



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

Richard A. Davey, MassDOT Secretary and CEO and MPO Chairman
Karl H. Quackenbush, Executive Director, MPO Staff

MEMORANDUM

DATE September 20, 2012
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Program for: Completion of Green Line Extension New Starts
Analysis

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 Completion of Green Line Extension New Starts Analysis in the form of the draft dated 9/20/2012.

Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

22336

Client

Massachusetts Bay Transportation Authority
Project Supervisor: Andrew Brennan

CTPS Project Supervisors

Principal: Karl H. Quackenbush
Manager: Bruce Kaplan

Funding

New MBTA Contract

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 nor reduce the quality of other work in the UPWP.

Background

The work program outlined below is intended to provide planning and modeling assistance to the client, the Massachusetts Bay Transportation Authority (MBTA), as part of completion of work on a New Starts submission for the Green Line Extension. CTPS has recently finished work on the Final Environmental Impact Report (FEIR) and provided support for the draft New Starts submission to the Federal Transit Administration (FTA). Completion of the New Starts submission is contingent upon utilization of the Boston Region MPO's most recent Long-Range Transportation Plan (LRTP), *Paths to a Sustainable Region*, adopted on September 22, 2011. CTPS's continuing support for the New Starts submission will involve revisiting the draft New Starts modeling efforts in light of the new LRTP and updating results using the most current data.

Objectives

The objectives of this work program are:

1. To provide the necessary components for a New Starts submission
2. To support the project team and coordinate with stakeholders and the FTA

Work Description

The Boston Region MPO's regional travel demand model set will be used to produce outputs for the New Starts submission to FTA.

Task 1 Perform Study Area Base-Year Model Calibration

CTPS will use the latest version of the base-year model in this study. Specific attention will be paid to further calibration of the study area transit and roadway networks to replicate existing conditions. Results from the base-year model will be summarized to provide certain systemwide statistics, as well as study-area-specific data, such as daily boardings and access-mode shares on major transit services.

Product of Task 1

A well-calibrated travel demand model set for the study area

Task 2 Prepare Inputs for Forecast Years

CTPS will produce forecasts for two horizon years: the opening year and the 2035 design horizon year. Model inputs—socioeconomic data, congested-highway travel times, auto operating costs, CBD parking costs, transit fares, and travel times—will be consistent with the currently adopted land use and background transportation projects assumed in *Paths to a Sustainable Region*. MAPC and other relevant agencies, such as other MPOs, as well as MassDOT, will be consulted about the best demographic and land use assumptions to use in this planning effort for conducting both the opening year and the 2035 design horizon year analyses and responding to FTA's request for more defined demographic forecasts in New Starts submissions.

Products of Task 2

Model inputs for both the opening and design horizon years

Task 3 Conduct No-Build Model Runs for the Forecast Years

Using the model work done for *Paths to a Sustainable Region*, CTPS will create no-build networks for the two forecast years: the opening year and the design horizon year. Forecast-year model runs will be conducted for these no-build scenarios, and the results will be summarized at the same levels of detail as for the base year.

Product of Task 3

A complete summary of travel forecasts for the no-build scenario in both forecast years

Task 4 Run Model for Proposed Alternative

In this task, CTPS will model the proposed alternative and analyze the results for both the opening and design horizon years. Several sensitivity tests will be conducted in this task.

Subtask 4.1 Conduct model runs for proposed alternative

The proposed alternative will be analyzed for the opening and design horizon years. Mode choice and highway assignment results will be summarized in tabular form. Aggregate statistics such as total linked and unlinked transit trips will be summarized by submode. These statistics will form the basis for determining the utilization of the proposed service.

Subtask 4.2 Sensitivity testing of corridor bus routes

CTPS will investigate the potential for changes to study area bus service given the future presence of the new Green Line extension. Up to six alternatives will be examined for minimizing corridor bus mileage while best complementing and maximizing the Green Line Extension ridership. This may

or may not result in bus route reconfigurations and modifications to the proposed alternative.

Product of Task 4

A complete summary of travel forecasts for the proposed alternative and documentation of the sensitivity testing of corridor bus routes

Task 5 Run Model for the Approved FTA Baseline Alternative

Current FTA guidance mandates the development of a Transportation System Management/Baseline alternative for the design horizon year. This relatively low-cost scenario is supposed to provide the best study area transit options without the introduction of fixed-guideway (rail/busway) service. Such a scenario has already been created and approved by FTA in the draft New Starts submission. CTPS will repeat the same modeling effort using the updated demographic and land use assumptions that will be prepared in Task 2. Outputs from the model similar to the ones in Task 4 will be processed and examined.

Product of Task 5

A complete summary of travel forecasts for the Baseline alternative for the opening and design horizon years of analysis

Task 6 Analyze Green Line Capacity

CTPS will analyze, by time period, opening and design horizon year peak load and capacity concerns on the entire Green Line rapid transit service, specifically in the currently heavily traveled Central Subway portion shared by the four different Green Line branches. The ridership demand under the Build scenario examined in Task 4 will be measured against the carrying capacity of each of the Green Line branches. CTPS will provide this information to other study team members and assist them in the development of station and platform designs that adequately meet capacity demands.

Product of Task 6

Memorandum presenting the peak load and capacity analysis

Task 7 Estimate Transportation User Benefits – SUMMIT

CTPS will use the results of the travel demand model forecasts to run the FTA-developed SUMMIT software and produce tables showing transportation user benefits, comparing the Build scenario to the Baseline alternative. User benefits, similar to travel time savings, are used in the cost-effectiveness formula that FTA considers in reviewing New Starts submissions. Several maps showing the pattern of travel time savings will be generated using results from the SUMMIT software. Additionally, the transit trip flows by mode will be analyzed to determine the origins and destinations of the markets in the study area. Graphics will be

produced to show the spatial distribution of the primary beneficiaries of the project.

Products of Task 7

Tables, maps, and a memorandum summarizing results obtained using the SUMMIT software

Task 8 Estimate New Evaluative New Starts Measures

On January 25, 2012, FTA proposed a new series of evaluative measures for New Starts work. Among these are metrics for mobility, cost-effectiveness, environmental standards, economic development, operating efficiencies, livability, regional air quality, greenhouse gas emission, and land use. CTPS will work to provide appropriate results once these criteria are officially established. Particular attention will be paid to quantifying the benefits associated with economic agglomeration and clustering of development. This is expected to require the rental and/or purchase of specialized economic forecasting software.

Products of Task 8

Estimates the new New Starts evaluative measures

Task 9 Estimate Passenger Revenue

Travel model results will serve as the starting point for estimating likely passenger revenue associated with each scenario. The revenue estimates will take into consideration the different regional transit agencies' fare structures and parking revenue by operating entity. CTPS will also assist the projects team's financial consultant in the development of its financial plan.

Product of Task 9

Passenger revenue estimates for each transit scenario

Task 10 Quantify Uncertainties

The travel demand model set that CTPS will use in this study will be developed based on a set of assumptions that cover a broad spectrum of topics. The confidence in many of these assumptions decreases the further we go into the future. Assumptions such as costs, land use, and other transit investments are all major inputs into the travel demand modeling process and can potentially be a major area of uncertainty in relation to future conditions. Sensitivity testing will be undertaken to test the degree to which these assumptions could impact future Green Line Extension ridership and other performance measures.

Product of Task 10

Memorandum explaining and documenting the uncertainty analysis

Task 11 Conduct Service and Fare Equity Analysis

Major transit service changes, such as the Green Line Extension, are required by MBTA service delivery policy, FTA Title VI regulations, and FTA New Starts requirements to be examined to ensure that they do not unfairly burden low-income and minority communities, also known as “environmental-justice communities.” A Service and Fare Equity Analysis will be conducted to comply with these requirements. Prior environmental-justice analyses performed by CTPS have been judged by FTA to address all of the equity issues that need to be investigated in a Service and Fare Equity Analysis. Hence, CTPS will conduct an environmental-justice analysis, focusing on performance measures—accessibility to health care, higher education, and jobs; mobility and congestion; and environmental impacts—that serve as indicators of benefits and burdens for environmental-justice and non-environmental-justice communities.

Product of Task 11

Memorandum explaining and documenting the Service and Fare Equity Analysis

Task 12 Produce Technical Memoranda

CTPS will produce two technical memoranda concerned with overall project documentation. One will describe the modeling methodology, while the other will present the results of Task 1’s model calibration. These memoranda are separate from the memoranda listed for prior tasks.

Products of Task 12

Modeling methodology memorandum and calibration memorandum

Task 13 Assist with FTA New Starts Program Grant Submission

CTPS will coordinate with and assist MBTA and its project team throughout the project, especially focusing on the FTA New Starts grant submission process. It is anticipated that CTPS will participate in up to 17 internal team meetings and 2 public meetings.

Products of Task 13

Written products and data requested by the client, in appropriate forms

Estimated Schedule

It is estimated that this project will be completed twelve months after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 1.

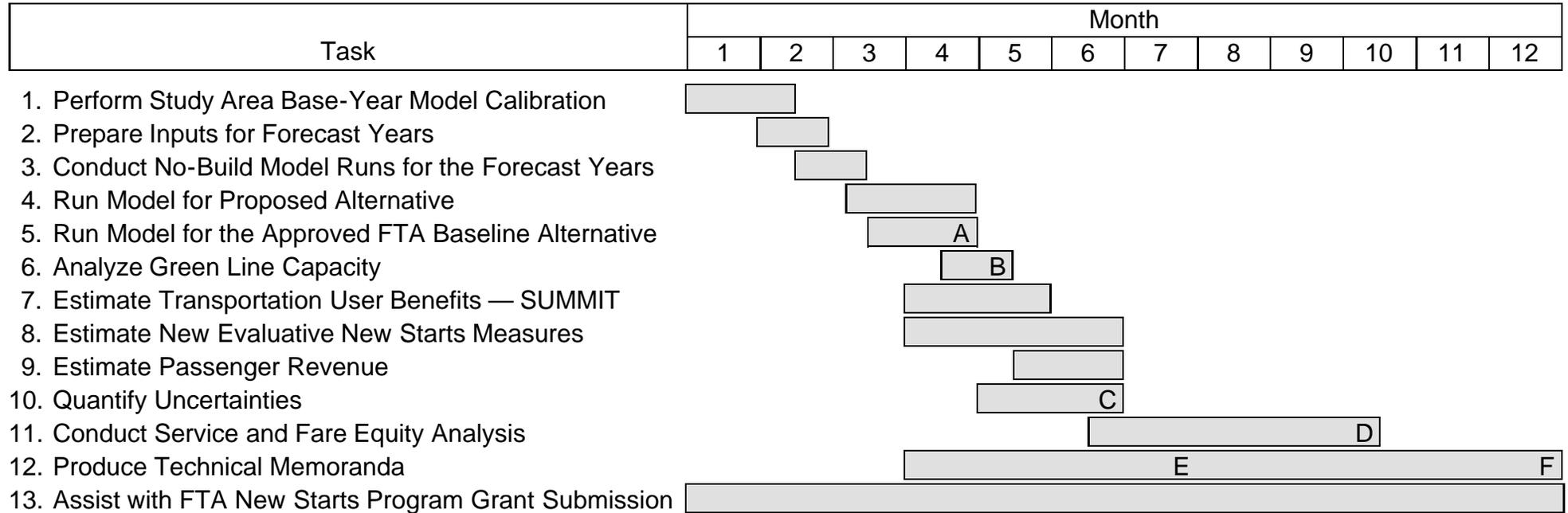
Estimated Cost

The total cost of this project is estimated to be \$191,747. This includes the cost of 62.5 person-weeks of staff time, overhead at the rate of 96.58 percent, printing,

travel, equipment, consultants, and other direct costs. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/SAP/BK/yb

Exhibit 1
ESTIMATED SCHEDULE
Completion of Green Line Extension New Starts Analysis



Products/Milestones

- A: New Starts templates, Maps
- B: Capacity Memorandum
- C: Uncertainty Memorandum
- D: Service and Fare Equity Analysis Memorandum
- E: Calibration Memorandum
- F: Methodology Memorandum
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Exhibit 2
ESTIMATED COST
Completion of Green Line Extension New Starts Analysis

Direct Salary and Overhead	\$171,747
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Task	Person-Weeks				Direct Salary	Overhead (96.58%)	Total Cost
	M-1	P-5	P-4	Total			
1. Perform Study Area Base-Year Model Calibration	0.5	1.0	1.5	3.0	\$4,418	\$4,267	\$8,684
2. Prepare Inputs for Forecast Years	0.0	0.5	2.0	2.5	\$3,363	\$3,248	\$6,610
3. Conduct No-Build Model Runs for the Forecast Years	0.0	0.5	2.0	2.5	\$3,363	\$3,248	\$6,610
4. Run Model for Proposed Alternative	1.0	1.5	7.0	9.5	\$13,044	\$12,598	\$25,642
5. Run Model for the Approved FTA Baseline Alternative	0.0	0.0	3.5	3.5	\$4,417	\$4,266	\$8,682
6. Analyze Green Line Capacity	0.5	1.0	1.5	3.0	\$4,418	\$4,267	\$8,684
7. Estimate Transportation User Benefits — SUMMIT	1.0	0.0	3.0	4.0	\$5,480	\$5,293	\$10,773
8. Estimate New Evaluative New Starts Measures	1.5	1.0	7.5	10.0	\$13,683	\$13,215	\$26,899
9. Estimate Passenger Revenue	1.0	0.0	2.0	3.0	\$4,218	\$4,074	\$8,292
10. Quantify Uncertainties	1.0	0.5	3.0	4.5	\$6,319	\$6,103	\$12,422
11. Conduct Service and Fare Equity Analysis	0.5	0.5	2.0	3.0	\$4,210	\$4,066	\$8,276
12. Produce Technical Memoranda	3.0	1.0	4.0	8.0	\$11,808	\$11,404	\$23,212
13. Assist with FTA New Starts Program Grant Submission	1.0	1.5	3.5	6.0	\$8,628	\$8,332	\$16,960
Total	11.0	9.0	42.5	62.5	\$87,368	\$84,380	\$171,747

Other Direct Costs	\$20,000
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Economic Modeling Software License	\$20,000
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TOTAL COST	\$191,747
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Funding
 New MBTA Contract