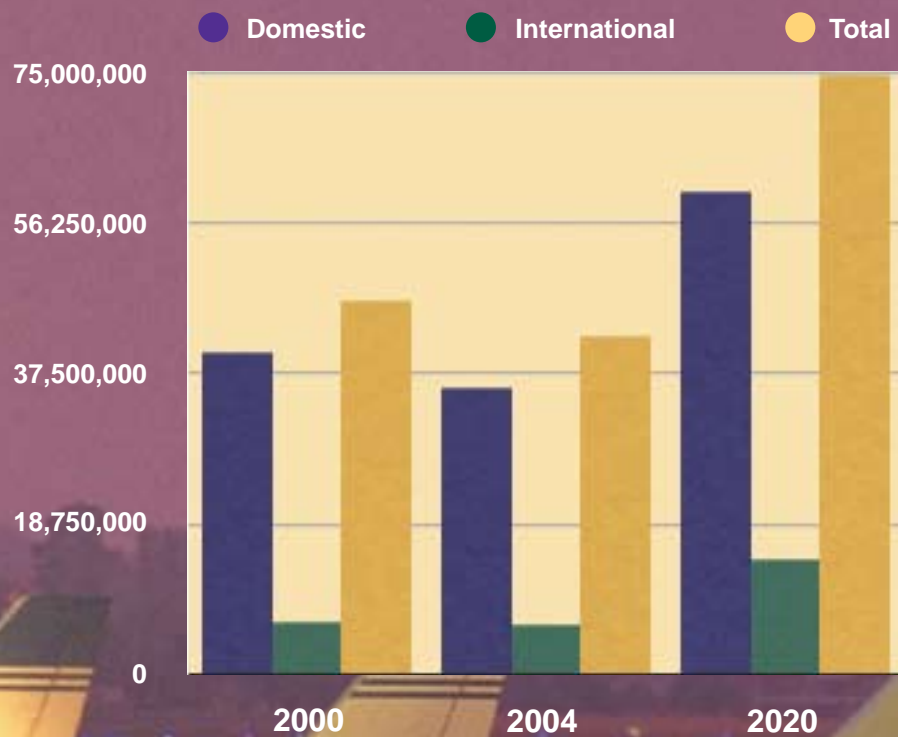# Forecast Results

**Overall Growth**

The New England Region experienced a total decline in passengers from 2000 to 2004 but is forecast to grow in the Base Case scenario to 75 million passengers by 2020. International activity is shown to grow most quickly by an average annual rate of 4.7% over the next decade (2010-2020).

**New England Passenger Forecast**



Legend: ● Domestic  ● International  ● Total

Y-axis: 75,000,000 / 56,250,000 / 37,500,000 / 18,750,000 / 0

X-axis: 2000 / 2004 / 2020

## Forecast Scenarios

As explained in the Forecast Methodology, forecast scenarios were developed to help determine how air passenger demand might change under varying economic conditions, for example, if the economy were to grow either more slowly or faster than expected. The economic and fare assumptions that define the scenarios are shown in the following table.

One interesting observation that emerged from the analysis of the scenarios concerns the sensitivity of passenger demand to changes in future income growth. The assumption for growth in personal income in the high and low growth scenarios was adjusted 50 percent upward (from the Base Case) and 50 percent downward respectively. The resulting effect on demand was not symmetrical. For example, with an economy weaker than the base case, and all other factors held constant, air travel is projected to decrease by 7.5 million passengers. But a 50 percent improvement in the economy creates a larger *increase*, of 15 million passengers.

Therefore, it is important that airport facilities maintain the ability to accommodate and quickly adjust to increases in demand in order to support cycles of economic expansion. This requires leading rather than reacting to passenger requirements. Investing for demand that is supported by an airport's catchment area characteristics is different from "build it and they will come" development. Alternately, flexibility for rapid expansion can often be incorporated into facility designs for a modest additional cost. Finally, the very nature of an airport system approach provides the flexibility to offset congestion at one location with surplus capacity in adjacent markets.

## Forecast Scenarios

| Base | Population<br>Real Personal Income | 0.3%<br>1.6% | CY 2004 Fares<br>-1.2% p.y. through 2020 |
|------|------------|------|------------|
| Enhanced | Population<br>Real Personal Income | 0.3%<br>2.4% | Base Fares, with 15% premium at BOS and NYC airports |
| Depressed | Population<br>Real Personal Income | 0.3%<br>0.8% | CY 2004 Fares, held constant |

## Point of Origin of Future Demand

After overall demand for the region was forecast, this was disaggregated by regional point of origin, how this demand would be distributed across the region.

Point of origin of future demand indicates the following:

- Boston metropolitan area is forecast to retain a dominant share of the growth in New England passengers.
- The two airport catchment areas closest to Boston, Providence and Manchester, indicate strong growth in passenger demand.
- New Haven and Worcester both have substantial growth in their catchment areas yet have had difficulty sustaining service.
- Bradley continues to have a strong market.
- Portland's market is forecast to increase at an average annual rate of 3.4%, though this could be expanded by the recent introduction of a low fare carrier, Jet Blue, into this market.
- Bangor and Burlington's catchment areas are forecast to grow by 3.6% and 3.8% respectively, which are both higher than the overall regional growth rate of 3.5%
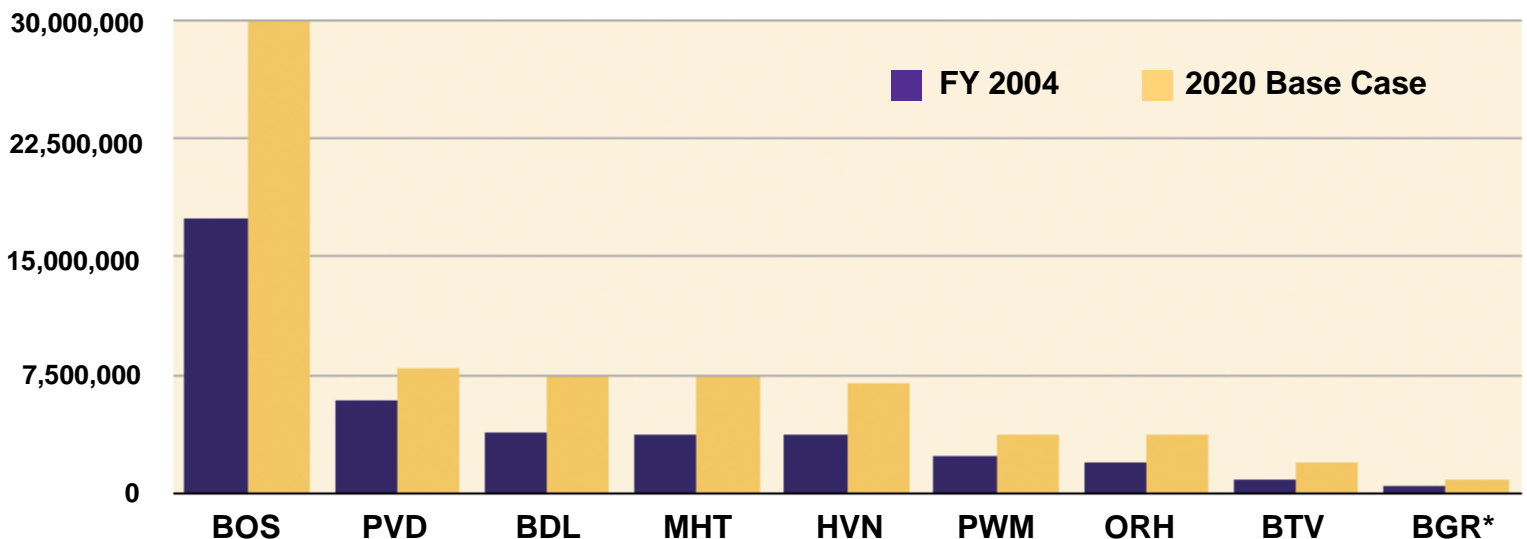
## Airport Forecasts

Based on the geographical distribution of ground origins of the region's passenger demand as previously discussed, an airport choice model was developed to determine how that pattern of demand would be distributed among the region's airports. This yielded two useful findings: (1) forecasts of passenger activity at each airport, and (2) an indication of the level of success of each airport in serving its catchment area demand (or, stated another way, preventing the phenomenon known as "leakage." Leakage is discussed in the following article).

The table to the right displays the forecast results for each of the airports and for each of the scenarios.  In viewing this table, you will recall that, as discussed earlier in Forecast Methodology, the forecast figures in the table reflect passenger choice behavior as they are collectively influenced by fares, service, and distance, as reported in the 2004 survey.

Results for Portsmouth were not shown since it was determined that within the planning horizon

### Catchment Area Forecasts



* Note: BOS-Boston, PVD-Providence, BDL-Bradley, MHT-Manchester, HVN-New Haven, PWM-Portland, ORH-Worcester, BTV-Burlington, BGR-Bangor, BED-Bedford, PSM-Portsmouth.

## Forecast Airport Passengers - 2020 - Depressed, Base, and Enhanced Scenarios

| Airport | Actual FY 2004 | 2020 Depressed | 2020 Base | 2020 Enhanced | Average Annual Growth Depressed | Base | Enhanced |
|---|---|---|---|---|---|---|---|
| BOS | 24,477,000 | 38,302,000 | 42,437,000 | 49,578,000 | 2.8% | 3.4% | 4.4% |
| BDL | 6,472,000 | 9,655,000 | 10,384,000 | 12,430,000 | 2.5% | 2.9% | 4.0% |
| PVD | 5,253,000 | 8,551,000 | 9,057,000 | 11,195,000 | 3.0% | 3.4% | 4.7% |
| MHT | 3,783,000 | 6,317,000 | 7,123,000 | 9,221,000 | 3.2% | 3.9% | 5.5% |
| PWM | 1,265,000 | 2,089,000 | 2,347,000 | 2,781,000 | 3.1% | 3.8% | 4.9% |
| BTV | 1,169,000 | 1,989,000 | 2,148,000 | 2,523,000 | 3.3% | 3.8% | 4.8% |
| BGR | 445,000 | 776,000 | 833,000 | 971,000 | 3.4% | 3.9% | 4.8% |
| HVN | 43,000 | 629,000 | 962,000 | 1,113,000 | 17.7% | 20.7% | 21.8% |
| ORH | | | 284,000 | 536,000 | | | |
| BED | 26,000 | 37,000 | 451,000 | 790,000 | 2.2% | 18.9% | 23.0% |
| Total | 42,933,000 | 68,345,000 | 76,026,000 | 91,138,000 | 2.9% | 3.5% | 4.7% |

of this study, Portsmouth is expected to be limited to a role of developing complementary niche airline services. While the development of those services is difficult to forecast, they have been shown to yield important system benefits, such as providing an alternate location for ramp overnight parking of aircraft, especially for air charter flights. The Portsmouth airport is analyzing the results of this study in hope that such opportunities can be more readily identified in the future. Portsmouth may also be a very suitable airport for air charters or other operators considering use of the new Airbus A380 aircraft.

### Forecast Leakage Rates
In the Overview article, it was stated that an objective of regional airport planning in New England has been to improve customer service by providing convenient access to competitively priced airline services. One way to measure the performance of the system is to examine leakage rates, the number of passengers leaving an airport's catchment area to use an alternate airport because they are willing to travel a greater distance to get better fares, more convenient schedules or other tangible advantages.
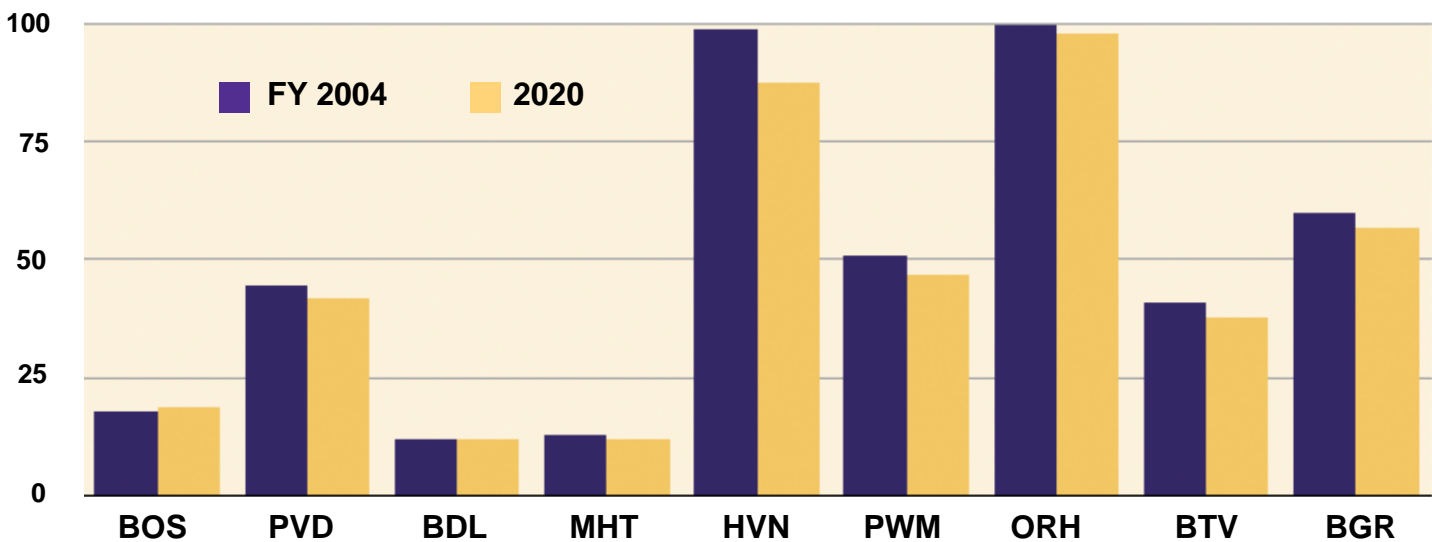
The model results for the forecast base case and 2004 leakage rates are shown in the chart below. Note that in this case lowered numbers represent improvements. As can be expected, Boston has the lowest leakage rate because of its extensive schedule of services. What would be less expected is that Burlington, VT has the second lowest leakage rate. This can be explained by the remoteness of this market from alternative airports.

Also of interest is the finding that the forecasts predict only modest reduction in the leakage rates for Manchester and Providence over the forecast period. By contrast, from 1996-2004 these airports, along with Worcester increased their share of the Boston Area System from 12 percent to 28 percent.
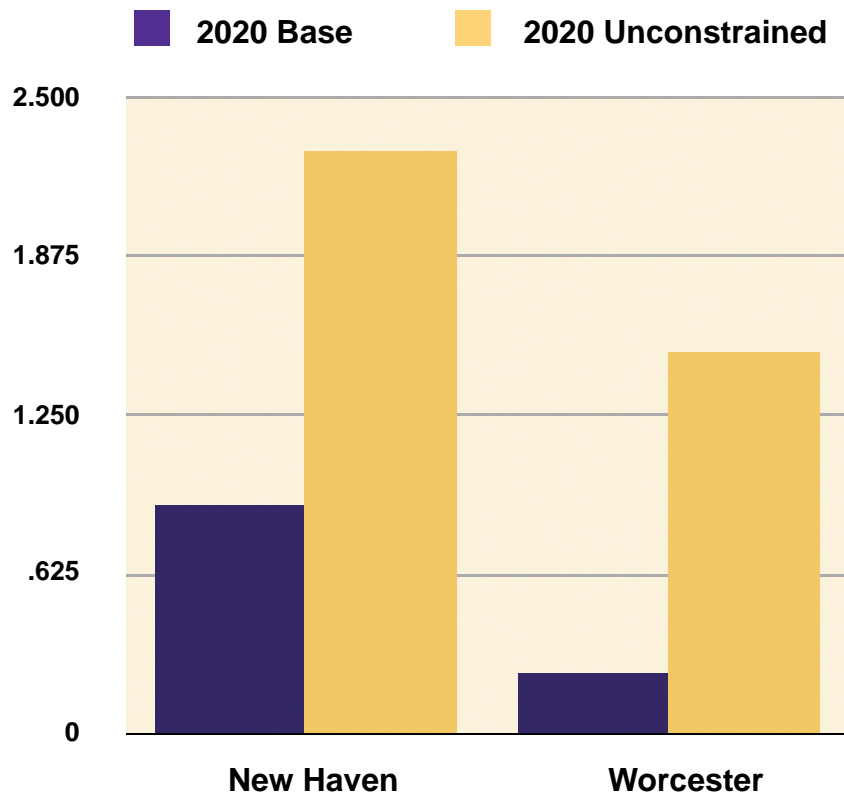
Generally this chart demonstrates that, to the extent the models are correct, the emphasis through this planning period will be placed on developing the services necessary to keep pace with growth in each catchment area rather than to accommodate any drastic shifts in airport usage patterns.

It is important to note the caveat used, "if the models are correct." The two major requirements of an airport choice model are: (1) a large amount of data, and (2) a set of well-crafted assumptions. Data, of course, is very expensive and it is often difficult to determine the extent to which passenger survey responses reflect their perceptions about their choices versus the facts. The degree to which passenger behavior can't be explained by schedules, fares, and access times are accounted for through an "airport constant." This essentially is a bias factor, which is fine except we don't know very much about how stable these are over time. More than likely they will change as passengers learn more about their choices and experiences using alternate airports. Yet our current forecasts hold them constant through 2020. Accordingly, it is recommended that the 2004 passenger survey be repeated periodically in order to continue to refine our understanding of shifts in passenger preferences and how airport choice behavior will be influenced by these changes.

**Airport Catchment Area Leakage Rate** - Base Case Forecasts

## Comparison of Base Case to Unconstrained Forecasts

**■ 2020 Base**   **□ 2020 Unconstrained**

| | |
|---|---|
| 2.500 | |
| 1.875 | |
| 1.250 | |
| .625 | |
| 0 | |

**New Haven**        **Worcester**

## Unconstrained Forecasts for New Haven and Worcester

At the time of this study there was very little service at the New Haven and Worcester airports. In the original base case, forecast services for these two airports were built up gradually over time. In an experiment designed to examine the nature of their role in the regional system, the study allowed activity levels allocated to these airports to grow in a way that was not constrained by airport capacity (i.e., the physical ability of its facilities to handle traffic). To accomplish this, a more ambitious service schedule similar to that of Manchester and Portland was used to determine the degree to which higher level of services would attract passengers.

In addition, Worcester ground access times in the model were reduced to reflect improvements that were considered plausible in terms of actual projects. An adjustment was also made in the "airport constants" for these airports, as discussed above, to reflect those observed for Manchester and Portland. The results show that New Haven could potentially support 2.3 million passengers annually compared to 1 million in the base case and Worcester could potentially support 1.5 million compared to 0.3 million in the base case. In this experiment, leakage to the congested New York City and Logan airports is reduced by approximately 900,000 passengers.

## Air Cargo

Air cargo, another important service provided by most of the NERASP airports, was included in this study in order to address two critical questions:

1. Does the regional airport system have the ability to provide the air cargo service the region requires?
2. Will air cargo activity create any problems with development of these airports for scheduled passenger requirements?

The domestic cargo projections reflect:

- The projected moderate growth in the overall New England economy in comparison to other regions in North America.
- Increased truck substitution, particularly in the densely developed areas of New England and the adjacent regions in North America.
- A slight decline in cargo growth after 2010, reflecting more moderate economic growth in New England during the further years of the forecast period.

The international cargo projections reflect:

- A gradual economic recovery nationally and internationally, spurring increased global trade and more direct routes between New England and overseas markets.
- The projected moderate growth in the overall New England economy in comparison to other regions in North America.
- International cargo tonnage growth will be moderated by the continued substitution of ocean-borne cargo movements.
- Less leakage of international cargo from the New England region to John F. Kennedy International Airport.
- A slight decline in cargo growth after 2010, reflecting more moderate economic growth in New England during the out-years.

## Airport-Specific Cargo Forecasts

An analysis was performed, using knowledge of both the strength of the market and the capacity of facilities at each airport. That analysis resulted in the following airport specific forecasts.

### Projected Annual Growth Rates for Air Cargo NERASP Airports

| Airport | 2005-2010 | 2010-2025 |
|---|---|---|
| Logan | 3.0% | 3.0% |
| T.F. Green | 3.0% | 2.5% |
| Portsmouth | 0.0% | * |
| Portland | 4.0% | 4.0% |
| Burlington | 3.0% | 3.0% |
| Manchester | 6.0% | 5.5% |
| Tweed-New Haven | 0.0% | 0.0% |
| Bradley | 6.0% | 5.5% |
| Worcester | 0.0% | 0.0% |
| Bangor | 1.0% | 1.0% |

### New England Cargo Base Forecast Growth Rate Annual Projections (in tons)

| Year | Domestic Cargo Growth | Interational Cargo Growth |
|---|---|---|
| 2005-2010 | 3.0% | 3.5% |
| 2010-2025 | 2.5% | 3.0% |

## General Aviation

General aviation (GA) includes all aircraft not operating as scheduled service or military operations. Its most common form is the single engine piston aircraft owned by an individual or club and used primarily for recreational transportation. Typically, as passenger airports develop more scheduled activity, these smaller aircraft will tend to find operating in a scheduled air carrier environment less convenient and more expensive. It is expected that they will consequently be motivated to find adequate facilities at nearby airports, specializing in general aviation services, to which they can relocate. That is the reason for the negative GA growth rates at many of the regional airports with high passenger growth rates. This suggests that maintaining and improving the region's general aviation airports system is an important complementary effort for supporting the air carrier airports.

* Note: New air cargo service potentially starts at airport if space becomes constrained at Manchester

A less common, but thriving, expression of GA is the corporation-owned aircraft whose operation is geared to business needs. Several recent developments are transforming the corporate aviation sector, developments that will have growing importance for air passenger transportation. These include the following:

- Changes in aircraft technology,
- New ways to reduce the cost of ownership (e.g., fractional ownership), and
- The reduced convenience in scheduled airline services.

Some premium travelers are now viewing point-to-point/on-demand service as a better value. One company at Hanscom Airport, Linear Air, has received much attention for its aggressive ordering of micro-jets. These planes would be used to develop air charter services that would operate on-demand. While these services are unlikely to produce a major change in the total number of scheduled passengers, it is possible that they will compete for a portion of the premium fare passenger market. And while their impact on total passengers will be small, they could create a significant increase in aircraft operations in the airspace currently dominated by large transport jets. Their growth will initially be limited by the production capacity of manufacturers of these aircraft, though market forces could cause this to increase substantially in the future. However, since much speculation remains as to the cost structure of this business model, market acceptance, and operational issues, it was determined for the purposes of this study to be premature to estimate the full impact of these developments.

Though this study only examined GA activity at the eleven airports at which scheduled passenger jet service is provided, it should be evident from the foregoing discussion that the general aviation airports throughout the region will play an increasingly important role in enhancing the overall performance of the New England aviation system.

## Ground Access Forecasts

As noted earlier, the airport choice Base Case forecast provided a wealth of information about the ground trips required to gain access to air travel. The NERASP study used this information to identify clusters of passenger demand of sufficient magnitude to support markedly improved public ground transportation service options. The following discussion presents the major findings of this analysis.

**Express Bus Market, 2020**
Logan International Airport
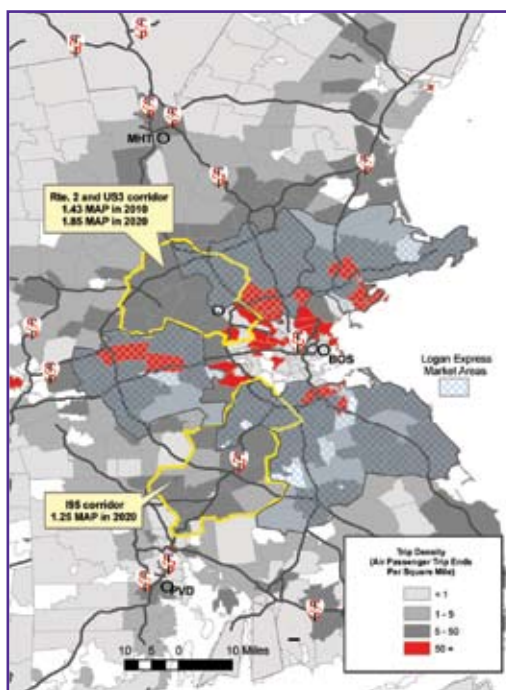


**Express Bus Market, 2020**
Bradley International Airport
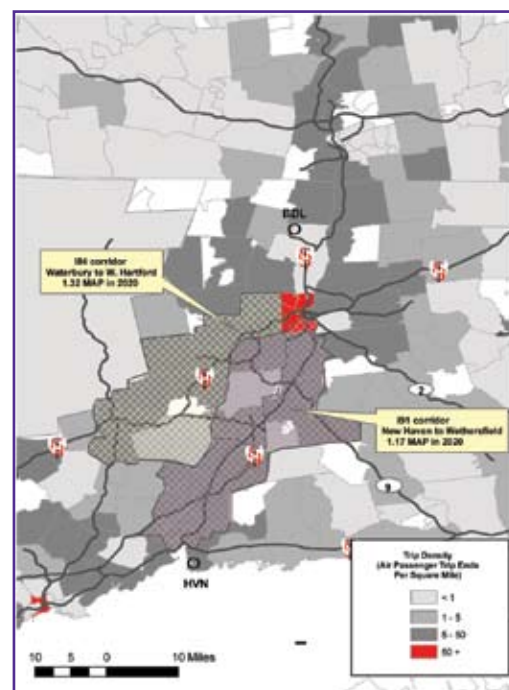
**Airport Express Bus Service:**

Airport Express Bus refers to dedicated express buses generally operating between suburban parking lots and an airport. To be successful, services of this type ordinarily require attractive schedule frequency (typically every half-hour) and extensive schedule hours. Baggage is stored under the passenger compartment and retrieved for the passenger at the terminal door. It therefore offers a level of convenience that is perceived by many travelers as being competitive with automobile travel to airports.

Findings of the study are as follows:
- By 2020, Boston Logan could possibly support at least two additional routes to the northwest and southwest.
- Bradley Airport has significant passenger volumes to its southwest (I-84) and to the south (I-91) that offer the potential for new express bus service from one of these two corridors.
- The largest corridor used by passengers for Manchester has a forecast volume of 0.8 million annual passengers which is below the minimum threshold of 1.2 million annual passengers needed to support unsubsidized service.
- No other markets appear feasible through this forecast.

**Airport Shared Ride Service**

This service is provided by vans offering door-to-door service within a targeted market area with two to five million annual passenger trips. The study indicates that new opportunities for this service are emerging in:

*Boston Logan International Airport's market:*
- Cambridge/Somerville/
- Arlington/Belmont, and
- Newton/Brookline/Watertown

*Providence's T.F. Green's market:*
- Providence/Cranston/Warwick/Pawtucket

The analyses described in this article have focused upon identifying viable markets in which investments in proven models of public transportation services could be successful, based upon forecast patterns of passenger trips to airports. Since the success of these alternative modes relies upon providing a better combination of price and convenience than private cars, it is conceivable that they could also be designed to help airports reduce leakage from their catchment areas. This could be a productive area to explore in any subsequent studies. On the other hand, based upon current research, public transportation services beyond these identified markets will be very risky for any substantial public investment. ✈

**Shared Ride Market, 2020**
Logan International Airport
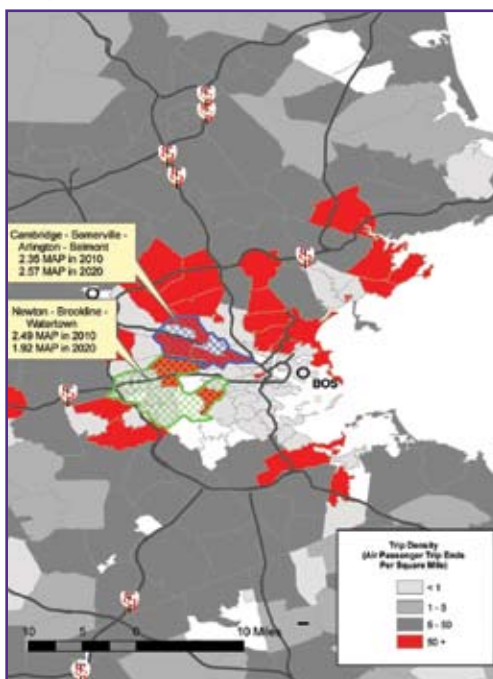


**Shared Ride Market, 2020**
T.F. Green Airport