

FINAL DRAFT



To: RIDOT
Office of Transit

Date: July 15, 2019

Memorandum

Project #: 72895.05

From: VHB and RKG Associates

Re: PVD-BOS Phase I Enhanced Rail Service Economic Impact Analysis

1 PURPOSE

To strengthen economic links between Providence and Boston, a short-term initiative is under evaluation that includes the implementation of faster and more frequent rail service between the cities. The Providence-Boston trip time of greater than one hour compares unfavorably with other primary-secondary city pairs on the Northeast Corridor (NEC), though this is primarily due to infrastructure and operational constraints on the NEC. This longer trip time psychologically increases the mental distance between the two markets and hinders economic growth that affects integration of education, healthcare, business, cultural and recreation opportunities between the two cities.

This memorandum summarizes the preliminary ridership estimate, traveler benefit assessment, and economic analysis for faster passenger rail service between Providence and Boston along the NEC. This analysis assumes a 45-minute travel time from Providence to Boston with stops in Providence, Route 128, Back Bay, and South Station. Two service scenarios were considered: six round trips per day (two AM peak round trips, two PM peak round trips, two off-peak round trips); and nine round trips per day (three AM peak round trips, three PM peak round trips, three off-peak round trips).

2 CONCLUSIONS

The following conclusions were reached:

- Enhanced rail service will benefit both cities by increasing the locational value for many types of business activities and for residents, resulting in increased productivity in existing industries and helping to attract new firms. Enhanced rail service that creates more and better connections between these two cities may have positive effects on hiring, commuting patterns, and business collaboration – especially among the growing industries that are already driving employment (and real estate) growth in both cities.
- For the six round trip scenario, ridership is estimated to increase by 18 to 29 percent, or 435 to 690 new one-way riders per day. This is the equivalent of 110,600 to 175,100 new riders annually.
- For the nine round trip scenario, ridership is estimated to increase by 24 to 38 percent which amounts to 585 to 925 new one-way riders per day. This is the equivalent of 148,700 to 235,500 new riders annually.
- Annualized traveler benefits from the faster service is estimated at between \$4.09 and \$5.26.4 million for the six round trip service plan and between \$5.46.4 and \$6.98.4 million for the nine round trip service plan.
- An estimated 1,195 to 2,035 new jobs may be created over 10 years in Rhode Island and Massachusetts, including direct employment in select growth industries such as health care, professional services, scientific services, information, and other "knowledge economy" jobs, and indirect and induced employment in other sectors of the economy.

- Approximately \$110 to \$175 million in annual earnings would be realized in ten years including statewide, secondary economic effects of new jobs.
- By 2029, additional job growth may create direct state income tax benefits of \$3 to \$4 million per year in Massachusetts and \$250,000 to \$500,000 in Rhode Island.
- These additional jobs may lead to increased demand for commercial real estate, which may include 50,000 to 150,000 square feet in Boston, and 25,000 to 50,000 square feet in Providence, as well as increased demand for new housing, especially in the downtown Providence market.

The following sections of the memorandum summarize the ridership estimate, traveler benefits, and economic impacts of the enhanced rail service. The Appendix includes the detailed methodology and analyses.

3 RIDERSHIP ESTIMATE

Travel-demand elasticities were used to estimate potential ridership. Elasticities estimate the percent change in ridership based on the percent change in a given factor (e.g., span of service, headway/frequency¹, travel time). Important to note is that elasticities yield a *systemwide change* in ridership due to a proposed change in service and do not provide a more granular ridership estimate (i.e., ridership at the train level). In the context of this potential service, the two most applicable elasticity variables to use are **headway** and **travel time**. A low- and high-end elasticity was used for each variable.

For purposes of this analysis, it was assumed that the base ridership for computing the ridership response to a change in **headway** would consist of the following sources:

- Source 1: Individuals who currently ride MBTA commuter rail from Providence Station to Boston
- Source 2: Individuals who currently ride Amtrak from Providence Station to Boston
- Source 3: Individuals who currently ride MBTA commuter rail from South Attleboro Station to Boston
- Source 4: Individuals who currently ride MBTA commuter rail from Attleboro Station to Boston

The ridership response to the potential express service due to the change in **travel time** was computed by taking the reduction in travel time and applying it to both the six and nine round trip scenarios. Under both scenarios, travel times would decrease by approximately 33.3 percent.

Table 1 and **Table 2** summarize the total estimated ridership response for both the six and nine round trip scenarios.

¹ Headway is the time between trains traveling in the same direction. Frequency is the number of trains arriving in an hour.

Table 1 Six Round Trip Ridership Response (Over a 10-year Horizon)

Total	Base Daily	Change Daily	Total Daily	Base Annual	Change Annual	Total Annual
LOW	2,408	+435	2,843	611,632	+110,569	722,201
HIGH	2,408	+689	3,097	611,632	+175,092	786,724

Note: Assumes 254 weekdays and no increased weekend ridership.

Table 2 Nine Round Trip Ridership Response (Over a 10-year Horizon)

Total	Base Daily	Change Daily	Total Daily	Base Annual	Change Annual	Total Annual
LOW	2,408	+585	2,993	611,632	+148,696	760,328
HIGH	2,408	+927	3,335	611,632	+235,468	847,100

Note: Assumes 254 weekdays and no increased weekend ridership.

As shown in Tables 1 and 2, the following ridership changes result from the improved headway and travel time for service from Providence to Boston:

- For the six round trip scenario, ridership is estimated to increase by 18 to 29 percent, or 435 to 689 new riders per day (the equivalent of 110,569 to 175,092 new riders annually).
- For the nine round trip scenario, ridership is estimated to increase by 24 to 38 percent which amounts to 585 to 927 new riders per day (the equivalent of 148,696 to 235,468 new riders annually).

The Appendix includes a detailed technical memorandum from VHB that details the ridership analysis.

4 TRAVELER BENEFITS

Implementing express rail service between Providence Station and Boston South Station would generate an economic benefit to everyday travelers. This evaluation aligns changes in travel time and frequency for various travelers who would benefit from this additional rail service with economic benefits including users costs and the value of time saved. Both existing and estimated new ridership were evaluated further to determine the broader economic benefits given the improvements in passenger rail service. The change in travel experience is represented by travel time and monetized based on industry standard best practices.

Economic benefits linked to travel time will vary for riders of the enhanced service depending on how they travelled previously. For purposes of this analysis, it was assumed that enhanced service riders come from the following:

- **Existing MBTA Riders:** Existing commuter rail riders traveling between Providence, South Attleboro, or Attleboro Stations and Boston
- **Existing Amtrak Riders:** Existing Amtrak riders traveling between Providence and Boston
- **Induced Demand:** Estimated new riders making the trip between Providence and Boston because it has become more attractive
- **Mode Shift:** Estimated new riders previously traveling via another mode between Providence and Boston (primarily automobile)

In order to monetize the travel benefits of the new express rail service, the change in travel time was identified for each of these riders along with out-of-pocket costs including transit fares and automobile costs which included the price of gasoline and vehicle maintenance. In order to monetize changes in travel time for users, that time needs to be adjusted by a dollar value.

The resulting quantified annual benefits to travelers are as follows:

- Between ~~\$4.09~~ and ~~\$5.26.4~~ million in annual traveler benefits for the six round trip service plan
- Between ~~\$5.46.1~~ and ~~\$6.98.1~~ million in annual traveler benefits for the nine round trip service plan

These benefits were derived for the two daily peaks (morning and evening) where the value of time is at a premium and there is the most traffic congestion on the roadway network between Providence and Boston.

The Appendix includes a detailed technical memorandum from VHB that summarizes these traveler benefits.

5 ECONOMIC BENEFITS

Potential economic benefits are presented in terms of job creation, income tax receipt impacts, and secondary/induced job creation in industries that serve new workers and/or residents. While the markets for commercial space in both Boston and Providence are reported to be strong and showing decreasing levels of vacancy, substantial differences in cost may be precluding some firms from locating in Boston. Downtown Boston's office vacancy rate of 7.2 percent, coupled with average rents of \$56 per square foot has as many as two dozen firms searching for well over a million square feet of available space. For firms seeking dynamic urban commercial space, Providence offers an attractive alternative at a lower cost. Enhanced connectivity might benefit these firms in attracting top talent and high-value clients that are highly concentrated in Boston and its adjacent communities.

Similarly, high vehicle traffic volumes, long commute times, and relatively infrequent rail service may be impacting the ability of some Boston-based firms to meet with potential clients and collaborators in Providence – an academic and innovation center in its own right.

Potential stakeholders in Providence were interviewed to discuss the possible impacts of enhanced rail service between Providence and Boston. The following key points were discussed:

- All stakeholders interviewed agreed that enhanced service would benefit Providence as well as any individual businesses in Rhode Island that rely on access to skilled labor or which maintain regular contact with clients or colleagues in Boston. Providence would feel less distant for Boston people – like being on the 'T' - increasing the attractiveness of the city.
- Better and faster access to Boston's Logan Airport was cited multiple times as another benefit of enhanced service.
- Changes in employment, sales, or overall cost savings would occur.
- Better access to a larger skilled workforce (in Boston) was cited as a benefit for high tech and life sciences companies in Providence. The city's lower housing costs, attractiveness to the millennial and Generation Z workforce, and proximity to the state's multiple scenic attractions were mentioned most often.
- Stronger connections between Providence's growing life-sciences and high-tech start-ups and collaborators in Boston will help spur economic activity.

In order to estimate possible changes in employment resulting from enhanced rail service between the cities, employment trends in key growth sectors of the economy were analyzed. Change in employment resulting from additional induced growth over the next decade were then calculated. The following conclusions were reached:

- An estimated 1,195 to 2,035 new jobs may be created over 10 years in Rhode Island and Massachusetts, including direct employment in select growth industries such as health care, professional services, scientific services, information, and other "knowledge economy" jobs, and indirect and induced employment in other sectors of the economy.
- Approximately \$110 to \$175 million in annual earnings would be realized by Year 10, including statewide, secondary economic effects of new jobs.
- By 2029, additional job growth may create direct income tax benefits of \$3 to \$4 million per year in Massachusetts and \$250,000 to \$500,000 in Rhode Island.
- These additional jobs may lead to increased demand for commercial real estate, which may include 50,000 to 150,000 square feet in Boston, and 25,000 to 50,000 square feet in Providence.

In conclusion, enhanced rail service will benefit both cities by increasing the locational value for many types of business activities and for residents, resulting in increased productivity in existing industries and helping to attract new firms. Enhanced rail service that creates more and better connections between these two cities may have positive effects on hiring, commuting patterns, and business collaboration – especially among the growing industries that are already driving employment (and real estate) growth in both cities. This analysis does not address the cost/benefit question or estimate the return on investment associated with the infrastructure costs associated with the enhanced service.

The Appendix includes a detailed technical memorandum from RKG Associates on the economic impact findings.

APPENDIX

- VHB Ridership Technical Memorandum
- VHB Traveler Benefits Technical Memorandum
- RKG Economic Benefits Technical Memorandum