



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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

MEMORANDUM

DATE March 20, 2014
TO Boston Region Metropolitan Planning Organization
FROM Karl H. Quackenbush
CTPS Executive Director
RE Work Program for: FRA NEC FUTURE: Modeling Support

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 FRA NEC FUTURE: Modeling Support, presented in this memorandum

Project Identification

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

12324

Clients

Federal Railroad Administration (FRA) and PB – AECOM Joint Venture for NEC FUTURE

Project Supervisors: Rebecca Reyes-Alicia, FRA and Jeffrey Roux, AECOM

CTPS Project Supervisors

Principal: Scott Peterson

Manager: Bruce Kaplan

Funding

FRA Contract #TBD

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

NEC FUTURE is a comprehensive federal planning effort to define, evaluate, and prioritize future investments in the Northeast Corridor (NEC), launched by the Federal Railroad Administration (FRA) in February 2012. The purpose of this FRA initiative is to evaluate new ideas and approaches to grow the region's intercity, commuter, and freight rail services and to perform environmental evaluations of proposed transportation alternatives.

The FRA has initiated a comprehensive planning process for future investment in the corridor through 2040. The NEC FUTURE program includes both a Service Development Plan (SDP) and a broad environmental analysis known as a Tier 1 Environmental Impact Statement, or EIS. These studies will help provide a road map to a better transportation solution for the Northeast.

NEC FUTURE will create a framework for the future investments needed to improve passenger rail capacity and service through 2040. The technical work includes an analysis of market conditions in the corridor, the development of reasonable program alternatives and an evaluation of the environmental impacts of those alternatives, and a recommendation of an approach that balances the needs of various users of the corridor—commuters, intercity rail passengers, or rail freight—in a manner that ensures safe, efficient travel throughout the Northeast.

To date, the project has completed a screening of a long list of preliminary alternatives, winnowing the list to six alternatives for further, more detailed analysis. Moving into the next phase of the project, the NEC FUTURE team will begin evaluating these alternatives using robust travel demand forecasting techniques to fully quantify the benefits of expanding train operations and capacity on the Northeast Corridor.

The forecasting approach for NEC FUTURE includes the development of a new interregional (intercity) forecasting model to estimate the implications of expanding and improving the rail mode between urban areas along the NEC. For travel within local areas, the NEC FUTURE team is using an approach whereby each of the local regional forecasting models will be applied individually to estimate the impacts to travel within urban areas. The NEC FUTURE project team, which consists of the NEC FUTURE forecasting and alternatives teams, intends to significantly leverage existing, off-the-shelf Central Transportation Planning Staff (CTPS) modeling

resources to the maximum extent possible. CTPS has been requested to assist the NEC FUTURE team to support the development of the Tier 1 EIS.

Objectives

The two principal objectives of this work program are:

1. To assist the project team with the quantification of the six preliminary service alternatives developed by the NEC FUTURE team
2. To provide necessary data and outputs to help the project team complete its work

Work Description

CTPS has identified five tasks needed to complete this work:

Task 1 Establish Project Assumptions, Definitions, and Expectations

CTPS staff will coordinate with the NEC FUTURE project team to establish the data required to execute the CTPS forecasting model. These discussions will include conversations about demographic data, transit service plans, calibration and validation targets, the 2040 No-Build scenario, and necessary outputs.

Products of Task 1

- Identification of specific model areas for calibration
- Definition of the 2040 No-Build scenario
- Consensus on which demographic data will be used
- Consensus on which transit service plans will be used
- Identification of key reports and needed model outputs

Task 2 Calibrate the Base-Year Model

CTPS will utilize the latest calibrated version of the regional model set for this study. Specific attention will be paid to the commuter rail corridors. CTPS will calibrate the base-year model to the most recent transit ridership data. Although the calibration will focus on commuter rail ridership, bus and/or rapid transit ridership may also be examined in these corridors.

Product of Task 2

A calibrated 2012 base-year model set in line with the project team expectations

Task 3 Prepare 2040 Scenario Inputs

CTPS will work with the NEC FUTURE project team to develop different 2040 horizon-year scenarios. This will be a two-part effort, as two distinct land use scenarios will ultimately be applied to seven different transit service scenarios.

Subtask 3.1 Receive Land Use Scenarios and Execute Trip Generation and Distribution

Two distinct land use scenarios will be modeled for the 2040 horizon year. Both of the land use scenarios will build on the land use data previously adopted by the Boston Region MPO's current Long-Range Transportation Plan (LRTP) for year 2040. CTPS staff will then adjust these data to match the national county-level forecasts chosen by the project team and to ensure consistence with the overall NEC analysis. Both the "base" (most likely growth) and the "high" (aggressive growth) demographic projections will be developed by the project team and provided to CTPS. Both of these scenarios will be run through CTPS's trip generation and trip distribution routines, and will be utilized as inputs for the 2040 scenarios described in the following tasks.

Subtask 3.2 Prepare 2040 Scenarios

CTPS will prepare one No-Build scenario and up to six Build transit service scenarios for modeling. The detailed information of the Build scenarios will be provided by the project team and will then be reviewed and approved by MassDOT. In this subtask, CTPS staff, in consultation with the project team, will also develop routines to extract key model outputs from No-Build and Build scenarios.

Products of Task 3

- Two distinct land use scenarios prepared through the trip distribution step of the CTPS modeling process
- Seven coded 2040 transit service scenarios, ready for modeling
- Procedures for extracting identified model outputs

Task 4 Model the 2040 Scenarios and Analyze Results

CTPS staff will prepare, execute, and summarize CTPS model runs for one No-Build and up to six Build transit service scenarios, as listed in the previous task. This will occur in three phrases. The seven scenarios will be modeled using the aforementioned "base" case land use ("most likely growth") scenario. The Build scenarios will then be modified in order to better balance the travel demand with the supply network and will be re-run again using the "base" case land use scenario/ These six refined "Build" transit service alternatives will then be used in the modeling of the "high" land use scenario runs; a No-Build alternative will also be modeled using the "high" land use scheme. Thus, in total, 20 model runs will be performed. The relevant aforementioned key model outputs will be summarized and presented for each run using the procedures described in the previous task.

Products of Task 4

- Up to six refined Build transit service alternatives

- Summaries of commuter rail linked trips and total linked transit trips
- Station-level transit boardings and alightings
- Automobile trips and regional automobile vehicle-miles traveled (VMT), including drive-to-transit trips
- Groupings of Station-to-Station regional rail trip tables
- Area-to-area regional rail trip tables

Task 5 Coordinate with Project Team and Provide Ongoing Technical Assistance

CTPS will work with the project team throughout the study, with an anticipated time frame for modeling work of approximately nine months. 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 and other stakeholders. CTPS staff time and budget estimates reflect attendance at a maximum of nine internal project meetings between CTPS staff and project team. CTPS will fulfill any data requests from the project team when the data are readily available, and will educate the stakeholders about the work included in this scope.

Product of Task 5

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

Task 6 Produce Technical Memorandum

A technical memorandum documenting all of the model methodology, assumptions, and results and the analysis findings will be provided to the project team.

Product of Task 6

A technical memorandum documenting the project

Estimated Schedule

It is estimated that this project will be completed nine 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 \$149,975. This includes the cost of 49.0 person-weeks of staff time, overhead at the rate of 97.42 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

Exhibit 1
ESTIMATED SCHEDULE
FRA NEC FUTURE: Modeling Support

Task	Month								
	1	2	3	4	5	6	7	8	9
1. Establish Project Assumptions, Definitions, and Expectations	█								
2. Calibrate the Base-Year Model	█	█							
3. Prepare 2040 Scenario Inputs		█	█	█					
4. Model the 2040 Scenarios and Analyze Results			█	█	█	█	█	█	A
5. Coordinate with the Project Team and Provide Ongoing Technical Assistance	█	█	█	█	█	█	█	█	█
6. Produce Technical Memorandum								█	B

Products/Milestones

A: Electronic data files

B: Technical memorandum

Exhibit 2
ESTIMATED COST
FRA NEC FUTURE: Modeling Support

Direct Salary and Overhead	\$149,975
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Task	Person-Weeks				Direct Salary	Overhead (97.42%)	Total Cost
	M-1	P-5	P-4	Total			
1. Establish Project Assumptions, Definitions, and Expectations	1.0	1.5	0.0	2.5	\$4,241	\$4,131	\$8,372
2. Calibrate the Base-Year Model	0.5	3.0	1.5	5.0	\$7,825	\$7,623	\$15,448
3. Prepare 2040 Scenario Inputs	1.5	2.5	2.0	6.0	\$9,314	\$9,073	\$18,387
4. Model the 2040 Scenarios and Analyze Results	3.0	10.0	13.0	26.0	\$38,472	\$37,479	\$75,951
5. Coordinate with the Project Team and Provide Ongoing Technical Assistance	2.5	3.0	0.0	5.5	\$9,332	\$9,091	\$18,424
6. Produce Technical Memorandum	1.5	2.5	0.0	4.0	\$6,784	\$6,609	\$13,393
Total	10.0	22.5	16.5	49.0	\$75,967	\$74,007	\$149,975

Other Direct Costs	\$0
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TOTAL COST	\$149,975
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Funding
 FRA Contract #TBD