



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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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:

MassDOT Office of Planning and  
Programming

City of Boston

City of Newton

City of Somerville

Town of Bedford

Town of Braintree

Town of Framingham

Town of Hapkinton

Metropolitan Area Planning Council

Massachusetts Bay Transportation  
Authority Advisory Board

Massachusetts Bay Transportation  
Authority

MassDOT Highway Division

Massachusetts Port Authority

Regional Transportation Advisory  
Council (nonvoting)

Federal Highway Administration  
(nonvoting)

Federal Transit Administration  
(nonvoting)

### MEMORANDUM

**DATE** September 8, 2011  
**TO** Transportation Planning and Programming Committee  
of the Boston Region Metropolitan Planning Organization  
**FROM** Karl H. Quackenbush, CTPS Acting Director  
**RE** Work Program for: Boston Ramp Study

#### ACTION REQUIRED

Review and approval

#### PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization, upon the recommendation of MassDOT, vote to approve the work program for Boston Ramp Study in the form of the draft dated September 8, 2011.

#### PROJECT IDENTIFICATION

**Unified Planning Work Program Classification**  
Planning Studies

**CTPS Project Number**  
95047

**Client**  
Massachusetts Department of Transportation  
*Project Supervisor(s):* Mark Berger

**CTPS Project Supervisors**  
*Principal:* Karl Quackenbush  
*Manager:* Scott Peterson

**Funding**  
MassDOT SPR Contract #68456

## **IMPACT ON MPO WORK**

The MPO staff has sufficient resources to complete this work in a capable and timely manner. By undertaking this work, the MPO staff will neither delay the completion of nor reduce the quality of other work in the UPWP.

## **BACKGROUND**

The purpose of this project is to support a study that MassDOT is conducting that will develop and evaluate alternatives for new ramps along the Massachusetts Turnpike between Brookline Avenue and Berkeley Street in the city of Boston. The Back Bay, Longwood Medical Area, Fenway, and Seaport District neighborhoods are important economic engines within the city of Boston. The Massachusetts Turnpike travels through or very near these neighborhoods, but only provides limited-access ramps in the Back Bay (eastbound-off and westbound-on) and full-access ramps in the Seaport District (all directions). New connections to the Massachusetts Turnpike would also allow for potential new transit bus routes between these neighborhoods.

In 1997, the Massachusetts Turnpike Authority, in conjunction with the Boston Transportation Department and the Boston Redevelopment Authority, conducted the “Boston Extension Ramps Feasibility Study.” This previous study developed and analyzed eight new ramp alternatives along I-90 to provide improved access between Back Bay and Logan Airport and the South Boston Waterfront. The new study will provide input into a detailed level-of-service and safety analysis of each alternative’s impact on the operations of the Massachusetts Turnpike and surrounding roadways. The study will also analyze the changes in travel patterns caused by each alternative, including detailed level-of-service analysis for key intersections directly affected by changes in Turnpike access. Other than the key intersections, the study will not provide a detailed level-of-service analysis of other roadways and intersections in the study area. A recommended plan of future transportation improvements (short-term and long-term) will be the end product of this project.

## **OBJECTIVE(S)**

The objective of this work is to conduct six model runs: a 2009 base year, a 2035 no-build forecast year, and four build alternatives for 2035. The four build alternatives are:

1. Construct new off-ramp from I-90 WB to Berkeley Street. Close Arlington Street I-90 WB on-ramp.
2. Construct new off- ramp from I-90 WB to Trinity Place. Close Clarendon Street and Arlington Street I-90 WB on-ramps.

3. Construct new off-ramp from I-90 WB to Brookline Avenue. Close Massachusetts Avenue I-90 WB on-ramp.
4. As the project progresses, CTPS will work with the MassDOT project team to test an I-90 EB alternative.

For the sake of schedule constraints and practical modeling considerations, all four alternatives will be modeled with all electronic tolling in place. This assumption does not imply a final toll policy decision.

The end product would be a comparison of traffic volumes and other key transportation metrics by peak period between the no-build and build scenarios for multiple locations in the study area.

## **WORK DESCRIPTION**

Work on this project will include six tasks. These tasks will consist of the following:

1. The model set will be calibrated to a base year (2009) using traffic counts, transit information, congested speeds, and toll revenue. CTPS will utilize electronic toll collection data to help calibrate the model.
2. CTPS will develop a no-build scenario for the 2035 forecast year, and apply and analyze the model results.
3. CTPS will work with MassDOT to convert the conceptual designs for the four alternatives into inputs that can be modeled.
4. Using the model set for 2035, CTPS will test up to a maximum of four alternatives and examine the results for multiple roadway locations, based on input from MassDOT.
5. The methodology and results of the analysis will be documented in a technical memorandum.
6. CTPS will provide support to MassDOT and its stakeholders for up to one year from the start of this project.

Each of these tasks is described below.

**Task 1 Develop and Calibrate Base-Year (2009) Model**

CTPS will develop a 2009 base-year model and calibrate it to highway and transit use in the study area. The study will focus on 23 intersections and 20 roadway locations. This base-year model will be used to develop forecast years in the Boston Ramp Study and the Toll Equity Study.

***Products of Task 1***

- A calibrated and validated base-year model set by time period and daily
- Tabular and graphical summaries of highway assignment results for the study area
- Tabular and graphical summaries of turning movements for selected intersections
- Tabular summaries of transit ridership and boardings for selected transit lines and stations

**Task 2 Model Future-Year No-Build Scenario for 2035**

In this task, the 2035 no-build roadway network in the study area will be created, based on the Boston Region MPO's Long-Range Transportation Plan (LRTP) currently under development. The 2035 no-build scenario will use the most recent land use assumptions approved by the MPO for this LRTP. The outputs of the no-build model run will be used as the basis for analyzing the impacts of the build scenarios described in Task 4.

***Products of Task 2***

- A 2035 no-build model set using the MPO-approved land use
- Highway and transit trip tables to use as inputs to the build scenarios
- Tabular and graphic summaries corresponding to those produced in Task 1 for the base year

**Task 3 Convert Conceptual Designs into Inputs to Use in the Travel Model**

CTPS will work with MassDOT to define and clarify the operations for the proposed alternatives in order to incorporate the design characteristics into the travel modeling process.

***Products of Task 3***

Tabular and graphical design concepts and operational characteristics that can be used as input into the modeling process

**Task 4 Develop and Model Multiple Build Alternatives and Analyze Results**

CTPS will modify the no-build model roadway network to reflect up to a maximum of four build scenarios. The build scenarios will utilize the same land use assumptions as the no-build scenario. The results of this modeling will be analyzed, comparing traffic conditions under the no-build scenario to conditions with various configurations of the proposed Boston Ramp alternatives. The build alternatives' traffic operations at 23

intersections will be examined qualitatively to determine their likely impact due to the changes to the roadway network.

***Products of Task 4***

- Tabular summaries of the travel model results by Boston neighborhood, which includes Chinatown, Longwood, and the Back Bay.
- Tabular and graphic summaries corresponding to those produced in Task 1 for the base year.

**Task 5 Coordinate with Project Team and Provide Ongoing Technical Assistance**

CTPS will work with the Boston Ramp project team for up to one year from the start date of this project. The work will consist of attending up to a maximum of five internal meetings and three meetings with stakeholders. CTPS will fulfill any data requests from the project team, when data is readily available, and educate the stakeholders about any past or proposed work discussed in this scope.

***Products of Task 5***

Coordinate with the project team, attend meetings, provide data to the project team, and prepare memos and presentations as needed

**Task 6 Produce Technical Memorandum**

Prepare technical memorandum documenting the work done on this task and comparing the model results (changes in peak-hour vehicle volumes and speeds at the selected roadway locations) for the four scenarios with the no-build scenario results.

***Product of Task 6***

A technical memorandum with tabular and graphical summaries of results and documentation of the methodology used in the analysis.

**ESTIMATED SCHEDULE**

It is estimated that this project will be completed 10 months 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 \$63,000. This includes the cost of 24.5 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.

Exhibit 1  
 ESTIMATED SCHEDULE  
 Boston Ramp Study



Products/Milestones

A: Technical memorandum with tabular and graphical summaries of results and documentation of the methodology used in the analysis.

Exhibit 2  
 ESTIMATED COST  
 Boston Ramp Study

<b>Direct Salary and Overhead</b>	<b>\$62,960</b>
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Task	Person-Weeks						Direct Salary	Overhead (@ 94.57%)	Total Cost
	M-1	P-5	P-4	P-3	SP-3	Total			
1. Develop and Calibrate Base-Year (2009) Model	0.6	1.5	3.6	1.0	0.0	6.7	\$8,901	\$8,417	\$17,318
2. Model Future-Year No-Build Scenario for 2035	0.6	0.8	1.6	0.0	0.0	3.0	\$4,259	\$4,027	\$8,286
3. Convert Conceptual Designs into Inputs to Use in the Travel Model	0.2	0.7	0.0	0.0	0.0	0.9	\$1,474	\$1,394	\$2,868
4. Develop and Model Multiple Build Alternatives and Analyze Results	1.0	1.5	3.9	0.0	0.0	6.4	\$8,881	\$8,399	\$17,281
5. Coordinate with Project Team and Provide Ongoing Technical Assistance	0.8	0.5	0.0	1.2	0.0	2.5	\$3,356	\$3,174	\$6,530
6. Produce Technical Memorandum	0.8	0.0	1.1	1.6	1.5	5.0	\$5,487	\$5,189	\$10,677
Total	4.0	5.0	10.2	3.8	1.5	24.5	\$32,358	\$30,601	\$62,960

<b>Other Direct Costs</b>	<b>\$40</b>
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Travel	\$40
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<b>TOTAL COST</b>	<b>\$63,000</b>
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*Funding*  
 MassDOT SPR Contract #68456