



BOSTON REGION METROPOLITAN PLANNING ORGANIZATION

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Jeffrey B. Mullan
MassDOT Secretary and CEO
and MPO Chairman

Arnold J. Soolman
Director, MPO Staff

The Boston Region MPO,
the federally designated
entity responsible for
transportation decision-
making for the 101 cities
and towns in the MPO
region, is composed of:

MassDOT Office of Planning and
Programming
City of Boston
City of Newton
City of Somerville
Town of Bedford
Town of Braintree
Town of Framingham
Town of Hopkinton
Metropolitan Area Planning Council
Massachusetts Bay Transportation
Authority Advisory Board
Massachusetts Bay Transportation
Authority
MassDOT Highway Division
Massachusetts Port Authority
Regional Transportation Advisory
Council (nonvoting)
Federal Highway Administration
(nonvoting)
Federal Transit Administration
(nonvoting)

MEMORANDUM

DATE May 20, 2010
TO Transportation Planning and Programming Committee
of the Boston Region Metropolitan Planning Organization
FROM Arnold J. Soolman, CTPS Director
RE Work Program for: I-93 Access Improvements in the South Bay Area

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization vote to approve the work program for I-93 Access Improvements in the South Bay Area in the form of the draft dated May 20, 2010.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification

Planning Studies

CTPS Project Number

22122

Client

Boston Metropolitan Planning Organization

CTPS Project Supervisors

Principal: Karl Quackenbush

Manager: William Kuttner

Funding

MassDOT FTA \$5303 Transit Planning Contract #80-0004;

MassDOT 3C PL Highway Planning Contract #59796

IMPACT ON MPO WORK

This is MPO work and will be carried out in conformance with the priorities established by the MPO.

BACKGROUND

The recently reconstructed I-93 Central Artery emerges from its southbound tunnel at Kneeland Street. The first three southbound entry ramps onto the above-ground section of I-93 are from Kneeland Street, from Herald/Albany Streets, and then from Southampton Street at the South Bay Center shopping complex. Southbound traffic approaching I-93 on the Massachusetts Avenue connector merges with Southampton Street traffic before entering I-93.

During much of the construction duration of the Central Artery/ Tunnel (CA/T) Project, there continued to be southbound entrances at Kneeland and Southampton Streets, but it was not possible to provide a southbound entrance near Herald Street. A temporary entrance was provided directly beneath the Massachusetts Avenue connector. This ramp served traffic collected on Albany Street from the Back Bay as well as the South End. Massachusetts Avenue traffic still needed to use the Southampton Street ramp.

When the Albany/Herald ramp opened, the CA/T project closed the temporary southbound on-ramp. The original CA/T plan called for building an off-ramp at the point where the temporary on-ramp had been. It was later decided that this off-ramp was not necessary, and that I-93 in that area would function better with no ramp at all.

Near the southern limit of the CA/T project, however, a five lane southbound section of the rebuilt CA/T project is reduced to four lanes with a lane drop to Massachusetts Avenue. The rebuilt roadway then connects with the existing four-lane Southeast Expressway at Southampton Street. The Southampton Street on-ramp, including traffic from Massachusetts Avenue, merges into the existing four lane expressway creating a bottleneck and resulting in southbound queues on all days of the week. While this workscope does not study any increased through capacity in this bottleneck section of I-93 or any other envisioned improvements in the area, it does investigate to what extent, if any, permanently restoring the former temporary on-ramp would affect traffic flow on area ramps, arterials, and I-93.

Southbound I-93 traffic flow might be less affected by adding a fifth southbound lane between the Southampton Street entrance and the Columbia Road exit. This would provide a one-half mile section of I-93 within which entering traffic at Southampton Street could weave out of the right lane prior to a lane drop at Columbia Road. This change might be achieved with negligible land takings but would require some bridge reconstruction. Traffic flow with this added lane section will be simulated, and relevant construction issues will be identified. It is anticipated that implementation of this extra lane would be independent of restoring the on-ramp.

OBJECTIVES

The principal objectives of this work program are:

1. To investigate the feasibility of restoring the former temporary southbound entry ramp to the Southeast Expressway at the Massachusetts Avenue connector.
2. To model travel demand and simulate traffic flow in order to identify any net time savings or safety benefits from restoration of the ramp or related improvements. This project will require use of both the regional planning-level travel model as well as a more geographically focused traffic simulation model.
3. To gather and organize documents and other materials which can be used, along with this study's products, in support of further planning and design efforts. Any evaluation of costs will be based upon an updating of earlier efforts.

WORK DESCRIPTION

The work required to accomplish the study objectives has been grouped into six tasks:

Task 1 Gather Right-of-Way (ROW) and Traffic Data

Peak period traffic volumes and travel speeds will be updated as required for all relevant travel lanes and ramps. Available roadway plans, profiles, and ownership boundaries will be obtained from MassDOT or the City of Boston.

Product of Task 1

Collection of readily available roadway, land use, traffic, and operations information

Task 2 Build and Calibrate an Area Roadway Simulation

Changes and improvements to traffic flow on ramps, arterials, and the Southeast Expressway will be estimated using a CTPS roadway network simulation program. A model of the study area will be developed and calibrated using information gathered in Task 1.

Product of Task 2

A calibrated study area simulation model

Task 3 Develop Network and Traffic Scenarios

Implementing an additional southbound on-ramp will be a significant change in network topology. A peak period traffic assignment will be performed using the CTPS regional model to provide an estimate of build scenario traffic volumes. Versions of the

simulation network with build scenario variants will also be developed. It is anticipated that most variants will be closely related, and that simulation can be undertaken as required to optimize parameters such as weaving distances, etc.

Product of Task 3

A set of simulated scenarios using regional model traffic projections

Task 4 Evaluate Build Scenarios

Design parameters such as weaving lengths, etc., will be adjusted as appropriate to determine the best possible traffic flow for each build variant. The optimal performance characteristics of each tested variant will be measured using the simulation model.

Product of Task 4

Memorandum describing improvements achievable in each build variant

ESTIMATED SCHEDULE

It is estimated that this project will be completed five 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 \$79,957. This includes the cost of 29.5 person-weeks of staff time, overhead at the rate of 88.99 percent, and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

AJS/WSK/wsk

Exhibit 1
 ESTIMATED SCHEDULE
 I-93 Access Improvements in the South Bay Area

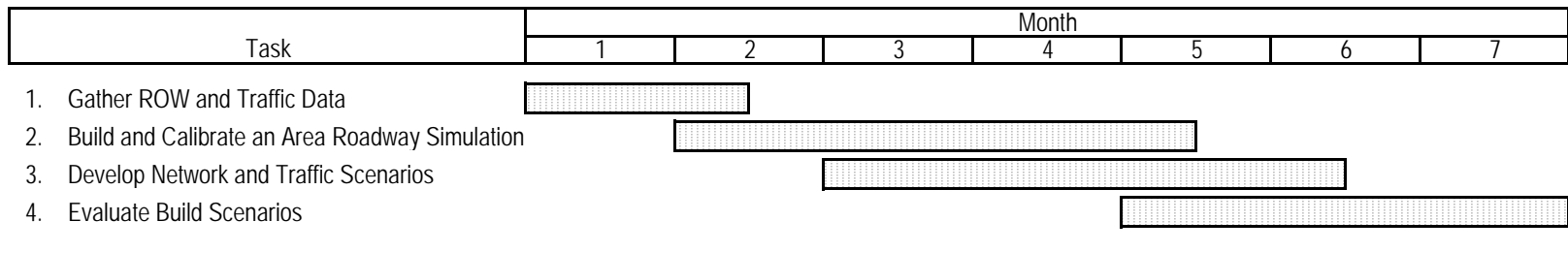


Exhibit 2

ESTIMATED COST

I-93 Access Improvements in the South Bay Area

Direct Salary and Overhead	\$79,156
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Task	Person-Weeks							Direct Salary	Overhead (@ 88.99%)	Total Cost
	M-1	P-5	P-4	P-2	P-1	Temp	Total			
1. Gather ROW and Traffic Data	0.0	2.0	0.0	0.0	0.0	3.0	5.0	\$4,718	\$4,198	\$8,916
2. Build and Calibrate an Area Roadway Simulation	0.0	6.0	0.0	0.0	0.0	0.0	6.0	\$9,572	\$8,518	\$18,089
3. Develop Network and Traffic Scenarios	1.0	6.0	0.0	0.0	0.0	0.0	7.0	\$11,209	\$9,975	\$21,183
4. Evaluate Build Scenarios	2.0	6.0	2.0	0.5	1.0	0.0	11.5	\$16,386	\$14,582	\$30,968
Total	3.0	20.0	2.0	0.5	1.0	3.0	29.5	\$41,884	\$37,273	\$79,156

Other Direct Costs	\$800
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Travel \$800

TOTAL COST	\$79,956
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Funding

MassDOT FTA §5303 Transit Planning Contract #80-0004; MassDOT 3C PL Highway Planning Contract #59796



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Council (nonvoting)
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(nonvoting)
Federal Transit Administration
(nonvoting)

MEMORANDUM

DATE May 20, 2010
TO Transportation Planning and Programming Committee
of the Boston Region Metropolitan Planning Organization
FROM Arnold J. Soolman, CTPS Director
RE Work Program for: State Fiscal Year 2011 National Transit Database
Directly Operated Bus and Rail Passenger-Miles and Boardings
Estimates

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization, upon the recommendation of the Massachusetts Bay Transportation Authority, vote to approve the work program for State Fiscal Year 2011 National Transit Database Directly Operated Bus and Rail Passenger-Miles and Boardings Estimates in the form of the draft dated May 20, 2010.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification

Technical Support/Operations Analysis Projects

CTPS Project Number

14319

Client

Massachusetts Bay Transportation Authority
Project Supervisor: Melissa Dullea

CTPS Project Supervisors

Principal: Liz Moore
Manager: Robert S. Guptill

Funding

Future 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 of nor reduce the quality of other work in the UPWP.

BACKGROUND

For many years, in support of the MBTA's National Transit Database (NTD) submittals to the Federal Transit Administration (FTA), CTPS has produced passenger-miles and boardings estimates for the MBTA's bus and trackless trolley system. In state fiscal year (SFY) 1996, the scope of the analysis expanded to include the heavy rail and light rail transit systems. In SFY 2000, the scope expanded again to include the MBTA commuter rail system.

OBJECTIVES

The primary objective of this project is to develop estimates of passenger-miles and boardings for the following MBTA transportation modes: motor bus, trackless trolley, heavy rail, light rail, and commuter rail. CTPS will also verify MBTA estimates of the average passenger trip length for the commuter rail mode. The data that will form the basis of these estimates will be collected in a variety of ways:

- Ridechecks on buses and trackless trolleys, through both the ongoing bus data collection program and supplementary data collection
- Electronic passenger fare-mix counts from automated fare-collection (AFC) faregates at heavy rail and light rail subway stations and fareboxes on motor bus and trackless trolley routes
- Fare-mix counts of passengers on surface light rail, including counts of passengers boarding through rear doors or otherwise failing to interact with the farebox
- Passenger surveys on the heavy rail and light rail systems and on the Silver Line Waterfront to determine origin and destination information
- Commuter rail ridership data provided by the Massachusetts Bay Commuter Railroad Company (MBCR) and CTPS ridership data

WORK DESCRIPTION

Task 1 Develop Sampling Plans

For the heavy rail and light rail systems, as well as the Silver Line Waterfront service, a sampling plan for passenger surveys will be devised to ensure a random selection of

stations across all parts of each system over the entire year for all days of the week and all time periods.

For light rail service at surface stops, onboard observations are necessary because not all passengers interact with fare collection equipment when boarding Green Line and Mattapan High-Speed Line vehicles. Counts of passengers boarding through rear doors and failing to interact with the farebox will be conducted. Two ridecheckers will be necessary: one to count the number of rear boardings and the other to note the number of passengers boarding through the front door who do not interact with the farebox (flash-pass trips, children, and fare evaders). A sampling plan will be devised to ensure that these observations are conducted on surface light rail over the entire year for all days of the week and all time periods.

For the bus system, a sampling plan for ridechecks will be devised to ensure a random selection of trips across all parts of the system over the entire year for all days of the week and time periods. Ridecheckers will also note the number of passengers who board through rear doors or otherwise fail to interact with the farebox.

For the trackless trolley system, a sampling plan will be developed to conduct full-route ridechecks of each route. These ridechecks involve CTPS staff members riding each scheduled trip for each route over the course of a single quarter in SFY 2011. The specific quarter will be determined based on CTPS staffing availability.

No direct data collection is planned for commuter rail. However, a sampling of some trips may be necessary to verify the figures reported by the contract operator.

CTPS will continue to collect as much data as possible through electronic means. CTPS's palmtop computers support the following CTPS-developed applications:

- Light rail, heavy rail, and Silver Line Waterfront passenger surveys
- Faregate noninteraction count
- Surface light rail rear door boarding count
- Surface light rail front door farebox noninteraction count
- Bus and trackless trolley farebox noninteraction count

Products of Task 1

- Heavy rail and light rail sampling plan for SFY 2011 passenger surveys
- Surface-light-rail sampling plan for SFY 2011 observations
- Bus and trackless trolley sampling plan for SFY 2011 ridechecks

Task 2 Collect Data

The heavy rail, light rail, Silver Line Waterfront, bus, and trackless trolley assignments generated by the sampling plan created in Task 1 will be executed. CTPS will conduct passenger surveys at each of the heavy rail, light rail, and Silver Line Waterfront survey

locations. Counts of the number of passengers passing through faregates, and specifically those who do not interact with the faregate, at station survey locations will also be conducted. Along Green Line and Mattapan High-Speed Line surface routes, onboard observations of passengers, and specifically those who do not interact with the farebox, will be conducted. CTPS will also conduct ridechecks on selected bus and trackless trolley trips using palmtop computers, and will note the number of passengers who do not interact with the farebox.

All ridechecks, passenger surveys, and passenger counts will be performed by CTPS personnel, using palmtop computers. The data collected on ridechecks will be uploaded directly to the CTPS bus ridership information database, where they will be checked for completeness and accuracy. Passenger survey results and passenger count data will be uploaded directly to the CTPS non-palm database, where they will similarly be checked for completeness and accuracy.

AFC data will be requested from the MBTA for total heavy rail and light rail subway station boardings, as well as for total surface light rail, motor bus, and trackless trolley boardings. In addition, AFC data will be requested for total farebox deposits for each sampled bus and trackless trolley trip.

Products of Task 2

- Completed passenger survey assignments for heavy rail, light rail, and Silver Line Waterfront stations in electronic form
- Completed passenger count assignments for surface light rail, motor bus, and trackless trolley in electronic form
- Ridecheck data in electronic form
- AFC data on total boardings for light and heavy rail stations and surface light rail, motor bus, and trackless trolley routes
- AFC revenue data for motor bus and trackless trolley fareboxes for ridechecked trips

Task 3 Clean, Code, and Keypunch Survey, Passenger Count, and Ridecheck Data

CTPS will clean the heavy rail and light rail passenger survey data as necessary after downloading them into a spreadsheet program. The program will allow for the processing of the origin-destination data, as well as any other data included on the form. The farebox noninteraction passenger count data for surface light rail, motor bus, and trackless trolley will also be entered into a spreadsheet for processing. Ridecheck data will also be cleaned.

Products of Task 3

- Heavy rail and light rail passenger survey data in electronic form
- Surface light rail, motor bus, and trackless trolley passenger count data in electronic form
- Cleaned ridecheck data in electronic form

Task 4 Estimate Passenger-Miles and Boardings

Information on the total number of passengers boarding at subway stations on the heavy rail and light rail systems will be obtained from the MBTA through AFC faregate passenger counts. Factors that account for the number of transfers between each mode will then be estimated based on the origin-destination passenger surveys conducted in Task 2. Additionally, a faregate noninteraction factor will be developed from the observations at station survey locations. These factors will be applied to the AFC faregate counts to estimate total unlinked heavy rail and light rail riders attributable to subway boardings.

For light rail surface stops, counts of passengers boarding through rear doors and failing to interact with the farebox will be used to develop a farebox noninteraction factor. This factor will be applied to the AFC farebox counts of total passengers on surface light rail, which will then be increased to account for transfers made to other heavy rail or light rail lines, resulting in an estimate of total unlinked light rail and heavy rail riders attributable to light rail surface boardings.

Meanwhile, the origin-destination data generated by the passenger surveys will be converted into estimates of the average passenger-miles per passenger for both the heavy rail and light rail systems. This conversion will make use of procedures developed a number of years ago for the Systemwide Rapid Transit Survey. Multiplying the average passenger-miles per passenger by the total number of passengers will yield estimates of total passenger-miles for each mode.

As was done for surface light rail, a farebox noninteraction factor developed as part of the ridecheck sample will be applied to the AFC farebox count of total motor bus and trackless trolley passengers to estimate total boardings. Total passenger-miles will be estimated, as in previous years, using the ridecheck sample of trips to develop an average trip distance: this distance multiplied by total boardings results in total passenger-miles.

For the commuter rail system, ridership counts supplied by MBCR will provide the basis for the estimate of passenger boardings. Counts by station, in conjunction with data indicating the percentage of alightings prior to North Station and South Station (from the 2000 Commuter Rail Peak Load Counts report), will provide the basis for the estimate of average passenger trip length.

Product of Task 4

Estimates of passenger-miles and boardings for all MBTA modes discussed above

Task 5 Document Results

The results of Task 4 will be documented in a technical memorandum. This memorandum will include a statistical analysis confirming that the true values for

passenger-miles and boardings have a 95 percent probability of falling within 10 percent of the estimates, as required by the FTA.

Product of Task 5

A technical memorandum describing the data collection and analysis processes, summarizing results, and presenting a statistical analysis of the results

Task 6 Assist with Compliance Audit

The FTA requires an independent auditor to review and verify the MBTA's directly operated bus and rail passenger-miles and boardings estimates. As the agency responsible for these estimates, CTPS will provide any materials and assistance necessary for the audit.

ESTIMATED SCHEDULE

It is estimated that this project will be completed in November 2011, approximately 17 months after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 1.

ESTIMATED COST

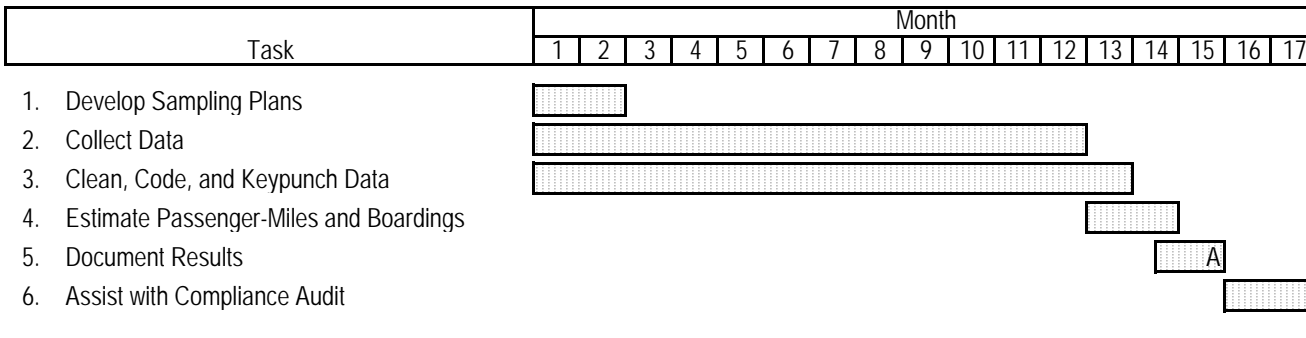
The total cost of this project is estimated to be \$88,126. This includes the cost of 68.8 person-weeks of staff time, overhead at the rate of 88.99 percent and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

AJS/RSG/rsg

Exhibit 1

ESTIMATED SCHEDULE

State Fiscal Year 2011 National Transit Database Directly Operated Bus and Rail Passenger-Miles and Boardings Estimates



Products/Milestones

A: Technical memorandum

Exhibit 2

ESTIMATED COST

State Fiscal Year 2011 National Transit Database Directly Operated Bus and Rail Passenger-Miles and Boardings Estimates

Direct Salary and Overhead	\$87,398
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Task	Person-Weeks						Direct Salary	Overhead (@ 88.99%)	Total Cost
	M-1	P-4	SP-3	SP-1	Temp	Total			
1. Develop Sampling Plans	0.0	0.8	2.1	0.0	0.5	3.4	\$2,884	\$2,567	\$5,451
2. Collect Data	0.2	0.2	7.2	23.7	22.7	54.0	\$32,268	\$28,715	\$60,983
3. Clean, Code, and Key punch Data	0.0	2.0	3.8	0.0	2.0	7.8	\$6,451	\$5,740	\$12,191
4. Estimate Passenger-Miles and Boardings	0.0	2.0	0.0	0.0	0.0	2.0	\$2,440	\$2,171	\$4,611
5. Document Results	0.6	0.8	0.0	0.0	0.0	1.4	\$1,958	\$1,743	\$3,701
6. Assist with Compliance Audit	0.0	0.2	0.0	0.0	0.0	0.2	\$244	\$217	\$461
Total	0.8	6.0	13.1	23.7	25.2	68.8	\$46,244	\$41,153	\$87,398

Other Direct Costs	\$728
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Travel \$728

TOTAL COST	\$88,126
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Funding

Future MBTA Contract



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Federal Transit Administration
(nonvoting)

MEMORANDUM

DATE May 20, 2010
TO Transportation Planning and Programming Committee
of the Boston Region Metropolitan Planning Organization
FROM Arnold J. Soolman, CTPS Director
RE Work Program for: State Fiscal Year 2011 National Transit Database
Purchased Bus Transportation Passenger-Miles and Boardings Estimates

ACTION REQUIRED

Review and approval

PROPOSED MOTION

That the Transportation Planning and Programming Committee of the Boston Region Metropolitan Planning Organization, upon the recommendation of the Massachusetts Bay Transportation Authority, vote to approve the work program for State Fiscal Year 2011 National Transit Database Purchased Bus Transportation Passenger-Miles and Boardings Estimates in the form of the draft dated May 20, 2010.

PROJECT IDENTIFICATION

Unified Planning Work Program Classification
Technical Support/Operations Analysis Projects

CTPS Project Number
14318

Client
Massachusetts Bay Transportation Authority
Project Supervisor: Lauren Coughlin

CTPS Project Supervisors
Principal: Liz Moore
Manager: Robert Guptill

Funding
Future 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 of nor reduce the quality of other work in the UPWP.

BACKGROUND

For a number of years, in support of the MBTA's National Transit Database submittals to the Federal Transit Administration, CTPS has produced passenger-miles and boardings estimates for the MBTA's directly operated bus and trackless trolley system and, since state fiscal year (SFY) 1996, for the heavy rail and light rail transit systems. In SFY 2001, the scope of analysis was expanded to include bus routes operated as part of the Interdistrict Bus Program and Suburban Transportation Program and other contracted MBTA local bus service. In SFY 2010, the Interdistrict Bus Program was discontinued and removed from the scope of analysis.

With a smaller universe of bus routes, CTPS conducted both random and full-route ridechecks in SFY 2010 to determine which method provided better data. The random-ridecheck approach, which was used in previous years, sampled a predetermined number of randomly selected trips each week across all MBTA-funded private-carrier bus routes. The full-route-ridecheck approach, which is the approach used to estimate boardings and passenger-miles on directly operated trackless trolley routes, involves conducting a full-route ridecheck for each MBTA-funded private-carrier bus route. It was determined that the methodology employing full-route ridechecks does satisfy the FTA requirement that the true values for passenger-miles and boardings have a 95 percent probability of falling within 10 percent of the estimates. In addition, this methodology provides ridership and schedule adherence data for each purchased bus route that can be used for other planning purposes. Therefore, with the provisional approval of the FTA, the MBTA decided to use only full-route ridechecks in SFY 2011 to estimate total passenger-miles and boardings.

OBJECTIVE

To develop estimates of passenger-miles and boardings for bus routes operated as part of the Suburban Transportation Program and all other contracted MBTA local bus service.

WORK DESCRIPTION

The data that will form the basis for the passenger-miles and boardings estimates will be collected through onboard ridechecks. These ridechecks will be conducted as part of the ongoing bus data collection program that CTPS performs for the MBTA.

Task 1 Develop Sampling Plan

A sampling plan will be developed to conduct full-route ridechecks of each private-carrier bus route. These ridechecks involve CTPS staff members riding each scheduled trip for each route over the course of a single quarter in SFY 2011. The specific quarter will be determined based on CTPS staffing availability.

Product of Task 1

Bus sampling plan and traffic checkers' assignments

Task 2 Collect Data

CTPS staff members will carry out the assignments created in Task 1. As in the past, ridecheck data to be collected include boardings and alightings by stop, farebox readings, trip-level travel times, departure and arrival times, and intermediate-stop arrival times. These data will be collected using palmtop computers and uploaded directly to the CTPS bus ridership information database, where they will be checked for completeness and accuracy.

Product of Task 2

Ridecheck data in electronic form

Task 3 Estimate Passenger-Miles and Boardings

Estimates of passenger-miles and boardings for private-carrier bus services will be produced using revenue data from the MBTA and output from the CTPS bus ridership information database. Specifically, estimates of the average farebox deposit will be generated, along with the average passenger trip length, based on ridecheck observations. By dividing the average farebox deposit into total revenue, an estimate of total boardings may be made. Multiplying this total by the average trip length yields total passenger-miles.

Product of Task 3

Estimates of passenger-miles and boardings for private-carrier bus services

Task 4 Document Results

The results of Task 3 will be documented in a technical memorandum. The memorandum will also discuss the FTA requirement that the true values for passenger-miles and boardings have a 95 percent probability of falling within 10 percent of the estimates. As discussed above, meeting this requirement through the use of the full-route-ridecheck approach will be used rather than the random-sampling approach outlined in FTA Circular 2710.4A.

Product of Task 4

A technical memorandum describing the data collection and analysis processes, summarizing results, and discussing FTA's statistical validation requirements

Task 5 Assist with Compliance Audit

The FTA requires an independent auditor to review and verify the MBTA's purchased bus passenger-miles and boardings estimates. As the agency responsible for these estimates, CTPS will provide any materials and assistance necessary for the audit.

ESTIMATED SCHEDULE

It is estimated that this project will be completed in November 2011, approximately 17 months after the notice to proceed is received. The proposed schedule, by task, is shown in Exhibit 1.

ESTIMATED COST

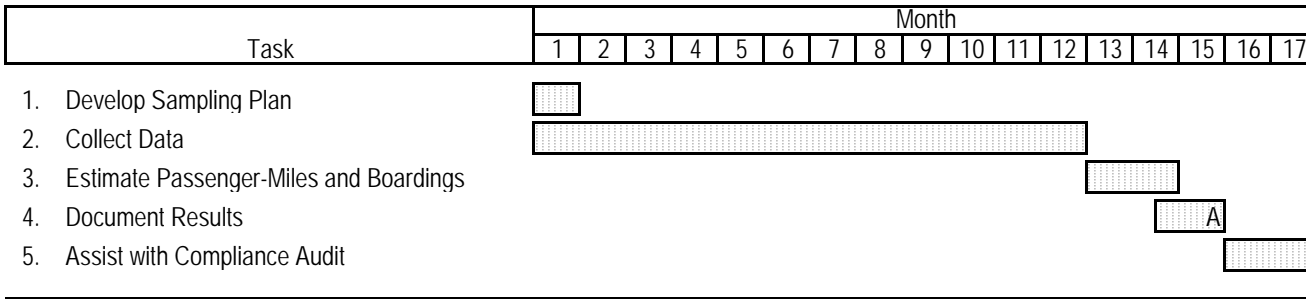
The total cost of this project is estimated to be \$23,878. This includes the cost of 13.9 person-weeks of staff time, overhead at the rate of 88.99 percent, and travel. A detailed breakdown of estimated costs is presented in Exhibit 2.

AJS/RSG/rsg

Exhibit 1

ESTIMATED SCHEDULE

State Fiscal Year 2011 National Transit Database Purchased Bus Transportation Passenger-Miles and Boardings Estimates



Products/Milestones

A: Technical memorandum

Exhibit 2

ESTIMATED COST

State Fiscal Year 2011 National Transit Database Purchased Bus Transportation Passenger-Miles and Boardings Estimates

Direct Salary and Overhead	\$22,878
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Task	Person-Weeks							Direct Salary	Overhead (@ 88.99%)	Total Cost
	M-1	P-5	P-4	SP-3	SP-1	Temp	Total			
1. Develop Sampling Plan	0.0	1.0	0.0	0.0	0.0	1.2	2.2	\$2,206	\$1,963	\$4,170
2. Collect Data	0.5	0.0	0.0	2.5	3.0	3.0	9.0	\$6,146	\$5,470	\$11,616
3. Estimate Passenger-Miles and Boardings	0.0	0.0	1.0	0.0	0.0	0.0	1.0	\$1,220	\$1,086	\$2,305
4. Document Results	1.1	0.0	0.5	0.0	0.0	0.0	1.6	\$2,411	\$2,145	\$4,556
5. Assist with Compliance Audit	0.0	0.0	0.1	0.0	0.0	0.0	0.1	\$122	\$109	\$231
Total	1.6	1.0	1.6	2.5	3.0	4.2	13.9	\$12,105	\$10,772	\$22,878

Other Direct Costs	\$1,000
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Travel	\$1,000
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TOTAL COST	\$23,878
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Funding

Future MBTA Contract