



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Stephanie Pollack, MassDOT Secretary and CEO and MPO Chair

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### *WORK PROGRAM*

## FEDERAL FISCAL YEAR 2020 TIP PROJECT IMPACTS:

## BEFORE-AND-AFTER EVALUATION

MARCH 5, 2020

### Proposed Motion

The Boston Region Metropolitan Planning Organization (MPO) votes to approve this work program.

### Project Identification

Unified Planning Work Program (UPWP) Classification

Boston Region MPO Planning Studies and Technical Analyses

Project Number 13294

Client

Boston Region MPO

Project Supervisors

*Principal:* Mark Abbott

*Manager:* Bill Kuttner

Funding Source

MPO 3C Planning and §5303 Contract #108217

### Schedule and Budget

Schedule: 7 months after work commences

Budget: \$60,000

Schedule and budget details are shown in Exhibits 1 and 2, respectively.

### Relationship to MPO Goals

The Boston Region MPO elected to fund this study with its federally allocated metropolitan planning funds during federal fiscal year (FFY) 2020. The work completed through this study will address the following goal area(s) established in the MPO's Long-Range Transportation Plan: system preservation, capacity management and mobility, clean air and clean communities, economic vitality.

## Background

The purpose of this study is to identify the effectiveness of selected Transportation Improvement Program (TIP) projects and evaluate the anticipated improvements to safety, traffic flow, and other factors. Measuring project effectiveness is important in evaluating whether the employed strategies work well and are suitable for application in similar situations.

The MPO undertook before-and-after studies of TIP projects in FFYs 2012 and 2014. The FFY 2014 study evaluated four projects that were completed between the summer of 2008 and the fall of 2010. The study indicated that several years after project completion, traffic was able to adapt to the modified roadways and post-improvement crash records were compiled. Multiyear crash records were a critical resource for the evaluation process.

The FFY 2020 study will identify a sample of projects completed prior to 2017. Projects evaluated in this study will be analyzed in a manner similar to the FFY 2014 study so that quantified improvements in recent projects can be compared with the improvements measured in the earlier projects. The Boston Region MPO is required to have a Congestion Management Process, which mandates these ongoing before-and-after study efforts.

The safety and traffic flow conditions prior to improvement can be obtained from the materials that were submitted as part of the original TIP evaluation process. In most cases, conditions are obtained through a functional design report (FDR). FDRs are used as a basic decision tool for infrastructure planning and generally represent a project design at a 25 percent level. As part of this study, current traffic flow conditions will be observed in the field. The updated statewide crash database will also be reviewed to develop a recent crash history.

## Objectives

This study will measure, to the extent practicable, the transportation, safety, and related benefits for a sample of TIP projects subsequent to completion. Possible implications for future TIP project selection will be identified and discussed. Up to four completed projects may be evaluated as part of this study.

## Work Description

### Task 1 Select Projects for the Study Sample

This task will identify and appropriate a sample of projects for evaluation. Projects in this sample should have the following characteristics:

- Projects had been listed in a previous TIP and included in Massachusetts Department of Transportation (MassDOT) project files

- Project FDRs are available
- Construction was undertaken prior to 2017
- Improvements substantially corresponded to the FDR description

The study sample of projects have no prescribed composition. All projects are different, and even projects that appear to involve similar physical improvements are often implemented at locations with different land uses and travel characteristics. Given the data intensity of this study, the availability of traffic and safety information will be an important selection consideration.

#### *Product of Task 1*

A proposed study sample and documentation of selection reasoning.

#### **Task 2 Organize Pre-Project Data as a Basis for Comparison**

Pre-construction data that is readily available in FDRs or other supporting documents will be assembled and reviewed by project staff. Specific traffic, safety, and related data, for which direct comparisons with current conditions can be developed, will be identified. Types of data that might be available and appropriate for comparison with post-construction conditions include:

- Traffic volumes
- Bicycle and pedestrian counts
- Traffic level-of-service
- Intersection and approach delay
- Queue lengths
- Crash experience
- Crash rates

#### *Product of Task 2*

Data and related location descriptions for each project in the study sample prior to project implementation. These data will serve as the basis for comparison and project impact evaluation.

#### **Task 3 Develop Comparable Post-Construction Data**

Staff will obtain post-construction data that correspond to the pre-project data developed as part of Task 2. Staff will obtain data from reliable existing data sources, notably the statewide crash database. If current traffic data are not readily available, staff will arrange for current traffic data to be obtained through MassDOT, or if necessary, collect the data directly.

#### *Product of Task 3*

Sets of directly comparable post-construction data for each project in the study sample.

### Task 3 Compare and Evaluate Study Sample Before-and-After Data

The differences between pre-construction and current values of quantifiable metrics, such as those listed in Task 2, will be calculated. These differences will serve as the basis for analyzing the project impacts.

These quantifiable direct comparisons will be used in evaluating the degree to which each project in the study sample is providing benefits or generating negative impacts. If projections were made during project planning, these projections will be compared with the post-construction conditions.

Direct comparison of the quantified metrics may be supplemented with additional information including

- material changes in project area land uses;
- general observations from location site visits; and
- user and stakeholder feedback.

#### *Product of Task 3*

Evaluations of the study sample projects to determine effectiveness.

### Task 4 Document Findings

Staff will prepare technical memoranda and appendices, as appropriate, documenting data, analytical approach, and key findings.

#### *Product of Task 4*

Technical publications that will include

- sample project and project area descriptions;
- pre-project data, highlighting the data being used for comparisons;
- current quantitative data and qualitative information;
- analytical approach and calculations of project effectiveness; and
- implications for TIP project analysis and selection.

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
**FFY 2020 TIP Project Impacts: Before-and-After Evaluation**

Task	Month						
	1	2	3	4	5	6	7
1. Select projects for the study sample	█						
2. Organize pre-project data as a Basis for Comparison		█					
3. Develop comparable post-construction data			█				
4. Compare and evaluate study sample Before-and-After Data				█			
5. Document findings					█		A

Products/Milestones

A: Technical memorandum

**Exhibit 2**  
**ESTIMATED COST**  
**FFY 2020 TIP Project Impacts: Before-and-After Evaluation**

<b>Direct Salary and Overhead</b>							<b>\$59,860</b>
Task	Person-Weeks				Direct Salary	Overhead (102.11%)	Total Cost
	M-1	P-5	Temp	Total			
1. Select projects for the study sample	0.5	1.0	0.0	1.5	\$2,916	\$2,978	\$5,894
2. Organize pre-project data as a Basis for Comparison	0.5	3.0	0.0	3.5	\$6,889	\$7,035	\$13,924
3. Develop comparable post-construction data	1.0	2.0	2.0	5.0	\$6,890	\$7,036	\$13,926
4. Compare and evaluate study sample Before-and-After Data	1.0	1.1	2.0	4.1	\$5,102	\$5,210	\$10,313
5. Document findings	1.0	3.0	0.0	4.0	\$7,819	\$7,984	\$15,803
Total	4.0	10.1	4.0	18.1	\$29,618	\$30,243	\$59,860
<b>Other Direct Costs</b>							<b>\$140</b>
Travel							\$140
<b>TOTAL COST</b>							<b>\$60,000</b>

**Funding**

MPO 3C Planning Contract and §5303 Contract #108217