	From	To	Time Periods				
				AM	Midday	PM	Sat	Sun
1-EB	Broadway	Albany Avenue	US 9W	1.29	1.34	1.37	-	-
1-WB				1.76	1.69	1.91	-	-
2-NB	Albany, Ulster Ave.	Broadway	US 9W	1.21	1.31	1.29	1.30	-
2-SB				1.07	1.23	1.19	1.17	-
3-NB	Washington Ave.	SR 32	Thruway Circle	2.14	1.82	2.06	-	-
3-SB				1.98	2.26	2.04	-	-
11-EB	SR 299 Main Street	I-87	SR 32	1.28	1.40	1.90	2.17	-
11-WB				1.16	1.53	2.19	2.34	-
12-EB	SR 299	US 9W	I-87	1.41	1.29	1.40	1.27	-
12-WB				1.15	1.18	1.33	1.24	-
13-NB	Burt Street/Hill/ Partition /Ulster Ave/SR 212	Overbaugh Street	SR 32	1.29	1.41	1.25	-	-
13-SB				1.57	1.30	1.41	-	-
15-NB	I587	Albany Avenue	US 209	-	-	-	1.00	-
15-SB				-	-	-	1.53	-

- Sections 1,2 and 3 are primarily signalized, commuter corridors
- Route 299 (Sections 11 and 12) is considered a main east-west thoroughfare for travelers
- Section 13 has segments of roadway that travel through the downtown, windy streets of Saugerties

Key Findings – Dutchess County

AM Peak Period (6-9 AM) Travel Time Indexes



Key Findings – Dutchess County

Travel Time Index (TTI)

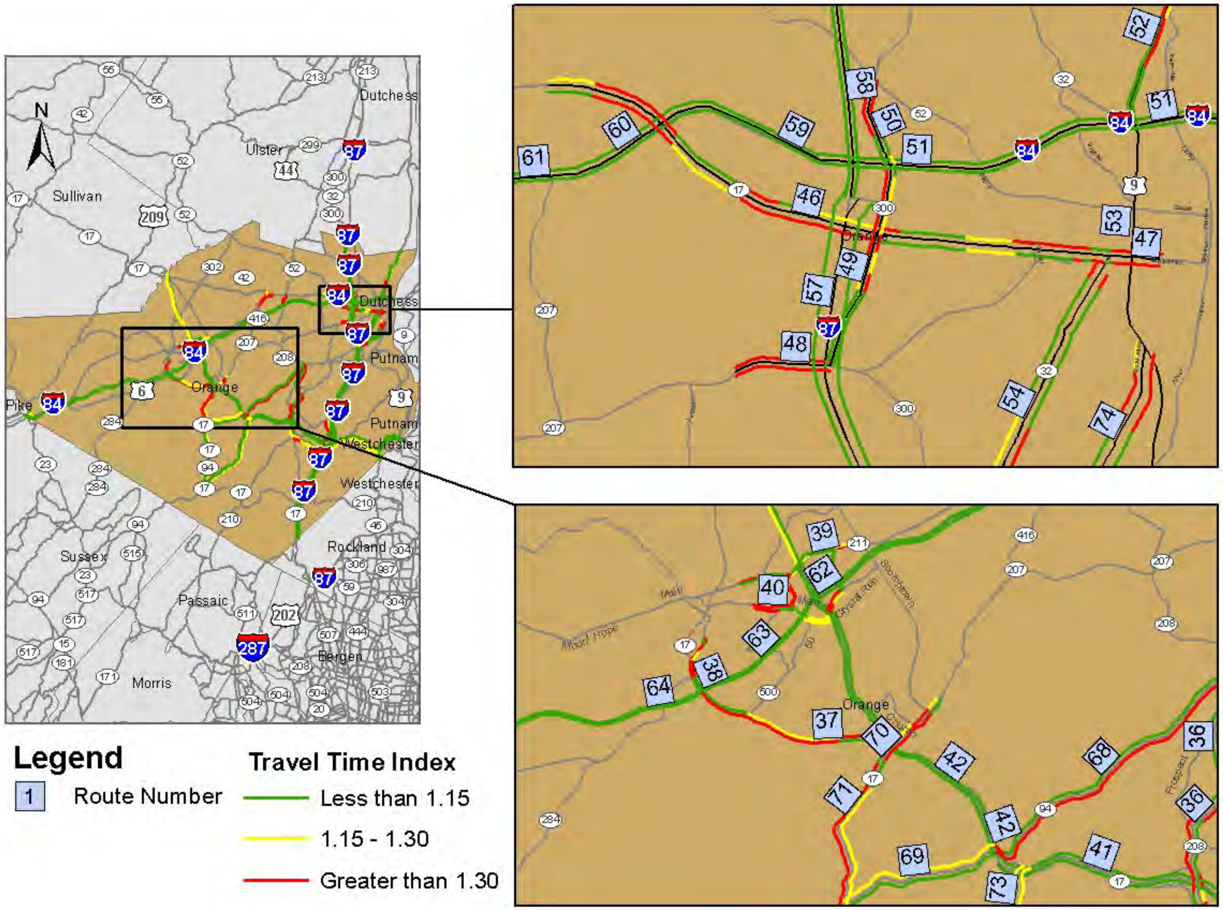
Routes	Roadway	From	To	Time Periods				
				AM	Midday	PM	Sat	Sun
16-NB	US 9	I 84	NY 55/US 44	1.25	1.35	1.54	1.42	
16-SB				1.24	1.30	1.51	1.52	
17-NB	US 9	US 44/NY 55	NY 9G	1.10	1.17	1.22	1.42	
17-SB				1.12	1.10	1.14	1.53	
24-EB	NY 52	I 84	Taconic State Parkway	1.26	1.30	1.39		
24-WB				1.24	1.23	1.58		
25-NB	NY 9D	I 84	US 9	1.31	1.28	1.44		
25-SB				1.31	1.24	1.35		

•These sections are mostly local signalized corridors through downtown areas.

•Route US 9 is a major commuter corridor and that includes shopping and entertainment destinations.

Key Findings – Orange County

AM Peak Period (6-9 AM) Travel Time Indexes



Key Findings – Orange County

Travel Time Index (TTI)

Routes	Roadway	From	To	Time Periods				
				AM	Midday	PM	Sat	Sun
34-NB	Rte 17/32	Larkin Dr.	CR 105	1.24	1.39	1.56	1.37	
34-SB				1.45	1.34	1.77	1.45	
35-NB	Rte 17M/208	Rte 17	Rte 17	1.25	1.34	1.63	1.50	
35-SB				1.28	1.33	1.51	1.52	
37-EB	Rte 17M	Rte 17	I84	1.41	1.31	1.38		
37-WB				1.20	1.27	1.65		
38-NB	Rte 17M	Rte 17	I84	1.48	1.79	1.61	1.82	
38-SB				1.71	1.69	1.73	1.66	

- Section 34 is near Woodbury Commons
- Section 35 is the east-west thoroughfare to Route 87
- Sections 37 and 38 are the main route from Middletown on the north and to Goshen in the south

Key Findings – Orange County

Travel Time Index (TTI)

Routes	Roadway	From	To	Time Periods				
				AM	Midday	PM	Sat	Sun
43-NB	Rte 208	Neelytown Rd (CR99)	Rte 17	1.68	1.46	1.92	1.36	
43-SB				1.72	1.90	1.86	1.30	
44-NB	Rte 208	Scotchfield St.	William St	2.14	2.31	2.81		
44-SB				1.39	1.42	2.27		
45-EB	Rte 52	Elm St	Montgomery St	1.37	2.37	1.76		
45-WB				1.69	1.77	2.37		
46-EB	Rte 17K	Rte 300	Rte 747	1.65	1.44	1.39		
46-WB				1.46	1.42	1.59		
47-EB	Broadway/Rte 17K	William St	Rte 300	1.35	1.43	1.69	1.58	
47-WB				1.55	1.86	2.16	1.79	

- Sections 43, 44 and 45 are local signalized corridors through downtown areas.
- Rte 17K is a signalized corridor leading to downtown Newburgh

Conclusions

- Provides reliable baseline travel time data to advance the CMP and calibrate travel demand models
- Identifies congested routes
- Could be used to prioritize TIP projects
- Further study is needed to determine the cause of congestion – operational, recurring incidents, insufficient capacity etc. and potential improvements
- Update regularly – every three to four years
- Consider expanding future efforts to include overnight periods for more accurate free flow travel time data