



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

State Transportation Building
Ten Park Plaza, Suite 2150
Boston, MA 02116-3968
Tel. (617) 973-7100
Fax (617) 973-8855
TTY (617) 973-7089
www.bostonmpo.org

James A. Aloisi, Jr.
Secretary of Transportation
and MPO Chairman

Arnold J. Soolman
Director, MPO Staff

The Boston Region MPO,
the federally designated
entity responsible for
transportation decision-
making for the 101 cities
and towns in the MPO
region, is composed of
the following:

Executive Office of Transportation
and Public Works

City of Boston

City of Newton

City of Salem

City of Somerville

Town of Bedford

Town of Framingham

Town of Hopkinton

Metropolitan Area Planning Council

Massachusetts Bay Transportation
Authority Advisory Board

Massachusetts Bay Transportation
Authority

Massachusetts Highway Department

Massachusetts Port Authority

Massachusetts Turnpike Authority

Regional Transportation Advisory
Council (nonvoting)

Federal Highway Administration
(nonvoting)

Federal Transit Administration
(nonvoting)

MEMORANDUM

DATE May 7, 2009
TO Transportation Planning and Programming Committee
of the Boston Region Metropolitan Planning Organization
FROM Arnold J. Soolman, CTPS Director
RE Work Program for: Arterial Traffic Signal Improvements and
Coordination

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization vote to approve the work program for Arterial Traffic Signal Improvements and Coordination in the form of the draft dated May 7, 2009.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification
Planning Studies

CTPS Project Number
13243

Client
Boston Region Metropolitan Planning Organization

CTPS Project Supervisors
Principal: Efi Pagitsas
Manager: Mark Abbott

Funding
MassHighway 3C PL Highway Planning Contract #56242

IMPACT ON MPO WORK

This is MPO work and will be carried out in conformance with the priorities established by the MPO.

BACKGROUND

This study is one of the recommendations from the MPO's Mobility Management System (MMS).

Traffic signal coordination or synchronization promotes efficient traffic operations along an arterial roadway. Typically, arterial flow quality and efficiency is dictated by the level of service at traffic signals and the degree of coordination between them. As a rule of thumb, traffic signals located within one-quarter of a mile from each other qualify potentially for coordination. Coordination is performed in such a way that traffic platoons along the road where this signal treatment is applied can proceed through intersections at certain speeds without braking or stopping. In coordination, side street traffic and pedestrian volumes must also be considered so that their needs for service through the coordinated intersections are met without extra delays.

The "promotion of efficient system management and operations" is one of the SAFETEA-LU planning factors seeking to integrate this concept in the existing planning process. Side benefits to coordination are enhanced safety: when arterial signal systems are managed and operated efficiently, usually safety improves as well.

This study's purpose is to evaluate three or four groups of arterial signalized intersections from throughout the region and to develop recommendations for improvements focused primarily on traffic signal coordination in order to improve traffic flow and safety along these arterials. As part of the traffic signal coordination strategy, staff will consider geometric improvements and traffic signal design changes at the selected locations. Each group will likely consist of two or three intersections.

OBJECTIVE

This study seeks to accomplish the following objective: to develop recommendations for traffic signal coordination of three or four groups of intersections on arterials in the Boston Region MPO area, for the purpose of potentially improving operations and safety at and between the intersections.

WORK DESCRIPTION

Task 1 Select Intersections

Subtask 1.1 Select Ten Groups of Intersections for Possible Inclusion in the Study

The final set of three to four groups of intersections will be selected from an initial set of ten groups. The set of ten will be selected using a tiered selection process as follows: 1. Locations will be selected only if they are not currently under study by MPO staff or by others, or under design. 2. Using GIS techniques, staff will identify all groups of two or three signalized intersections in the region that meet the “one-quarter mile or less between intersections” criterion. 3. Of these, only those intersections that match with locations included in Transportation Improvement Program (TIP) projects from the “Conceptual” and “Pre-TIP” categories will be considered.

Subtask 1.2 Coordinate with Transportation Agencies and Involved Communities

Following the process described above, it is expected that the selected ten intersection groups will be along major arterials operated by MassHighway, the Department of Conservation and Recreation (DCR), and cities. Staff will coordinate with the involved entities to (a) receive their input in the process with respect to appropriate intersections to be studied and (b) discuss mechanisms to follow up with implementing eventual recommendations. MAPC staff outreach should be helpful in identifying community interest. CTPS staff will contact MassHighway and DCR staff to identify locations with agency interest. Based on criteria listed above, the larger set of ten will be reduced to up to four groups of intersections, which staff will analyze in detail.

Product(s) of Task 1

A table listing the initial set of ten intersection groups considered and the final set of up to four groups of intersections throughout the region meeting criteria from the sources referenced above. The table will include information explaining why the final set of intersection groups were chosen.

Task 2 Perform Field Reconnaissance and Collect Data

Once the set of up to four groups of intersections has been selected, staff will collect detailed data and information pertaining to each location. This will involve visiting each site and inventorying all relevant geometric, landscape, land use, and signal features. Data will include:

- Turning movement counts (TMCs)
- Bicycle counts
- Pedestrian counts
- Signal timing data (phases, timing lengths)
- Queue lengths
- Geometric data (lanes, curb cuts, sidewalks, crosswalks, pedestrian buttons)
- Land use/zoning information
- Jurisdictional/administrative system responsibilities

Product(s) of Task 2

Summaries of count, signal, queue, and geometric data, as well as land use and jurisdictional information, for the final set of selected intersections

Task 3 Evaluate and Analyze Selected Intersection Groups

Staff will evaluate each intersection for its level of service performance as an isolated traffic signal first and then test various strategies for coordination between adjacent intersections. The software SYNCHRO will be used for these purposes. Particular attention will be given to the evaluation of existing pedestrian signal phases, if any, or the need for them. Also, field observations will yield a full understanding of safety levels and traffic operations of vehicles, bicycles, and pedestrians at each location. Impacts of signal progression on bus transit (if any) will be analyzed qualitatively.

Product(s) of Task 3

Level of service and energy savings summaries for each intersection and for each of the considered coordination strategies per intersection group

Task 4 Receive Input from MassHighway District Office Staff and Local Officials

Once staff has developed coordination strategy results for the selected intersection groups, staff will contact MassHighway District Office and DCR staff, and local officials in each community involved, in order to discuss the intersection summaries, receive input on analysis and findings, and discuss potential improvements.

Product(s) of Task 4

The product of this task will be a summary of discussions and interactions with MassHighway District Office and DCR staff and local officials with respect to the preliminary findings. The combined comments generated by local and state officials will steer the development of all final recommended improvements.

Task 5 Recommend Improvements

Based on the evaluation and analysis performed in Task 3, and on the feedback given by local and state officials, staff will recommend specific traffic signal coordination strategies to improve throughput capacity, operations, and safety levels at the selected intersection groups. Staff will also estimate costs and identify the jurisdictional entity responsible for implementation.

Product(s) of Task 5

The product of this task will be a list of recommended traffic signal coordination strategies for the selected groups of intersections.

Task 6 Document All Findings and Recommendations

Staff will document all study tasks in a technical memorandum. MassHighway, DCR, and each of the communities involved will also receive a condensed memorandum pertaining to their particular intersections that will present analysis and recommendations.

Product(s) of Task 6

The Task 6 product will be a technical memorandum documenting Tasks 1 through 5.

ESTIMATED SCHEDULE

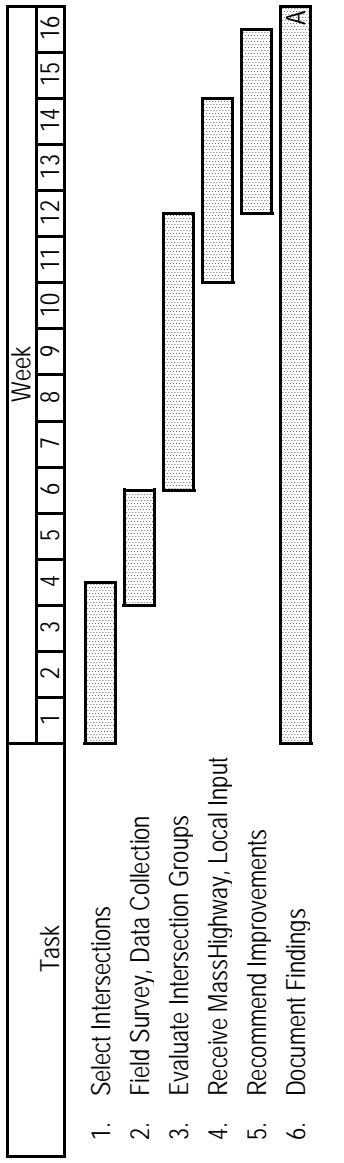
It is estimated that this project would be completed 16 weeks after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 1.

ESTIMATED COST

The total cost of this project is estimated to be \$45,000. This includes the cost of 16.0 person-weeks of staff time, overhead at the rate of 86.97 percent, and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

AJS/EP/ep

Exhibit 1
ESTIMATED SCHEDULE
 Arterial Traffic Signal Improvements and Coordination



Products/Milestones
 A: Technical memorandum

Exhibit 2
 ESTIMATED COST
 Arterial Traffic Signal Improvements and Coordination

Direct Salary and Overhead \$44,872

Task	Person-Weeks		Total	Direct Salary	Overhead (@ 86.97%)	Total Cost
	M-1	P-5 Temp				
1. Select Intersections	0.5	1.5	2.0	\$3,212	\$2,793	\$6,005
2. Field Survey, Data Collection	0.0	1.5	3.0	\$3,157	\$2,745	\$5,902
3. Evaluate Intersection Groups	0.2	5.0	5.2	\$8,304	\$7,222	\$15,525
4. Receive MassHighway, Local Input	0.2	1.0	1.2	\$1,923	\$1,672	\$3,595
5. Recommend Improvements	0.6	1.0	1.6	\$2,578	\$2,242	\$4,819
6. Document Findings	1.0	2.0	3.0	\$4,828	\$4,199	\$9,026
Total	2.5	12.0	16.0	\$24,000	\$20,873	\$44,872

Other Direct Costs \$128

Travel \$128

TOTAL COST \$45,000

Funding
 MassHighway 3C PL Highway Planning Contract #56242