BOSTON REGION METROPOLITAN PLANNING ORGANIZATION
Richard A. Davey, MassDOT Secretary and CEO and MPO Chairman
Karl H. Quackenbush, Executive Director, MPO Staff

MEMORANDUM

DATE October 17, 2013

TO Boston Region Metropolitan Planning Organization

FROM Karl H. Quackenbush
CTPS Executive Director

RE Work Program for: Diesel Multiple Unit Feasibility Study

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 the Diesel Multiple Unit Study presented in this memorandum.

Project Identification

Unified Planning Work Program Classification

Technical Support/Operation Analysis

CTPS Project Number

42513

Client

Massachusetts Department of Transportation, Planning Division
Project Supervisors: Matthew Ciborowski

CTPS Project Supervisors

Principal: Ying Bao
Manager: Ben Dowling

Funding

MassDOT §5303 Contract #78922

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 other work in the UPWP.

Background

In order to maximize the use of the existing facilities of the MBTA transit system, MassDOT is studying the feasibility of using and the deploying Diesel Multiple Units (DMU) on up to six commuter rail corridors in the Boston metropolitan area. This includes the implementation and deployment of DMUs in the Fairmount Line corridor, which has already been examined, in a separate study. Because DMUs have the potential to provide cost-effective transit service to rail corridors, MassDOT is interested in studying the deployment of DMUs in other rail corridors in the Boston metropolitan area in addition to the Fairmount corridor.

A DMU is a self-contained locomotive car that does not require a separate engine for its locomotion. DMUs can be cost-effective alternatives compared with complete rail sets, which are composed of cars and locomotives. DMUs can provide high levels of service to commuter rail corridors in off-peak periods without the cost of operating a full train set and without the cost of constructing electric power systems. Deploying DMUs on existing commuter rail corridors has the potential to provide better transit service to densely developed areas that are not currently well served by MBTA rapid transit or bus service, and to allow for full utilization of underutilized facilities such as parking garages.

Objectives

The main objective of this study is to gauge the ridership potential and associated air quality benefits of implementing DMU service along six commuter rail corridors in the Boston metropolitan area. A related objective of this study is to estimate the number of DMU vehicles that would be needed to meet the forecasted ridership demand on those corridors. This study will also examine the environmental justice benefits associated with implementing DMU service on existing rail corridors.

Work Description

The Boston Region MPO's regional travel demand model set will be used to estimate ridership data and other important data that will be used in the evaluation of the proposed new DMU service alternatives. This project will consist of the following tasks.

Task 1 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 selected commuter rail corridors that will be examined for possible DMU implementation. CTPS will calibrate the base-year model to the most recent transit ridership data, at the line and station levels, in those corridors. Although the calibration will focus on commuter rail ridership in these corridors, bus and/or rapid transit ridership may also be examined in those corridors.

Product of Task 1

A calibrated 2012 base-year model set for the selected corridors.

Task 2 Model Five Proposed DMU Service Alternatives

This task will focus on the modeling of the implementation and deployment of DMU service in five different commuter rail corridors in the Boston area, not including the Fairmount Line corridor, which has already been evaluated. Each alternative will be modeled individually for its opening-year service using the calibrated base-year model set developed in Task 1. Certain programmed highway and transit projects listed in the MPO's Long-Range Transportation Plan (LRTP) will be included to accurately represent each corridor's opening year. DMU service plans will be provided by MassDOT.

Products of Task 2

- Summaries of ridership forecasts for each of the build scenarios
- Summaries of the air quality benefits associated with each scenario
- Calculation of the vehicle requirements for each of the build scenarios

Task 3 Model One No-Build and Two Build Future-Year Scenarios

In addition to analyzing the ridership potential of DMUs in individual selected corridors, two future year build scenarios will be run in which DMUs are implemented in various corridors throughout the entire Boston metropolitan region. The project team will decide the future horizon year in which the DMU service will be implemented. In this task, CTPS will also use the results from the earlier model forecasts to quantify the impacts of each particular DMU corridor on transit ridership, mode shift, and transfer activities in the MPO's modeled region. Additionally, the results will be used to conduct sensitivity tests to examine the synergies between different DMU corridors. CTPS will also follow the routine modeling methodologies to conduct an air quality analysis and an environmental-justice analysis for the tested service strategies.

Product of Task 3

- Summaries of ridership forecasts for each of the scenarios
- Summaries of the air quality benefits associated with the build scenarios

- Calculation of vehicle requirements for the build scenarios
- Summary of the air quality analysis
- Summary of the environmental justice analysis

Task 4 Produce Technical Memoranda

Six technical memoranda documenting the modeling methodology, assumptions, results, and the analysis findings for each DMU corridor

Product of Task 4

Six technical memoranda documenting the analysis and results for each DMU corridor

Estimated Schedule

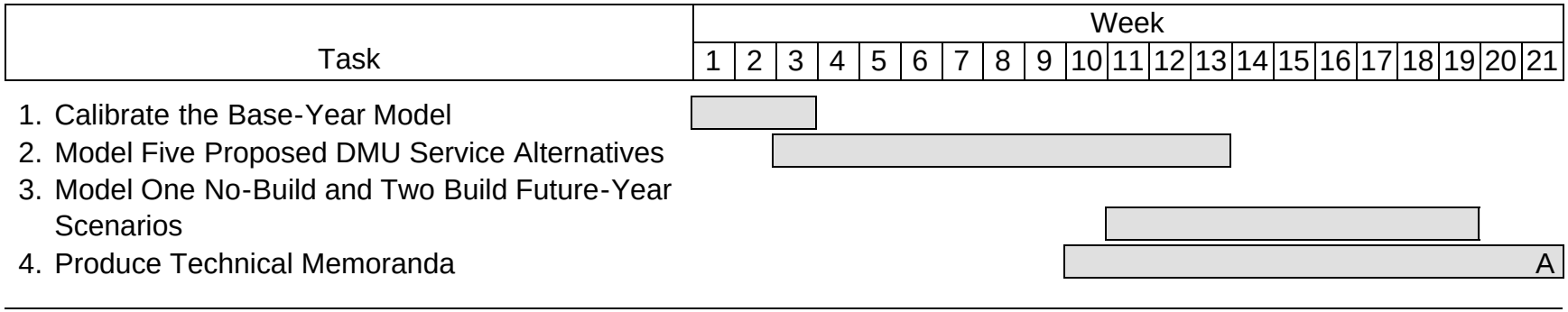
It is estimated that this project will be completed 21 weeks after work commences. The proposed schedule, by task, is shown in Exhibit 1.

Estimated Cost

The total cost of this project is estimated to be $90,000. This includes the cost of 29.4 person-weeks of staff time, and overhead at the rate of 97.42 percent. A detailed breakdown of estimated costs is presented in Exhibit 2.

KQ/BHD/bhd

Exhibit 1
ESTIMATED SCHEDULE
Diesel Multiple Unit Feasibility Study



Products/Milestones

A: Technical memoranda documenting results of each DMU corridor

Exhibit 2
ESTIMATED COST
Diesel Multiple Unit Feasibility Study

Direct Salary and Overhead	**$90,000**

Task	Person-Weeks M-1	P-5	P-4	Total	Direct Salary	Overhead (97.42%)	Total Cost
1. Calibrate the Base-Year Model	1.0	0.0	3.0	4.0	$5,497	$5,355	$10,851
2. Model Five Proposed DMU Service Alternatives	1.0	4.0	3.0	8.0	$12,266	$11,949	$24,215
3. Model One No-Build and Two Build Future-Year Scenarios	2.0	6.0	3.9	11.9	$18,493	$18,016	$36,510
4. Produce Technical Memoranda	2.5	3.0	0.0	5.5	$9,332	$9,091	$18,424
Total	6.5	13.0	9.9	29.4	$45,588	$44,412	$90,000

Other Direct Costs	**$0**

TOTAL COST	**$90,000**

Funding

MassDOT §5303 Contract #78922