

Appendix A Northeast Corridor:

Mobility Problems and Proposed Solutions



BACKGROUND

EXISTING CONDITIONS

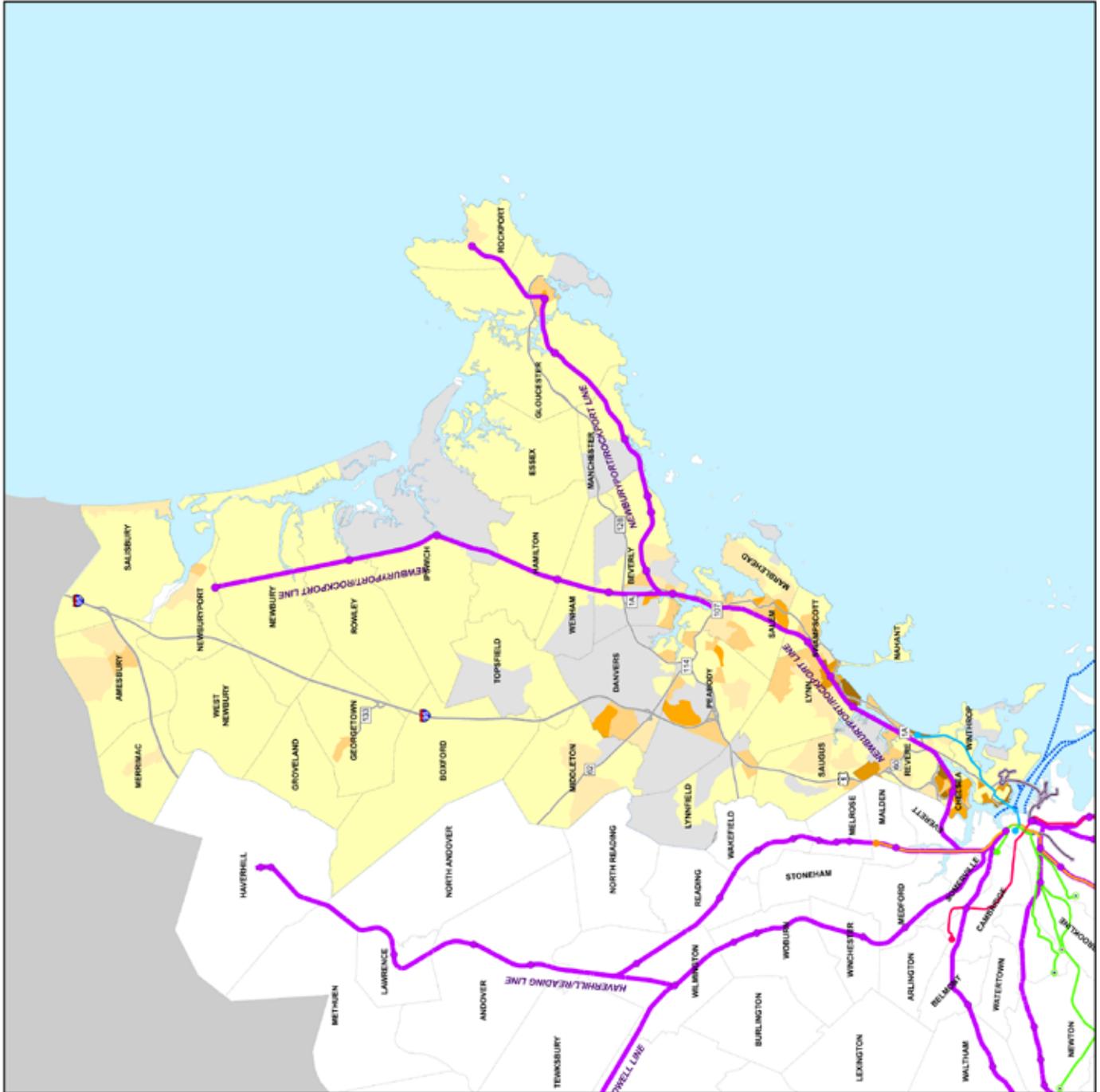
The Northeast Corridor extends from the Boston Harbor to Merrimac, Amesbury, and Salisbury bordering New Hampshire north of the Merrimack River. The corridor includes eight cities, 24 towns, and East Boston (a neighborhood of Boston), including Logan Airport. In the Northeast Corridor is found the historic factory city of Lynn, as well as the maritime communities of Salem, Marblehead, Beverly, Gloucester, and Newburyport. Large swaths of the corridor north of Cape Ann are protected marine estuaries.

The MBTA offers rapid transit, bus, and commuter rail services across much of this corridor. The Blue Line has eight stations from Maverick Square in East Boston to Wonderland in Revere. The Blue Line also has a stop serving Logan Airport, from which dedicated free Massport shuttle buses circulate to all air terminals. MBTA Blue Line service to Logan Airport has recently been supplemented by the popular Silver Line bus rapid transit service from South Station.

Maverick and Wonderland Stations both serve as major bus hubs, though some important services operate from other stations, notably buses to Winthrop from Orient Heights operated by Paul Revere Transportation under contract to the MBTA. MBTA buses also serve the corridor communities of Chelsea, Saugus, Lynn, Swampscott, Marblehead, Salem, Peabody, Beverly and Danvers. Many MBTA buses in this corridor operate all the way to Haymarket Station, in Boston Proper. These routes use the I-90 Ted Williams Tunnel, Route 1A Sumner Tunnel, or U.S. Route 1 Tobin Bridge. Because these routes use the regional express highways, they are able to provide a high level of service.

MAP A-2
Northeast Corridor
of the MBTA Service Area

Projected Change in
Population Density
from 2000 to 2030



2030 MetroFuture Projection
Change in Population/Sq. Mi. by TAZ

- 4,086 - 0
- 1 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 8,000
- 8,001 - 164,061

Rapid Transit

- Blue Line
- Green Line
- Orange Line
- Red Line
- Mattapan High Speed Line
- Silver Line

Commuter Boat

- Commuter boat route

Commuter Rail

- Commuter rail line



Commuter rail service is operated on the Newburyport and Rockport Lines. Trains of both these lines serve Chelsea, Lynn, Swampscott, Salem, and Beverly. At Beverly one line goes north to Rowley and Newburyport, and one line goes northeast to Manchester, Gloucester, and Rockport. The five municipalities served by both lines enjoy a comparatively higher level of rail service, and are also served by MBTA buses.

Bus service in the Northeast Corridor is also provided by the Cape Ann Transportation Authority (CATA) and the Merrimack Valley Regional Transit Authority (MVRTA). CATA provides seven bus routes from downtown Gloucester to other points in Gloucester and Rockport, and a Saturday-only route that operates between downtown Gloucester and the Liberty Tree and North Shore Malls in Danvers and Peabody. MVRTA has one year-round route serving Merrimac, Amesbury, and Newburyport, and operates a summer-only route that serves Merrimac, Amesbury, and Salisbury.

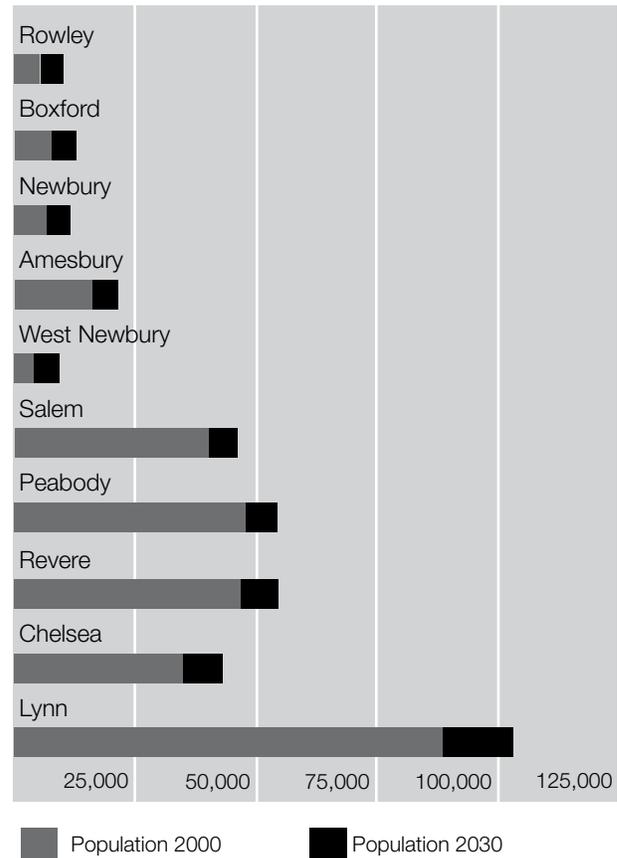
POPULATION

The most densely populated corridor communities are concentrated near Boston, mostly inside of Route 128, with the highest densities found in Chelsea, Winthrop, Revere, Lynn, and portions of Beverly, Peabody, and Salem (see Map A-1). Population densities in parts of Chelsea and Lynn are projected to experience the largest increases between 2000 and 2030 (see Map A-2).

According to the U. S. Census, the Northeast Corridor's year 2000 population was 590,368. In absolute numbers, population is projected to increase by 103,629 (18%) to 693,995 by 2030.¹ Almost three-quarters of the communities are projected to experience double-digit population growth. However, the growth for most communities is expected to be fairly moderate, with the most robust occurring in the least populated communities. The city of Lynn was the most populous community in 2000 and is projected

to be the most populous in 2030 as well, with Chelsea, Lynn, Peabody, and Revere accounting for more than a third of the corridor's absolute population growth (see Figure A-1).

FIGURE A-1
Northeast Corridor 2000–2030
Population Growth: Top-Ten Communities
in Order of Increase



A number of housing developments are currently planned for the corridor. Two of the largest are the Little River Transit Village Transit, a proposed transit-oriented development of 600 units in Newbury/Newburyport, and the proposed Wonderland transit-oriented development of 902 homes in Revere.

EMPLOYMENT

The 2000 census data show that cities and towns within Route 128 have the highest em-

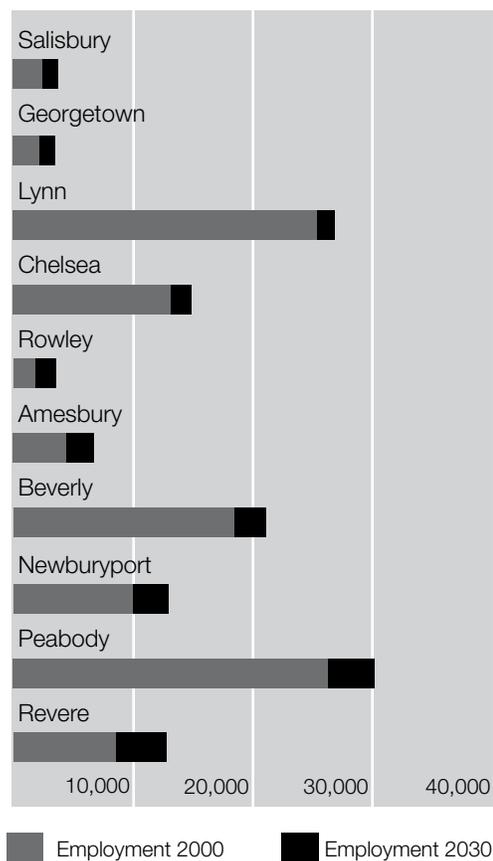
¹ Metropolitan Area Planning Council (MAPC) and Merrimack Valley Planning Commission (MVPC) population and employment forecasts.

ployment densities in the Northeast Corridor, while the majority of corridor communities outside Route 128 have low employment densities, with portions of Newburyport and Rockport being the main exceptions (see Map A-3). Most communities in the corridor are projected to experience modest or no employment density changes between 2000 and 2030 (see Map A-4).

In absolute terms, employment in this corridor is projected to increase by 15% between 2000 and 2030, with most communities experiencing stable or modest growth.² Of the six corridors, the Northeast shows the lowest level of 2000 employment and is projected to have the lowest absolute employment growth, as well as the lowest rate of employment growth, between 2000 and 2030. Peabody has the highest current level of employment, and the second highest projected growth (14%) by 2030 (see Figure A-2).

Larger proposed employment developments in the corridor include the Little River Transit Village proposed in Newbury/Newburyport with 123,000 square feet of retail and 48,000 square feet of office space, and the Wonderland project, which is now undergoing permitting and will have 42,000 square feet of retail and 145,000 square feet of office space.

FIGURE A-2
Northeast Corridor
2000–2030 Employment Growth:
Top-Ten Communities in Order of Increase



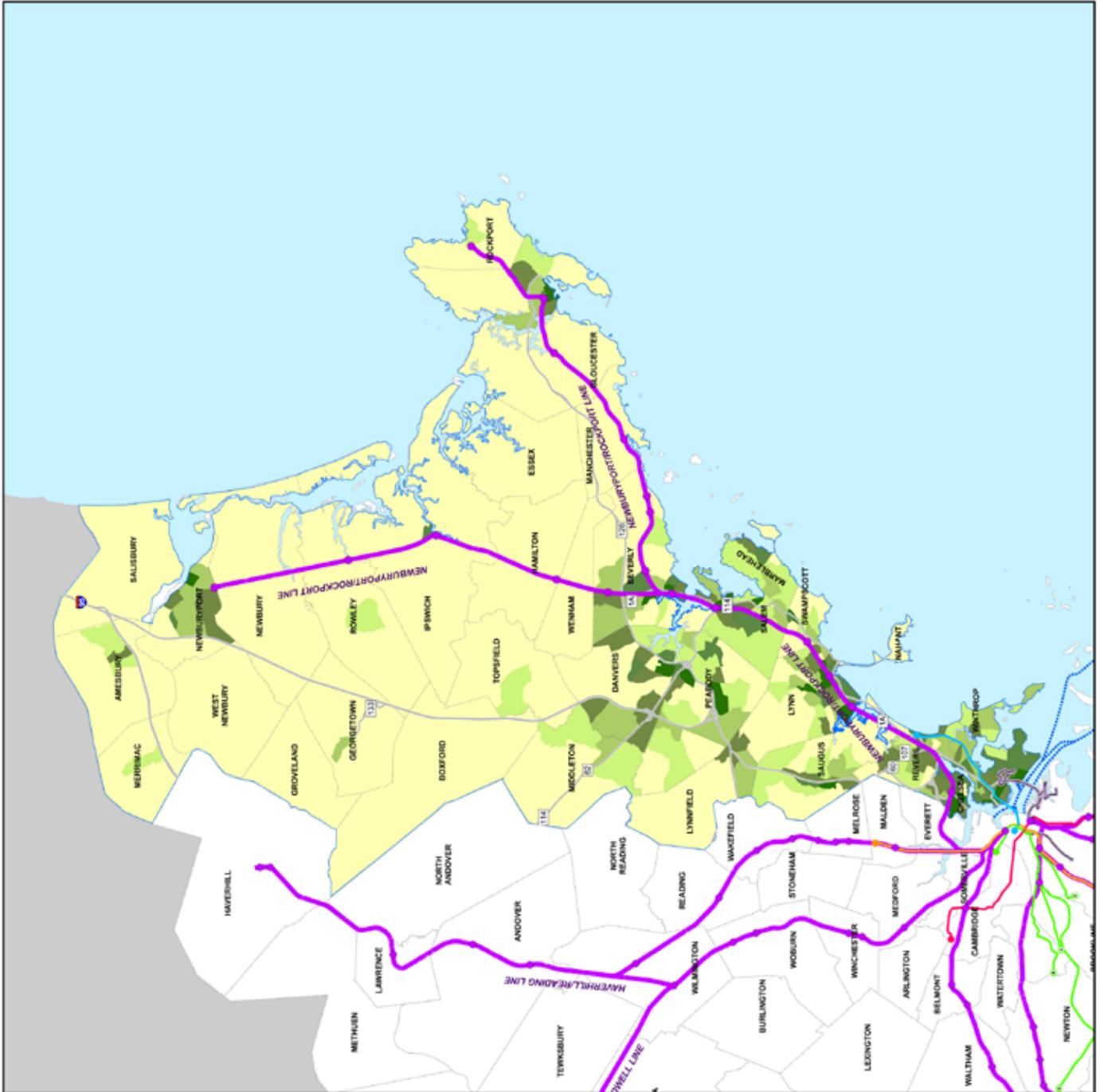
JOURNEY TO WORK

Nationally, work trips account for a small proportion—15%—of all trips.³ Because most commuting occurs during peak travel times, work-trip volumes determine the capacity needs, as well as the performance, of highway and transit systems. In 2000, of all work trips that originated in the Northeast Corridor, 76% were made in single-occupancy vehicles (SOVs), and 8% were made on transit (see Figure A-3).

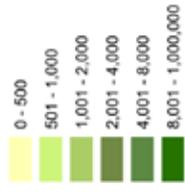
² Ibid.

³ Transportation Research Board, *Commuting in America III: The Third National Report on Commuting Patterns and Trends*, NCHRP Report 550, October 2006, p. 3.

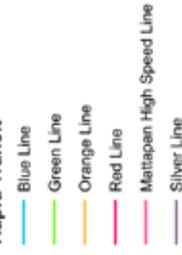
MAP A-3
Northeast Corridor
of the MBTA Service Area
Employment Density, 2000



2000 CTPS Employment Database
Employees/Square Mile by TAZ



Rapid Transit



Commuter Boat

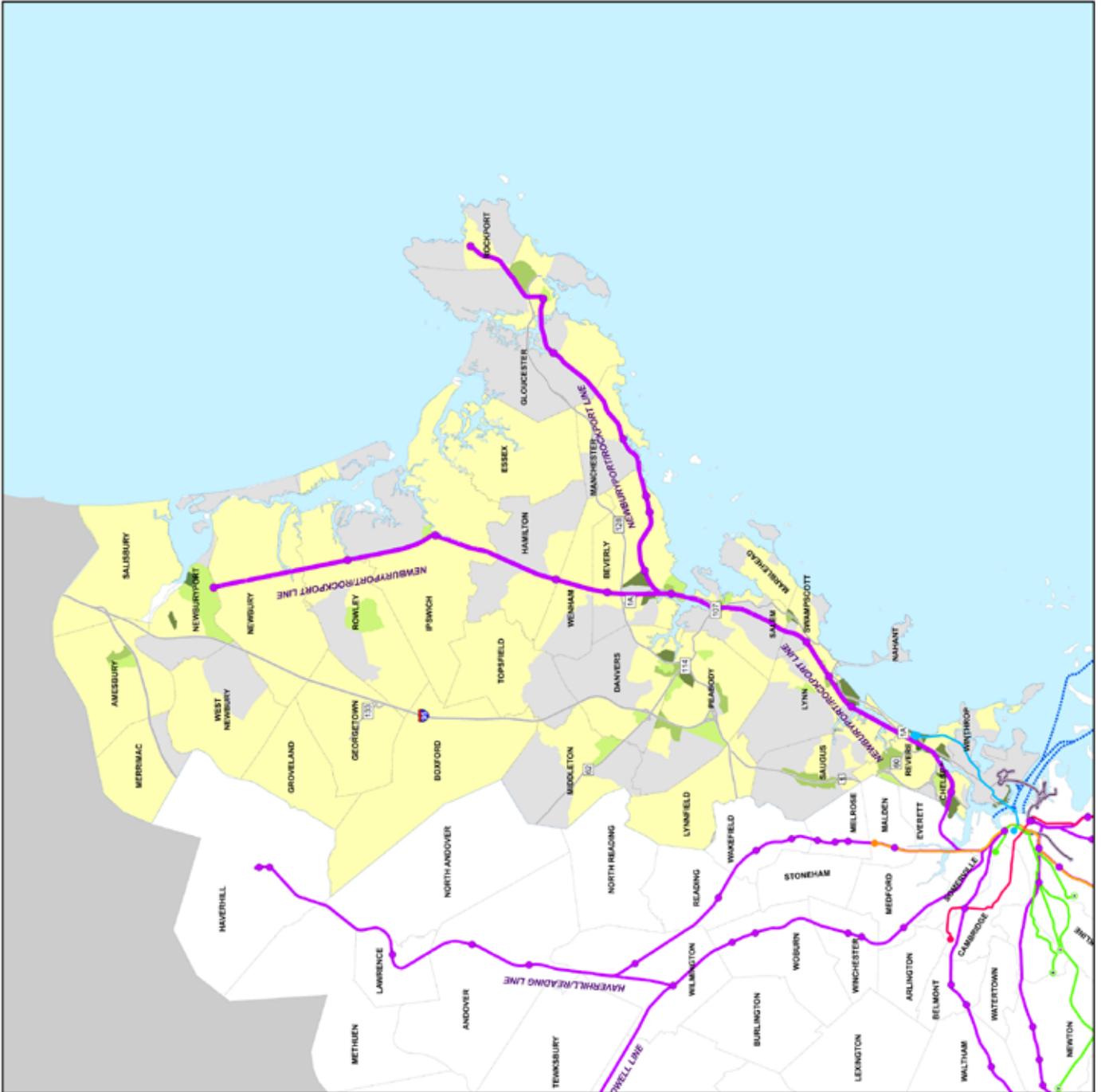


Commuter Rail

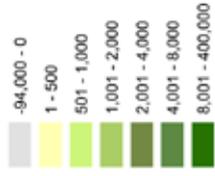


MAP A-4 Northeast Corridor of the MBTA Service Area

Projected Change in Employment Density from 2000 to 2030



2030 MetroFuture Projection
Change in Employees/Sq. Mi. by TAZ



Rapid Transit

- Blue Line
- Green Line
- Orange Line
- Mattapan High Speed Line
- Red Line
- Silver Line

Commuter Boat

- Commuter boat route

Commuter Rail

- Commuter rail line



FIGURE A-3
2000 Travel Modes to Work by
Northeast Corridor Residents

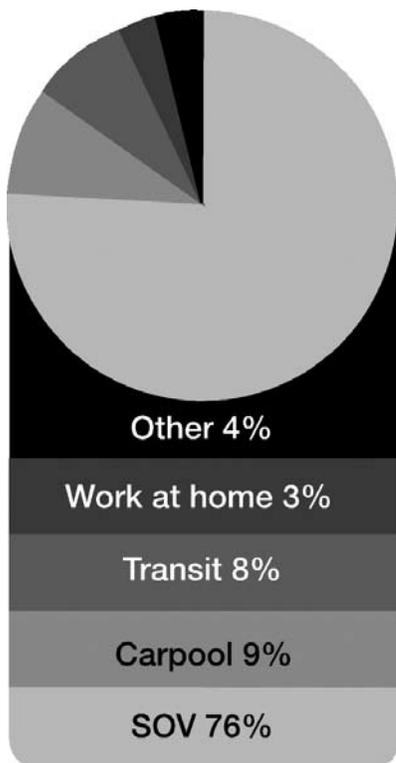
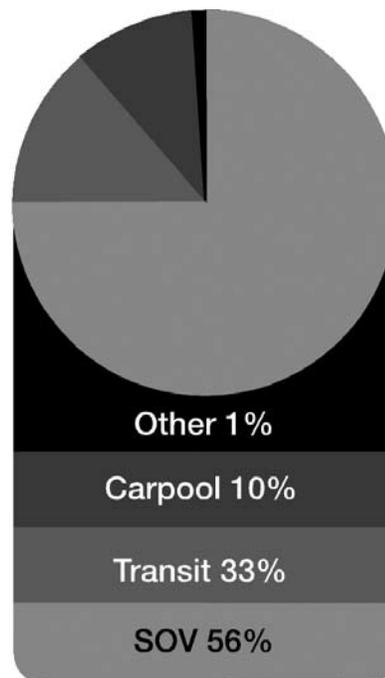


FIGURE A-4
2000 Travel Modes to Work by
Northeast Corridor Residents
To Boston and Cambridge



Most MBTA service is radially oriented towards Boston and Cambridge, which together are the destination for 18% of the work trips made by corridor residents. Of the work trips from the corridor to Boston and Cambridge, 56% are made in single-occupancy vehicles, and 38% are made by transit (see Figure A-4). Almost half of these corridor work trips to Boston and Cambridge originate in four communities: Chelsea, Lynn, Revere, and Winthrop, all of which are close to Boston.

TRAFFIC CONGESTION

Interstate 95 is the main radial highway in the Northeast Corridor between New Hampshire and metropolitan Boston. In Peabody, I-95 joins Route 128 and becomes Boston's inner circumferential expressway. Traffic into Boston continues south on U.S. Route 1 and enters Boston over the Tobin Bridge. Route 1A parallels U.S. Route 1 closer to the coastline, connecting the older town centers.

Monitoring shows that peak-period traffic on the section of Route 1 between Peabody and Boston moves at close to the posted speed limits, except at the final entry to Boston over the Tobin Bridge. I-95 north of Route 128 is generally not congested, so typical speeds during peak periods are assumed to be at or above the speed limit.

Route 1A through Revere and East Boston experiences reduced peak-hour travel speeds, especially inbound as it approaches Boston.⁴ The MBTA operates a number of express bus

routes from the North Shore that use this section of Route 1A.

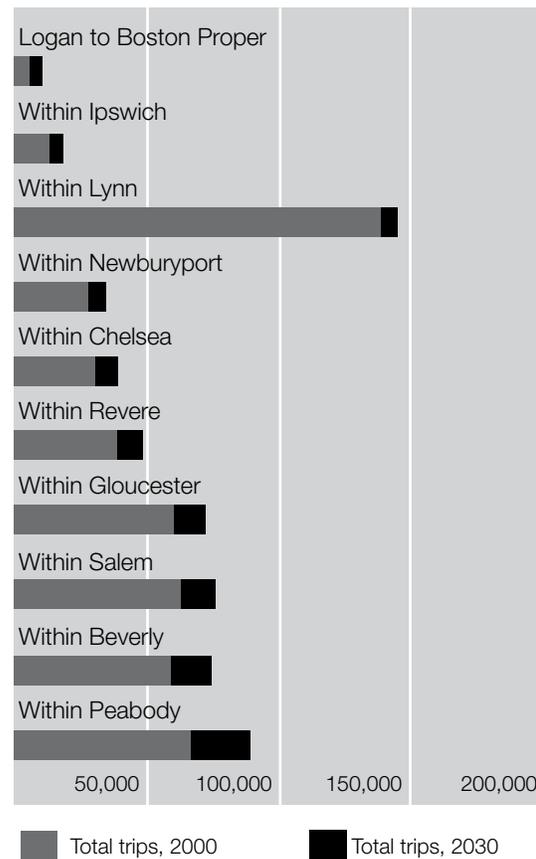
TRAVEL PROJECTIONS

The CTPS regional travel-demand model provides estimates of current travel volumes and projections of future travel volumes for all major modes: auto, transit, and walk/bike. A useful way of tracking travel growth patterns is to look at the change in travel between pairs of municipalities, to include trips beginning and ending in the same municipality. By 2030, there are projected to be 50 travel pairs in the Northeast Corridor with projected increases of at least 1,000 two-way trips per day. The projected travel volume increase for these 50 pairs is 187,922 trips per day (just over 20%).

The largest projected increases in the corridor are trips made entirely within one community: within Peabody (22,348), within Beverly (15,113), within Salem (13,251), within Gloucester (12,004), within Revere (9,698), within Chelsea (8,633), within Newburyport (6,584), and within Lynn (6,213). (See Figure A-5.)

At present, transit coverage within the Northeast Corridor varies among communities, with those nearest to Boston having the most extensive route networks. Peabody and Beverly, which have the two largest projected travel volume increases in the corridor, are each served by a combination of MBTA and town-sponsored bus routes. Of the rest of the top 15 projected travel volume increases, all but one are projected to be within or between municipalities/neighborhoods that are connected by MBTA bus or rapid transit service, by MBTA-funded bus service, or by Regional Transit Authority (RTA) bus service (Ipswich has no year-round local bus service, but has had town-sponsored summer bus service for several years). These top 15 account for 65% of the projected increases in the corridor. Several of those below the top 15 also have MBTA local service, but some have either no transit service or very limited service.

FIGURE A-5
Northeast Corridor Trip Increases 2000–2030:
Top-Ten in Order of Increase



The model also projects that 11 origin-destination pairs will have increases of over 1,000 daily trips between points in the Northeast Corridor and points in other PMT corridors, including 7 routes connecting with the North Corridor, 3 with Boston Proper, and 1 with the Northwest Corridor. The largest of these increases are for trips between Logan Airport and Boston Proper (4,536), and trips between Logan Airport and Cambridge (2,075). The projected increases for the other 9 pairs are below 1,700 for each pair.

ENVIRONMENTAL JUSTICE

The federal government defines environmental justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, education level, or income with

4 2004 Congestion Management System (CMS) Report, Central Transportation Planning Staff, December 2004.

respect to the development, implementation, and enforcement of environmental laws. The MBTA monitors EJ through implementation of and reporting for Title VI of the Civil Rights Act of 1964.

The Northeast Corridor encompasses East Boston, a densely populated neighborhood that is comprised of tracts that are classified as minority areas, low-income areas, or both for Title VI. Several other municipalities in the Northeast Corridor—Chelsea, Revere, Lynn, and Salem—contain census tracts that are classified as minority or as both minority and low-income, and Peabody has a tract that is identified as low-income.

Over 30 bus routes operate in this corridor; 14 are classified as minority routes, and 9 are classified as minority and low-income.

The Newburyport/Rockport commuter rail line operates in the Northeast Corridor. Three commuter rail stations in this corridor meet the both minority and low-income criteria.

A portion of the Blue Line runs through this corridor. Six of the Blue Line stations in this corridor meet the minority criterion, and two of these stations meet both the minority and low-income criteria.

MOBILITY PROBLEMS AND PROPOSED SOLUTIONS

CAPACITY IMPROVEMENTS ARE NEEDED

Investments will be needed to ensure that sufficient capacity is available to serve current and projected travel demand.

Problem 1:

As indicated above, by 2030 large growth in intracity trips is projected for Peabody, Beverly and Salem, all of which currently have only partial local transit coverage.

Proposed Solutions:

- Strengthen the identity of common service corridors associated with major employment, residential, or other activity hubs by consolidating services, providing real-time customer

information, improving amenities, and enhancing bus stop facilities.

- Expand local bus service to West Peabody.

Problem 2:

By 2030, modeling projections suggest that three bus routes in the Northeast Corridor (Routes 110, 111, and 117) will experience passenger crowding levels that would trigger the need for additional service.

Proposed Solutions:

- To increase peak-period capacity and to ensure that future vehicle loads do not exceed safe and comfortable levels, three additional 40-foot buses would be required to operate these three routes. Replacing existing 40-foot buses with 60-foot buses would be another method for increasing capacity to meet demand.
- Create the Urban Ring BRT transitway between Bellingham Square and Wood Island.

Problem 3:

Lynn had the highest number of total intracity trips in this corridor in 2000 (138,747). Although the rate of growth in trips is projected to be relatively small, Lynn would continue to have the most trips within any single municipality in the corridor by 2030. Lynn's transit mode share is, however, comparatively low, despite a robust bus and commuter rail network.

Proposed Solution:

Provide better bus amenities at Central Square, such as real-time customer information, and improve system identity

Problem 4:

Very densely populated areas in Chelsea, which currently generate significant numbers of trips into the urban core, do not have frequent rapid transit access within a reasonable walking distance.

Proposed Solutions:

- Implement BRT service to Bellingham Square in Chelsea from Maverick Station.

- Create the Urban Ring BRT transitway between Bellingham Square and Wood Island.

Problem 5:

Very densely populated areas in Lynn, which currently generate significant numbers of trips into the urban core, do not have frequent rapid transit access within a reasonable walking distance.

Proposed Solution:

Extend the Blue Line to Lynn.

Problem 6:

There are still some capacity constraints on the Newburyport/Rockport commuter rail line that cause delays.

Proposed Solution:

Double-track 0.8 miles through the Salem Tunnel on the trunk portion of the line, almost 15 miles on the Newburyport Branch between North Beverly and Newburyport, and 4 miles between Control Point Wilson in Gloucester and Rockport Station on the Rockport Branch.

ACCESS TO MBTA SERVICES NEEDS TO BE IMPROVED

CONNECTIONS WITH OTHER RTAs

Problem:

The Northeast Corridor is served by two Regional Transit Authorities that provide connections to MBTA services. Although an effort was made in the past to coordinate some bus schedules with commuter rail, current services provide few convenient connections.

The Cape Ann Transportation Authority (CATA) operates seven year-round bus routes from downtown Gloucester to other points in Gloucester and to Rockport. All of these routes either originate or stop at a waiting room on Main Street in Gloucester, approximately one-third of a mile from the Gloucester commuter rail station. Two of the seven routes serve Gloucester Station directly on most trips, but do not provide conveniently timed connections to or from trains. Two

other routes serve Gloucester Station on selected peak-period trips that were originally scheduled to facilitate easy transfers between buses and trains. However, over time, the bus schedules have not been changed to accommodate changes in commuter rail schedules, so they no longer provide easy connections. One of the routes that serves Gloucester Station also stops at Rockport Station, where several outbound midday trips provide fairly close connections to inbound trains, but not from outbound trains. The other three of the seven routes have no direct service to Gloucester Station. One of these serves West Gloucester Station directly on all trips, several of which connect well with inbound trains, but none of which provide connections from outbound trains.

Although the Merrimack Valley Regional Transit Authority (MVRTA) operates primarily in the North Corridor, one year-round MVRTA route operates in the Northeast Corridor, providing service from downtown Haverhill—about 0.2 miles from the commuter rail station—through Merrimac and Amesbury to downtown Newburyport, where two AM peak-period trips serve Newburyport Station. Both trips provide close connections there to inbound trains and one connects within 21 minutes from an outbound train. In the PM peak, one trip connects from an outbound train, but there is no inbound connection.

Although both the Cape Ann Transportation Authority (CATA) and the Merrimack Valley Regional Transit Authority (MVRTA) serve the Northeast Corridor, current schedules provide few close connections between RTA and MBTA services. In general, RTA bus routes do not function well as commuter rail feeders, as they serve different functions and populations. Most RTA routes provide local service on even headways, while commuter rail provides long-distance commuter service and operates on uneven headways due to a number of equipment and operational constraints. In addition, because RTA routes have frequent stops and many do not provide direct service to stations, using them to access stations is much slower than driving.

Proposed Solution:

Adjusting the RTA services to meet the commuter rail schedules would inconvenience customers making local trips. Changing the commuter rail schedules to coordinate with RTA services would entail significant capital and operating costs without significantly improving service for most commuter rail riders. The best solution, therefore, would be to create RTA feeder services to commuter rail. It is recommended that as demand for commuter rail feeder service increases, the MBTA work with CATA and MVRTA to select one or more stations on commuter rail routes in the corridor and to determine the number and alignment of routes that would be required to provide adequate feeder services.

ADA ACCESSIBILITY

Problem:

Although the MBTA has made strides toward providing ADA accessibility to all of its services, some gaps still remain. On the Newburyport/Rockport Line, Prides Crossing and Chelsea stations have not yet been made accessible.

Proposed Solution:

Based on the feasibility of construction, Chelsea is a high priority for near-term accessibility improvements.

STATION PARKING

Problem 1:

Access to rail transit services, for customers of all abilities, is constrained by the availability of parking, both for automobiles and for bicycles. An inventory of station parking that was completed during the fall of 2005 and winter of 2006 shows that parking at the following stations is utilized at 85% of capacity or greater⁵ (see Table A-1).

**TABLE A-1
Northeast Corridor
Station Parking at 85% Usage or Greater**

LINE	STATION
Newburyport/Rockport	Beverly Depot
	Salem
	Ipswich
	Manchester
	Prides Crossing
	Swampscott
Blue Line	Beachmont
	Suffolk Downs

Proposed Solution:

The MBTA can address inadequate parking capacity either by increasing the number of spaces or controlling demand through measures like raising the price of parking overall or installing automated parking-fee collection at MBTA lots to allow for congestion pricing and to improve enforcement of parking regulations.

When evaluating the potential expansion of parking, the availability of MBTA-owned land, the potential cost of acquiring nearby land, and the potential cost of a multilevel structure are all important considerations. Potential parking expansion projects in the Northeast Corridor include Beverly, Salem, Wonderland, and Rockport.

Problem 2:

For some customers, access to rail services is constrained by the lack of bicycle parking. A recent study provided a detailed inventory of bicycle amenities, by MBTA station, that included the location, number, and condition of bike racks, bike rack shelters, and signage directing cyclists to them. The study also noted that at some stations where bike racks were provided, cyclists did not utilize the racks, but parked their bikes elsewhere.⁶

⁵ Fijalkowski, Jared, and Ostertog, Heather, *Inventory of Park-and-Ride Lots at MBTA Facilities*, Central Transportation Planning Staff, February 27, 2007.

⁶ Fijalkowski, Jared, and Yaitanes, Justin, *2005–2006 Inventory of Bicycle Parking Spaces and Number of Parked Bicycles at MBTA Stations*, Central Transportation Planning Staff, October 2, 2007, Table 6.

**TABLE A-2
Northeast Corridor Bicycle Parking Improvements**

LINE	STATION	BICYCLE PARKING ENHANCEMENT RECOMMENDATION
Blue Line	Orient Heights	Install sheltered racks
	Maverick	Install sheltered racks
	Wonderland	Provide shelter for existing racks
	Wood Island	Provide shelter for existing racks
	Revere Beach	Provide shelter for existing racks
Newburyport/Rockport	Swampscott	Install inverted-U racks near stairs to platforms
	Hamilton/Wenham	Install sheltered racks close to platforms
	Ipswich	Relocate existing racks to sheltered area
	Beverly Depot	Relocate existing racks to sheltered area
	Newburyport	Relocate existing racks closer to platform

Proposed Solution:

The study recommended that the MBTA continue to expand bicycle parking at stations; however, the MBTA does not currently have a standard for determining what the appropriate number of spaces would be for each station. The study therefore also recommended that the MBTA adopt a standard for providing bicycle parking spaces at transit stations.

In instances where bikes were parked at locations other than at bike racks that were provided, the study made recommendations, based on the type of problem observed, including:

- The rack was in an inconvenient location (e.g., far from the platform).
- The rack was not sheltered from the weather.
- The rack was in a secluded location that was difficult to find or might encourage theft.
- The rack was damaged or difficult to use.

The specific improvements shown in Table A-2 are recommended for stations at which existing bike racks were not used.⁷

INFRASTRUCTURE ENHANCEMENTS ARE NEEDED

Problem:

In order to continue to maintain and improve service quality as demand grows and as technologies and materials improve, the MBTA would need to continually invest in infrastructure enhancements.

Proposed Solution:

Table A-3 lists some of the enhancement projects that have been identified as future needs.

⁷ Fijalkowski, Jared, and Yaitanes, Justin, 2005–2006 *Inventory of Bicycle Parking Spaces and Number of Parked Bicycles at MBTA Stations*, Central Transportation Planning Staff, October 2, 2007, Table 6.

**TABLE A-3
Northeast Corridor Infrastructure Enhancement Projects**

BLUE LINE	
<i>Asset Category</i>	<i>Project Description</i>
Facilities	Construct busways on the Route 1A side of Wonderland Station and consolidate parking in a multilevel structure adjacent to Route 1A.
Signals	Evaluate the use of Communication-Based Train Control (CBTC) for the Blue Line.
NEWBURYPORT/ROCKPORT LINE	
<i>Asset Category</i>	<i>Project Description</i>
Facilities	Construct a new commuter rail layover facility in Rockport.
Power	Install ventilation fans at the Newburyport Line layover facility.
Signals	Improve the reliability of the Gloucester Branch signal system on the Newburyport/Rockport Line: replace the track code system, install a power switch, eliminate the pole line, and upgrade the crossing warning systems.
Signals	Upgrade signals from Beverly Junction to Chelsea on the Newburyport Line.

A STATE OF GOOD REPAIR NEEDS TO BE ACHIEVED.

Problem:

A number of system preservation projects must be addressed in the short- to mid-term to bring the system into a state of good repair and to ensure the safety of passengers and reliability of service. Some system preservation projects also have the potential to improve service, given technological advances since the original systems were constructed.

Proposed Solution:

Table A-4 lists some of the specific projects needed to bring the system into a state of good repair and maintain it in that condition.

**TABLE A-4
Northeast Corridor State-of-Good-Repair Projects**

Bus	
<i>Asset Category</i>	<i>Project Description</i>
Maintenance/storage facilities	Replace the roof and air conditioning system at the Charlestown bus garage and maintenance facility.
Maintenance/storage facilities	Refurbish the bus storage facility at Lynn garage (bus maintenance functions may be moved to Wellington Station in the North Corridor).
BLUE LINE	
<i>Asset Category</i>	<i>Project Description</i>
Power	Replace all 125-volt DC emergency lighting systems at stations on the Blue Line.
Power	Replace Blue Line passenger station unit substations (one substation being done as part of Blue Line modifications).
Power	Remove existing heavy section insulators and replace them with new, lightweight, state-of-the-art-design double-beam section insulators in Orient Heights Yard on the Blue Line.
Power	Completely replace the OCS system in the Orient Heights Yard, as well as other areas along the Blue Line.
Power	Install two AC cables on the Blue Line from Orient Heights substation to Wonderland substation. Refurbish all substation buildings and replace all the internal operating equipment.
Signals	Replace the outdated signal system on the Blue Line.
Track/right-of-way	Blue Line special track work renewal program to replace turnouts (switches).
Track/right-of-way	Rebuild Blue Line track in the Orient Heights Facility.
Track/right-of-way	Replace worn rail, bolted rail, and ties from Government Center to Orient Heights stations on the Blue Line.
NEWBURYPORT/ROCKPORT LINE	
<i>Asset Category</i>	<i>Project Description</i>
Bridges	Repair one bridge on the Newburyport/Rockport Line that is currently rated as structurally deficient.
Bridges	Upgrade electrical controls for the Beverly Drawbridge.