BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Stephanie Pollack, MassDOT Secretary and CEO and MPO Chair
Karl H. Quackenbush, Executive Director, MPO Staff

MEMORANDUM

DATE October 6, 2016
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush, Executive Director
RE Work Program for: Using General Transit Feed Specification Data to Find Shared Bus Route Segments with Excessively Irregular Headways

Action Required

Review and approval

Proposed Motion

That the Boston Region Metropolitan Planning Organization (MPO) vote to approve the work program for General Transit Feed Specification Data to Find Shared Bus Route Segments with Excessively Irregular Headways presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Boston Region MPO Planning Studies and Technical Analysis

CTPS Project Number

13278

Client

Boston Region MPO

CTPS Project Supervisors

Principal: Annette Demchur
Manager: Steven Andrews

Funding

MPO §5303 Contract #91027 and
MPO §5303 Contract #TBD

Impact on MPO Work

This is MPO work and will be carried out in conformance with the priorities established by the MPO.

Background

Many MBTA riders board vehicles at bus stops in trunk sections of the bus system, which are segments of the bus network shared by multiple bus routes and that serve several common stops, but where riders view the combined routes as a single route. When the spacing between bus arrivals, also known as the headway, is even, people who use services in these corridors enjoy higher-frequency service than riders on the branches that feed into the trunk section.

However, if buses in a trunk segment arrive at the same time or headways are especially irregular, people may not perceive the corridor as offering high-frequency service. Buses may arrive at a stop at irregular frequencies because they are not operating according to schedule for myriad reasons or because they are scheduled independently, without attention to coordinating with other buses operating in the corridor.

The MBTA maintains files that conform to the General Transit Feed Specification (GTFS), a standardized way to record transit schedules. Transit users, generally through a trip planner application, use GTFS feeds to find the fastest way to their destinations. Planners and analysts can also use them to measure characteristics of the transit service. By using GTFS feeds, we may be able to expeditiously analyze the departure patterns of buses along trunk sections. Equipped with information about times and locations that could benefit from better coordinated headways, the MBTA may be able to adjust its schedules to improve service frequency.

Objectives

The goal of this study is to provide actionable information to MBTA planners about the circumstances in which coordinating headways may improve its users' experiences.

This study will answer three questions:

1. For trunk sections of the bus network, which stops have excessively irregular frequencies?
2. Are there reasons why the trunk services have irregular headways that would preclude coordinating them?

3. Is there likely to be a substantial benefit, for example, in terms of decreased average passenger wait times, to coordinating headways on specific trunk sections?

Work Description

Staff will conduct this work in three tasks: determining which segments of the network will be included in this study, identifying a metric to measure the regularity with which buses on trunk sections are scheduled to arrive, and quantifying and reporting the benefits and issues associated with coordinating headways.

Task 1 Identify Study Locations

Staff will determine the parts of the bus network to include in the study in two steps:

- Identify corridors where multiple routes operate and serve common stops
- Identify stops that enable people to use the routes in these corridors interchangeably, where coordinating the headways will result in reduced passenger wait times

Product of Task 1

A list of corridors and stops to be included in the study

Task 2 Identify a Bus Regularity Metric

Staff will develop a metric to evaluate the regularity of bus arrivals. One possible metric would be to evaluate the average scheduled wait time compared to the wait time for evenly spaced buses.

Product of Task 2

Metric to evaluate regularity of bus arrivals

Task 3 Quantify the Differences between the Scheduled and Ideal Headways

Using the MBTA's GTFS feeds, staff will quantify and report on the benefits and the issues associated with coordinating headways on trunk sections of the bus system.

Product of Task 3

White paper summarizing findings of the study

Task 4 Present Findings to the MPO

Staff will prepare presentation materials and present the findings of this study to the MPO.

Product of Task 4

Presentation materials

Estimated Schedule

It is estimated that this project will be completed 26 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 $25,000. This includes the cost of 8.4 person-weeks of staff time, and overhead at the rate of 102.7 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/SPA/spa

Exhibit 1
ESTIMATED SCHEDULE
Using General Transit Feed Specification Data to Find Shared Bus Route Segments with Excessively Irregular Headways

Task	Month					
	1	2	3	4	5	6
1. Identify Study Locations						
2. Identify a Bus Regularity Metric						
3. Quantify the Differences between the Scheduled and Ideal Headways						
4. Present Findings to the MPO						

Exhibit 2
ESTIMATED COST
Using General Transit Feed Specification Data to Find Shared Bus Route Segments with Excessively Irregular Headways

Direct Salary and Overhead	**$25,000**

Task	Person-Weeks M-1	Person-Weeks P-4	Person-Weeks Total	Direct Salary	Overhead (102.70%)	Total Cost
1. Identify Study Locations	0.0	0.8	0.8	$1,083	$1,112	$2,195
2. Identify a Bus Regularity Metric	0.0	0.4	0.4	$542	$556	$1,098
3. Quantify the Differences between the Scheduled and Ideal Headways	1.5	4.2	5.7	$8,451	$8,679	$17,131
4. Present Findings to the MPO	0.5	1.0	1.5	$2,258	$2,319	$4,576
Total	2.0	6.4	8.4	$12,334	$12,667	$25,000

Other Direct Costs	**$0**

TOTAL COST	**$25,000**

Funding

MPO §5303 Contract #91027 and
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