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

Richard A. Davey
MassDOT Secretary and CEO
and MPO Chairman

Karl H. Quackenbush
Executive Director, MPO Staff

MEMORANDUM

DATE **December 15, 2011**

TO **Boston Region Metropolitan Planning Organization**

FROM **Karl H. Quackenbush**
CTPS Executive Director

RE **Work Program for: TIP Project Impacts Before-After Evaluation, FFY 2012**

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Boston Region Metropolitan Planning Organization vote to approve the work program for the TIP Project Impacts Before-After Evaluation, FFY 2012, in the form of the draft dated December 15, 2011.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification
Technical Support/Operations Analysis Projects

CTPS Project Number
12202

Client
Boston Region Metropolitan Planning Organization

CTPS Project Supervisors
Principal: Efi Pagitsas
Manager: Mark Abbott

Funding
MPO Planning Contract #69965
MPO §5303 Contract #70172

IMPACT ON MPO WORK

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

BACKGROUND

This will be a pilot study to identify the effectiveness of selected TIP projects. Measuring project effectiveness is important in order to know whether the employed strategies work well and are, therefore, suitable for application in similar situations. It is also required by federal regulation as part of the mandatory Congestion Management Process (CMP).

To this end, staff will select TIP projects that were constructed in federal fiscal years 2008 and 2009. This would allow users at the project location to become familiar with the operations and for user demand to normalize in the area. The "before" data and relevant measures of effectiveness will be gathered from existing functional design reports (FDRs) or traffic studies. The "after" data will be collected by MPO staff in the field. The measures of effectiveness will be calculated from these data.

The types of "before" and "after" data that will be collected and the associated performance measures that will be calculated depend on the type of project and improvements that are being assessed and also on the primary objective of the TIP project. Typically, for intersection improvement projects, intersection operations and safety will be evaluated using turning movement counts, operational performance measures, and crash data. Staff will compare the two sets of data and draw conclusions on changes in performance.

OBJECTIVE

This pilot study will help identify if certain improvement strategies work well and are therefore suitable to propose for other project locations in the Boston Region MPO area. Up to six projects could be evaluated as part of this study.

WORK DESCRIPTION

Task 1 Select Projects

This task will initially identify up to six project locations throughout the region, listed in previous TIPs and MassDOT project files, that have available FDRs and traffic studies or other studies, and that were reconstructed in 2008 or 2009 based upon the recommended improvements found in the reports and/or studies. Staff will choose projects constructed during 2008 or 2009 in order to allow traffic

patterns to settle and adequate data for "after" comparison to become available. Staff will determine this group of projects by employing a variety of strategies:

- Review past TIP and MassDOT projects to identify prospective locations that have been reconstructed.
- Review locations with MassDOT to obtain reports or studies.
- Give priority to project locations that have an MBTA or other bus route passing through the project.
- Give priority to projects that have a less traditional design improvement (e.g., roundabout, signal coordination, etc.).

The project list could include isolated signalized intersection reconstruction, groups of intersections along a reconstructed corridor, interchange reconstruction projects, and/or bike-pedestrian accommodations. Criteria for selecting a particular project from the list will include:

- Construction completed in the last three years
- Availability of FDRs or traffic/other studies that can provide "before" data
- Special consideration will be given to urban and suburban environments

Product of Task 1

A table listing up to six projects throughout the region, selected as described above. The table will include information explaining why the projects were chosen and the type of improvements that were implemented.

Task 2 Perform Field Reconnaissance and Collect "After" Data

Once the projects have been selected, staff will collect detailed "after" data and information pertaining to each project location. This will involve visiting each site and inventorying all relevant geometric, land use, and operational features. For example, for intersection projects, data may include:

- Manual turning movement counts (MTMCs)
- Bicycle counts
- Pedestrian counts
- Transit vehicle counts
- Signal timing data (phases, timing lengths)
- Queue lengths
- Geometric data (lanes, curb cuts, sidewalks, crosswalks, pedestrian buttons, transit amenities)
- Land use and zoning information
- Jurisdictional and administrative responsibilities
- Crash data

Products of Task 2

Depending on the type of project evaluated, products may include summaries of traffic counts, signal information, queues, geometric data, land use and jurisdictional information, or other relevant performance data.

Task 3 Evaluate Selected Projects

Staff will evaluate each project using various types of analysis. Also, the analysis will depend on the type of project being evaluated. The following pertains largely to intersection projects. First, counts such as turning movements, automatic traffic recorder (ATR) counts, pedestrian counts, or bicycle counts will be compared to determine if traffic growth has occurred as expected. Second, the area will be examined for any land developments since the "before" data were collected to enable staff to differentiate traffic impacts of the improvement and those of increased development. Third, the crash data for each location will be analyzed with regard to crash type and severity and whether bicycles or pedestrians were involved in the crashes. Fourth, a capacity analysis will be performed in order to determine the operational level of service at each intersection. Particular attention will be given to the evaluation of existing pedestrian signal phases, if any, or the need for them. Fifth, field observations will be performed to gain a full understanding of safety levels and of the operations of vehicles, bicycles, and pedestrians at each location.

Finally, to the extent feasible within the budget constraints of this pilot project, the perceptions of project users regarding the impacts of the project will be elicited. The rationale for this is that, irrespective of whether measurable improvements can be detected and attributed to a project, travelers' perceptions about how an investment affected their trip are ultimately of primary importance. This effort may include administering a set of questions to users encountered during field reconnaissance. Pedestrians will be more easily questioned than motorists, but if there is a safe, effective way to elicit the views of the latter, it will be tested.

Staff may also collaborate with MAPC, as that agency may have access to transportation-oriented surveys of employees near a project area, and there is some chance that data from those surveys could yield insights into user perceptions about the impacts of a transportation project near their work site.

One challenge with these user surveys, aside from the logistical ones, will be for users to be able to remember their perceptions about the project area prior to the subject project's being implemented. In addition, many users encountered will not have traveled through the project area three years earlier, before the project was implemented.

The following measures of effectiveness (MOEs) will likely be used in evaluating the project, if it involves intersections:

- Level of service (LOS)
- Traffic volumes
- Pedestrian and bicycle activity
- Intersection and approach delay
- Queue length
- Comparison of "before" and "after" crash data: number of crashes and crash types
- Crash rates (if a minimum of three years of recent MassDOT crash data are available for the reconstructed intersection)
- Air quality assessment: fuel usage, economy, emissions, and greenhouse gases (if data are available from FDRs or traffic reports)

Products of Task 3

Summaries of "before" and "after" performance measures for the selected projects, including (for intersection projects) level of service, incidence and types of crashes, and an overall assessment of how safe or unsafe it is and how well or how poorly traffic and other modes, including buses, are processed through it.

Task 4 Document All Findings

Staff will document all study tasks in a technical memorandum. The memorandum will provide information related to the type of project improvement and a comparison of the before-after analysis to identify if a particular improvement or parts of it would be useful to apply in future projects to improve operations or safety. In addition, any useful "best practices" information gleaned from other MPOs or state DOTs that may have undertaken a similar before-after project comparison will be incorporated into the evaluations and documentation.

Product of Task 4

A technical memorandum documenting Tasks 1 through 3, including documentation of any conclusions based upon the before-after analysis. A summary of the types of improvements, along with the positive or negative impacts of the improvements, will be provided.

ESTIMATED SCHEDULE

It is estimated that this project will be completed 24 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 $30,000. This includes the cost of 10.5 person-weeks of staff time, overhead at the rate of 94.57 percent, and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/EP/ma

Exhibit 1
ESTIMATED SCHEDULE
TIP Project Impacts Before-After Evaluation, FFY 2012

Task	Month 1	2	3	4	5	6
1. Select Projects						
2. Perform Field Reconnaissance and Collect Data						
3. Evaluate Selected Projects						
4. Document All Findings						

Exhibit 2
ESTIMATED COST
TIP Project Impacts Before-After Evaluation, FFY 2012

Direct Salary and Overhead	$29,858

Task	M-1	P-5	Temp	Total	Direct Salary	Overhead (@ 94.57%)	Total Cost
1. Select Projects	0.1	1.0	0.0	1.1	$1,799	$1,701	$3,501
2. Perform Field Reconnaissance and Collect Data	0.1	0.4	1.6	2.1	$1,591	$1,505	$3,096
3. Evaluate Selected Projects	0.1	3.2	0.0	3.3	$5,394	$5,101	$10,495
4. Document All Findings	1.5	2.5	0.0	4.0	$6,561	$6,205	$12,766
Total	1.8	7.1	1.6	10.5	$15,346	$14,512	$29,858

Other Direct Costs	$142
Travel	$142

TOTAL COST	$30,000

Funding

MPO §5303 Contract #70172; MPO Planning Contract #69965