

MEMORANDUM

DATE March 16, 2017
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush, Executive Director
RE Work Program for Title VI Service Equity Analysis: Scenario Testing

Action Required

Review and approval

Proposed Motion

That the Boston Region Metropolitan Planning Organization (MPO), upon the recommendation of the Massachusetts Department of Transportation (MassDOT), vote to approve the work program for *Title VI Service Equity Analysis: Scenario Testing*, presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Agency and Other Client Transportation Planning Studies and Technical Analyses

CTPS Project Number

11411

Client

MassDOT, Office of Transportation Planning
Project Supervisor: Nicole Tishler

CTPS Project Supervisors

Principal: Annette Demchur
Manager: Nicholas Hart

Funding

MassDOT §5303 Contract #94643

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 any work in the Unified Planning Work Program.

Background

The Federal Transit Administration (FTA) Circular 4702.1B provides guidelines and requirements for implementing US Department of Transportation regulations pertaining to Title VI of the Civil Rights Act of 1964 (49 CFR 21). The circular requires large transit providers (those that operate 50 or more fixed-route vehicles during peak service times and that are located in an urbanized area with a population of 200,000 or more) to conduct a service equity analysis to evaluate, prior to implementing any major service change, whether the planned change would have a discriminatory impact based on race, color, or national origin.

The FTA's guidelines for conducting the analysis recommend that transit providers measure potential disparate impacts and disproportionate burdens by comparing the proportion of persons in the protected class who are adversely affected by the service change with the proportion of persons not in the protected class who are adversely affected by the service change, using either ridership or population data for the analysis. While an analysis based on ridership data has the potential to provide the most meaningful information about the impact of changes to existing services, it is costly and difficult to obtain statistically reliable results from passenger surveys, and such surveys do not account for potential riders who could be affected by new, extended, or rerouted services. Alternatively, an analysis based on population data, following the FTA's guidelines, is limited to a cursory look at the population of the area surrounding the location of the service change. Further, it does not account for riders who may transfer to the area of the service change from other parts of the network or for the existence of other transit options. In addition, neither of the FTA's methods for conducting service equity analyses account for the varying magnitude of adverse effects attributable to different types of service changes.

In a previous Boston Region MPO study, *Title VI Service Equity Analysis: Methodology Development*, MPO staff developed an improved methodology for conducting Title VI service equity analyses, and conducted a proof of concept to demonstrate its application. The new methodology utilizes the Modified Transit Opportunity Index (MTOI) to measure the amount of transit opportunity provided to a census tract as a function of access opportunity, trip opportunity, and temporal comparability within the transit system network. The adverse effects of a proposed service change are measured by calculating the percentage decrease in MTOI between the existing and proposed service for each census tract in the network

area. The percentage change in the MTOI of a census tract is multiplied by the minority and nonminority population of that census tract and aggregated for all census tracts in the network area to determine the total impact of the service change on minority and nonminority populations. The ratio of the impact on the two populations is calculated and compared to the transit agency's disparate impact threshold to determine if the proposed service change would result in a disparate impact.

In this study, staff will conduct scenario testing to provide further proof of concept of the new methodology and inform future full-scale development of the methodology as a tool for conducting Title VI service equity analyses in the MBTA's service area. Scenario testing will involve a comparison of the results of service equity analyses obtained using the MTOI methodology and the methods outlined by FTA.

Objectives

1. Conduct scenario testing of the service equity analysis methodology developed in the previous Boston Region MPO study, *Title VI Service Equity Analysis: Methodology Development*, to further provide proof of concept and inform future full-scale development of the methodology as a tool for conducting Title VI service equity analyses in the MBTA's service area
2. Present results to stakeholders at MassDOT and the MBTA

Work Description

The work required to accomplish the study's objectives will be carried out in the three tasks described below:

Task 1 Prepare Resources to Perform MTOI Calculations

Staff will gather and prepare the data and resources required to update the existing platform used to calculate MTOI. Multiple variations of the MBTA key bus route and rapid transit network will be created to represent the scenarios that will be tested and to serve as inputs to the MTOI platform. The platform will be updated in order to process the multiple network variations.

Products of Task 1

- Network variations of the MBTA key bus route and rapid transit network
- Updated platform for performing MTOI calculations

Task 2 Conduct Scenario Testing

The set of scenarios will test the impacts of removing each of the MBTA key bus routes—Routes 1, 15, 22, 23, 28, 32, 39, 57, 66, 71, 73, 77, 111, 116, and 117—from a network comprised of the MBTA key bus routes and rapid transit lines. For each scenario, staff will conduct a service equity analysis using the MTOI

methodology and the two methods outlined by FTA, and then compare the results.

Products of Task 2

- Service equity analyses for the removal of each MBTA key bus route using the MTOI method
- Service equity analyses for the removal of each MBTA key bus route using the FTA ridership-data method
- Service equity analyses for the removal of each MBTA key bus route using the FTA population-data method

Task 3 Present Results of Scenario Testing

The results of the scenario testing will be presented to stakeholders at MassDOT and the MBTA. Results will be presented in tabular and graphical form. Staff will respond to any inquiries made by MassDOT and MBTA staff after the initial presentation.

Products of Task 3

Results of scenario testing in tabular and graphical form

Estimated Schedule

It is estimated that this project will be completed 12 weeks after work commences. The proposed schedule, by task, is shown in Exhibit 1.

Estimated Cost

The total cost of this project is estimated to be \$19,833. This includes the cost of eight person-weeks of staff time and overhead at the rate of 102.70 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/NH/nh

Exhibit 2
ESTIMATED COST
Title VI Service Equity Analysis: Scenario Testing

Direct Salary and Overhead	\$19,833
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Task	Person-Weeks			Direct Salary	Overhead (102.70%)	Total Cost
	M-1	P-3	Total			
1. Prepare resources to perform MTOI calculations	0.0	2.0	2.0	\$2,385	\$2,449	\$4,834
2. Conduct scenario testing	0.0	2.0	2.0	\$2,385	\$2,449	\$4,834
3. Present results of scenario testing	0.4	3.6	4.0	\$5,015	\$5,151	\$10,166
Total	0.4	7.6	8.0	\$9,785	\$10,049	\$19,833

Other Direct Costs	\$0
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TOTAL COST	\$19,833
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Funding