



## BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Phillip Eng, MPO Chair | Interim Secretary and CEO, Massachusetts Department of Transportation  
Tegin Leigh Teich, Executive Director, MPO Staff

### WORK PROGRAM

## MBTA FARE EQUITY ANALYSIS AND MODAL ALLOCATION FACTORS

DECEMBER 18, 2025

### Proposed Motion

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

### Project Identification

#### Unified Planning Work Program (UPWP) Classification

Not listed in federal fiscal year (FFY) 2026 UPWP

#### Project Number 11511

#### Client

Massachusetts Bay Transportation Authority (MBTA)

*Client Supervisor: David Churella*

#### Project Supervisors

*Principal: Rosemary McCarron*

*Manager: Tanner Bonner*

#### Funding Source

MBTA Contract

### Schedule and Budget

**Schedule:** 48 months from notice to proceed

**Budget:** \$250,000

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

This budget was developed using a billing overhead rate of 122.59 percent as approved by the Boston Region MPO for state fiscal year (SFY) 2026. The overhead rate will be adjusted at the start of each SFY.

## **Relationship to MPO Work**

This study is supported in full with non-MPO funding. Committing MPO staff to this project will not impinge on the quality or timeliness of MPO-funded work.

## **Background**

The MBTA typically updates its fare structure about every two years. Under the MBTA's Service and Fare Change Equity Policy, each fare change must be evaluated for potential disparate impacts or disproportionate burdens on protected populations. The Boston Region MPO staff have provided technical assistance to the MBTA related to fare structure and tariff changes for more than 25 years, most recently in SFY 2025.

A continuously maintained model is essential to complete timely analysis of fare change proposals. The MBTA requested that Boston Region MPO staff update and maintain the agent-based model used to evaluate fare changes and calculate updated modal allocation factors on an annual basis. The MPO staff will also provide analysis of planned fare changes.

## **Objective**

This work will update and maintain the existing agent-based model for evaluating fare changes and modal allocation factors and evaluate proposed MBTA fare changes for equity impacts.

## **Work Description**

### **Task 1 Project Coordination**

MPO staff will coordinate with representatives of the MBTA throughout model development. MBTA staff will provide direction on this work and give feedback to MPO staff on the preliminary results of the analyses. MPO staff will coordinate with the MBTA to describe the fare changes and to report results for the final memorandum.

### **Task 2 Update the Agent-Based Model**

MPO staff have developed an agent-based fare equity analysis methodology derived from (1) responses to the MBTA System-Wide Passenger Survey, (2) annual fare revenue collected by MBTA fare products, and (3) annual unlinked trips observed for each MBTA mode. In the agent-based ridership model, MPO staff match survey responses with annual MBTA ridership and revenue. The model estimates the number of passengers—or agents—each survey represents based on the trip-making patterns reported, fare products used, modes traveled on, and the reported trip frequency. MPO staff uses the agent-based model to price travel under existing and proposed fare structures to project the impacts of the fare change on different populations.

In this task, MPO staff will update the inputs to its agent-based model in consultation with the MBTA. MPO staff will gather the most recent ridership data, fare revenue, and MBTA System-Wide Passenger Survey responses and update the model to adapt to new data structures. MPO staff will coordinate with the Massachusetts Department of Transportation Office of Performance Management and Innovation (OPMI) as deemed necessary. MPO staff will conduct an annual model validation test by evaluating baseline conditions and estimating the equity impacts of hypothetical fare scenarios to ensure model calibration.

***Products of Task 2***

Updated agent-based model

Documentation detailing model updates and sample outputs

**Task 3 Analyze the Equity Impacts of Fare Changes**

In this task, MPO staff will use the agent-based model and other methodologies as needed to analyze the potential effects of fare changes on different socioeconomic groups in accordance with the requirements of Federal Transit Administration (FTA) Circular 4702.1B Title VI Requirements and Guidelines for FTA Recipients and the MBTA's Service and Fare Change Equity Policy. MPO staff will prepare fare equity analysis summary results for proposed fare changes using the results from the agent-based model and other necessary methods. The draft analysis will include an evaluation of the effects of the proposed changes on minority and low-income populations.

After the MBTA selects a set of fare changes for implementation, staff will process any changes made to the draft analysis. Staff will then update and finalize the draft memorandum for the chosen scenario. Staff will incorporate the edits and revisions gathered from the review process into a final document.

***Products of Task 3***

Draft memorandum

Final memorandum detailing the fare equity analysis for the set of fare changes

**Task 4 Calculate Modal Allocation Factors**

MPO staff will use the updated inputs developed as part of Task 2 to calculate modal allocation factors on an annual basis. These factors will detail the estimated percentage of revenue per MBTA fare product that is allocated to each MBTA mode per year.

***Products of Task 4***

Modal allocation factors table with internal documentation

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
**MBTA Fare Equity Analysis and Modal Allocation Factors**

Task	Quarter															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Project Coordination																
2. Update the Agent-Based Model	A				A				A				A			
3. Analyze the Equity Impacts of Fare Changes	B	C							B	C						
4. Calculate Modal Allocation Factors		D				D				D				D		

**Products/Milestones**

- A: Updated model and documentation with sample outputs
- B: Draft memorandum of fare equity analysis
- C: Final memorandum of fare equity analysis for the final set of fare changes
- D: Modal allocation factors table and documentation

**Exhibit 2**  
**ESTIMATED COST**  
**MBTA Fare Equity Analysis and Modal Allocation Factors**

<b>Direct Salary and Overhead</b>								<b>\$250,000</b>
Task	Person-Weeks by Pay Grade					Direct Salary	Overhead (122.59%)	Total Cost
	G-9	G-8	G-7	G-6	Total			
1. Project Coordination	0.0	0.9	0.6	2.6	4.1	\$6,862	\$8,412	\$15,274
2. Update the Agent-Based Model	0.0	0.0	7.6	38.5	46.1	\$71,833	\$88,060	\$159,893
3. Analyze the Equity Impacts of Fare Changes	0.3	0.4	3.2	13.0	16.8	\$26,882	\$32,954	\$59,836
4. Calculate Modal Allocation Factors	0.0	0.0	0.4	4.0	4.4	\$6,738	\$8,260	\$14,997
Total	0.3	1.3	11.8	58.1	71.4	\$112,315	\$137,686	\$250,000
<b>Other Direct Costs</b>								<b>\$0</b>
<b>TOTAL COST</b>								<b>\$250,000</b>

**Funding**  
 MBTA Contract

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