



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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

MEMORANDUM

DATE August 20, 2015
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Program for: Program for Mass Transportation: Commuter Rail,
Rapid Transit, Bus, and Ferry

Action Required

Review and approval

Proposed Motion

That the Boston Region Metropolitan Planning Organization, upon the recommendation of the Massachusetts Department of Transportation, vote to approve the work program for Program for Mass Transportation: Commuter Rail, Rapid Transit, Bus, and Ferry presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

97330

Client

Massachusetts Department of Transportation, Office of Transportation Planning
Project Supervisor: Scott Hamwey

CTPS Project Supervisors

Principal: Scott Peterson

Manager: Bruce Kaplan

Funding

MassDOT SPR Contract #86842

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 UPWP.

Background

The Massachusetts Bay Transportation Authority (MBTA), one of the nation's largest public transportation agencies, operates services in many different transit modes—commuter rail, rapid transit (heavy rail, light rail, and bus rapid transit), bus (which includes trolleybus), ferry, and paratransit. The MBTA's 1999 enabling legislation requires the MBTA to develop a 25-year "master plan," which must be updated every five years. This plan, the Program for Mass Transportation (PMT), establishes the long-term vision for transit in the region. In contrast to previous PMTs, which were fiscally unconstrained, this PMT will provide for a "fiscally responsible" 25-year plan that allows for a long-term vision but also takes cost-effectiveness into consideration. The Massachusetts Department of Transportation (MassDOT) requested that the Central Transportation Planning Staff (CTPS) assist MassDOT and the MBTA with this PMT update by providing modeling support related to planning for the commuter rail, rapid transit, bus, and ferry modes. This work program details the initial PMT work funded by the existing MassDOT SPR contract (#86842).

Objectives

- To assist in the development of potential transit system improvement projects for the MBTA's commuter rail, rapid transit, bus, and ferry modes
- To evaluate potential transit system improvement projects for the MBTA's commuter rail, rapid transit, bus, and ferry modes

Work Description

Task 1 Participate on a Steering Committee, Coordinate with the Project Team, and Provide Ongoing Technical Assistance

CTPS will serve as a member of the existing PMT Steering Committee. This committee is tasked with defining the approach to developing the PMT, advising the MBTA on the public launch of the PMT, and coordinating the PMT with related MBTA planning efforts, such as the Capital Investment Program and other service planning efforts. CTPS will work with the MassDOT project team throughout the study. In the event of project delays beyond the control of CTPS, the timing of project deliverables will be consistent with revised schedules set by the project team. CTPS will fulfill any data requests from the project team for which the data are readily available. It is anticipated that CTPS staff will attend a maximum of nine project meetings.

Product of Task 1

Coordination with the project team, attendance at meetings, and other assistance as needed

Task 2 Perform a Base-Year Model Calibration

CTPS will take the most up-to-date version of the Boston Region MPO's base-year travel demand model and calibrate it to available systemwide MBTA data. Empirical data, not schedule information, for transit service will be represented in this effort. CTPS will produce a calibrated multimodal travel demand model set, including representation of empirical transit conditions, and tabular and graphic summaries of systemwide, modal, and line-level transit volumes estimated on daily and peak-period bases; the summaries will include peak-load line-level analyses.

This representation of empirical conditions may reveal that the transit system's actual run times and service frequencies differ from the scheduled run times and frequencies.

Products of Task 2

- A calibrated multimodal travel demand model set, including representation of empirical transit conditions
- Tabular and graphic summaries of systemwide, modal, and line-level transit volumes estimated on daily and peak-period bases, including peak-load line-level analyses

Task 3 Model a 2040 No-Build Scenario

CTPS will develop a 2040 no-build scenario for this study. The no-build scenario will use the most recent demographic assumptions and multimodal transportation networks from the Boston Region MPO's Long-Range Transportation Plan, except for transit run times and headways; the data for these metrics will be taken from the results of Task 2. This scenario will also incorporate the demographic assumptions that are being used in CTPS's current work for the City of Boston's Go Boston 2030 study to the greatest possible extent. The model set will be used to produce estimated transit volumes for this scenario. Staff will use the same categories of volumes for this scenario as were used in Task 2 for the base year, so that the base-year and no-build scenarios can be compared. The outputs of the 2040 no-build model run will be used as the basis for analyzing the impacts of potential transit system improvements.

Products of Task 3

- 2040 no-build scenario – multimodal transportation network

- Tabular and graphic summaries of systemwide and line-level transit volumes estimated on daily and peak-period bases, including peak-load line-level analyses

Task 4 Develop and Model Fiscally Responsible 2040 Build Scenarios

CTPS will assist in the development of up to three different scenarios containing packages of commuter rail, rapid transit, bus, and ferry improvements designed to achieve specific MBTA service goals and to meet MBTA standards. Each of these scenarios' associated costs will be considered in the identification of the investment levels needed to achieve each of these goals and standards. MassDOT will perform all of the cost analyses for these proposed scenarios. The regional travel demand model set will be used to produce estimated transit volumes for this scenario. Staff will use the same categories of transit volumes for this scenario as were used in Task 2. CTPS will summarize the results of the analyses in this task and compare them to the results of previous tasks.

Products of Task 4

- 2040 fiscally responsible multimodal scenarios
- Tabular and graphic summaries of systemwide and line-level transit volumes estimated on daily and peak-period bases, including peak-load line-level analyses

Task 5 Model a 2025 Short-Term Horizon Year No-Build Scenario

CTPS will develop a 2025 short-term horizon no-build scenario for this study. The no-build scenario will use the most recent demographic assumptions and multimodal transportation networks from the Boston Region MPO's Long-Range Transportation Plan. However, the run times and headways will be the same as those used in Task 2. The model set will be used to produce estimated transit volumes for this scenario. Staff will use the same categories of volumes for this scenario as were used in Task 1 for the base year so that the base-year and no-build scenarios can be compared. The outputs of this model run will be used as the basis for analyzing the impacts of the 2025 build scenarios (Tasks 6).

Products of Task 5

- 2025 no-build scenario – multimodal transportation network
- Tabular and graphic summaries of systemwide and line-level transit volumes estimated on daily and peak-period bases, including peak-load line-level analyses

Task 6 Develop and Model Fiscally Responsible 2025 Short-Term Horizon Year Build Scenarios

CTPS will assist in the development of up to two different short-term horizon-year scenarios containing packages of commuter rail, rapid transit, bus, and ferry improvements designed to achieve specific MBTA service goals and meet MBTA standards. Each of these scenarios' associated costs will aid in the identification of the investment levels needed to achieve each of the goals. MassDOT will perform all of the cost analyses for these proposed scenarios. The regional travel demand model set will be used to produce estimated transit volumes for this scenario. Staff will use the same categories of volumes for this scenario as were used in Task 2. CTPS will summarize the results of this task and will compare them to the results of the previous tasks.

Products of Task 6

- 2025 fiscally responsible multimodal build scenarios
- Tabular and graphic summaries of systemwide and line-level transit volumes estimated on daily and peak-period bases, including peak-load line-level analyses

Task 7 Perform Air Quality and Environmental-Justice Analyses

CTPS will work in coordination with the project team on air quality analyses. The air quality analyses, building on the model outputs from Tasks 2–6, will estimate mobile emissions from cars, trucks, and transit vehicles of carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and particulate matter (PM_{2.5} and PM₁₀).

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

Products of Task 7

- Tabular summaries of emissions resulting from the air quality studies
- Tabular summaries of the results of the environmental-justice analyses

Task 8 Ferry Needs Assessment

Building off the recent MBTA Ferry Fleet Maintenance Plan, CTPS staff will conduct a needs assessment for the current ferry system. This analysis will document the current state of the MBTA ferry system as well as identify opportunities for improvement.

Product of Task 8

Needs assessment for the ferry system

Task 9 Prepare a Final Memorandum or Report

CTPS staff will produce a final memorandum or report that will summarize the findings of the project.

Product of Task 9

Memorandum or report

Estimated Schedule

It is estimated that this project will be completed seven months 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 \$140,000. This includes the cost of 51.1 person-weeks of staff time and overhead at the rate of 98.88 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

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Exhibit 1

ESTIMATED SCHEDULE

Program for Mass Transportation: Commuter Rail, Rapid Transit, Bus, and Ferry

Task	Month						
	1	2	3	4	5	6	7
1. Participate on a Steering Committee, Coordinate with the Project Team, and Provide Ongoing Technical Assistance	[Task 1: Months 1-7]						
2. Perform a Base-Year Model Calibration	[Task 2: Month 1]						
3. Model a 2040 No-Build Scenario		[Task 3: Month 2]					
4. Develop and Model Fiscally Responsible 2040 Build Scenarios			[Task 4: Month 3]				
5. Model a 2025 Short-Term Horizon Year No-Build Scenario				[Task 5: Month 4]			
6. Develop and Model Fiscally Responsible 2025 Short-Term Horizon Year Build Scenarios					[Task 6: Month 5]		
7. Perform Air Quality and Environmental-Justice Analyses						[Task 7: Month 6]	
8. Ferry Needs Assessment	[Task 8: Months 1-7]						
9. Prepare a Final Memorandum or Report							[Task 9: Month 7]

Exhibit 2

ESTIMATED COST

Program for Mass Transportation: Commuter Rail, Rapid Transit, Bus, and Ferry

Direct Salary and Overhead	\$140,000
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Task	Person-Weeks					Direct Salary	Overhead (98.88%)	Total Cost
	M-1	P-5	P-4	P-3	Total			
1. Participate on a Steering Committee, Coordinate with the Project Team, and Provide Ongoing Technical Assistance	1.0	0.0	2.0	2.0	5.0	\$6,617	\$6,543	\$13,161
2. Perform a Base-Year Model Calibration	0.5	1.0	3.0	3.0	7.5	\$10,039	\$9,927	\$19,966
3. Model a 2040 No-Build Scenario	0.5	0.0	3.0	3.0	6.5	\$8,212	\$8,121	\$16,333
4. Develop and Model Fiscally Responsible 2040 Build Scenarios	1.0	0.5	3.0	3.0	7.5	\$9,899	\$9,788	\$19,688
5. Model a 2025 Short-Term Horizon Year No-Build Scenario	0.5	0.5	2.4	2.0	5.4	\$7,205	\$7,124	\$14,329
6. Develop and Model Fiscally Responsible 2025 Short-Term Horizon Year Build Scenarios	1.0	0.4	2.0	2.0	5.4	\$7,439	\$7,356	\$14,796
7. Perform Air Quality and Environmental-Justice Analyses	0.5	0.0	0.0	2.0	2.5	\$3,107	\$3,072	\$6,179
8. Ferry Needs Assessment	1.0	1.5	0.0	0.0	2.5	\$4,454	\$4,404	\$8,858
9. Prepare a Final Memorandum or Report	4.0	0.8	3.0	1.0	8.8	\$13,421	\$13,271	\$26,692
Total	10.0	4.7	18.4	18.0	51.1	\$70,394	\$69,606	\$140,000

Other Direct Costs	\$0
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TOTAL COST	\$140,000
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Funding

MassDOT SPR Contract #86842