



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Jamey Tesler, MassDOT Secretary and CEO and MPO Chair
Tegin L. Teich, Executive Director, MPO Staff

WORK PROGRAM NORTH SHORE BUSWAY STUDY

FEBRUARY 17, 2022

Proposed Motion

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

Project Identification

Unified Planning Work Program (UPWP) Classification

Agency and Other Client Transportation Planning Studies and Technical Analyses

Project Number 11498

Client

Massachusetts Bay Transportation Authority (MBTA)

Client Supervisor: Eric Burkman

Project Supervisors

Principal: Rebecca Morgan

Manager: Bruce Kaplan

Funding Source

MBTA Contract

Schedule and Budget

Schedule: Seven months from notice to proceed

Budget: \$108,819

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

The schedule and budget above refer to all eight tasks described in this work program. Additional exhibits are provided that break out the schedule and budget for the tasks in Options A and B.

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 Massachusetts Bay Transportation Authority (MBTA) has proposed a center-running bus lane facility linking Wonderland Station in Revere to Lynn (at the intersection of Broad and Chestnut Street/Atlantic Street) via North Shore Road, General Edwards Bridge, the Lynnway, and Broad Street. This bus rapid transit (BRT) facility would produce a two-seat rapid-transit service between downtown Lynn and Boston. The BRT facility will be created by a variety of methods: the conversion of general-purpose lanes, lane narrowing, reduced parking, and the creation of cycle lanes or protected bicycle lanes. This reconstruction will chiefly impact vehicular traffic along the project corridor as well as on parallel roadways, such as Revere Beach Boulevard, Route 107, and US Route 1. There is specific concern about traffic volumes on North Shore Road given its importance as a roadway connection between North Shore communities and Boston.

The MBTA has asked the Central Transportation Planning Staff (CTPS) to support the transportation analysis of a conceptual bus lane scenario and to evaluate the potential trip diversions and reroutings that will result from the reconstruction of these roadways. The MBTA has requested information about the impacts of the bus lane on general-purpose vehicular traffic, specifically the locations and volumes of diversions. Impacts on roadways in Revere—North Shore Road, Revere Beach Boulevard, and Bell Circle—are of particular interest, as are the impacts on the tunnels and bridges that serve as the Boston Harbor crossings.

CTPS previously studied portions of this corridor and suggested Complete Streets treatments for the Lynnway similar to what is being proposed by the MBTA in its *Federal Fiscal Year 2015 Priority Corridors for the Long-Range Transportation Plan Needs Assessment*. Using the Boston Region MPO's regional travel demand model set and other tools, CTPS will support MBTA and its project team by assessing the existing traffic conditions and travel patterns, and by providing modeling results and analyses for use in the evaluation of the proposed reconstruction scenario.

Objective

The principal objective of this study is to support the MBTA and its project team in planning tasks that are associated with the busway project, to provide the information and data necessary for studying the traffic and transit impacts of the project, and for engaging with stakeholders and the public.

Work Description

CTPS will utilize the Boston Region MPO's travel demand model (TDM19) to model and analyze the impacts of the proposed center-running bus-lane facility linking Wonderland Station in Revere to Lynn (at the intersection of Broad and Chestnut Street/Atlantic Street) via North Shore Road, General Edwards Bridge, the Lynnway, and Broad Street. The work required to meet the immediate needs of the MBTA project team for its conceptual design analysis will be carried out in the four tasks described below.

Task 1 Calibrate Model for the Study Area

This task will begin with the calibration of TDM19's 2018 base year for the North Shore Road and Lynnway study area against traffic counts on local roadways and StreetLight data. The calibration efforts will focus on comparing the peak-period counts (AM peak period: 6:00 to 9:00 AM; and PM peak period: 3:00 to 6:00 PM) produced by the model to empirical counts for key roadways and intersections in the study area. Ridership figures from the model for selected transit services in the study area, particularly the Blue Line rapid transit, specifically Wonderland Station, and MBTA bus Routes 441 and 442, will be compared to recent empirical counts.

Product of Task 1

Calibrated multimodal travel demand model set for the study area which will serve as the no-build scenario

Task 2 Model Busway Scenario

CTPS will model the busway project as the build scenario using the same land use and demographic assumptions as in the no-build scenario. The MBTA and its consultants will provide CTPS with transit service plans and relevant roadway design data. TDM19 will be run to produce peak-period (AM and PM) travel forecasts for these scenarios. The analysis of the results will include comparisons of peak-period traffic conditions and transit ridership under the no-build scenario to the conditions of the build scenario. Passenger ridership and boardings on selected transit lines and at stations in the study area will be summarized to evaluate the impacts of the new busway service.

Products of Task 2

Comparisons of the build scenario to the no-build scenario, including data on traffic volumes, vehicle-miles traveled, vehicle-hours traveled, mode share, and transit ridership

Analysis of changes in regional and study corridor travel patterns, including mode-shift analyses

Traffic diversion maps

Task 3 Perform Roadway Select Link Analyses

CTPS will conduct as many as four select link analyses to evaluate trips associated with selected roadway links. These analyses will help disclose where trips are coming from and where they are going (their origins and destinations) and the volume difference on each selected link. Potential roadways for analysis include North Shore Road, General Edwards Bridge, the Lynnway, and Broad Street.

Products of Task 3

Highway select-link-assignment-difference plots comparing volume and travel patterns

Task 4 Prepare Documentation

A technical memorandum summarizing the general modeling methodology and the results of the analysis will be provided to the MBTA and the project team.

Product of Task 4

A summary of the findings compiled in a technical memorandum

OPTION A: Additional Analyses**Task 5 Perform Air Quality Analyses**

CTPS will perform air quality analyses in coordination with the project team. The air quality analyses, which will be based on the model outputs of the previous tasks, will estimate roadway mobile emissions from automobiles and trucks of carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and particulate matter (PM_{2.5} and PM₁₀).

Products of Task 5

Tabular summaries of automobile and truck mobile emissions

Task 6 Perform Equity/Environmental Justice Analyses

CTPS will conduct environmental justice analyses for the proposed build scenario. After identifying communities of concern, specified performance measures will be used as indicators of benefits and burdens for environmental justice and non-environmental justice communities. These measures will focus on accessibility to health care, higher education, and jobs; mobility and congestion; and environmental impacts.

Products of Task 6

Tabular summaries of results of the environmental justice analyses

Task 7 Perform Destination Access Analysis

CTPS will conduct destination access analyses for the build scenario to identify how the proposed busway will improve access to employment and other key

opportunities for populations in the study corridor. Conveyal, a destination access model, will be employed for this effort.

Products of Task 7

Tabular summaries and graphics displaying changes in key opportunities for populations in the study area due to the busway

OPTION B: Exploratory Modeling

Task 8 Conduct Exploratory Modeling Analysis

CTPS will utilize the Federal Highway Administration's TMIP-EMAT (<https://tmip-emat.github.io/>) exploratory modeling and analysis tool, which will integrate with the next generation travel demand model for the Boston region: TDM23. TMIP-EMAT facilitates the analysis of multiple uncertainties using a model platform and presents the result in a trend format that is more useful for gaining insight into the relative importance of different factors and potential impacts of the bus lane.

This task will begin with a review and compilation of potential sources of uncertainty to be evaluated and the model outputs to be analyzed. Example uncertainties that could be explored include the following:

- Work-from-home behavior
- Transit parameters (e.g., in-vehicle travel time [IVTT] and out-of-vehicle travel time [OVTT], and transfer penalty)
- Walk-transit mode definitions (impacts of multi-use path)
- Roadway congestion parameters (capacity, alpha, and beta)
- Distribution sensitivity to improved transit paths

Example model outputs to evaluate include the following:

- transit ridership
- congestion levels on North Shore Road and parallel facilities
- changes in accessibility

CTPS will organize and review the model outputs with the MBTA in a workshop style meeting using TMIP-EMAT's interactive visualization tools. A summary of the findings will be compiled in a technical memorandum.

This task depends on the completion of the TDM23 development, scheduled for Summer 2022.

Products of Task 8

Summary of findings in a technical memorandum

The Boston Region Metropolitan Planning Organization (MPO) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin (including limited English proficiency), be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination under any program or activity that receives federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, Federal Transit Administration, or both, prohibit discrimination on the basis of age, sex, and disability. The Boston Region MPO considers these protected populations in its Title VI Programs, consistent with federal interpretation and administration. In addition, the Boston Region MPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with U.S. Department of Transportation policy and guidance on federal Executive Order 13166.

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Title VI Specialist
Boston Region MPO
10 Park Plaza, Suite 2150
Boston, MA 02116
civilrights@ctps.org

By Telephone:

857.702.3702 (voice)

For people with hearing or speaking difficulties, connect through the state MassRelay service:

- **Relay Using TTY or Hearing Carry-over:** 800.439.2370
- **Relay Using Voice Carry-over:** 866.887.6619
- **Relay Using Text to Speech:** 866.645.9870

For more information, including numbers for Spanish speakers, visit <https://www.mass.gov/massrelay>.

Exhibit 1
ESTIMATED SCHEDULE
North Shore Busway Study

Task	Month						
	1	2	3	4	5	6	7
1. Calibrate Model for the Study Area	█	█					
2. Model Busway Scenario		█	█				
3. Perform Roadway Select Link Analyses	█	█	█	█			
4. Prepare Documentation				█	█		
5. Perform Air Quality Analyses					█		
6. Perform Equity / Environmental Justice Analysis					█	█	
7. Perform Destination Access Analysis					█	█	
8. Conduct Exploratory Modeling Analysis						█	█

Exhibit 2
ESTIMATED COST
North Shore Busway Study

Direct Salary and Overhead	\$108,819
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Task	Person-Weeks						Direct Salary	Overhead (109.09%)	Total Cost
	M-1	P-5	P-4	P-3	P-2	Total			
1. Calibrate Model for the Study Area	0.0	1.8	4.0	0.0	0.0	5.8	\$8,966	\$9,781	\$18,748
2. Model Busway Scenario	0.0	2.2	3.0	0.0	0.0	5.2	\$10,125	\$11,045	\$21,170
3. Perform Roadway Select Link Analyses	0.0	1.5	4.0	0.0	0.0	5.5	\$9,635	\$10,510	\$20,145
4. Prepare Documentation	1.0	1.5	0.0	0.0	0.0	2.5	\$4,495	\$4,904	\$9,399
5. Perform Air Quality Analyses	0.0	0.2	0.0	0.0	0.0	0.2	\$457	\$498	\$955
6. Perform Equity / Environmental Justice Analysis	0.0	0.2	0.5	0.0	1.0	1.8	\$2,386	\$2,602	\$4,988
7. Perform Destination Access Analysis	0.0	2.0	0.0	0.0	0.0	2.0	\$3,654	\$3,986	\$7,640
8. Conduct Exploratory Modeling Analysis	0.0	0.0	0.0	6.0	0.0	6.0	\$12,327	\$13,447	\$25,774
Total	1.0	9.5	11.5	6.0	1.0	29.0	\$52,044	\$56,775	\$108,819

Other Direct Costs	\$0
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TOTAL COST	\$108,819
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Funding
 MBTA Contract

**Exhibit 1 - Option A
ESTIMATED SCHEDULE
North Shore Busway Study**

Task	Month				
	1	2	3	4	5
5. Perform Air Quality Analyses					
6. Perform Equity / Environmental Justice Analysis					
7. Perform Destination Access Analysis					

**Exhibit 2 - Option A
ESTIMATED COST
North Shore Busway Study**

Direct Salary and Overhead	\$13,583
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Task	Person-Weeks				Direct Salary	Overhead (109.09%)	Total Cost
	P-5	P-4	P-2	Total			
5. Perform Air Quality Analyses	0.2	0.0	0.0	0.2	\$457	\$498	\$955
6. Perform Equity / Environmental Justice Analysis	0.2	0.5	1.0	1.8	\$2,386	\$2,602	\$4,988
7. Perform Destination Access Analysis	2.0	0.0	0.0	2.0	\$3,654	\$3,986	\$7,640
Total	2.5	0.5	1.0	4.0	\$6,496	\$7,087	\$13,583

Other Direct Costs	\$0
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TOTAL COST	\$13,583
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Funding
MBTA Contract

**Exhibit 1 - Option B
ESTIMATED SCHEDULE
North Shore Busway Study**

Task	Month						
	1	2	3	4	5	6	7

8. Conduct Exploratory Modeling Analysis

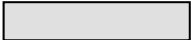


Exhibit 2 - Option B
ESTIMATED COST
North Shore Busway Study

Direct Salary and Overhead	\$25,774
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Task	Person-Weeks		Direct Salary	Overhead (109.09%)	Total Cost
	P-3	Total			
8. Conduct Exploratory Modeling Analysis	6.0	6.0	\$12,327	\$13,447	\$25,774
Total	6.0	6.0	\$12,327	\$13,447	\$25,774

Other Direct Costs	\$0
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TOTAL COST	\$25,774
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Funding
 MBTA Contract