CDTC NEW VISIONS

REGIONAL OPERATIONS AND SAFETY ADVISORY COMMITTEE

White Paper

September 2015

Capital District Transportation Committee
One Park Place
Albany NY 12205
518-458-2161
www.cdtcmpo.org

Contents

Introduction

The Regional Operations and Safety Advisory Committee was asked to examine issues relating to the operations, safety and security for the New Visions Regional Transportation Plan update, and to make recommendations for policies and actions for the New Visions 2040 Plan. The topics considered include:

- Travel/delay data
- Intelligent Transportation System Priority Network
- Safety needs inventory
- Safety plan
- Review project candidates
- Congestion Management Process
- Security Planning
- Performance measures: critical congestion, reliability, safety

Many of these topics are already considered and supported in the New Visions 2035 Plan. The Advisory Committee considered ways in which the Plan could be updated and strengthened. The Advisory Committee is not a policy decision making committee, but rather has been asked to make recommendations to CDTC's Planning Committee and Policy Board. The Advisory Committee members include:

Regional Operations and Safety Advisory Committee:

- Bill Trudeau, City of Albany
- Chris Lavin, Chief of Police, East Greenbush
- Chris Wallin, City of Schenectady
- Gary Cook, CDTA
- Jim Mearkle, Albany County
- Mark Kennedy, NYSDOT
- Mark Pyskadlo, NYSDOT
- Michael Loftus, NYSTA
- Mike Doody, NYSDOT
- Paul Overbaugh, GTSC
- Rob Cherry, NYSDOT
- Rob Limoges, NYSDOT
- Rocky Ferraro, CDRPC
- Sergeant Steve Hopsicker, State Police
- Tom Werner, Saratoga County
- Trooper Leonard Fornabia, State Police, Troop G
- Chris O'Neill, CDTC staff
- Sandy Misiewicz, CDTC staff
- Mike Franchini, CDTC Executive Director
- Sree Nampoothiri, CDTC staff
- Robert Wetmore, CDTC staff

New Visions: Operations and Travel Reliability

The New Visions Plan addresses operations and travel reliability in a number of important ways and provides a framework for improving regional environmental quality. The following New Visions Planning and Investment Principle supports traffic reliability:

> ***Travel Reliability – Reliable traffic flow is more important than reducing congestion – traffic congestion is often a sign of an area's economic vitality.***
>
> *Managing traffic flows on the Capital Region expressway and arterial system is critical for both economic and social reasons.*
> - *Congestion management is much more cost effective than highway capacity increases or new lanes. Congestion alone does not justify increasing highway capacity or adding new lanes.*
> - *Congestion management actions will include traffic management center improvements, incident management, managed lanes, managed tolls, traffic information technology, traffic signal coordination, parking management, and travel demand management strategies such as supporting more transit, pedestrian, and bicycle travel, carpooling, vanpooling, carsharing, bikesharing, and flexible work hours.*
> - *Some congestion is acceptable when the community deems it acceptable, or when it results from balancing the needs of other transportation modes such as pedestrian, bicycle, and transit.*

CDTC has studied traffic congestion and traffic operations in the Capital District. The New Visions Plan recognizes that managing traffic flows is critical for the health of the region. There are multiple tools available for managing traffic and the Plan supports a comprehensive approach to traffic management. Some of the major categories of tools include incident management, demand management, intelligent transportation systems (technology), arterial management and land use planning. These approaches are discussed in this paper.

Most of the congestion in the Capital District is caused by "non-recurring delay" such as delay caused by a vehicle crash, a snowstorm or major weather event, or construction. **Incident Management** is the planned, coordinated process of detecting and removing incidents to restore normal traffic operations as quickly as possible. With a majority of all expressway system delay caused by incidents -- ranging from vehicles with flat tires on shoulders to major crashes -- quick detection and removal are critical to maintaining traffic flows, particularly during peak travel periods.

As a representative example, the following table (Table 1) compares "incident delay" to "recurrent delay" on the Northway for weekday AM and PM peaks in 2011. The data indicates that a total of 72% of weekday peak hour delay on the Northway is related to incidents. Because incident delay is the main cause of congestion, and because travel time reliability and predictability are important to travelers, the CDTC New Visions Plan has identified traffic reliability as an important performance measure. This traffic data is collected by the New York State Department of Transportation (NYSDOT) through the Management Information System for Transportation (MIST) for a number of locations on the Northway, I-90, I-787 and Alternate Route 7. This system provides traffic count and speed and incident data for every 15-minute interval throughout the year. On the expressway system, delay is calculated as travel time in excess of travel time at 50 miles per hour.

Table 1
2011 Weekday Vehicle Hours of Delay on the Northway:
Recurrent Delay and Incident Delay

	Hours of Delay				Percent Delay		
	Recurrent Delay	Incident Delay	Disabled Vehicle Delay	Total Delay	Recurrent Delay	Incident Delay	Disabled Vehicle Delay
AM Peak Southbound	32,312	55,213	3,661	91,186	35%	61%	4%
AM Peak Northbound	150	3,471	16	3,637	4%	95%	0%
Total AM Peak	32,461	58,684	3,677	94,823	34%	62%	4%
PM Peak Southbound	1,479	2,503	353	4,335	34%	58%	8%
PM Peak Northbound	19,766	63,473	7,163	90,402	22%	70%	8%
Total PM Peak	21,245	65,976	7,516	94,737	22%	70%	8%
Total AM and PM Peaks	**53,706**	**124,660**	**11,194**	**189,559**	**28%**	**66%**	**6%**

Source: NYSDOT MIST database. The AM peak period is defined as from 7:00 AM to 9:00 AM. The PM peak period is defined as from 4:00 PM to 6:00 PM.

Table 2 shows total delay on the Expressway system that is monitored by the MIST data system. The data indicates that delay is worse in the PM peak period, with 50% more delay occurring system wide. However, on the Northway, AM peak period delay is more comparable to PM peak period delay.

Table 2
2011 Weekday Vehicle Hours of Delay by Facility and Peak Period

Facility	Limits	AM Peak Period	PM Peak Period
Northway Southbound	From Exit 10 to Exit 1	91,186	4,335
Northway Northbound	From Exit 1 to Exit 10	3,624	90,402
Ramps Between I-90 and I-87		1,168	4,135
I-90 Westbound	From Exit 10 to Exit 1	7,154	37,739
I-90 Eastbound	From Exit 1 to Exit 10	2,393	7,031
Route 7 Westbound	From I-787 to I-87	463	5,764
Route 7 Eastbound	From I-87 to I-787	2,930	489
Route I-787 Southbound	From Route 7 to Route 378	5,578	1,449
Route I-787 Northbound	From Route 378 to Route 7	900	22,426
Total		**115,396**	**173,769**

Source: NYSDOT MIST database. The AM peak period is defined as from 7:00 AM to 9:00 AM. The PM peak period is defined as from 4:00 PM to 6:00 PM.

An important measure of traffic flow is reliability. Non-recurring delay is more unacceptable to the average commuter because it is unexpected and disrupts plans, while predictable, recurring delay can be more tolerable. For example, the MIST data shows that on an average day, average travel time from Exit 5A on I-90 to the Riverview Road in Clifton Park on I-90 is 20 minutes, or 6 minutes longer than free flow. However, the 95th percentile travel time (incident related) is 30 minutes, which is 16 minutes longer than free flow. The incident related travel time is more disruptive. In order to measure the reliability of expressway segments, CDTC uses the Planning Time Index (PTI). This index represents the ration of travel time on a worse than average day (95th percentile) to a travel time with an average speed of 55 mph. Tables 3 and 4 show the Planning Time Index by expressway segments for AM and PM peaks for 2011 weekdays. The tables also show average speed and 95th percentile speeds. In the PM peak hour, the Northway segment north of Exit 7, northbound, has the slowest average speed on the Northway, while the Northway segment between Exits 2 and 4 northbound is the least reliable. In the

PM peak, Route 7 between I-787 and the Northway also has a high PTI indicating lower reliability. In the AM peak, the two segments with the highest PTI are on the Northway southbound between Exits Exit 8A and the Twin bridges. Incident management is a vital tool for addressing traffic reliability.

Table 3
PM Peak Period Planning Time Index, Weekdays, 2011
Average Speed and 95th Percentile Speed

Link Name	Average Speed (mph)	95th Percentile Speed (mph)	Planning Time Index
I-87 Northbound (NB):			
I-87 Ex. 1-2 (NB)	49	30	1.83
I-87 Ex. 2-4 (NB)	48	25	2.17
I-87 Ex. 4-5 (NB)	47	30	1.81
I-87 Ex. 5-6 (NB)	48	29	1.90
I-87 Ex. 7 (NB)	47	34	1.62
I-87 Ex. 7 (north of) (NB)	43	32	1.74
I-87 Twin Br. (south of) (NB)	59	49	1.12
I-87 NB Riverview Rd.	57	50	1.10
I-87 Ex. 8 Twin Br. (NB)	58	51	1.07
I-87 Ex. 8-8A (NB)	60	54	1.02
I-87 Ex. 8A-9 (NB)	60	55	1.00
I-87 Ex. 10 Rest Area (NB)	63	58	0.94
I-787 Northbound (NB):			
I787 NB Ex. 7-8	50	38	1.46
Route 7 Westbound (WB):			
Rt. 7 WB I787-I87	51	26	2.12
I-90 Westbound (WB):			
I-90 WB Ex. 6-5A	53	43	1.27
I90 WB Ex. 5A-5	49	35	1.59
I90 WB Ex. 5-4	49	32	1.70
I-90 WB Ex. 3-2	43	29	1.92
I-90 Westbound (WB):			
I-90 EB Ex. 2-3	56	50	1.11
I90 EB Ex. 4-5	56	46	1.19
I90 EB Ex. 5-5A	50	39	1.41
I-90 EB Ex. 5A-6	55	41	1.35
Patroon Br. I90 EB to Exit 8	53	46	1.20
I90 EB Ex. 8-9	60	56	0.99
I90 EB Ex. 9-10	61	57	0.96

Table 4
AM Peak Period Planning Time Index, Weekdays, 2011
Average Speed and 95th Percentile Speed

Link Name	Average Speed (mph)	95th Percentile Speed (mph)	Planning Time Index
I-87 Southbound (SB):			
I-87 Ex. 2-1 (SB)	54	40	1.39
I-87 Ex. 4-2 (SB)	56	48	1.14
I-87 Ex. 5-4 (SB)	61	53	1.03
I-87 Ex. 6-5 (SB)	57	48	1.16
I-87 Ex. 7 (SB)	66	60	0.92
I-87 Ex. 7 (North of) (SB)	57	48	1.14
I-87 Twin Br. (south of) (SB)	57	43	1.29
I-87 SB Riverview Rd.	54	38	1.43
I-87 Ex. 8-Twin Br. (SB)	46	23	2.37
I-87 Ex. 8A-8 (SB)	49	18	3.06
I-87 Ex. 9-8A (SB)	51	28	1.96
I-87 Ex. 10-9 (SB)	60	35	1.58
I-787 Southbound (SB):			
I787 SB Ex. 8-7	54	39	1.42
Route 7 Eastbound (EB):			
Rt. 7 EB I87-I787	58	47	1.17
I-90 Westbound (WB):			
I-90 WB Ex. 6-5A	55	47	1.17
I90 WB Ex. 5A-5	53	48	1.16
I90 WB Ex. 5-4	56	48	1.15
I-90 WB Ex. 3-2	55	51	1.09
I-90 Westbound (WB):			
I-90 EB Ex. 2-3	55	49	1.11
I90 EB Ex. 4-5	57	49	1.12
I90 EB Ex. 5-5A	51	43	1.27
I-90 EB Ex. 5A-6	59	54	1.03
Patroon Br. I90 EB to Exit 8	55	47	1.17
I90 EB Ex. 8-9	61	55	0.99
I90 EB Ex. 9-10	62	55	0.99

Source: NYSDOT MIST database. The AM peak period is defined as from 7:00 AM to 9:00 AM. The PM peak period is defined as from 4:00 PM to 6:00 PM.

The MIST data system provides extensive monitoring of the four highest volume expressways in the Capital Region, but congestion also occurs throughout the region. CDTC maintains a travel demand model for the four county region which is called the STEP Model (Systematic Transportation Planning and Evaluation Model). The STEP Model is based on population, housing and employment data and estimates traffic volumes based on demand. These estimated volumes are compared against actual traffic counts to validate the model. Figure 1 shows the STEP Model estimates of traffic congestion (excess vehicle hours of delay) in the Capital District. The STEP Model indicates that the worst congestion in the Capital District occurs on the four highest volume expressways that are covered by the MIST data. The model also indicates other locations along arterials in the cities and suburbs that are often related to intersection delays. CDTC has developed a "Congestion Management Process" (CMP) that identifies critical congestion locations.

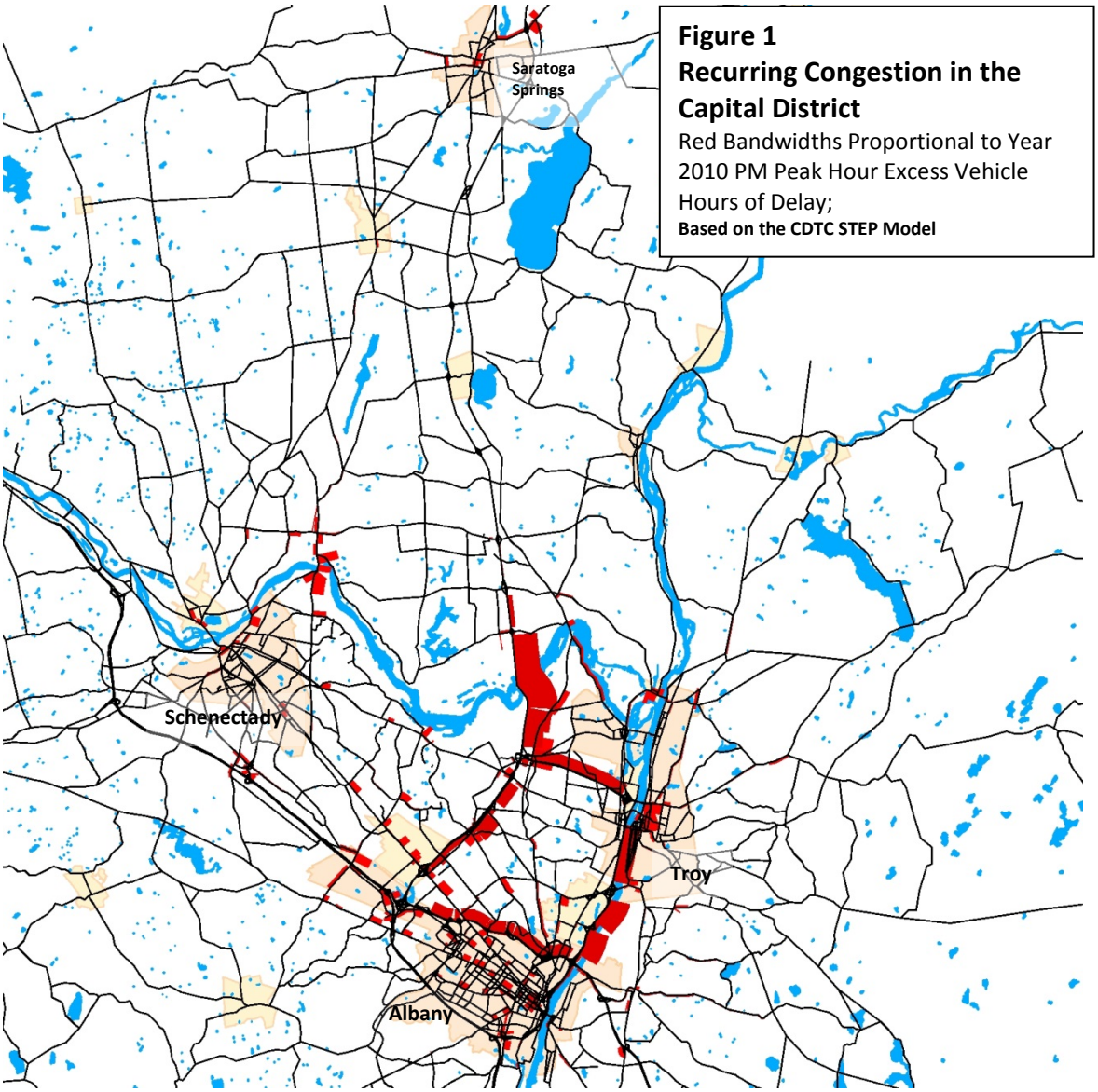


Figure 1
Recurring Congestion in the Capital District
Red Bandwidths Proportional to Year 2010 PM Peak Hour Excess Vehicle Hours of Delay;
Based on the CDTC STEP Model

All federal-aid roads are included in the model and shown in the map. Blue indicates water bodies; tan shading indicates city and village boundaries.

The CDTC STEP Model provides a valuable tool for planning and supports operations and project development. The Model is used to forecast future traffic volumes in the Capital Region. It is also used to predict where traffic diversions will occur during highway construction, and provides NYSDOT with valuable information that can be used to develop the best traffic management plans for construction. The STEP Model has been used to provide emergency planners with traffic analysis for different types of potential emergencies.

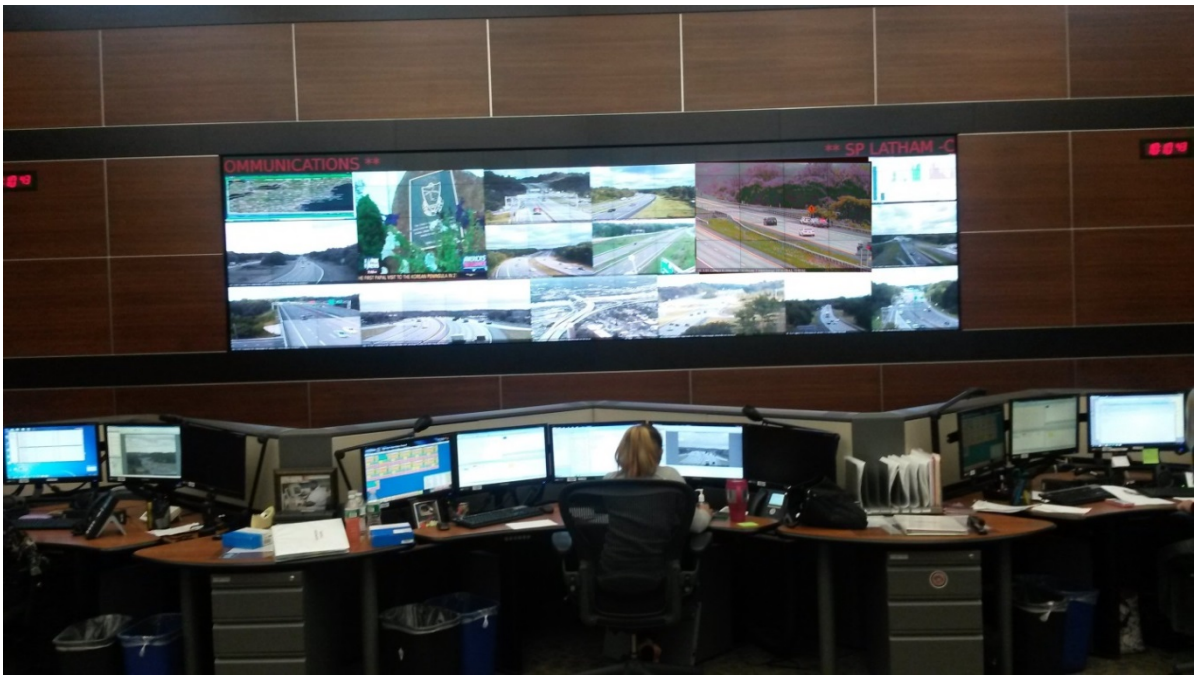
Strategies and Programs

The Capital Region Transportation Management Center is a traffic monitoring and response center operated by the New York State Department of Transportation in partnership with the New York State Police. The TMC is located at the New York State Police Troop G headquarters in Latham, NY and has been in continuous operation since December, 1998. Partnering with the State Police has enhanced situation awareness of regional traffic issues and decreased incident response time. The TMC is a focal

point for regional traffic incident management, utilizing traffic cameras and road sensors, and it is the originator of NYSDOT regional 511 video and message feeds. The TMC enables State Troopers, DOT HELP Trucks, and other emergency personnel to respond swiftly to crash scenes and other highway problems. When it is appropriate, DOT maintenance crews are dispatched to help restore traffic flow quickly. Since the establishment of the TMC, traffic flow has improved for all Capital Region highway users. The TMC also coordinates with the Thruway Operations Center (TSOC), CDTA, and plans for traffic management during construction and special events.

The TMC is an essential tool for providing incident management services. Reliability of and predictability of travel are important goals supported by the TMC. Quick clearance of incidents, management of traffic during construction, coordination between NYSDOT and emergency service providers are critical to minimizing delays. The TMC is an important component of the Governor's "Drivers First" initiative. Reliability and predictability of travel time on expressways benefits all users including passenger vehicles, truck freight/commodity movements and public transit such as the CDTA's Northway Express Bus Service. Planning for traffic management during construction as part of design benefits drivers.

CDTC has provided strong support for the TMC and its mission. CDTC has consistently provided funding through the Transportation Improvement Program (TIP). The 2013-18 CDTC TIP provides $2.8 million per year for the TMC, including support for the HELP program. The CDTC New Visions Plan identifies the TMC as a vital component of congestion management and traffic reliability for the Capital District. Non-recurrent delay represents the worst congestion Capital Region drivers encounter, and TMC incident management and operations efforts are the most effective ways to reduce non-recurrent delay in the Capital District. Commercial vehicles rely on TMC and 511 data. The TMC is also a critical resource for responding to emergencies such as Hurricane Irene and Hurricane Sandy. By managing traffic flows, the TMC makes a vital contribution to the attractiveness and economic vitality of the Capital District.



The Capital Region Transportation Management Center

The HELP program provides roadside assistance

Variable message signs help motorists avoid incidents and delays


The TMC operates 40 Digital CCTV cameras

Travel Demand Management- Travel demand management (TDM) refers to efforts to reduce auto travel and congestion by improving transit access, bicycle and pedestrian access, providing opportunities for carpooling and telecommuting, and other strategies. TDM reduces congestion, reduces the costs of driving, and it is an important way to reduce greenhouse gas emissions. CDTC strongly supports TDM by investing in transit, bicycle and pedestrian facilities, carpooling and land use planning. CDTC projects and investments that support TDM include:

- Federal funding for **transit** service in the Capital District is a major part of the CDTC TIP. New Visions incorporates CDTA's Transit Development Plan, which will improve and grow a variety of transit services for the Capital District, increasing mobility and supporting economic development and smart regional growth. One example is CDTC's investment in the BusPlus system on the Route 5 corridor.
- New Visions encourages development that incorporates **bicycle and pedestrian** accommodations into highway construction as well as city, village, and town plans and provides for recreational opportunities through creation of bike/hike trails.
- CDTC maintains the **iPool2** Ride2gether website which offers a ridematching service and a one-stop shop for traveler needs.

- CDTC maintains the **Capital Coexist** website, a localized education campaign geared towards cyclists and motorists safely coexisting when using the region's roadways.
- **Capital CarShare-** CDTC sponsors this car-sharing program in Albany, with four cars available and two more on the way**.** Future expansion could include Troy, Schenectady and Saratoga Springs.

Providing the opportunity to rent a car on an as needed basis makes not owning a car, or only owning one car in a household, more feasible.

- CDTC sponsored four demonstration/trial weeks of **Bike Share** during the summer (2014) in Albany, Schenectady, Troy and Saratoga Springs.
- Investments in **Park and Ride** lots have been supported by CDTC and CDTA and NYSDOT.
- **Guaranteed Ride Home**- this program provides a taxi trip home for a bus rider or carpooler when they need to respond to an unexpected issue, such as picking up a sick child from school.

Traffic Signal Technology and Intersection Improvements- Improving intersection operations is critically important to improving traffic flow for autos, transit vehicles and freight, and high quality access for pedestrians and cyclists. CDTC supports improvements to traffic signals that improve travel efficiency and traffic flow while reducing delay. CDTC also supports the construction of roundabouts at intersections where feasible. Examples of CDTC sponsored traffic signal and intersection improvements are listed below.

  - Route 5 Transit Signal Priority/signal coordination;
  - Queue Jumpers at the Intersections of Central Avenue with New Karner Road and Wolf Road;
  - ITS Transit Signal Priority on Washington and Western Avenues;
  - ITS Signal Improvements on New Scotland Avenue;
  - ITS Signal Improvements on Pawling Avenue;
  - Green Island Traffic Signals;
  - Erie Boulevard/Jay Street/Nott Street/Front Street Roundabout;
  - ITS Signal Improvements in the Troy's Second Avenue Corridor and in the area around Federal Street, Congress Street, Ferry Street and Fifth Street;
  - South Broadway/Ballston Avenue Intersection Improvements;
  - New Traffic Signal at Intersection of Providence Avenue & Hillside Avenue

- **Signal coordination** provides the opportunity for cars to move along an arterial with only infrequent stops at traffic signals, and significantly reduces delay. CDTC has sponsored signal coordination projects. Signal coordination can be used to improve arterial function, to discourage speeding on arterials while allowing motorists to make better time. Signal coordination can also be used to encourage speed calming on community streets. The goal of signal coordination is to improve travel time for an entire trip rather than focusing on travel time at a single intersection.

- **Transit Signal Priority** (TSP) is an innovation which allows buses to activate signals for extended green time as they approach a signal if they are behind schedule. The extended green time is usually ten seconds, which allows transit vehicles to provide higher quality service. It should be noted that autos in the same traffic stream with the bus will benefit as well. Because the green phase is typically extended only two or three times per hour, the impact on side streets is minimal. CDTC supports TSP as an important tool for improving transit service. TSP has been implemented in the Route 5 BusPlus corridor and is being developed for other corridors. Queue jumper signal phases also have the potential to improve transit on time performance by allowing buses to advance on green ahead of other vehicles, without disrupting traffic flow.
- **Pedestrian Signals-** Innovations in pedestrian signals include pedestrian activation of advanced walk phases, where pedestrians can begin crossing before vehicles enter the intersection; exclusive pedestrian phasing, where all vehicles, including right-turn-on red movements, are stopped while the pedestrian crosses. Countdown timers for pedestrians make crossing easier. In addition, a new type of signal for midblock pedestrian crossing has been introduced, called a HAWK beacon. This

signal requires autos to stop only when a pedestrian needs to cross. Innovative technology holds promise for improving midblock pedestrian crossings, school crossings, and speed control.

- **Roundabouts-** At many intersections, roundabouts are extremely effective at improve traffic flow and can provide significant safety benefits, especially for reducing severe (injury/fatal) crashes. An additional benefit of roundabouts is that maintenance requirements can be significantly less than for signalized intersections, and roundabouts by design can adapt to changing traffic conditions. NYSDOT has policies in place to require consideration of roundabouts when reconstructing an intersection. Additionally, roundabouts are the preferred alternative if the roundabout alternative is feasible.

Implementation of signal technology improvements has the potential to improve traffic mobility and safety at low cost. Signal technology also can enhance pedestrian, bicycle and transit access and provide an important component of complete streets. The CDTC Regional Operations and Safety Advisory Committee is developing recommendations for implementing and operating signal technology.

ITS technologies for transportation operations- Traffic signals are considered to be one type of Intelligent Transportation System (ITS) technology. ITS can be defined as using technology to make smarter use of transportation networks. It includes communications with drivers as well as communications within the transportation system. CDTC has long recognized the value of using ITS to improve travel for all modes, including autos, transit, bicycles and pedestrians, and freight. Emerging ITS technologies include:

- **Adaptive signal control** is a control strategy whereby the signal controller makes adjustments to cycle length, off-sets and phase timings in real time based on changes in the traffic characteristics on the arterial. This can be especially valuable during an incident on an expressway, when traffic may divert to a parallel arterial. Adaptive signal control has been recommended for the Northway/Route 9 corridor in the I-87/US 9 Integrated Corridor Management Plan. Under adaptive control, traffic signals in a network communicate with each other and adapt to changing traffic conditions to reduce the amount of time cars and trucks spend idling. Using fiber optic video receivers similar to those used in dynamic control systems, the new technology monitors vehicle numbers and makes changes in real time to minimize congestion wherever possible.

- **Self-Organizing Signals**- One example of Adaptive Signal Control is a system being developed and tested at the University at Albany called Self-Organizing Signals. This proposed system is based on the theory of self-organizing biological systems. Analogous to biological systems, each traffic signal in the system would communicate with the immediately adjacent signals and based on traffic sensor information would adjust the signal timing plan. This innovative approach has the potential to respond to minor changes in traffic flow as well as major changes to traffic flow in a way that optimizes the system. CDTC will continue to monitor the development of this innovative approach.

Arterial Management and Land Use Planning- A critical factor to the success of preserving capacity along existing arterial highways involves the coordination of development along the roadway. How land owners adjoining arterial highways use or develop their property and gain access to the highway system has a direct impact on how well the highway user is served. Land use and access considerations are critical to a successful arterial management program. CDTC supports strong municipal planning because municipal land use and zoning policies strongly influence the efficiency of the region's arterials and highways. CDTC also supports accommodation of pedestrian, transit, and access management concerns in the site planning review process. New Visions endorses corridor transportation plans that call for a

well-designed network of connected streets featuring pedestrian and bicycle treatments and transit access. The Plan acknowledges the importance of land use and development. CDTC sponsors the Linkage Planning Program, which provides funding for cities, towns, and villages to prepare and implement community-based transportation and land use plans consistent with New Visions principles.

The I-87/US 9 Integrated Corridor Management Plan- In partnership with CDTC, NYSDOT prepared an Integrated Corridor Management Plan for the Northway/Route 9 corridor. Integrated Corridor Management (ICM) would enable the New York State Department of Transportation (NYSDOT) to optimize use of available transportation infrastructure by directing travelers to underutilized capacity in a corridor. Strategies could include motorists shifting their trip departure times, routes, or modes, and/or NYSDOT dynamically adjusting capacity on I-87 by or adjusting traffic signal timings to accommodate demand fluctuations.

The Thaddeus Kosciusko Bridge carries the Northway over the Mohawk River

In addition, access management and smart growth strategies are proposed for the US 9 corridor. Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. Good access management provides a safe operating system for all users while balancing the function of the roadway with the access needs of the adjacent land uses.

The ICM Plan is based on the CDTC New Visions Plan policy that says that adding physical capacity to the Northway is not the right approach, but that managing congestion and traffic flows in the Northway corridor is the best way to add capacity and improve the Northway. A management approach is the best approach because the most severe delay on the Northway is “non-recurrent” delay; that is, delay that results from incidents and other events. CDTC analysis has shown that widening the Northway would result in travel demand immediately increasing to fill the new capacity, while doing little to address incident delay and reliability. One of the conclusions of this analysis is that there is no feasible capital improvement such as highway widening that can eliminate daily recurring congestion in the peak

periods. Adding capacity to the Northway can be expected to result in higher traffic volumes and could generally be expected to result in conditions similar to those which exist today. In addition, widening would not prevent delays that result from incidents such as bad weather conditions, traffic crashes and vehicle breakdowns. Adding considerable capacity in one corridor would also re-concentrate traffic into the peak period, putting severe traffic pressure on all intersecting roads and expressways that are not widened. In addition, widening the Northway would be prohibitively expensive and would provide benefits for only short periods in peak periods in one direction.

The I-87/Route 9 ICM Plan was developed in consultation with state and local police/emergency response staff and other local officials. It developed recommendations to manage incidents, improve traffic flow, and improve reliability. These recommendations are listed in Tables 5, 6, and 7. It is important to note that an important part of managing the Northway corridor is based on ongoing operational costs, which are shown in Tables 5, 6, and 7. Investing in operations is critical to managing traffic flow in the Northway corridor and in other corridors, and the corresponding costs need to be budgeted.

Table 5
I-87/Route 9 ICM Short Term Recommendations

Strategy/Elements	Description	Qty	Unit Price	Capital Cost	Operation/ Maintenance Cost (per year)
Bluetooth Based Detection for Travel Time I-87 & US 9					
Bluetooth Based Detection on I-87	Solar powered, cellular communications links, Bluetooth installed at ramps	16	$7,500	$120,000	$24,000
Bluetooth Based Detection on US 9	Solar powered, cellular communications links, Bluetooth installed at Selected intersections	34	$10,000	$340,000	$68,000
Totals				$460,000	$92,000

Table 6
I-87/Route 9 ICM Medium Term Recommendations

Strategy/Elements	Description	Qty	Unit Price	Capital Cost	Operation/ Maintenance Cost (per year)
Extension of Existing ITS Program on I-87					
Communications Backbone (per mile)	Extension of the existing fiber optic back bone from the Twin Bridges north to Saratoga Springs (Exit 8 to Exit 13)	14.5	$120,000	$1,740,000	$174,000
CCTV	Color video with pan, tilt, and zoom, cabinet, tower, foundation and conduit (Fill in between Exit 8 and 13)	10	$45,000	$450,000	$90,000
Variable Message Signs	Full matrix NTCIP, with foundations and gantry	4	$250,000	$1,000,000	$100,000
Incident Detection on Route 9					
Communications Backbone (per mile)	Extension of the existing fiber optic back bone on I-87 to Route 9, on Route 9 from Exit 2 to 13	16.5	$120,000	$1,980,000	$198,000
CCTV	Color video with pan, tilt, and zoom, cabinet, tower, foundation and conduit at intersections along Route 9	26	$40,000	$1,040,000	$208,000
Totals				$6,210,000	$770,000

Table 7
I-87/Route 9 ICM Estimated Long Term Deployment Costs

Strategy/Elements	Description	Qty	Unit Price	Capital Cost	Operation/ Maintenance Cost (per year)
Adaptive Signal Control on US 9					
Central Software	Central software for Traffic Operations Center	LS	$250,000	$250,000	$50,000
Detection	In pavement detectors (speed, volume, occupancy) on approach lanes with wireless connection	50	$40,000	$2,000,000	$400,000
Algorithm/ Controllers	Algorithm/ Controllers	50	$15,000	$750,000	$150,000
Totals				**$3,000,000**	**$600,000**

One concept studied during the ICM but needing further study is **active traffic management** (ATM) to serve traffic approaching the Twin Bridges. Active traffic management is defined as the ability to dynamically manage recurrent and non-recurrent congestion based on prevailing traffic conditions. Non-recurrent congestion refers to congestion that results from traffic crashes, weather events or other incidents. Speed harmonization is one example of active traffic management. Speed harmonization can help to reduce flow breakdown and the onset of stop-and-go driving behavior in support of improved mobility. An example of a speed harmonization strategy is the use of variable speed displays. They are set (and varied) according to prevalent roadway and operating conditions, including visibility, weather, lane constraints (e.g., work zones), crashes and other incidents, and real-time traffic flows/congestion levels. Variable speed displays may be advisory or regulatory. Another example of active traffic management is Dynamic Lane Assignment (DLA), which consists of lane control signals – typically installed in conjunction with variable speed displays – providing advance notice that a lane(s) is closed ahead and to start the merge process into the available lanes well in advance of the actual closure.

For the Northway, this strategy would require the installation of a series of overhead gantries at a spacing of approximately every 1/2 mile northbound on I-87 from Exit 4 to the Twin Bridges (5 miles) and southbound on I-87 from Exit 9 to the Twin Bridges (5 miles). Estimated costs are shown in Table 8. As described earlier, this is a location of recurring traffic congestion due to the geometry of I-87 approaching the Twin Bridges. Active traffic management has been shown to improve travel time reliability, increase roadway throughput, reduce crashes, save fuel and squeeze more traffic capacity from the existing roadway cross section. A comprehensive program of before and after traffic studies is underway for an active traffic management project in northern Virginia. CDTC will further evaluate this approach as national experience increases.

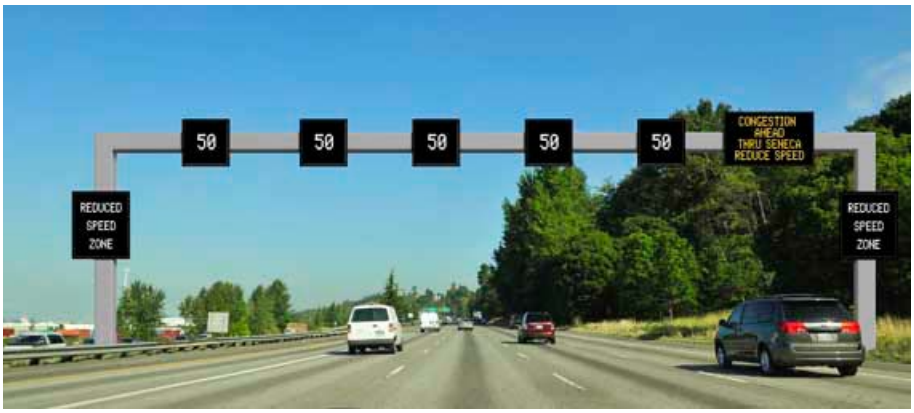


Figure 2. Variable speed displays in Seattle

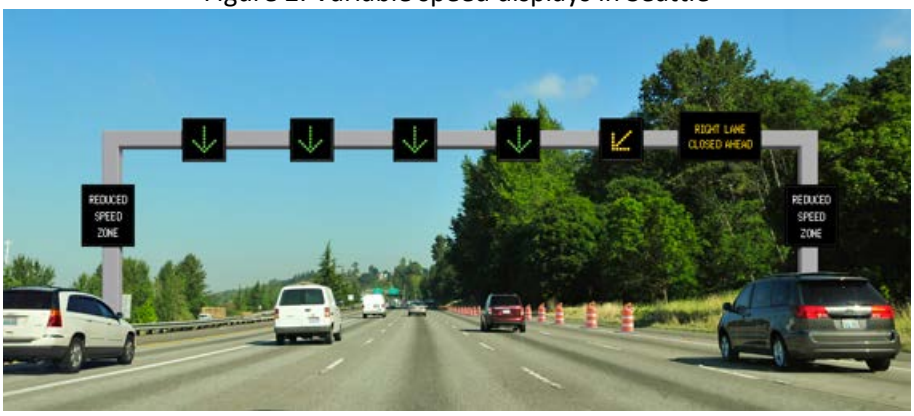


Figure 3. Dynamic Lane Assignment in Seattle

Table 8
I-87/Route 9 ICM: Estimated Deployment Costs for Strategies Requiring Further Study

Strategy/Elements	Description	Qty	Unit Price	Capital Cost	Operation/ Maintenance Cost (per year)
Active Traffic Management on I-87					
Speed Harmonization Variable Speed Limits Dynamic Lane Assignment Queue Warning	Gantries every 1/2 mile Northbound on I-87 from Exit 4 to the Twin Bridges (5 miles) and Southbound from Exit 9 to the Twin Bridges (5 Miles)	20	$225,000	$4,500,000	$450,000

Operational Improvements and the Intelligent Transportation System Priority Network- Given the expense and difficulty of adding expressway capacity, and given the high demand for expressway usage that is forecast to continue to grow in the Capital District, it is clear that strategic investments in operational improvements will continue to be important to the future of the Capital District. ITS investments, including incident management and traveler information systems, will make the Capital District more accessible and will be important for maintaining the quality of travel. Emerging and future technologies hold promise, and analysis of future traffic growth and future conditions further underscores the importance of ITS and operational investments to provide important benefits to the traveling public.

The CDTC New Visions Plan identifies priority networks for bike, pedestrian, transit, ITS, goods movement and infrastructure improvements. One purpose of the priority networks is to help set priorities for TIP project selection. Another purpose is to give guidance for project development to make sure that individual projects address important needs on each priority network. For example, if a bridge replacement project takes place on the ITS priority network, the ITS needs at that location should be carefully reviewed and given special consideration to determine if an ITS component could be efficiently incorporated into the project.

The identification of priority networks makes the most efficient and effective use of available resources. The largest impact will be seen by directing funding to the functionally most significant part of the transportation system.

The identification of priority networks does not imply that improvements off the defined networks are not warranted or desirable. Flexibility is required in interpretation, so long as the basic message—*these are important facilities*—is not lost.

The New Visions Plan identifies a network of expressway and arterial facilities as the platform for the regional ITS. There should be centrally coordinated traffic control and/or guidance along these facilities. The logic is that advising travelers of preferable alternatives *before* they enter the most congested areas and facilitating smooth flows along the alternatives can keep overall traffic conditions from worsening. The regional ITS priority network contains:

- priority expressways;
- arterials representing their immediate alternatives (ordinarily either parallel to or connecting the expressways);
- their secondary alternatives (which entail more surface street travel); and

- other arterials that are strategically important because they are important travel corridors, although they are not viewed as alternative routes for expressway travelers.

The Regional Operations and Safety Advisory Committee was asked to review the ITS priority network and determine if updates were needed. One of the comments made by the Committee is that volume and crashes on roads within the priority network should be considered in evaluating funding priority. The CDTC project evaluation process already takes into account volumes, facility importance and potential crash reduction in evaluating and prioritizing projects. This concept will be further considered in the context of ITS projects as CDTC refines its project evaluation and selection process.

The ITS priority network recognizes the importance of the expressway system, but the role of ITS on the arterial system is also important. Some ITS improvements to arterials which parallel the expressways will have direct benefits to expressway travel, especially by providing alternate routes during expressway incidents. Access management and physical improvements will be required for this to be effective. Nonetheless, ITS benefits from signal coordination, transit signal priority, or other improvements will also provide significant benefits to normal daily arterial function.

The ITS network recognizes the importance of coordinating signal timing on major city and suburban arterials. Transit-friendly application of that technology will include designing the operation of the signal system to achieve multiple objectives. Rather than optimizing signal timing for maximum traffic flow, signal system design can be developed that allows for efficient traffic progression at travel speeds that are compatible with pedestrian, bike and transit movements. This may provide for a win/win outcome. Even modest improvements in basic signal timing will show important results. Implementation of signal coordination along arterial corridors will improve traffic flow for autos as well as for transit using Transit Signal Priority (TSP). Successful implementation of signal coordination along the Route 5 corridor in Albany, Colonie, Village of Colonie, Niskayuna and Schenectady has demonstrated the value of ITS for arterial performance. For routes that parallel expressways, ITS holds the promise of allowing the signal coordination and timing plan to be changed by the TMC to facilitate diverted traffic during an incident.

The ITS priority network is described in Table 9 and is illustrated in Map 1. The priority network was updated to show it not going to Lake George, but does extend to the Saratoga County/Warren County border. It also includes all routing in the 40 mile BRT system. The Route 5 portion of the ITS Priority Network continues to include the BusPlus BRT; while the updated Priority Network includes all routing for the Washington Western BRT and the River Corridor BRT.

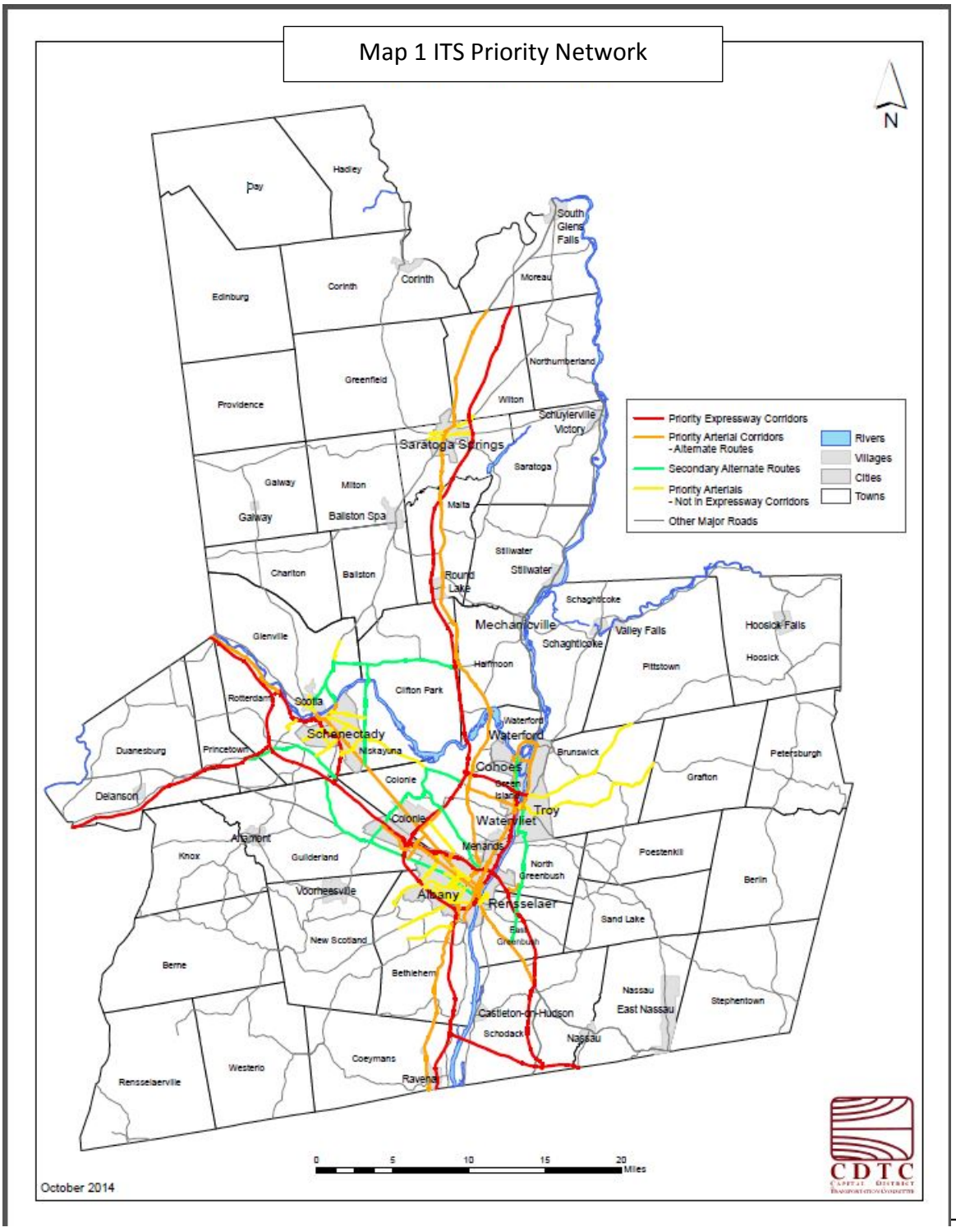
Table 9
ITS Priority Network Facilities

Priority Expressway Corridors	**Centerline Miles**
Northway (I-87) and Fuller Road Alternate: US 20 to Saratoga County/Warren County Line	43.6
Thruway (I-87/I-90): Albany/Greene County line to Schenectady County/ Montgomery County line; Berkshire Spur (21A to B1)	44.9
I-88: Thruway Interchange 25A to Schenectady County/Montgomery County Line	14.5
I-90: Thruway Exit 24 to Berkshire Spur	19.3
I-787: Thruway Interchange 23 to Alternate Route 7	8.7
I-890: End to End	7.8
Alternate Route 7: Northway to I-787	3.6
TOTAL MILEAGE	**142.4**
Priority Arterial Corridors – Immediate Alternate Routes for Expressways	
NY 2: I-787 to US 9	4.0
NY 5: Downtown Albany to Downtown Schenectady; Includes BusPlus BRT	16.0
US 9: Downtown Albany to Warren County Line	50.5
US 9/20: Downtown Albany to I-90 Interchange 11	7.0
Everett Road from Sand Creek Road to Route 5	0.8
NY 32/US 4: Downtown Albany to Waterford (US 4); includes all River Corridor BRT routing including Broadway in North Albany; BRT Routes in Troy, Lansingburgh and Cohoes	20.0
Erie Boulevard: NY 5 to Freeman's Bridge Road	1.2
Fuller Road: US 20 to NY 5	1.9
Washington Avenue: Central Avenue to NY 155	7.6
Wolf Road: NY 5 to Albany Shaker Road	2.0
I-90 Exit 8 Connector (NY 43): I-90 to US 4	1.3
US 9W: I-787 to Greene County Line	11.4
NY 5S from I-890 to Schenectady County/Montgomery County Line	5.86
TOTAL MILEAGE	**129.6**

Table 9 (continued)

Secondary Alternate Routes for Expressways	**Centerline Miles**
US 4: US 9/20 to NY 7	10.4
NY 7: I-890 to I-88	5.7
US 20: Downtown Albany to NY 155; includes Washington Western BRT routing	10.4
US 20/NY 146: NY 155 to Thruway Interchange 25	5.7
NY 50: NY 5 to Glenridge Road	3.4
NY 146: US 9 to Glenridge Road	6.1
NY 155: US 20 to Watervliet Shaker Road	4.0
Albany Shaker Road: NY 7 to US 9	7.7
NY 7: I-87 to Albany Shaker Road	3.2
Balltown Road: NY 5 to Glenridge Road	6.7
Freeman's Bridge Road: Erie Boulevard to NY 50	1.7
Glenridge Road: NY 50 to NY 146	2.1
Watervliet Shaker Road: New Karner Road to Albany Shaker Road	1.3
NY 787 Cohoes Arterial: NY 7 to Route 32	2.6
TOTAL MILEAGE	**71.0**
Priority Arterials Not in Expressway Corridors	
NY 2 in Troy and Brunswick	10.3
NY 7 in Troy and Brunswick	9.1
NY 7: Albany Shaker Road to I-890	6.6
NY 32: US 9W to Elm Avenue	3.6
NY 85: I-90 to NY 140	4.6
NY 443: Downtown Albany to Elm Avenue	5.7
Broadway/Partition Street/East Street: US 20 to Amtrak Station	0.3
Streets with a density of more than two traffic signals per mile	53.0
TOTAL MILEAGE	**93.2**

Map 1 ITS Priority Network



Performance Measures for Traffic Management and Operations- The CDTC New Visions Plan has used performance measures in evaluating congestion delay and traffic reliability as part of the Congestion Management Process (CMP). The CMP has been required by past federal legislation. MAP-21 emphasizes performance measures; however, federal rules about "system performance" measures aren't expected to be finalized until Spring of 2015. After that, States have 12 months to develop performance measures, and MPOs have an additional six months to develop performance measures that are consistent with MAP-21. "System performance" includes traffic reliability and congestion. It is anticipated that the federal guidance will allow each MPO to customize performance measures for traffic reliability and congestion based on the unique conditions and policies of each region, although a national perspective will be developed as well. CDTC should develop performance measures that are consistent with the federal guidance, and also complementary to the performance measures developed by the New York State Department of Transportation. Based on the schedule for federal guidance and State performance measures, further discussion and evaluation will be necessary in the coming months.

Another consideration is that technologies for measuring traffic reliability and congestion are evolving rapidly. Many private vendors are offering extensive data sets on traffic speeds and delay based on monitoring of cell phone locations. FHWA has recently commissioned the creation of a data national base, called "HERE" data, which monitors travel speeds on all Interstates and principal arterials (the "National Highway System") every five minutes, 24 hours a day, 365 days a year, for both passenger cars and trucks. In collaboration with the New York State Department of Transportation, CDTC is working to analyze and understand this data in a way that can be used for measuring transportation system performance. However, more time is needed to harvest this data in a form that can be used for CDTC planning. In addition, there are a number of other promising data sources that may be available in the coming year.

The following are recommendations by the Regional Operations and Safety Advisory Committee for CDTC Planning Committee consideration.

Recommendations

1. **Development of New Performance Measures**- Because expected national guidance is not yet available, and because new data sources are under development, it is recommended that CDTC postpone the development of new traffic reliability and congestion performance measures until after the proposed federal rule making is issued in December 2014. After the national guidance is developed, CDTC will be in a position to update the CDTC "Congestion Management Process" (CMP).

2. **Project Selection**- The Regional Operations and Safety Advisory Committee recommends that CDTC consider expanding its project review process to further evaluate operational needs and impacts during project evaluation and selection. Projects that improve operations can provide significant benefits at a relatively low cost. In addition, projects should be consistent with the ITS Priority Network. One purpose of the priority networks is to help set priorities for TIP project selection. Another purpose is to give guidance for project development to make sure that individual projects address important needs on each priority network.

3. **Funding for Operations**- CDTC should continue to support funding for operations, including the TMC, traffic signals, ITS innovations, improved project selection process for ITS/signals. At a minimum, funding should continue at existing levels. While existing funding at the federal and state level is often set up for capital projects, funding for operations provides essential improvements to traffic flow and traffic reliability, as well as improvements to transit systems.

CDTC should continue its strong policy that congestion management is much more cost effective than highway capacity increases or new lanes; and that congestion alone does not justify increasing highway capacity or adding new lanes. Because of other less expensive strategies, and because of changing transportation technologies, major highway expansion (adding through lanes for several miles or more) should not be considered.

4. **Community Traffic Engineering Services Program**- CDTC should explore the option of establishing a community traffic engineering services program. Under this potential program, CDTC would partner with a municipality to hire a traffic engineering consultant to provide intersection signal analysis, traffic counts, or analysis of potential operational improvements or ITS improvements. Municipalities would need to apply for funding for this program. The result could be the identification of candidate projects for future improvements.

5. **Active Traffic Management Strategies**- CDTC should further evaluate active traffic management (ATM) strategies, including speed harmonization and Dynamic Lane Assignment (DLA) for the Northway as national experience increases. Further national experience will help NYSDOT and CDTC determine if ATM strategies are a good fit for the Capital District.

New Visions Safety and Security

The New Visions Plan supports safety and security in a number of important ways. The following New Visions Planning and Investment Principle gives strong consideration to safety and security:

> ***Safety and Security – We can significantly save lives and reduce injuries when we decrease traffic accidents and better respond to traffic emergencies.***
>
> *CDTC and its members need to improve the safety of the regional transportation system by creating a travel environment that is consistent with the community context and reduces risk. Safety considerations will be integrated into all investment decisions.*
>
> *Roundabouts and road diets will be considered in proposed highway and intersection projects to address safety concerns as well as low cost safety improvements.*
>
> *Examination of security issues and incorporation of security actions using computer modeling and scenario planning will be considered in transportation planning and investment decisions.*

Safety

Transportation safety has been and continues to be a national and a statewide priority. Federal legislation, most recently MAP-21 (the Moving Ahead for Progress in the 21st Century Act signed into law on July 6, 2012, requires states to update and maintain a Strategic Highway Safety Plan. The Strategic Highway Safety Plan has a primary objective of reducing fatalities and serious injuries on all public roads. The Plan's emphasis areas are identified through a data driven, collaborative process with the state's safety partners including MPOs. The New York State Department of Transportation is developing an update to its 2010 Strategic Highway Safety Plan. Highway Safety Improvement Program funds are used to implement some of the identified strategies in the Strategic Highway Safety Plan.

The New Visions Plan has always prioritized safety. To support transportation safety and the implementation of the State Strategic Highway Safety Plan, CDTC sponsors many programs, initiatives and projects. Emerging tools such as electronic access to crash data and new safety programs are presenting the opportunity to increase the role of CDTC in safety planning.

CDTC's planning process will be consistent with the State Strategic Highway Safety Plan (SHSP) and with transit safety/security plans and programs. CDTC recognizes engineering, education and enforcement as three key components of safety. CDTC will continue to build on its existing safety initiatives, including:

- **The Linkage Program-** CDTC's Community and Transportation Linkage Planning Program (the Linkage Program) is an integrated land use and transportation planning program created to implement the New Visions Plan. The program has been recognized as a national best practice in livability planning and is the

cornerstone of CDTC's public outreach efforts. The program provides consultant or CDTC staff technical assistance for joint regional-local planning initiatives that link transportation and land use. Safety is a key element in Linkage studies, including integrated plans for complete streets and pedestrian safety. CDTC has funded a total of 79 collaborative, jointly-funded studies over the past fourteen years. Study sponsors have included 40 separate urban, suburban and rural municipalities and counties as well as not-for-profits and other public entities. Roughly $5.5 million in federal, state and local funds have been committed to the Linkage Program since its inception in 2000.

Poster funded by the National Highway Traffic Safety Administration with a grant from the New York State Governor's Traffic Safety Committee

- **Bicycle and Pedestrian Safety-** CDTC sponsors the Capital Coexist website, which is a localized education campaign geared towards cyclists and motorists safely coexisting when using the region's roadways. It will be expanded to include pedestrian education and issues. CDTC has also sponsored Law Enforcement Training for Pedestrian and Bicycle Safety. Safety related fact sheets have been prepared for through the NYSAMPO Safety Working Group and Bicycle and Pedestrian working group on Statewide Traffic Safety plans, Complete Streets, pedestrian signal timing and designing intersections for all users. In addition, NYSAMPO has hosted several training courses including Intersection Safety and Designing Pedestrian Safe Streets.

- **Consideration of Safety in the TIP-** CDTC is responsible for evaluating and programming federally funded transportation projects on the Transportation Improvement Program (TIP). Safety benefits are considered in TIP projects selection. The quantitative calculation of safety benefits is based on actual crash history and expected reduction in crashes based on the improvements being made. In addition, qualitative information is considered. For HSIP project applications, a rigorous evaluation is used to ensure consistency with state and federal guidelines. In order to encourage the programming of safety projects, CDTC has established set-aside funding for projects in the following categories: Intersection safety, Intelligent Transportation Systems (ITS), Bicycle/Pedestrian, and grade crossing safety.

- **Safety Partner Collaboration**- CDTC has formed valuable partnerships with statewide organizations to explore ways to improve safety. CDTC's Regional Operations and Safety Advisory Committee provides a forum for many of these groups to discuss safety planning and safety initiatives.

    - **NYSAMPO Safety Working Group**- Sponsored by the New York State Association of Metropolitan Planning Organizations (NYSAMPO), the Safety Working Group was created to advance safety planning in New York State, and to improve traffic safety for users on all public roads. Representatives from the 14 New York State MPOs, the New York State Department of Transportation, the Governor's Traffic Safety Committee, Cornell Local Roads Program and many others participate in this working group.
    - **Partnership with NYSDOT**- CDTC is partnering with the New York State Department of Transportation to analyze crash data, to help develop the Strategic Highway Safety Plan, and to develop programs and projects to improve safety.
    - **Partnership with GTSC/NYSP-** CDTC is partnering with the Governor's Traffic Safety Committee and the New York State Police to plan for safety programs, projects and policies.

- **Membership in NYSATSB-** The New York State Association of Traffic Safety Boards (NYSATSB) is a statewide association of county traffic safety boards, state and federal agencies, highway engineers, safety professionals, corporations and individuals who share common interest in traffic safety and injury prevention.

Expanding CDTC's Role in Safety Planning- MAP-21 provides a number of important improvements and challenges for safety planning. MAP-21:

- Requires regular updates of the State Strategic Highway Safety Plan (SHSP)
- Increases safety funding (HSIP)
- Consolidates funding programs:
  - Railway-highway crossings
  - Transportation Alternatives (TA) program
- Requires a state safety data system that:
  - performs problem identification and countermeasure analysis on all public roads
  - advances data collection, analysis, and integration capabilities
  - determines priorities for the correction of identified safety problems
- Safety Performance Measures- New York State will be required to develop safety performance measures and targets at the State level, and CDTC will be required to develop MPO safety performance measures and targets within 180 days of approval of the State performance measures.

Addressing the requirements of MAP-21 will be challenging, but will provide a significant opportunity to improve safety. CDTC will carefully consider and develop the best and most effective ways to improve safety in the Capital District.

The following are recommendations by the Regional Operations and Safety Advisory Committee for CDTC Planning Committee consideration.

According to FHWA guidance, States must also consider additional safety factors when identifying emphasis areas and strategies for their SHSP updates. These factors are:

- Findings of Road Safety Audits (RSA). RSA findings can be analyzed to identify common countermeasure recommendations, which may be particularly appropriate for systemic implementation.
- Locations of fatalities and serious injuries.
- Locations that possess risk factors for potential crashes.
- Rural roads, commensurate with fatality data.
- Motor vehicle crashes that include fatalities or serious injuries to bicyclists and pedestrians.
- Cost-effectiveness of improvements.
- Improvements to rail-highway grade crossings.
- Safety on all public roads, including non-State-owned public roads and roads on tribal land.
- Older Drivers and Pedestrians Special Rule: If there has been an increase in fatalities and serious injuries to older drivers and pedestrians, States must include strategies to address those increases in the SHSP updates.

Recommendations

1. **Safety Performance Measures**- A major task for CDTC in the coming year will be the development of safety performance measures and targets. The new federal rulemaking on safety performance measures gives MPOs the option of creating their own targets or following State targets. CDTC anticipates working closely with NYSDOT in developing performance measures and targets that are consistent with statewide measures and targets. However, CDTC will need to consider that State crash and fatality averages might not be appropriate for our area since the majority of population/crashes are in downstate.

2. **Develop a Regional Safety Plan**- Other leading MPOs in the country have instituted Safety Task Forces/Advisory Committees and prepare Regional Safety Reports and Action Plans. These plans present goals, emphasis areas, statistics, and initiatives. CDTC uses different data sources for identifying the depth and breadth of safety issues. One of the main sources CDTC has access to is NYSDOT's Accident Location Information System (ALIS). This has been used extensively for various

analyses, particularly at the County level. CDTC can build on these efforts to develop a regional safety plan.

3. **Community Safety Evaluation Program**- CDTC should explore the option of establishing a community safety evaluation program. Under this potential program, CDTC would partner with a municipality to hire an engineering consultant to provide safety evaluations for potential problem locations identified in the municipality. This problem identification phase of this program could be modeled after the safety evaluation process followed by NYSDOT Region 1. NYSDOT staff evaluates high accident locations every year, screens out those already evaluated in the past 2-3 years, and evaluates the rest in detail (including developing collision diagrams). CDTC could similarly prioritize the work with the help of consultants. The local decision makers would need to agree that these locations/projects are their priority, based on crash data and other local considerations, in their request for evaluation funding through the program. A variation on this proposal would be that CDTC would hire an on-call consultant to evaluate high crashes locations, but selection of locations would still be dependent on municipalities applying for consideration.
4. **Safety Education Programs**- CDTC should explore expanding its existing safety education programs and potentially develop/support new programs and partnerships. CDTC currently maintains the Capital Coexist website which educates both bicyclists and drivers about bicycle safety and sharing the road. This website should be expanded to include education for pedestrian safety as well as additional topics as identified in the NYS Strategic Highway Safety Plan or the future regional safety action plan. CDTC could also use programs such as the NYS Route 5 Pedestrian Safety Education initiative as a blue print and expand them to other corridors as well as the broader Region. In addition, CDTC will explore partnering with and supporting the enforcement community on safety education campaigns. CDTC could use the New Visions public participation process to assist in the identification of safety education topics of regional concern. CDTC will also explore the need for additional FHWA training programs for local government officials. CDTC will continue to partner with the Governor's Traffic Safety Committee, National Highway Traffic Safety Administration, New York State Department of Transportation and the other Metropolitan Planning Organizations in NYS on the development and implementation of safety education initiatives.

Figure 4
Total Crashes (2008-2012)

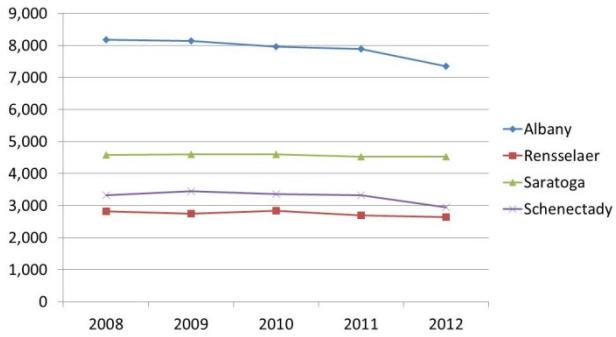


Figure 5
Fatal Crashes (2008-2012)

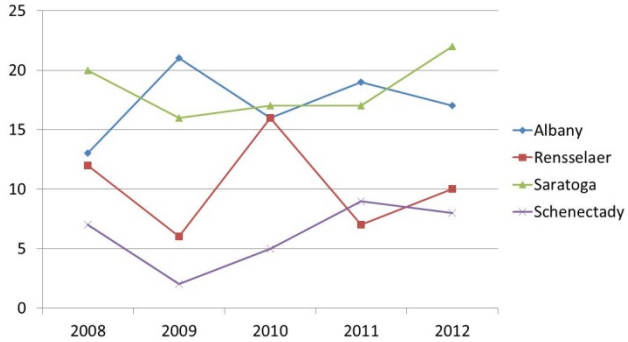


Figure 6
Injury Crashes (2008-2012)

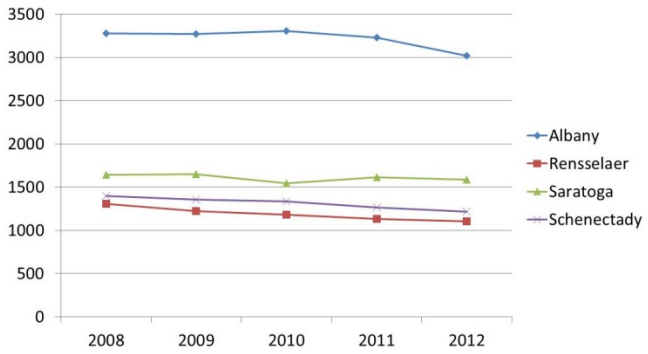
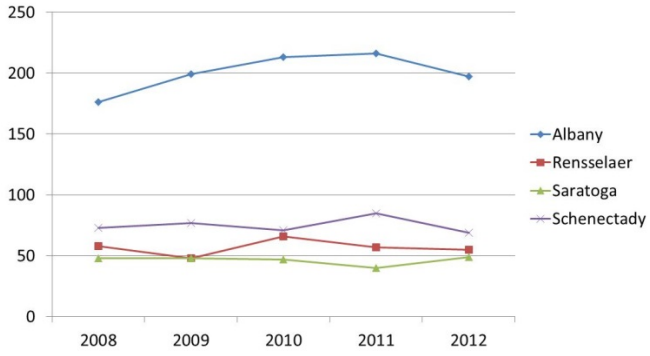


Figure 7
Motor Vehicle/Pedestrian Crashes (2008-2012)



Security Planning

Examination of security issues and incorporation of security actions using computer modeling and scenario planning will be considered in transportation planning and investment decisions.

The current federal transportation legislation – Moving Ahead for Progress in the 21st Century Act (MAP-21) – continued the metropolitan planning requirements on security planning that were specified in the 2005 legislation, The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

> *SAFETEA-LU requires that the statewide metropolitan planning process and the metropolitan planning process for a metropolitan planning area shall provide for consideration of projects and strategies that will increase the security of the transportation system for motorized and nonmotorized users [49 USC 5303(h)(1)(C) and 23 USC 134(h)(1)(C)].*

Though security was mentioned along with safety in the legislation in the past, the emphasis of plans and programs had been placed on safety with security given little attention. This requirement, along with guidance from Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), must be met prior to MPO and state adoption/approval of transportation plans.

Security planning involves planning and preparing for impacts on transportation system due to natural disasters (e.g. flooding, hurricanes, blizzards), planned events (e.g. July 4th celebration, parade), terrorist attacks, shooting or hostage situations, accidents or technical failures, and cyber threats.

The Role of MPOs

Although the immediate organizational response to security incidents and disasters will be the responsibility of security/public safety agencies, there is an important role that MPOs can play in promoting coordinated planning in anticipation of natural disasters or criminal/terrorism events. This involves regional coordination, data depository, technical support, and funding.

The level of MPO involvement in security planning varies across the country. At one extreme, there are MPOs that minimally incorporates security aspects into their long range plans. They rely on the transit agencies, DOT and other local and state entities for the operations. They include security in their long range plans and may organize committees that focus on Intelligent Transportation Systems. One the other extreme, there are MPOs who are responsible for not only preparing regional security plans but also operate the plans including the 911 system.

Table 10: Levels of MPO Involvement

Level	Role	MPOs
Traditional	The MPO incorporates system management and operations (M&O) role in its ongoing transportation planning activities. The focus would be on specific M&O projects that arise as part of the transportation planning process; but the primary responsibility for operations-type projects would rest elsewhere, most likely with the region's operations agencies.	New York City, Boston
Convener	The MPO would act as a forum where operations plans could be discussed and coordinated with other plans in the region. Regular meetings on operations issues would be held, but the MPO would still not be responsible for developing a regional operations plan.	Atlanta, Philadelphia
Champion	The MPO works aggressively to develop a regional consensus on operations planning. MPO planners work with operating agencies to create programs and projects that improve system performance. The MPO takes the lead in developing regional agreements on coordinated operations.	Los Angeles
Developer	The MPO would develop regional operations plans in addition to incorporating operations strategies into the transportation plan. System-oriented performance measures would be used to identify strategic operations gaps in the transportation system.	Houston
Operator	The MPO would be responsible for implementing operations strategies that were developed as part of the MPO-led planning process.	Kansas City, San Francisco

Source: US Department of Transportation

CDTC's Approach

Transportation security planning focuses on protecting critical infrastructure by preventing, preparing against, expediting responses to, and aiding in recovery from major natural and man-made events. For the Capital District, any transportation security plan should include the following:

- The interstate highway system, particularly at key nodes, such as the I87/ I90 merge;
- Key roadways (key links, evacuation routes, etc.), bridges, and overpasses, both in the interstate highway system and local road network;
- Albany International Airport and other community airports;
- Capital District Transportation Authority (CDTA) bus transit stations/transfer areas, intercity terminals, and Amtrak stations;
- Critical freight and inter-modal areas, such as major railway lines, Selkirk Rail Yard, The Port of Albany, and the Port of Rensselaer;
- National Highway System (NHS) Inter-modal Connectors, as identified by the FHWA;
- Traffic Management Center (TMC) and its data collection/dissemination assets.

CDTC recognizes that the primary responsibility for transportation security lies elsewhere. NYSDOT, other transportation service providers, state/county/local governments, and emergency responders are tackling security planning from various perspectives. However, there are areas related to security where CDTC is already involved. This includes long and short term planning activities and project funding. Current role of CDTC is somewhere between "traditional" and "convener." CDTC intends to continue in that role but get more active on various aspects of technical and non-technical services CDTC can provide to the municipalities as well as the larger security community in the region. The current involvement is briefly described below.

Regional Operations & Safety Advisory Committee- CDTC has established a Regional Operations & Safety Advisory Committee intended to create a platform for operations/ planning people from federal and state transportation agencies, transit agencies, various local municipalities, and law enforcement agencies to coordinate and integrate various traffic and transportation operations activities in the capital region. In addition to operations, the committee is charged with looking into various aspects of transportation safety and security.

The Capital Region Transportation Management Center (TMC)- Established in 1998, TMC monitors and provides responses to incidents and is operated jointly by the New York State Department of Transportation and the New York State Police. The TMC is a focal point for regional traffic incident management, utilizing traffic cameras and road sensors, and it is the originator of NYSDOT regional 511 video and message feeds. The TMC enables State Troopers, DOT HELP Trucks, and other emergency personnel to respond swiftly to crash scenes and other highway problems. CDTC has provided strong support for the TMC and its mission through the Transportation Improvement Program (TIP) finds. The 2013-18 CDTC TIP provides $2.8 million per year for the TMC.

Intelligent Transportation System (ITS)- ITS is an umbrella term for various technologies and support systems for traffic management. It includes traffic signals, detectors, video surveillance, NY511 system, information and communication technologies, etc. ITS can play important role in security planning by providing detection and management of traffic anomalies. CDTC has developed an ITS priority network that identifies critical locations where ITS technologies are in place or are a priority to be developed. CDTC provides extra credit for projects that addresses ITS components in the network during TIP funding.

CDTC Bridge Working Group- In November of 2013, CDTC formed a Bridge Working Group to address questions and concerns raised by the Planning Committee in response to the NYSDOT and Federal-level paradigm shift from routine replacement to an emphasis on preservation. Since bridges are an important part of 'critical infrastructure,' their preservation is of utmost importance to the security of the transportation infrastructure system. The Bridge Working Group, comprised of members representing four counties, local cities, NYSDOT, and CDTC, developed a mechanism to assist with identification of longer-term bridge replacement and preservation needs, including technically solid scoping and cost information for locally owned bridges. The work group is expected to device mechanisms that will allocate limited resources in stabilization of bridge assets within a comprehensive and objective bridge management approach. As a first step, the Working Group has contracted out a study entitled "Identification of Bridge Preservation Candidates, Treatments, and Costs for Locally-owned Capital District Bridges" to the consultants. The consultants is tasked with review of existing structural conditions, structural evaluation and treatment recommendation, identification of risk of failure for individual bridge elements, and documentation of bridge management recommendations,

including data and process. The study outputs are intended to help guide municipalities and CDTC in understanding conditions, risks, and repair strategies in order to facilitate prioritization and rational programming of bridge stabilization and repair work.

Regional Studies and Plans- CDTC conducts or partner with other agencies in conducting various studies and prepare plans that address traffic operations. Recent studies include the I-87/US 9 Integrated Corridor Management Plan (ICM). ICM enables agencies to optimize use of available transportation infrastructure by managing demand on a particular facility or directing travelers to underutilized facilities in a corridor. Strategies could include motorists shifting their trip departure times, routes, or modes, and/or NYSDOT dynamically adjusting capacity on I-87 by or adjusting traffic signal timings to accommodate demand fluctuations.

Participation in Local Emergency Planning Committees (LEPC)- LEPCs are the primary security/hazards coordination forum at the county level. CDTC regularly participates in the LEPC meetings in the region. CDTC has made the committee members aware of its role and service capabilities. These meetings allow CDTC to be aware of hazard planning and operations activities in the region and provide inputs in terms of potential traffic impacts and/or influence on/by other transportation projects/activities in the region.

Evacuation Scenarios- CDTC has collaborated with enforcement officials in the region to develop potential security incident scenarios. These scenarios were then fed into the regional traffic model to analyze the traffic impacts and identify evacuation routes, access routes for emergency vehicles, and overall evacuation plan. These plans recognize the importance of transit, para transit, and pedestrian environment during a catastrophic event.

Recommendations

CDTC is expected to continue its programs and projects that support multi-faceted aspects including operations, safety, and security. Specific areas identified for further exploration and/or expansion include the following:

1. **Foster communication and provide a forum-** The Regional Operations and Safety Advisory Committee is an excellent forum to further enhance the communication among various agencies in the security planning realm. State agencies, Police, and local operational and planning community are members of this committee and provide various inputs. This collaborative effort is further enhanced with CDTC's participation in LEPCs since LEPCs have a more diverse group including fire districts, health department, and private industry representatives who are outside the traditional transportation and planning entities. These collaborative efforts provide direct communication and interaction with key security-related groups incorporating them into the regional planning process. This Committee as well as CDTC's Planning Committee and Policy Board allows for direct links with CDTA, the Port of Albany, and the Albany International Airport since they are members of one or more of these forums. CDTC can further expand its activities within these committees by:
   - Providing a forum for discussions on coordinating incident/emergency response
   - Providing a forum for emergency agencies to coordinate surveillance and prevention strategies
   - Coordinating public information dissemination strategies

2. **Funding-** One of the MPO's responsibilities is to provide funding strategies and projects that will improve the performance of the transportation systems. CDTC has a substantial history of providing

funding the operations of the regional Transportation Management Center (TMC) and the Highway Emergency Local Patrol (H.E.L.P) as well as cooperatively funding key initiatives at rail, port, air, and inter-modal facilities. To further assist with funding security related strategies and projects, CDTC could take action in the following:

- Continue funding of TMC and ITS technologies
- Funding new strategies/technologies/projects that can help prevent events
- Collaborate with local emergency response community in securing other federal funds through State Homeland Security Grants and the Urban Area Security Initiative (UASI) Grant.

3. **Technical Support and Information Dissemination-** CDTC's regional role and technical strength place it in a unique position to provide technical support to emergency agencies and local communities on transportation system analyses such as vulnerability assessments, evacuation scenario development, data compilation and analyses, and best practices and public information dissemination. CDTC has potential access to many operational data on highways and safety data on streets. This knowledge base could be enhanced by linking these datasets with other emergency related datasets within the region. CDTC has already used its traffic demand model to develop evacuation scenarios. This kind of technical support could be extended to the local communities and made into a regular aspect of collaboration. CDTC could also coordinate different local governments to develop collaborative plans. Some of the areas CDTC could take action are:

   - Compile data on transportation system vulnerability and vulnerability analyses on regional transportation facilities and services
   - Disseminate (and possibly coordinate) research on structural integrity (CDTC Bridge Working Group is currently undertaking an assessment of local bridges in the CDTC region)
   - Disseminating best practices in incident-specific engineering design and emergency response
   - Coordinating public information dissemination strategies
   - Analyzing transportation network for emergency/hazardous route planning
   - Conducting targeted studies on identified deficiencies
   - Coordinating collaborative efforts among municipalities.

4. **Vulnerability Planning-** Global climate change has been affecting the weather patterns across the globe. It is predicted that frequency and severity of storms and blizzards could increase drastically in the future making our transportation infrastructure vulnerable to flooding, etc. It is important for our region to understand the vulnerability of our infrastructure and plan for critical failures or disruptions in the system. NYSDOT has been conducting flood vulnerability assessment of their system across the state. Similar assessment could be carried out of our local system in collaboration with Counties and municipalities that will give a comprehensive understanding of vulnerability in our region. This would allow CDTC and it members to develop projects and allocate funds for protecting critical infrastructure and develop resiliency. CDTC could apply for competitive grants from Federal Highway Administration (FHWA) to carry out such studies. Activities CDTC could take up in the future include:
   - Conduct vulnerability survey/assessment of local transportation system.
   - Develop options for improving resiliency of transportation facilities or systems