



# BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Gina Fiandaca, MassDOT Secretary and CEO and MPO Chair  
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## WORK PROGRAM

### FLEXIBLE FIXED-ROUTE BUS SERVICE

MARCH 2, 2023

#### 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** 13804

##### Client

Boston Region MPO

##### Project Supervisors

*Principal:* Paul Christner

*Manager:* Blake Acton

##### Funding Source

MPO Planning and MPO §5303 Contract 13804

#### Schedule and Budget

**Schedule:** 7 of months after work commences

**Budget:** \$20,000

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) 2023. The work completed through this study will address the following goal areas established in the MPO's Long-Range Transportation Plan: safety, capacity management and mobility, clean air and clean communities, transportation equity.

## Background

Flexible bus routes are designed to better meet rider demand by providing service that deviates from defined stops and routes to pick up and drop off eligible customers who request trips within a defined area. In contrast, traditional fixed routes operate on pre-planned routes that make stops at predefined locations according to a published schedule. Flexible routes can be more efficient in low-density areas or when passenger demand is low, while fixed routes are typically more efficient in areas with higher demand density. Flexible transit services can also provide significant benefits for older adults, those with limited mobility, and people who cannot drive, particularly in lower density suburban areas where fixed-route transit services may not adequately meet their needs.

An ongoing challenge for transit providers is knowing which routes would provide better service by operating as a flexible service. Transit providers must determine the optimal degree of flexibility while considering impacts to riders' experience and operation costs. The goal of this study is to assist transit providers in the Boston region by measuring these impacts so they can decide if particular transit corridors would be best served by a flexible service. Central Transportation Planning Staff (CTPS) will accomplish this goal by employing an analytical model developed in a recent Massachusetts Department of Transportation (MassDOT) study that evaluates the performance of flexible transit service.<sup>1</sup>

CTPS will collaborate with the authors of the MassDOT study and officials at regional transit authorities (RTAs) to select and evaluate the impacts on riders' experience and the costs of converting a route in a transit corridor to a flexible service. Staff will use the model results to recommend whether the corridor would benefit from switching to a flexible service. Finally, staff will evaluate the potential for the analytical model to be used by transit providers in the Boston region to guide their decision-making about implementing flexible transit services in other corridors.

## Objective

Identify a fixed transit route and evaluate its suitability for conversion to a flexible service.

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<sup>1</sup> Gonzales, Eric, and Eleni Christofa, "Flexible Transit Services," Report No. 21-020, Massachusetts Department of Transportation (2021).  
<https://www.umasstransportationcenter.org/Document.asp?DocID=927>.

## Work Description

CTPS will undertake a multi-step process to evaluate the feasibility of implementing flexible transit services in the Boston region. The first task involves selecting a transit corridor for analysis through collaboration with RTAs and reviewing ridership and schedule data. In the second task, CTPS will collect and prepare the data for input to the analytical model. Finally, in the third task, CTPS will use the analytical model to perform an analysis of the suitability of converting the selected RTA route into a flexible service, considering factors such as agency goals, community characteristics, and existing infrastructure. The results of this process will be provided in the form of a memorandum.

### **Task 1 Select Transit Corridor for Analysis**

CTPS will contact RTAs in the Boston region to request ideas for potential transit routes or corridors that may be suitable for conversion into a flexible service. Staff will review ridership and schedule data of the routes and select one for evaluation. A suitable option will be a fixed route or multiple fixed routes through a corridor with low-to-moderate passenger demand, but with demand too high to consider demand-responsive service.

#### ***Products of Task 1***

Selection of an RTA route or corridor for analysis

### **Task 2 Collect and Prepare Data for Modeling**

CTPS will collaborate with authors of the MassDOT study and RTA officials to collect and prepare the data for the analytical model. The required data can be broadly categorized into three main categories: service area characteristics, demand characteristics, and mode characteristics. For example, data on the service area include the size of the service area and the operational hours of the transit service, while data on demand characteristics include the density of demand and the distribution of demand within the service area. Finally, mode characteristics include the transit vehicle speed and the cost of vehicles.

#### ***Products of Task 2***

All data needed to conduct analytical model

### **Task 3 Perform Analysis**

With assistance from the MassDOT study authors, CTPS will use the data from Task 2 to analyze the potential impacts of converting the selected corridor from Task 1 to a flexible transit service. CTPS will use the results of the analytical model along with factors such as agency goals, community characteristics, and existing infrastructure to recommend flexible transit options for the corridor. Finally, CTPS will recommend whether the corridor should be converted to flexible transit following a review of the

overall costs, benefits, and potential challenges associated with implementing a flexible fixed-route transit service.

***Products of Task 3***

Evaluation of the suitability of converting an RTA route into a flexible service

Results provided in the form of a technical memorandum

**Exhibit 1**  
**ESTIMATED SCHEDULE**  
**Flexible Fixed-Route Bus Service**

Task	Month						
	1	2	3	4	5	6	7
1. Select Transit Corridor for Analysis	A						
2. Collect and Prepare Data for Modeling		B					
3. Perform Analysis				C			

**Products/Milestones**

- A: Selection of an RTA route or corridor for analysis
- B: All data needed to conduct analytical model
- C: Evaluation of the suitability of converting an RTA route into a flexible service. Results provided in the form of a technical memorandum.

**Exhibit 2**  
**ESTIMATED COST**  
**Flexible Fixed-Route Bus Service**

<b>Direct Salary and Overhead</b>							<b>\$20,000</b>
Task	Person-Weeks			Direct Salary	Overhead (119.34%)	Total Cost	
	M-1	P-2	Total				
1. Select Transit Corridor for Analysis	0.1	1.0	1.1	\$1,473	\$1,757	\$3,230	
2. Collect and Prepare Data for Modeling	0.1	2.0	2.1	\$2,761	\$3,295	\$6,056	
3. Perform Analysis	0.4	3.1	3.5	\$4,885	\$5,829	\$10,714	
Total	0.6	6.1	6.7	\$9,118	\$10,882	\$20,000	
<b>Other Direct Costs</b>							<b>\$0</b>
<b>TOTAL COST</b>							<b>\$20,000</b>

**Funding**

MPO §5303 Planning Contract #13804

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Title VI Specialist  
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10 Park Plaza, Suite 2150  
Boston, MA 02116  
[civilrights@ctps.org](mailto:civilrights@ctps.org)

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