

Federal Highway
Administration

Connecticut
Division Office

Resource Center

Connecticut
Department of
Transportation

Program Review



Local Agency Traffic Signal Operations and Maintenance

May 2012



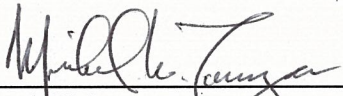
FINAL REPORT

**CONNECTICUT
LOCAL AGENCY TRAFFIC SIGNAL SYSTEM
PROCESS REVIEW REPORT**

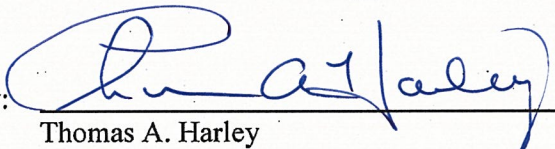
May 2012

This Local Agency Traffic Signal System Process Review Report was prepared by the Federal Highway Administration's (FHWA) Division Office in consultation with the Connecticut Department of Transportation and FHWA's Resource Center.

**STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION**

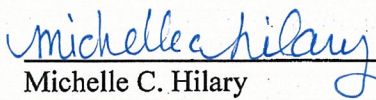
By: 
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Bureau Chief, Bureau of Highway Operations

Date: June 14, 2012

By: 
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Date: June 14, 2012

**FEDERAL HIGHWAY ADMINISTRATION
CONNECTICUT DIVISION OFFICE**

By: 
Michelle C. Hilary
Assistant Division Administrator

Date: June 18, 2012

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EXECUTIVE SUMMARY

This process review focused on assessing the management, operations, and maintenance of local agency traffic signal systems. A total of nine local agencies participated in the review. All are located in an urbanized area (see Appendix 1) and eight of nine are located within a transportation management area (see Appendix 2). All associated metropolitan planning organizations (MPOs) participated in the review.

Federal-aid investments for capital projects involving the installation or upgrade of traffic control signal systems for twelve local agencies within Connecticut during the span of ISTEA, TEA-21, and SAFETEA-LU, including extensions (1992 to the present), exceeds a total of \$100 million. CTDOT is responsible for assuring that Federal-aid investments in traffic signal systems include controls to assure that local agencies manage and operate these systems. There is a lack of demonstrated evidence or documented policies and procedures by the local agencies to ensure that financial and staffing commitments are put in place and maintained to manage and operate their signal systems.

This review determined that while there is variation amongst the local agencies relative to their traffic signal systems and to their current capabilities to manage, operate, and maintain them, there are many consistent commonalities amongst them which limit their ability to effectively carry out traffic signal operations and maintenance. The primary gaps involving operations and maintenance include limited local staffing and technical capabilities, insufficient local financial resources, inadequate evidence of transportation planning for traffic signal operations and maintenance with linkage to the Congestion Management Process and the statewide ITS architecture, lack of State, regional or local policies regarding operations and maintenance, lack of clearly documented local operations and maintenance objectives, lack of local management, operations, and maintenance plans, and lack of local performance results to show the level of operations.

This report documents fifteen major observations and gaps and provides specific recommendations along with recommended actions. The report identifies many opportunities for the improvement of traffic signal management, operations, and maintenance by local agencies. The review determined that the CTDOT, the MPOs, and the local agencies are not taking advantage of opportunities to assure that existing and future signal system infrastructure and capital project investments are adequately maintained and provide effective operations of traffic signal systems. Federal-aid funding for operating costs of local agency traffic signal systems is eligible, but is not currently being considered.

Future Federal-aid funding involving capital and infrastructure installations or upgrades for local traffic signal systems will not be allowed unless local agencies adopt and commit to clear goals and objectives and a plan for management, operations, and maintenance of their system to the satisfaction of the oversight agencies. Operations and maintenance projects may be funded. Local agencies must also commit to providing, developing, and maintaining adequate full-time staff with the experience and expertise to provide effective traffic signal operations and maintenance.

Staffing reductions and loss of expertise in traffic signal operations at CTDOT over the last several years are limiting the ability of the State to provide sufficient oversight of local agency traffic signal projects. Reductions in CTDOT staffing and expertise in this specialty area have reached a critical level, the ability of existing staff to operate traffic signal systems on State highways and oversee local agency systems is not sustainable, and will likely negatively impact traffic signal operations and maintenance on State roads in the future. State and Federal oversight for local agency traffic signals should be increased and State and local training and technical assistance are needed.

BACKGROUND

In June 2010 the Connecticut Division Office conducted a joint Operations Risk Assessment with the Connecticut Department of Transportation as part of an overall statewide risk assessment of all highway transportation program areas in Connecticut. One of the results of the Connecticut Division's overall 2010 risk assessment process was to identify traffic signal operations and maintenance within local agencies to be one of the top ten risk areas in the state. It was decided that the best response strategy was to mitigate the risk by conducting a process review of traffic signal operations and maintenance involving local agencies in Connecticut. The below risk statement was developed as part of operations risk assessment conducted in June 2010.

If municipal traffic control signal systems are not properly maintained, periodically re-timed & operated, then the systems will deteriorate, performance will degrade, and the public will not realize the full benefits (reduction in congestion and improvement in air quality) that these systems are designed to provide.

Nationally, efforts have been carried out towards assessing the condition and quality of traffic signal operations in the United States. The National Transportation Operations Coalition (NTOC) has sponsored three national Traffic Signal Operations Self Assessments, which were conducted in 2004, 2006, and 2011. The NTOC with support from FHWA developed a National Report Card on traffic signal operations based on the results of these assessments. The 2005 National Report Card produced a grade of D- and the 2007 National Report Card produced a grade of D. The 2012 National Report Card is schedule to be released in 2012. The 2007 Traffic Signal Operations Self Assessment involved 417 agencies from 47 states that voluntarily completed the assessment, representing approximately 45 percent of all traffic signals in the United States. Several agencies from Connecticut participated in this self assessment. A grade of D means that agency programs to support efficient maintenance and operations of traffic signals are not as effective as they could be.

The following benefits were presented in the National Traffic Signal Report Card as being achievable if agencies dedicated the efforts and the resources to achieve a high score.

- **Delay** would decrease by 15-20%
- **Travel time** would reduce up to 25%
- **Emissions** would reduce up to 22%
- **Fuel consumption** would reduce up to 10%
- **Benefit-cost ratio** up to 40:1

PURPOSE and OBJECTIVE

The purpose and objective of this process review is to conduct a joint Connecticut (CT) Division/FHWA Resource Center/Connecticut Department of Transportation (CTDOT) review focused on the operations and maintenance of local agency traffic control signal systems funded with Federal-aid funds.

The results and follow-up actions from this process review are intended to lead towards the development of systematic improvements to local agency traffic signal system operations and future traffic signal projects to reduce traffic congestion regionally and within local agencies in the State of Connecticut.

SCOPE and METHODOLOGY

The primary scope of this review is as follows:

1. Assess the state of traffic control signal system operations and maintenance in each local agency reviewed
2. Assess the level of local agency commitment and support (technical expertise, resources, implementation plan, etc.) towards providing satisfactory operations and maintenance of traffic control signal systems

The review was conducted using the following methodology:

1. Nine local agencies in Connecticut agreed to participate in field reviews and meetings that were conducted regionally by the review team on June 20, 21, and 22, 2011. These reviews included participation by representatives from the associated metropolitan planning organizations. Those participating are listed in Appendix 3.
2. A presentation was provided by FHWA each day which generated good candid discussion and assisted the review team in their assessment of the operations and maintenance of traffic signal systems involving the participating local agencies and metropolitan planning organizations.
3. A questionnaire was developed by the review team. The questionnaires were mailed to each local agency by the Connecticut Division office on May 18, 2011. All nine agencies returned completed questionnaires.
4. A review was also conducted using FHWA's Fiscal Management Information System (FMIS) to document facts regarding the number and obligated amounts of Federal-aid projects approved for funding by the Connecticut Division office involving traffic signal capital improvement projects. Appendix 4 contains the list of projects and Federal-aid funds obligated by local agency. Appendix 5 provides a bar chart showing the number of projects and funds obligated.
5. The 2011– 2040 Long-Range Transportation Plans prepared by the metropolitan planning organizations and other transportation planning documents were also analyzed to determine the level of consideration in these plans towards providing for the management, operations, and maintenance of traffic signal systems.

PROCESS REVIEW TEAM MEMBERS

This process review on local agency traffic signal systems was coordinated and conducted by the following FHWA and CTDOT team members:

Harold Decker, *Principal Engineer (CTDOT Highway Operations)*

John F. Korte, *Transportation Supervising Engineer (CTDOT Highway Operations)*

James Nesci, *Transportation Supervising Engineer (CTDOT Highway Operations)*

Peter Williamson, *Engineer 3 (CTDOT Traffic)*

Robert Ramirez, *ITS, Traffic & Safety Engineer (FHWA CT Division)*

Paul Olson, *ITS Specialist (FHWA Resource Center)*

Richard Denney, *ITS Specialist (FHWA Resource Center)*

OBSERVATIONS and RECOMMENDATIONS

The following observations and recommendations were compiled as a result of the field visits, the completed traffic signal operations and maintenance questionnaires, questions and discussions during the field reviews, reviews of various transportation planning documents, and the review of the Federal-aid projects.

Appendix 6 contains a matrix of the major observations noted during this review. The observations and recommendations are categorized into three principal phases or areas to assist in identifying where the action planning might best be focused and targeted. These phases or areas include the following:

- **Planning**
- **Project Development**
- **Technical Assistance and Training Program**

PLANNING PHASE

Observation #1: Local agencies are not utilizing Federal-aid funding for Traffic Signal Operations.

Recommendation: Many of the local agencies that participated in this review are struggling to find the resources necessary to adequately manage, operate, and maintain their traffic control systems installed with Federal-aid funds.

The metropolitan planning organizations and the local agencies that participated in the review were unaware that Federal-aid funds are eligible for traffic signal operations. Appendix 7 contains a

FHWA guidance document on “Transportation Systems Management and Operating Costs: Operating Cost Eligibility under the Federal Highway Program. This guidance cites traffic signals as capital improvement projects that may include eligible operating costs.

Recommended Action: The CTDOT, the metropolitan planning organizations, and the local agencies should investigate and consider options involving Federal-aid funding for traffic signal operations.

Observation #2: Most metropolitan planning organizations have not updated their ITS strategic deployment plans.

Two of the metropolitan planning organizations covering some of the local agencies included in this review developed ITS strategic deployment plans about fifteen years ago. Many of the projects included in these plans have been implemented. These two deployment plans primarily included traffic signal system upgrades and capital costs. The plans also included cost estimates for the conduct of reviews of traffic signal operations, which resulted in two region-wide traffic signal system projects for timing optimization on State and local roadways. These projects were initiated by CTDOT and funded with Federal-aid funds in 1998 and 1999.

A third metropolitan planning organization covering some of the local agencies included in this review developed an ITS Strategic Deployment Plan about two years ago. This plan does not consider needs, priorities and initiatives focused on traffic signal management, operations and maintenance.

Recommendation: Since a Congestion Management Process is required in transportation management areas (TMAs), it is recommended that this process be utilized to encourage effective systems management and operations within each TMA to address congestion management by providing enhanced linkage to updated ITS deployment plans, the transportation planning process, and the ITS statewide architecture.

Recommended Action: Metropolitan planning organizations should update their ITS strategic deployment plans. The metropolitan planning organizations should evaluate and consider a variety of corridor or area-wide congestion reduction projects when updating their ITS strategic deployment plans, including traffic signal timing and monitoring and control systems to respond to freeway incident diversion and planned special events. These plans should be linked to the ITS statewide architecture, the congestion management process, and the transportation planning process. The ITS strategic deployment plans should include a fairly detailed schedule of when the projects or actions in the plan need to be funded and completed.

Observation #3: The recent metropolitan long range transportation plans developed by the metropolitan planning organizations for the regions covered by local agencies included in this review do not appear to satisfy the requirements in 23 CFR, Part 450, Subpart C, Section 322 - Development and content of the metropolitan transportation plan.

These long range plans do not appear to adequately consider and include all strategies related to improving the performance of existing transportation facilities through operational and management strategies. There are minimum requirements on what must be included in the metropolitan transportation plan. 23 CFR 450.322(f)(3) includes operational and management

strategies as a minimum requirement. Specifically, this regulation states “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.” These metropolitan long range transportation plans either do not include or support very few projects for traffic signals improvements or the operations and management of traffic signals within the local agency maintained roads included in this review.

In addition, the same Federal regulation requires that these metropolitan long range transportation plans include a financial plan for implementing projects in the long range transportation plan. In as much as the local agencies included in this review have obligated over \$100 million for traffic signal capital improvement projects on Federal-aid highways, it is important to note that there are Federal requirements to ensure that operational deployments are effectively operated and maintained by State and local agencies. According to 23 CFR 450.322(f)(10)(i) “For purposes of transportation system operations and maintenance, the financial plan shall contain system-level estimates of costs and revenue sources that are reasonably expected to be available to adequately operate and maintain Federal-aid highways (as defined by 23 U.S.C. 101(a)(5)) and public transportation (as defined by title 49 U.S.C. Chapter 53).

Recommendation: The CTDOT should meet with the metropolitan planning organization to encourage them to get traffic signal capital improvements and management, operations, and maintenance initiatives included in the long range transportation plans. This effort should also involve consideration by each metropolitan planning organization of extracting mid-term traffic operations and maintenance program plans that are tied to their ITS Strategic Deployment Plan, and subsequently extracting projects to include in their Transportation Improvement Programs (TIPs).

The long range plan should also recognize that ITS systems, in general, and traffic signal systems specifically, have a relatively short life cycle. For example the life cycle for the a traffic signal system is typically 10 years; therefore, a long range plan for the next 20 to 30 years should include at least one major system upgrade. The planning for funding for this upgrade should begin now, not when the system is hopelessly out of date.

Some local agencies that were reviewed had equipment that is significantly beyond its life cycle and has not been supported by the vendors for over ten (10) years. The base operating system for the traffic signal management system in one city is Windows 95, which has not been supported since 2002.

Recommended Action: The CTDOT should collaborate and coordinate with Connecticut’s metropolitan planning organizations to agree on policy decisions to provide future assurances that the Federal regulations involving the transportation system management, operations, and maintenance of Federal-aid investments on Federal-aid highways are been fully satisfied.

Observation #4: The operation of traffic signals on local agency maintained roads is not normally included during the transportation planning certification process of the metropolitan planning organizations.

Recommendation: Since the planning requirements for operations, management, and maintenance of transportation facilities and systems, in particular traffic signals, does not appear to be included in the metropolitan planning organization’s transportation planning process, it is highly recommended

that this area be covered in the transportation planning certification process.

Recommended Action: The FHWA Connecticut Division should coordinate with the transportation planning organizations to include this area in the next round of transportation planning certifications. The Divisions' Planning and Engineering units will also collaborate and coordinate in planning and conducting the transportation planning certification reviews. Specifically, the Division's Engineering unit will support the Division's planning unit regarding the ITS portion of the certification reviews.

Observation #5: Policy level support for local agency traffic signal management, operations, and maintenance does not exist (no written policy).

Recommendation: Policy level support from CTDOT and the metropolitan planning organizations for local agencies desiring to improve traffic signal management, operations, and maintenance should be considered and strengthened.

Recommended Action: The CTDOT in collaboration with the metropolitan planning organizations should develop a documented policy in support of local agency traffic signal system management, operations, and maintenance.

PROJECT DEVELOPMENT PHASE

Observation #6: The local agency representatives responsible for traffic signal operations and maintenance and the metropolitan planning organizations have not demonstrated a consistent familiarity and understanding of the role of the ITS regional architecture regarding ITS projects, such as traffic control system projects. Some of the traffic engineers and operators that participated in the development of the statewide ITS architecture in 2004 are no longer working with their agencies. Some local agencies do not have a full-time traffic engineer, while other responsible local agency officials are not familiar with the requirements and how to implement Connecticut's statewide ITS architecture.

Recommendation: Strategies included in the metropolitan planning organizations' transportation improvement program and the metropolitan transportation planning documents should be linked to and consistent with Connecticut's ITS statewide architecture. The maintenance plan for the ITS Statewide Architecture should be kept current by CTDOT in coordination with the metropolitan planning organization representatives involved in the maintenance activities for the ITS architecture. Updates to Connecticut's statewide ITS architecture should be made, as needed.

Recommended Action: The CTDOT should coordinate an effort with the metropolitan planning organizations to plan a schedule for updating Connecticut's ITS statewide architecture. Training on the ITS regional architecture and requirements should be investigated and scheduled for participation by local agencies, metropolitan planning organizations, and CTDOT representatives (see also similar action item below under Recommendation #7) ITS projects, including traffic signal projects, should be developed consistent with the ITS regional architecture. The statewide ITS architecture and updates should also be linked to updates of the ITS Strategic Deployment Plans.

Observation #7: Connecticut developed a statewide ITS architecture in 2005. The local

agencies have indicated interest in learning how to apply the statewide ITS architecture and systems engineering final rule on ITS projects per 23 CFR, Part 940 during the planning and development of ITS projects, including traffic signal projects. Information provided by the local agencies and discussions during the field review indicated that the statewide ITS architecture and systems engineering final rule needs to be consistently applied by all local agency representatives responsible for implementing and operating traffic signal projects. Responsibility for providing oversight in accordance with the joint FHWA/CTDOT Stewardship and Oversight Agreement on local agency traffic signal projects has been with CTDOT.

Recommendation: FHWA should identify the appropriate training course(s) and should consider the best approach for delivering training on the ITS Architecture and Systems Engineering to the CTDOT and local agencies. The level of effort to assure conformance with 23 CFR 940 on future local agency traffic signal projects should be increased jointly by CTDOT and the Division office.

Recommended Action: FHWA has conducted an ITS Architecture and Systems Engineering workshop in several states. This workshop could be added to the FHWA work plan for conducting it in Connecticut if the CTDOT and the local agencies indicate that they are interested in hosting it in Connecticut.

The CTDOT should assure that local agencies consistently comply with ITS architecture and systems engineering requirements on traffic signal system projects. The Division will also increase Federal oversight on local agency traffic signal system projects. This will be accomplished through a combination of making selective local traffic signal system projects full oversight and by increasing the Division's stewardship of these projects via periodic file reviews of delegated projects. This is important as a demonstration that the projects are driven by needs, that the risk of straying from those needs during implementation (including phased implementation) is minimized, that the projects ultimately meet those needs, and that emphasis on future operations and maintenance of these projects is both committed to and provided by the local agency.

Observation #8: Some local agencies have struggled with maintaining positions for a traffic signal engineer and affording resources to operate their signal systems at desired levels. It was noted that a number of the local agencies that participated in the review are located regionally in close proximity to each other along the same major transportation corridors serving the region and are facing similar congestion issues along their arterial corridors.

Recommendation: Regional cooperation opportunities among local agencies should be explored. The local agencies should consider developing a regional concept of operations, including joint regional cooperation opportunities with the potential for leveraging resources and economies of scale toward traffic signal operations and maintenance. Examples of cooperative opportunities might include joint purchase agreements or traffic signal systems sharing.

Recommended Action: The CTDOT and local agencies should consider and determine the potential for establishing a forum or coordinated effort for initiating and continuing a dialogue on establishing regional cooperation opportunities between local agencies to support traffic signal operations and maintenance.

Observation #9: The local agencies have not developed documented traffic signal operations

objectives for their traffic signal systems. In certain instances, it is perceived that some local agencies may be making certain traffic signal procurements or deploying technology without establishing the operational and maintenance objectives and performance criteria to justify the capital investments. Discussion occurred during the review regarding the concept of exploring the development of a regional operations condition map.

Recommendation: A pilot project to explore the development of a regional arterial performance map should be explored.

Recommended Action: The CTDOT should require local agencies to develop operations objectives for traffic signals on future traffic signal projects and should also encourage them to develop performance measures to report on traffic signal operations.

Observation #10: Local agencies have not developed true operations and maintenance plans for traffic signals. Some plans (not true operations and maintenance plans) were developed on several local traffic signal projects many years ago and have not been updated on more current projects to reflect changes in local agency staffing, budgets, equipment, systems, and technical capabilities. The operations and maintenance plan should consider specific goals and policies related to providing efficient management and operations of the traffic signal systems, operations objectives, a data collection system, and system performance monitoring. Most local agencies indicated that they do not have a review program for area-wide or corridor traffic signal timing nor is it being done on a regular basis. One local agency indicated that signal timing and optimization was performed about 2 years ago.

The majority of the discussions from the agencies focused on the infrastructure elements that they have installed. Generally they did not have a well formed, much less documented, program for what to do with that infrastructure. Some of the justifications presented for the expenditures on the various infrastructure items were not well connected to clearly defined and documented operational needs. This is primarily because no agency had written documentation to guide their program.

Some engineers and operators interviewed lacked the most basic knowledge to understand the infrastructure that they were responsible for, much less how to operate it. This was due primarily to staff turnover and downsizing. Having clearly documented operational policies and guidelines would provide some basic information plus some program and operational consistency as engineers changed.

Recommendation: There is a significant need for the development of operations and maintenance plans along with written agency policy documentation. These documents could and should be prepared to cover all operators within a region. Doing this regionally will foster consistency and spread the costs and efforts for documentation preparation. FHWA can provide guidance or assistance in preparing these. A good guide to such a document is *Improving Traffic Signal Management and Operations: A Basic Service Model* FHWA publication FHWA-HOP-09-055 (<http://www.ops.fhwa.dot.gov/publications/fhwahop09055/index.htm>).

Recommended Action: A regional approach to documenting local agency traffic signal operations and maintenance policy and plans is highly recommended. The CTDOT should require this level of documentation and require its approval as part of its oversight responsibilities on all future traffic signal system capital and operations projects. The operations and maintenance plans should clearly

indicate and guarantee the funding required to carry out the tenants of that plan as well as expected outcomes.

The CTDOT and the FHWA shall require an operations and maintenance plan for each local agency's program and projects if the agency is to expect FHWA to further fund capital traffic signal system projects. Otherwise, CTDOT and FHWA may insist that the local agency fund operations projects in accordance with Observation/Recommendation #1. Also, the tracking of local agency accountability for the fulfillment of the operations and maintenance plans developed and approved should also be considered by CTDOT and FHWA as a condition of future Federal-aid funding.

Observation #11: The use of adaptive signal control in Connecticut has not been strongly considered by any of the local agencies that participated in the review. Adaptive traffic signal control is a FHWA Every Day Counts (EDC) initiative that has not been implemented in Connecticut and should be considered by local agencies, if appropriate. Awareness and exposure on the applicability and benefits of adaptive signal control has not generally been provided to the local agencies in Connecticut.

Recommendation: More focus should be placed on the potential utilization of adaptive signal control in Connecticut. However, the majority of the agencies that were reviewed do not possess the supporting policies or the staff knowledge and expertise to effectively operate an adaptive signal control system. There are likely locations where this could benefit arterial operations, but if it is not operated correctly by knowledgeable staff it could make the situation worse.

Recommended Action: The CTDOT and the local agencies should consider obtaining awareness training on adaptive signal control and should explore potential opportunities of implementing adaptive signal control projects. At least one local agency has expressed interest in adaptive signal control. Local agencies interested in pursuing adaptive signal control should also plan to develop a policy for its implementation and operation.

TECHNICAL ASSISTANCE AND TRAINING PROGRAM

Observation #12: All local agencies expressed an interest in developing their staff regarding traffic signal operations and maintenance. FHWA has promoted the development of many training courses and learning opportunities for traffic signals.

Recommendation: A learning development program geared for agencies interested in developing the skills of their traffic signal operations maintenance staff should be developed. Some of the existing learning opportunities include the following: NHI courses, Systems Engineering workshop, Regional Architecture workshop, and Operations Management workshop.

Recommended Action: The CTDOT and the Connecticut LTAP Center should take the lead in developing a technical assistance and training program for traffic signal operations and management.

Observation #13: The local agencies have expressed a desire to take advantage of FHWA opportunities to assist them in advancing traffic signal operations, management, and maintenance. While a number of training courses and other typical learning opportunities are available, FHWA's peer exchange program can be geared to providing agencies with

information on implementing best practices or assistance in establishing successful policies, plans, and programs.

Recommendation: Since many of the issues that exist in Connecticut for improving traffic signal operations and maintenance are consistent amongst all or most of the local agencies, a peer exchange could be customized to fulfill multiple needs.

Recommended Action: CTDOT should assist the local agencies in justifying and preparing an application for a peer exchange on traffic signal operations. The Connecticut Division can assist in promoting and facilitating the conduct of the peer exchange.

Observation #14: Most local agencies have limitations in developing successful traffic signal operations and maintenance programs due to staffing issues, funding issues, and technical assistance needs. The shared use of an experienced traffic engineer with technical expertise would help fill many of the staffing and gaps in technical expertise in the traffic signal operations area.

Recommendation: The concept of establishing a circuit rider program in Connecticut through the LTAP Center should be considered to provide shared engineering services for traffic signal operations and maintenance. One of the first tasks could be assisting local agencies in preparing their traffic signal management, operations and maintenance guidance and policy statements and also their operations objectives and plans. Traffic signal timing support should also be a major focus area for a circuit rider.

Recommended Action: The CTDOT and the LTAP Center should meet with local agencies to consider the potential for establishing a circuit rider program to support traffic signal operations and maintenance activities for local agencies needing assistance in Connecticut.

Observation #15: Most of the local agencies do not have a formal or comprehensive development program in place for developing the knowledge, skills, and abilities of their traffic staff.

Recommendation: The local agencies should be provided assistance in putting together a successful staff development and resources program for traffic signal operations and maintenance. This program would clearly define the expected basic knowledge skills and abilities but also basic training requirements and certifications.

Recommended Action: The CTDOT, the LTAP Center, and FHWA should provide local agencies with assistance in developing a model staff development and resources program.

CONCLUSIONS

A number of recommendations were identified during the field reviews and discussions with local agency representatives and the metropolitan planning organizations that participated in the process review. The gaps and shortcomings related to traffic signal management, operations, and maintenance in Connecticut are generally wide-ranging in nature.

Local agencies will need assistance from CTDOT, the metropolitan planning organizations, and FHWA in order to improve the level of traffic signal operations within their urbanized areas and region. The recommended actions identified in this report can address the critical traffic operations and maintenance gaps involving the local agencies that participated in the review, as well as others.

This report documents a number of gaps and needs affecting the management, operations, and maintenance of traffic signal systems by local agencies. The report also identifies a variety of opportunities for improvement that the metropolitan planning organizations and local agencies must take advantage of in order to improve the safe and efficient flow of traffic in urbanized areas and along Federal-aid highways.

This report points out the need for local agencies to develop a policy to commit staff and resources and a process to identify and document their objectives, needs, plans, program, and performance measures for improving traffic signal system operations and maintenance.

The metropolitan planning organizations have the responsibility of applying the planning factor involving promoting efficient system management and operations in their transportation planning process as required by Federal regulations. They should also consider utilizing a variety of tools and processes, including regional concepts of operation and linking transportation planning to the congestion management process, the statewide ITS architecture, and to ITS strategic deployment plans.

The CTDOT and the Connecticut Division office should work in collaboration with the metropolitan planning organizations and the local agencies by providing needed guidance, technical assistance, and training and by increasing the level of oversight on traffic signal system projects. The CTDOT also needs to consider approaches for increasing the level of staff and the expertise needed to support this effort and to provide the increased oversight and assistance.

Future Federal-aid funding on capital and infrastructure projects involving local agency traffic signal system projects will be tied to the project satisfying Federal regulations and a local agency's commitment via a written policy and a plan towards carrying out the operations and maintenance of the system.

ACTION PLAN

The following action plan is highly recommended for improving the level of traffic signal operations and maintenance along all roadways within Connecticut local towns and municipalities.

1. The Connecticut Division office will conduct an Executive Briefing at CTDOT in late May 2012 to present the scope, observations, findings, recommendations, and discuss the next steps regarding this process review.
2. The CTDOT and the Connecticut Division will jointly oversee the adoption and implementation of recommendations and actions.



Approved:

Michelle Hilary

Michelle C. Hilary
Assistant Division Administrator
Connecticut Division, FHWA

June 18, 2012

Date

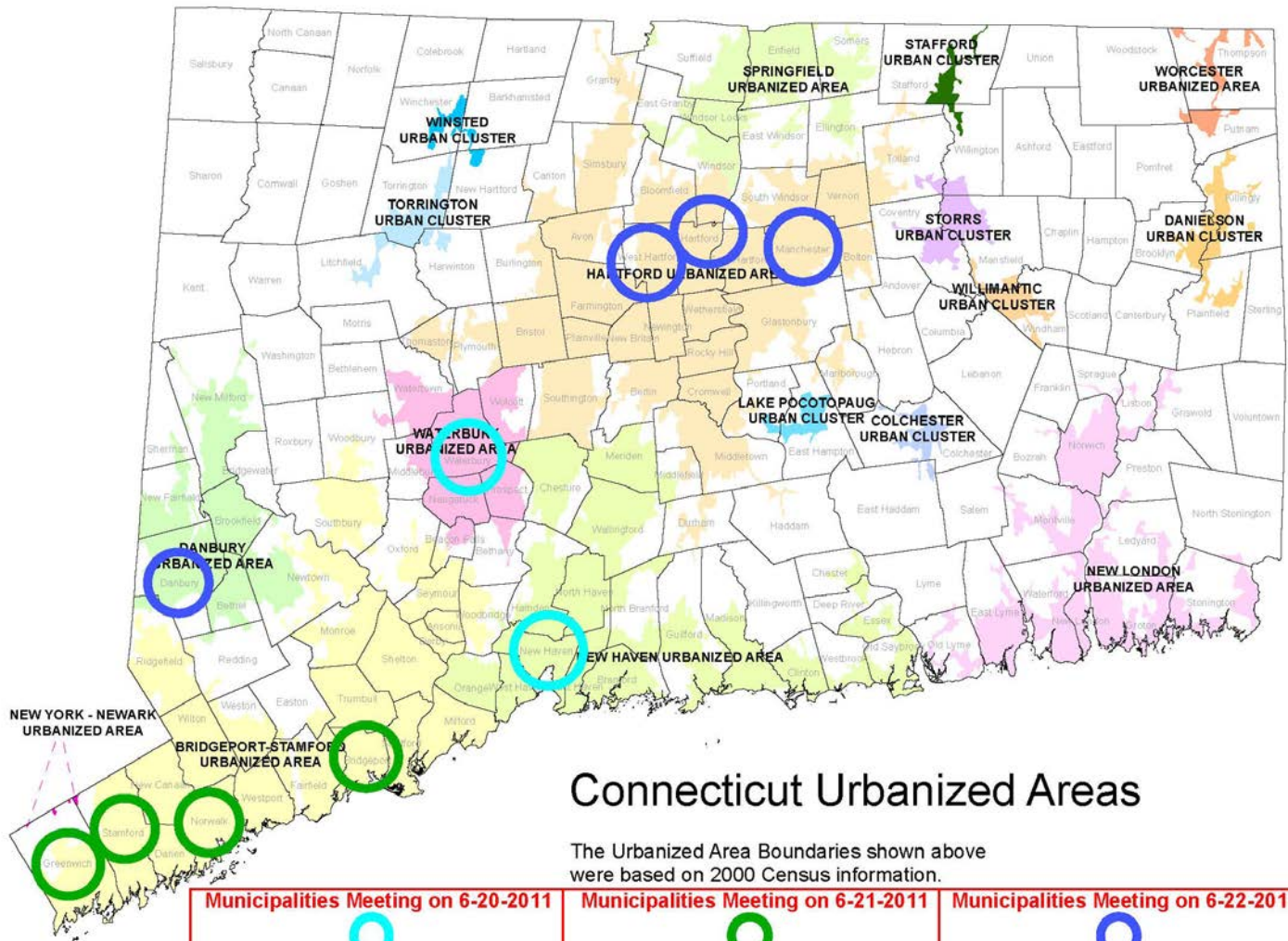


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APPENDIX 1

Local Agencies Participating by Urbanized Area



Connecticut Urbanized Areas

The Urbanized Area Boundaries shown above were based on 2000 Census information.

Municipalities Meeting on 6-20-2011	Municipalities Meeting on 6-21-2011	Municipalities Meeting on 6-22-2011
○	○	○

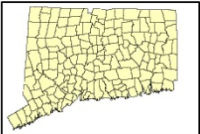
APPENDIX 2

Local Agencies Participating by Transportation Management Area



Legend

- Interstate
- U.S. Highway
- Major State Highway
- Bridgeport-Stamford TMA
- New Haven TMA
- Hartford TMA

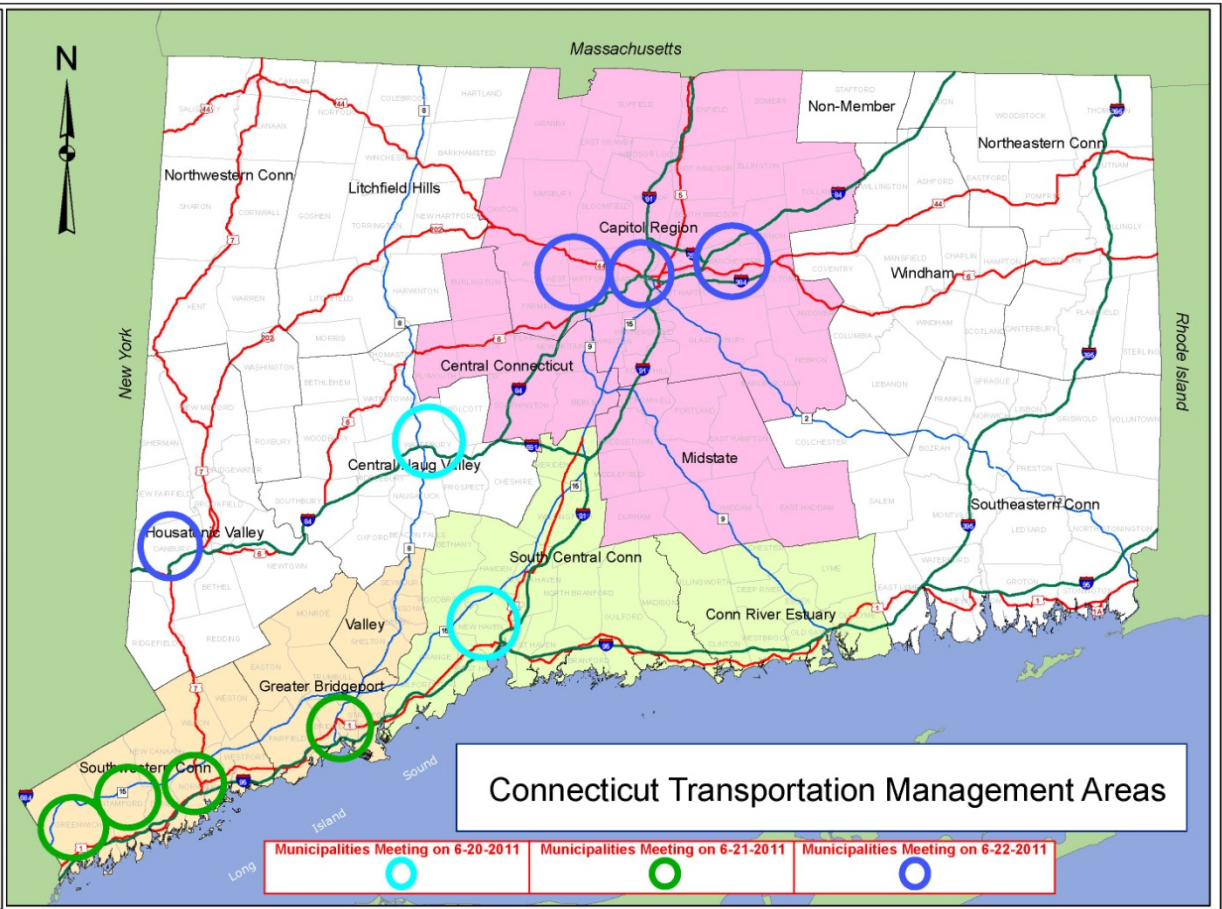


Map Scale



Developed
April 1, 2009

This map, developed for internal ConnDOT use, is a cartographic rendering of DOT roadway records. It should not be referenced or incorporated in any manner in legal documents or proceedings.



Connecticut Transportation Management Areas

- Municipalities Meeting on 6-20-2011
- Municipalities Meeting on 6-21-2011
- Municipalities Meeting on 6-22-2011

APPENDIX 3

Participant List at Local Agency Traffic Signal Field Reviews and Meetings

2011 Traffic Signal System Review

6/17/11

Traffic Signal System Site Visits and Meeting

New Haven and Waterbury

June 20, 2011 – 9:00 am to 4:00 pm

Attendance List

Name	Agency	Telephone No.	Initial
Bob Jahn	CITY OF WATERBURY	(203) 574-6851, x7190	RRV
Denis Cuevas	CITY OF WATERBURY	(203)	JAC
<i>BILL EGGE</i> Sr. Traffic Technician	CITY OF WATERBURY	(203)	WML
Bijan Notghi	CITY OF NEW HAVEN	(203) 946-8069	
Consultant	For CITY OF NEW HAVEN		
<i>Claudio Vecchiaro</i> System Integrator	For CITY OF NEW HAVEN	<i>signal service inc</i> 860-289-8033	CV
✓ Joe Perrelli	COGCNV	(203) 757-0535	JP
✓ Péter Dorpalen	COGCNV	(203) 757-0535	PD
Stephen Dudley	SCRCOG	(203) 234-7555	SD
Robert Ramirez	FHWA-CT	(860) 659-6703 x 3004	RR
Paul R. Olson	FHWA-RC	(720) 963-3239	PRO
Richard Denney	FHWA-RC	(410) 962-4796	RD
Harold J. Decker	CT DOT	(860) 594-2636	HD
John F. Korte	CT DOT	(860) 594-3459	JFK
James F. Nesci	CT DOT	(860) 258-0347	JFN
Peter E. Williamson	CT DOT	(860) 594-2775	PEW
<i>J STRANNS</i>	<i>ON IT</i>	<i>203-946-8067</i>	<i>JS</i>
<i>Morteza Hayatghaybi</i>	<i>Vhb, Inc</i>	<i>860-632-1500</i>	<i>MH</i>
<i>Rob York</i>	<i>Signal Service INC</i>	<i>860-289-8033</i>	<i>RY</i>
<i>Bijan Notghi</i>	<i>CNH T&P</i>	<i>203-946-8069</i>	<i>BN</i>
<i>Mark J. Donovos</i>	<i>WITBY ENGR</i>	<i>203-574-6851</i>	<i>MD</i>

2011 Traffic Signal System Review

6/17/11

Traffic Signal System Meeting

Bridgeport, Danbury, Greenwich, Norwalk, and Stamford

June 21, 2011 – 8:30 am to 4:00 pm

Attendance List

Name	Agency	Telephone No.	Initial
Sadi H. Wadi	CITY OF BRIDGEPORT	(203) 332-5642	SW
Abdul Mohamed	CITY OF DANBURY	(203) 797-4643	
James W. Michel	TOWN OF GREENWICH	(203) 622-7767	JWM
Melissa Evans	TOWN OF GREENWICH	(203) 622-7767	ME
Joe Roberto	TOWN OF GREENWICH	(203) 622-7763	JR
Nick Mariani	TOWN OF GREENWICH	(203) 622-7763	NM
Michael M. Yeosock	CITY OF NORWALK	(203) 854-7844	MMY
Fred Eshraghi	CITY OF NORWALK	(203) 854-7843	F.E.
Veera Karukonda	CITY OF STAMFORD	(203) 977-5675	VSK
Mani Poola	CITY OF STAMFORD	(203) 977-4237	
Susan Prosi	SWRPA	(203) 316-5190	
Dr. Floyd Lapp	SWRPA	(203) 316-5190	
Mark Nielsen	GBRPA	(203) 366-5405	MN
Dave Hannon	HVCEO	(203) 775-6256	
Robert Ramirez	FHWA-CT	(860) 659-6703 x 3004	RR
Paul R. Olson	FHWA-RC	(720) 963-3239	PRO
Richard Denney	FHWA-RC	(410) 962-4796	RD
Amy Jackson-Grove	FHWA-CT	(860) 659-6703 x 3009	
Harold J. Decker	CT DOT	(860) 594-2636	HD
John F. Korte	CT DOT	(860) 594-3459	JFK
James F. Nesci	CT DOT	(860) 258-0347	JN
Peter E. Williamson	CT DOT	(860) 594-2775	PEW
George Salanto	City of BPT	203-275-6434	GS
Robert Antons	City of Norwalk	203-216-1367	RA
Matthew Oprica	City of Norwalk	(203) 854-3207	MO
FRANK MAURO		(203) 854-3205	FM
Sue Prosi	SWRPA	(203) 316-5190	SP

Floyd Lapp

2011 Traffic Signal System Review

6/3/11

Traffic Signal System Meeting

Hartford, Manchester, Middletown, West Hartford

June 22, 2011 – 9:00 am to 4:00 pm

Attendance List

Name	Agency	Telephone No.	Initials
Kevin Burnham	CITY OF HARTFORD	(860) 757-9964	<i>[Handwritten initials]</i>
Raj Mathur	CITY OF HARTFORD	(860) 757-9986	<i>[Handwritten initials]</i>
Jim Mayer	TOWN OF MANCHESTER	(860) 647-3151	<i>[Handwritten initials]</i>
Mark Carlino	TOWN OF MANCHESTER	(860) 647-3067	<i>[Handwritten initials]</i>
Jeff Lamalva	TOWN OF MANCHESTER	(860) 647-3158	<i>[Handwritten initials]</i>
Duane Martin	TOWN OF W. HARTFORD	(860) 561-7539	<i>[Handwritten initials]</i>
Mark Hallenbeck	TOWN OF W. HARTFORD	(860) 561 8109	<i>[Handwritten initials]</i>
Robert Barlow	TOWN OF W. HARTFORD	(860) 561-8116	
Jennifer Carrier	CRCOG	(860) 522-2217 x212	<i>[Handwritten initials]</i>
Lia Huang	CRCOG	(860) 522-2217 x224	<i>[Handwritten initials]</i>
Robert Ramirez	FHWA-CT	(860) 659-6703 x 3004	<i>[Handwritten initials]</i>
Paul R. Olson	FHWA-RC	(720) 963-3239	<i>[Handwritten initials]</i>
Richard Denney	FHWA-RC	(410) 962-4796	<i>[Handwritten initials]</i>
Amy Jackson-Grove	FHWA-CT	(860) 659-6703 x 3009	
Harold Decker	CT DOT	(860) 594-2636	<i>[Handwritten initials]</i>
John F. Korte	CT DOT	(860) 594-3459	<i>[Handwritten initials]</i>
James F. Nesci	CT DOT	(860) 258-0347	<i>[Handwritten initials]</i>
Peter E. Williamson	CT DOT	(860) 594-2775	<i>[Handwritten initials]</i>
Abdul Barry Mohamed	City of Danbury	203-797-4641	<i>[Handwritten initials]</i>
ROBERT HARAMUT	MIDSTATE RPA	860-347-7214	<i>[Handwritten initials]</i>

APPENDIX 4

**Listing of Traffic Signal System Projects and Federal-aid Funds Obligated by
Local Agency**

2011 Traffic Signal Process Review - Municipality Project List

3/7/2012
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State No.	FAP No.	Status	Phase	Description	Comp. Date	Auth. Date	Fed. Funds
New Haven							
0092-0562/563	1092(123)	ACTIVE	PE	New Haven, Extend Centrally Controlled Traffic Signal System, Phase 4B, 19 Locations		5/7/2003	\$ 689,700.00
0092-0562	1092(129)	ACTIVE	CN	New Haven, Extend Centrally Controlled Traffic Signal System, Phase 4B, 19 Locations		6/16/2008	\$ 5,678,432.00
0092-0563	1092(130)	ACTIVE	CN	New Haven, Extend and Upgrade Central Controlled Traffic Signal System, Phase 4A, 22 Locations		8/31/2006	\$ 3,332,585.00
0092-0488	0005(771)	ACTIVE	PE	New Haven, Computerized Traffic Signal System, Various Locations		8/1/1996	\$ 1,505,000.00
0092-0542	000R(035)	FINAL VOUCHER SUBMITTED	CN	New Haven, Computerized Traffic Signal System, Various Locations	3/10/2011	8/1/2001	\$ 5,421,807.24
0092-0545	000R(036)	ACTIVE	CN	New Haven, Computerized Traffic Signal System, Phase 3B, Various Locations		8/9/2007	\$ 4,501,497.00
0092-0564	000R(313)	ACTIVE	CN	New Haven, Extend Existing Central Signal Control System in Downtown, 20 Locations		9/20/2010	\$ 4,349,572.00
0092-0232	1092(013)	CLOSED	CN	NEW HAVEN, VARIOUS INTERSECTIONS, COMP TRAFFIC SIGNAL SYSTEM	4/1/1997	06/01/1989	\$ 1,500,770.41
							\$ 28,979,363.65
Bridgeport							
0015-0310/311	000R(303)	ACTIVE	PE	Bridgeport Traffic Signal Modernization & Provide Preemption, 15 Locations		3/16/2004	\$ 592,000.00
0015-0311	000R(312)	ACTIVE	CN	Bridgeport Traffic Signal Modernization/Upgrades at Various Locations, Phase A		8/16/2006	\$ 5,428,457.60
0015-0310	000R(316)	ACTIVE	CN	Bridgeport Traffic Signal Modernization at Various Locations, Phase B		9/18/2009	\$ 3,881,097.60
0015-0291	1015(104)	FINAL VOUCHER SUBMITTED	PE	Bridgeport Traffic Signal Revisions Along Barnum Ave, 12 Locations	9/11/2002	8/1/1999	\$ 218,861.48
0015-0291	1015(111)	ACTIVE	CN	Bridgeport Traffic Signal Revisions Along Barnum Ave, 12 Locations		9/11/2002	\$ 2,805,806.00
0015-0280	1015(107)	ACTIVE	CN	Bridgeport Traffic Signal Revisions Along Park Ave, 16 Locations		7/1/2001	\$ 2,224,428.11
0015-0231	2782(001)	CLOSED	PE	Bridgeport, Main Street at 22 Locations, Traffic Signal System	7/1/2001	2/1/1994	\$197,827.78
0015-0231	2782(002)	CLOSED	CN	Bridgeport, Main Street at 22 Locations, Interconnect Traffic Signal System	6/13/2002	8/1/1996	\$1,795,502.55
0015-0203	0005(439)	CLOSED	CN	BPT, RTES 130/700 13 LOCATIONS, TRAFFIC SIGNAL MODERNIZATION	2/1/1995	09/01/1992	\$ 920,675.38
							\$ 18,064,656.50
Stamford							
0135-0280	000R(147)	ACTIVE	CN	Stamford Computerized Traffic Signal System, Phase 4	10/22/2004	6/1/2001	\$ 2,352,336.00
0135-0282	000R(167)	ACTIVE	CN	Stamford Signal System Expansion & Hardware Upgrade, Phase 5		9/11/2002	\$ 2,455,798.00
0135-0293	000R(400)	ACTIVE	CN	Stamford & Greenwich Traffic Signal System Upgrade, Phase 6		9/18/2007	\$ 4,804,760.00
0135-0250	0005(769)	CLOSED	CN	Stamford, Various Locations, Interconnect Traffic Signal System, Phase I	9/1/2000	8/1/1996	\$568,281.58
0135-0257	0005(836)	CLOSED	CN	Stamford, Various Locations, Computerized Traffic Signal System, Phase 2	8/1/2000	7/1/1997	\$1,436,962.30
0135-0259	0005(894)	CLOSED	CN	Stamford, Computerized Traffic Signal System, Phase 3, System Expansion and Hardware Upgrade	11/28/2001	2/1/1998	\$2,108,164
							\$ 13,726,301.74
Waterbury							
0151-0252	715(1004)	ACTIVE	CN	Waterbury Traffic Signal System Expansion, Computerized Traffic Signal System, Various Locations	12/9/2004	2/1/2000	\$ 3,950,484.00
0151-0252	715(1001)	ACTIVE	PE	Waterbury Traffic Signal System, Various Locations	2/15/2000	2/1/1994	\$ 509,050.00
0151-0252	715(1003)	FINAL VOUCHER SUBMITTED	RW	Waterbury Traffic Signal System Expansion, Computerized Traffic Signal System, Various Locations	12/11/2008	7/1/1998	\$ 28,633.59
0151-0269	715(1002)	CLOSED	CN	Waterbury, Central Business District, Traffic Control Signal System	4/25/2002	6/1/1997	\$663,538.72
0151-0250	1506(003)	CLOSED	PE	Waterbury, SR 845 at Five Locations, Traffic Signal Revisions	7/1/1996	8/1/1994	\$74,180.98
0151-0250	1506(005)	CLOSED	CN	Waterbury, SR 845 at Five Locations, Traffic Signal Revisions		9/1/1995	\$388,813.53
0151-0195	1151(007)	CLOSED	CN	WATERBURY CBD, TRAFFIC SIGNAL SYSTEM	9/1/1992	03/01/1989	\$ 2,743,547.10
							\$ 8,358,247.92
Greenwich							
0056-0261	7048(009)	FINAL VOUCHER SUBMITTED	CN	Greenwich Traffic Responsive Signal System	12/29/09	5/1/01	\$ 623,895.39
0056-0160	1056(005)	CLOSED	CN	GREENWICH CENTRAL BUSINESS DISTRICT, TRAFFIC SIGNAL SYSTEM		04/01/1989	\$ 1,640,843.33
0056-0255	0005(628)	CLOSED	CN	GREENWICH, FIVE INTERSECTIONS, TRAFFIC SIGNAL REVISIONS	11/1/1997	08/01/1995	\$ 740,792.29
0056-0273	000R(161)	ACTIVE	CN	GREENWICH, TRAFFIC SIGNAL REVISIONS/UPGRADES OF 4 EXISTING SIGNALIZED INTERSECTIONS		06/27/2005	\$ 845,712.00
							\$ 3,851,243.01
Norwalk							
0102-0326/0337	000R(384)	ACTIVE	PE	Norwalk Traffic Signal System Upgrades at Various Locations, Phase 1 and 2		4/4/2006	\$ 626,000.00
0102-0334	1102(106)	ACTIVE	PE	Norwalk Upgrade of Existing Signal System Along West Ave & Belden Ave		5/11/2009	\$ 237,600.00
0102-0337	000R(634)	ACTIVE	CN	NORWALK; COMPUTERIZED SIGNAL SYSTEM, PHASE 1 BREAKOUT OF 102-326, INCLUDES 15 INTERSECTIONS		09/08/2010	\$ 4,351,187.00
							\$ 5,214,787.00

Projects

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2011 Traffic Signal Process Review - Municipality Project List

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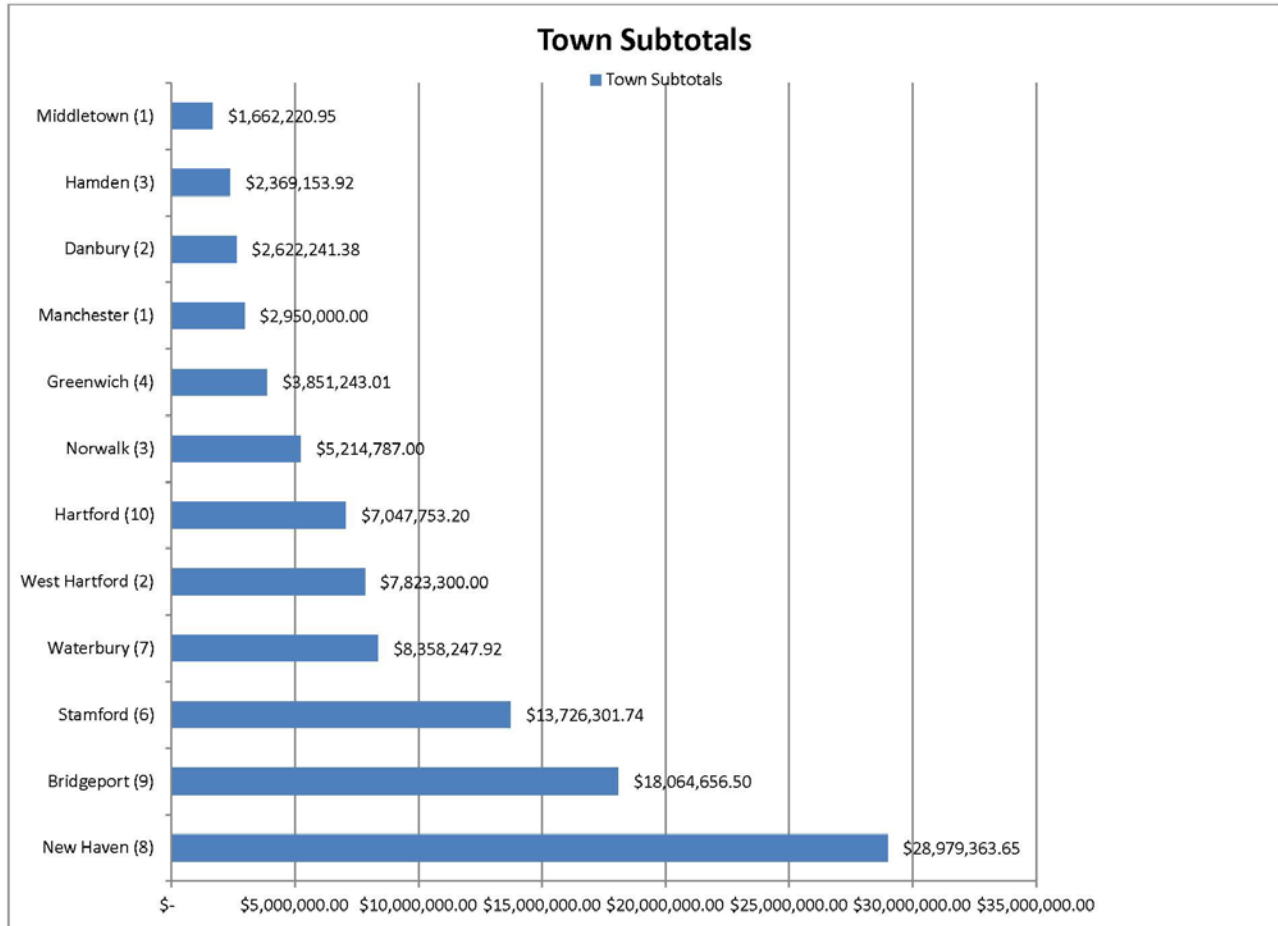
State No.	FAP No.	Status	Phase	Description	Comp. Date	Auth. Date	Fed. Funds
Hartford							
0063-0592	1063(116)	ACTIVE	CN	Hartford Franklin Ave Traffic Signal Installation, Benton St		5/22/2002	\$ 106,087.50
0063-0593	1063(115)	ACTIVE	CN	Hartford Washington St Traffic Signal Installation, Ward St		5/21/2002	\$ 106,087.50
0063-0606	1063(122)	ACTIVE	CN	Hartford Traffic Signal Installation at New Britain Ave and Henry St		7/10/2006	\$ 105,732.00
0063-0611	1063(121)	ACTIVE	PE	Hartford New Britain Ave Safety/Installation of Traffic Control Signal at Int of Henry St	12/23/2009	2/4/2003	\$ 225.99
0063-0573	1063(102)	ACTIVE	CN	Hartford Computerized Traffic Control Signal System		9/1/1999	\$ 1,958,100.00
0063-0361/0408	1063(049)	CLOSED	CN	HARTFORD, VARIOUS CITY STREETS, COMP. TRAF. CONTROL SYSTEM	7/1/1993	09/01/1985	\$ 2,715,935.13
0063-0399	1984(011)	CLOSED	CN	HTFD/BLMFD, RTES 187/44, TRAFFIC CONTROL SIGN SYSTEM	1/1/1989	08/01/1985	\$ 530,792.10
0063-0463	1063(052)	CLOSED	CN	HARTFORD, VARIOUS INTERSECTIONS, COMPUTERIZED INTERSECTION EXT.	12/1/1994	11/01/1990	\$ 374,648.79
0063-0486	1779(003)	CLOSED	CN	HARTFORD, NEW BRITAIN AVE/ 6 LOCATIONS, TRAFFIC SIGNALIZATION	5/1/2000	06/01/1992	\$ 464,762.01
0063-0514	0005(629)	CLOSED	CN	HARTFORD, VAR LOCS, COMPUTERIZED TRAFFIC SIGNALS	8/1/2001	08/01/1994	\$ 686,382.18
							\$ 7,047,753.20
West Hartford							
0155-0160	000R(363)	ACTIVE	CN	WEST HARTFORD; AT VARIOUS LOCATIONS - TRAFFIC SIGNAL HARDWARE UPGRADE - PHASE B		02/27/2008	\$ 3,320,700.00
0155-0161	000R(360)	ACTIVE	CN	WEST HARTFORD; VARIOUS LOCATIONS - INTERCONN. TRAFFIC SYS. 18 LOCATIONS IN THE TOWN		08/17/2007	\$ 4,502,600.00
							\$ 7,823,300.00
Danbury							
0034-0285	0005(763)	CLOSED	CN	Danbury, Computerized Traffic Signal System, Various Locations	1/2/2003	9/1/1996	\$1,955,442.79
0034-0255	0005(428)	FINAL VOUCHER SUBMITTED	PE	Danbury CBD, Computerized Signal System	6/1/2001	5/1/1992	\$ 665,798.59
							\$ 2,621,241.38
Hamden							
0061-0124	0061(004)	CLOSED	CN	HAMDEN, DIXWELL & WHITNEY AVENUES, COMPUTERIZED TRAFFIC SIGNAL SYSTEM		05/01/1991	\$ 461,425.62
0061-0125	0061(005)	CLOSED	CN	HAMDEN, DIXWELL AND WHITNEY AVENUES, TRAFFIC CONTROL SIGNAL SYSTEM	2/1/1994	04/01/1991	\$ 1,585.90
0061-0145	0707(103)	ACTIVE	CN	HAMDEN; WHITNEY AVE. - REPLACE/MODERNIZE TRAFFIC SIGNALS AT 11 LOCATIONS		09/02/2009	\$ 1,906,142.40
							\$ 2,369,153.92
Manchester							
0076-0197	1076(108)	ACTIVE	CN	MANCHESTER; INSTALL SIGNALS AT 19 CLOSED LOOP LOCATIONS IN BUCKLAND HILLS AREA		06/13/2006	\$ 2,950,000.00
Middletown							
0082-0263	0005(632)	CLOSED	CN	MIDDLETOWN; VAR. LOCATIONS ON MAIN ST., COMPUTERIZED TRAFFIC SIGNAL SYSTEM	5/1/2001	07/01/1997	\$ 1,662,220.95
							\$ 102,669,269.27

Projects

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APPENDIX 5

**Bar Chart of the Number of Traffic Signal System Projects and Federal-aid
Funds Obligated by Local Agency**



Bar Chart \$#

APPENDIX 6

**Observations Matrix of Traffic Signal System Operations and Maintenance by
Local Agency**

APPENDIX 7

Guidance on Federal-aid Eligibility of Operating Costs for Transportation Management Systems

**INFORMATION: Guidance on Federal-aid Eligibility of
Operating Costs for Transportation Management Systems
January 3, 2000
Reply to: HOTM-1**

Christine M. Johnson /s/Christine M. Johnson
Program Manager, Operations
Director, ITS Joint Program Office

Resource Center Directors
Division Administrators
Federal Lands Highway Division Engineers

The attached guidance is provided for your use in assisting our partners in determining applicability of Federal-Aid Funding for the operating costs of traffic monitoring, management, and control systems, such as integrated traffic control systems, incident management programs, and traffic control centers. This incorporates and updates information provided in information fliers discussing reimbursement of startup and operating costs for traffic control management projects provided in January 1998 and again in January 1999 by the Office of Traffic Management and Intelligent Transportation Systems Applications.

This program guidance is intended to help clarify some issues that have been brought to our attention, and in particular questions about what may constitute reasonable operating costs for computer and other electronic systems. In order to assure continuous operation, costs associated with maintaining these systems are necessary operating expenses so that traffic monitoring, management, and control facilities or programs provide their intended functions. Examples of these maintenance costs include system maintenance activities to assure peak performance (preventive computer maintenance) and replacement of defective or damaged computer components and other traffic management system hardware (including street-side hardware). As with other Federal-aid funding decisions, specific eligibility determinations related to traffic control operational costs and maintenance expenses are the discretion of the FHWA Division Offices.

If you have any questions concerning this guidance, please contact [Mr. Robert Rupert](#) at 202-366-2194.

[Attachment](#)



Transportation Systems Management & Operations: Operating Cost Eligibility Under the Federal-Aid Highway Program

Attachment

Contents

[Federal-aid Eligibility Policy Guide](#)

[Introduction](#)

[Background / Legislative](#)

[Interpretation / Rationale](#)

[Examples](#)

[Questions & Answers](#)

Federal-aid Eligibility Policy Guide

The operating costs for traffic monitoring, management, and control systems, such as integrated traffic control systems, incident management programs, and traffic control centers, are eligible for Federal reimbursement from National Highway System and Surface Transportation Program funding. For projects located in air quality non-attainment and maintenance areas, and in accordance with the eligibility requirements of 23 USC 149(b), Congestion Mitigation and Air Quality Improvement Program funds may be used for operating costs for a 3-year period, so long as those systems measurably demonstrate reductions in traffic delays. Operating costs include labor costs, administrative costs, costs of utilities and rent, and other costs, including system maintenance costs, associated with the continuous operation of the system.

Introduction

The movement of people, goods, and vehicles on the nation's surface transportation system is now critically dependent on how effectively that system is managed and operated. Adding to the roadway system is necessary in some key locations and corridors to serve the demands for this movement, and in some cases, provide for economic development in the area. However, the construction of new lanes will never alleviate the need for effective management and operations of the system - on existing as well as new segments. Well planned, cost-effective transportation operations and management actions can improve mobility, safety, and productivity of the system for transportation users in urban and rural areas.

Background - Legislative

The Transportation Equity Act for the 21st Century (TEA-21), signed into law on June 9, 1998, reinforces the Federal commitment to manage and operate the nation's transportation system. Under TEA-21, the Federal-aid Highway Program continues eligibility of operating costs for traffic monitoring, management, and control. The legislation defines operating costs as including labor costs, administrative costs, costs of utilities and rent, and other costs associated with the continuous management and operation of traffic systems, such as integrated traffic control systems, incident management programs, and traffic control centers.(1) An "operational improvement" continues to mean a capital improvement for installation of traffic surveillance and control equipment; computerized signal systems; motorist information systems; integrated traffic control systems; incident management programs; transportation demand management facilities; strategies, and programs; and such other capital improvements to public roads as the Secretary may designate, by regulation.(2) By definition, an operational improvement still does not include restoration or rehabilitating improvements; construction of additional lanes, interchanges, and grade

separations; and construction of a new facility on a new location.

For both National Highway System (NHS) and Surface Transportation Program (STP), TEA-21 continues the eligibility of capital and operating costs for traffic monitoring, management, and control facilities and programs.(3) Also, TEA-21 clarifies the eligibility of NHS and STP funds for Intelligent Transportation Systems (ITS) capital improvements to specifically allow funds to be spent for infrastructure-based ITS capital improvements.(4)

For the Congestion Mitigation and Air Quality Improvement Program, TEA-21 continues to include the establishment or operation of a traffic monitoring, management, and control facility or program as potentially eligible projects.(5) TEA-21 also explicitly adds, as an eligible condition for funding, programs or projects that improve traffic flow, including projects to improve signalization, construct high occupancy vehicle lanes, improve intersections, and implement ITS strategies.(6)

Interpretation / Rationale

Examples of typical eligible operating cost and expenses for traffic monitoring, management, and control include those costs mentioned in the legislative definition for operating costs.(1) In order to assure continuous operation, costs associated with maintaining these systems are necessary operating expenses so that traffic monitoring, management, and control facilities or programs provide their intended functions. Examples of these maintenance costs include system maintenance activities to assure peak performance (preventive computer maintenance) and replacement of defective or damaged computer components and other traffic management system hardware (including street-side hardware). Specific eligibility determinations related to traffic control operational costs and maintenance expenses are the discretion of the FHWA Division Office in a particular state.

This interpretation is consistent with the FHWA Strategic Plan, specifically related to the Mobility Goal and the Strategic Objective to "Improve the operation of the highway systems and intermodal linkages to increase transportation access for all people and commodities." In light of TEA-21, which reaffirms and increases the Federal commitment to manage and operate the nation's surface transportation system, this interpretation is also consistent with the intent of Congress.

It is appropriate for FHWA to adopt policies that encourage efficient management and operation of surface transportation. With a greater shift toward applying technology to addressing transportation needs, a broader life-cycle view of transportation operations is warranted that includes all activities related to sustaining system performance.

Examples

Some of the types of Federal-aid projects that may be funded include the installation and integration of the Intelligent Transportation Systems Infrastructure such as:

- Planning for regional Management and Operations programs
- Traffic Signal Control Systems
- Freeway Management Systems
- Incident Management Systems
- Multimodal Traveler Information Systems
- Transit Management Systems
- Electronic Toll Collection Systems
- Electronic Fare Payment Systems
- Railroad Grade Crossing Systems
- Emergency Services

- Implementation of the National ITS Architecture for metropolitan and rural areas
- Development of regional ITS Architecture

Some examples of typical Federal-aid capital improvement projects that may include eligible operating costs include:

- System Integration
- Telecommunications
- Reconstruction of Buildings or Structures that house system components
- Control / Management Center (Construction) and System Hardware and Software for the projects
- Infrastructure-based Intelligent Transportation System capital improvements to link systems to improve transportation and public safety services
- Dynamic / Variable message signs
- Traffic Signals

Some examples of typical eligible operating cost and expenses for traffic monitoring, management, and control include:

- Labor Costs
- Administrative costs
- Costs of Utilities and Rent
- Other costs associated with the continuous operation of the above-mentioned facilities and systems
- System Maintenance (activities to assure peak performance)
- Replacement of defective or damaged computer components and other traffic management system hardware (including street-side hardware).
- Computer hardware and software upgrades to remedy Year 2000 (Y2K) problems.

Questions and Answers

Q: What would not be considered eligible as an operating cost?

A: The discretion and flexibility afforded FHWA Division Offices in determining the eligibility of specific activities under this guidance, the allowances for preventive maintenance in Title 23(7), and other Federal-aid policies can allow for virtually any activity to be eligible. However, routine maintenance items that are not critical to the successful operation of the system, such as the painting of traffic signal controller cabinets or the maintenance of the exterior of transportation management center buildings, would normally fall outside of eligible operating costs.

Q: What are some typical activities associated with transportation management center computers whose costs could be eligible under Federal-aid?

A: Besides the costs associated with designing and procuring the computer system, other eligible activities could include regular checking of the computer components to make sure they are fully functional. Any corrective measures or upgrades (software or hardware) that are necessary would be eligible activities.

Q: Can "spare parts" be eligible for federal-aid?

A: System-critical parts (i.e., ones that are essential for the successful operation of the system) that are susceptible to failure, regardless of reason - acts of God, crashes, electronic "infant mortality" - have been determined by some FHWA Division Offices as eligible for federal-aid reimbursement.

Q: What documentation do states or local governments need to submit (or present upon request) for approval or authorization of operating costs?

A: The amount and specific nature of documentation are left to the judgement of the FHWA Division Office, but the documentation should be sufficient to determine that the proposed expenditures would be

eligible for Federal-aid reimbursement.

Q: Besides TEA-21 and Title 23, what overall rules govern the eligible operating costs and procurement method?

A: The Office of Management and Budget (OMB) Circular A-87, Cost Principles for State and Local Governments (available at <http://www.whitehouse.gov/OMB/circulars/a087/a087-all.html>) establishes principles for determining the allowable costs incurred by State, local, and federally-recognized Indian tribal governments under grants, cost reimbursement contracts, and other agreements with the Federal Government. Part 18 of Title 49 of the Code of Federal Regulations (49 CFR Part 18, available at <http://www.access.gpo.gov/nara/cfr/index.html>) also includes information related to the administration of grants and cooperative agreements with State and local governments.

Q: Where can I find out more about the Congestion Mitigation and Air Quality Improvement (CMAQ) Program?

A: The latest guidance on the CMAQ Program was issued April 28, 1999, and is available from FHWA Division and FTA Regional offices. The guidance, along with other CMAQ Program information, is available on the internet at <http://www.fhwa.dot.gov/environment/cmaq.htm>.

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- [1.](#) 23 USC 101(a)(17)
 - [2.](#) 23 USC 101(a)(18)
 - [3.](#) 23 USC 103(b)(6)(H) and 23 USC 133(b)(6)
 - [4.](#) 23 USC 103(b)(6)(O) and 23 USC 133(b)(13)
 - [5.](#) 23 USC 149(b)(4)
 - [6.](#) 23 USC 149(b)(5)
 - [7.](#) 23 USC 116(d)

GLOSSARY¹

Intelligent Transportation System (ITS) means electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

ITS project means any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture.

Major ITS project means any ITS project that implements part of a regional ITS initiative that is multi-jurisdictional, multi-modal, or otherwise affects regional integration of ITS systems.

National ITS Architecture (also “national architecture”) means a common framework for ITS interoperability. The National ITS Architecture comprises the logical architecture and physical architecture which satisfy a defined set of user services. The National ITS Architecture is maintained by the United States Department of Transportation (DOT) and is available on the DOT web site at [http:// www.its.dot.gov](http://www.its.dot.gov).

Project level ITS architecture is a framework that identifies the institutional agreement and technical integration necessary to interface a major ITS project with other ITS projects and systems.

Region is the geographical area that identifies the boundaries of the regional ITS architecture and is defined by and based on the needs of the participating agencies and other stakeholders. In metropolitan areas, a region should be no less than the boundaries of the metropolitan planning area.

Regional ITS architecture means a regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects.

Systems engineering is a structured process for arriving at a final design of a system. The final design is selected from a number of alternatives that would accomplish the same objectives and considers the total life-cycle of the project including not only the technical merits of potential solutions but also the costs and relative value of alternatives.

¹ Reference 23 CFR 940.3 Definitions