

MBTA Old Colony Commuter Rail Service Restoration Transportation Impact Study

Authors

Thomas J. Humphrey
Stephen Falbel

Graphics

Kenneth A. Dumas

Cover Design

Jane M. Gillis

Cover Photograph

Carol Gautreau Bent

The preparation of this document was supported by MBTA Contract X94PS04, the Federal Transit Administration through EOTC Contract 8169001/X0008, and state and local matching funds.

Central Transportation Planning Staff

Directed by the Boston Metropolitan Planning Organization. The MPO is composed of state and regional agencies and authorities, and local governments.

January 2001

Table of Contents

LIST OF FIGURES AND TABLES	iv
EXECUTIVE SUMMARY	ES-1
1. INTRODUCTION	1-1
2. IMPACT ON RED LINE AND OTHER MBTA SERVICES	2-1
Impact on Red Line	2-1
Impact on Other MBTA Commuter Rail Lines	2-21
Impact on MBTA Bus Routes	2-23
Impact on Commuter Boats	2-33
3. IMPACT ON PRIVATE CARRIER BUS RIDERSHIP AND SERVICE	3-1
Summary of Routes	3-1
Data Sources Used	3-2
Summary of Findings	3-3
Detailed Ridership Impacts by Carrier and Route	3-7
4. IMPACT ON THE HIGHWAY SYSTEM	4-1
Passenger Survey Results	4-1
Traffic Counts	4-4
Summary	4-12
APPENDIX A - PASSENGER COUNTS AT SELECTED RED LINE STATIONS, 1997, 1998, AND 2000	A-1
APPENDIX B - OLD COLONY PASSENGER COUNTS AT SOUTH STATION, QUINCY CENTER, AND BRAINTREE	B-1
APPENDIX C - BACKGROUND INFORMATION ON RAIL, BOAT, AND HIGHWAY TRANSPORTATION IN OLD COLONY SERVICE AREA	C-1
APPENDIX D - BACKGROUND INFORMATION ON PRIVATE CARRIER BUS SERVICE IN OLD COLONY SERVICE AREA	D-1

LIST OF FIGURES AND TABLES

FIGURES

Locations of Old Colony Lines Relative to Other Commuter Rail Routes	2-20
Locations of Old Colony Lines Relative to Red Line and MBTA feeder bus routes	2-25
Locations of Old Colony Lines Relative to South Shore Commuter Boat Routes	2-35
Locations of Old Colony Lines Relative to American Eagle Bus Route ...	3-9
Locations of Old Colony Lines Relative to Bloom's Bus Lines Route	3-11
Locations of Old Colony Lines Relative to Bonanza Bus Lines Woods Hole/Buzzards Bay and Fall River/Newport Routes	3-15
Locations of Old Colony Lines Relative to Interstate Coach Routes	3-17
Locations of Old Colony Lines Relative to JBL Bus Lines (former Carey's Bus Lines) Route	3-21
Locations of Old Colony Lines Relative to Plymouth & Brockton Street Railway Company Routes	3-23
Locations of Old Colony Lines Relative to BAT Ashmont Route	3-33
Locations of Old Colony Lines Relative to Major Highways	4-3

TABLES

1-1 Former Modes of Old Colony Inbound Riders in Fall 1998 Survey	1-2
2-1 Former Ridership on Other MBTA Services in Present Old Colony Service Area and Diversions Found in 1998 Survey	2-1
3-1 Private Carrier Express Bus Routes A.M. Peak Ridership Before Old Colony and Diversions Shown in 1998 Survey	3-3
4-1 Estimated Number of Vehicles Removed from Expressways	4-2
4-2 Estimated Reduction in Congestion Due to Old Colony	4-4

4-3 Traffic Volumes at Selected Locations: 1997 vs. 1998	4-6
4-4 Average Weekday Traffic Volume on Route 3 at Norwell, South of Route 53	4-7
4-5 Average Weekday Traffic Volume on Route 24 at Randolph, South of the Split	4-8
4-6 Ramp Counts at Route 3 Interchange #8	4-8
4-7 Ramp Counts at Route 3 Interchange #16	4-9
4-8 Ramp Counts at Route 3 Interchange #19	4-11
4-9 Ramp Counts at Route 24 Interchange #20	4-12

NOTE: Appendix A contains summary tables of Red Line passenger counts at selected stations in 1997, 1998, and 2000

Appendix B contains summary tables of Old Colony passenger counts at selected stations in 1997, 1998, 1999, and 2000

Executive Summary

In September 1997 the Massachusetts Bay Transportation Authority (MBTA) reinstated passenger service on two routes of the former Old Colony Railroad system. Previous passenger service on these lines had ended in 1959. This report presents the final results of a study conducted for the MBTA by the Central Transportation Planning Staff (CTPS) of the impacts that restoration of Old Colony passenger service has had on other transportation facilities. The results of a survey of Old Colony riders conducted by CTPS in September 1998 are presented in a separate report.

DESCRIPTION OF OLD COLONY LINES

The present Old Colony lines consist of two branches: the Middleborough/Lakeville Line and the Plymouth/Kingston Line. These lines share track between South Station in Boston and Braintree station, and connect with Red Line rapid transit service at those two points and at Quincy Center. Otherwise, they are separate. The Plymouth/Kingston Line divides further at the outer end, with branches to terminals in Kingston and in Plymouth.

All three outer terminals on the Old Colony Lines are about 35 miles from downtown Boston. The Middleborough/Lakeville Line has six stations south of Braintree and the Plymouth/Kingston Line has seven. Since November 1997 the weekday schedule on the Middleborough/Lakeville Line has provided 12 round trips, including four inbound in the A.M. peak and four outbound in the P.M. peak. (A fifth inbound trip arrives in Boston just before the start of the A.M. peak.) The weekday schedule on the Plymouth/Kingston Line has provided 15 round trips, including five inbound in the A.M. peak and four outbound in the P.M. peak. Midday service has included five round trips between Boston and the Plymouth terminal rather than Kingston. On Saturdays and Sundays the Middleborough/Lakeville Line has had seven round trips and the Plymouth/Kingston Line eight, including three Plymouth round trips.

RIDERSHIP TRENDS

In conjunction with this study CTPS conducted several one-day counts of Old Colony passenger boardings and alightings at South Station, Quincy Center, and Braintree between October 1997 and October 1999. Counts at stations south of Braintree were also conducted in October 1998. These showed that after nearly one year of full operation, the Middleborough/Lakeville Line had 2,970 riders inbound and 3,050 outbound on a sample weekday. The Plymouth/Kingston Line had 3,580 riders inbound and 3,570 outbound. Over 97% of the riders on the Middleborough/Lakeville Line and over 99% Plymouth/Kingston Line boarded or alighted at South Station, Quincy Center, or Braintree. Therefore, counts at these three stations alone were adequate for purposes of monitoring ridership.

After nearly two years of operation, ridership at these three stations alone on the Middleborough/Lakeville Line had risen to 3,495 inbound and 3,475 outbound. On the Plymouth/Kingston Line, the counts showed 3,850 riders inbound and 4,090 outbound. Counts of peak-period, peak-direction ridership at South Station in the Spring of 2000 show further growth of about 4%, with constraints on parking capacity at stations and on seating capacity on trains slowing the rate of growth. Including estimates for off-peak ridership and travel entirely south of Braintree, the two Old Colony lines together were carrying about 7,850 riders each way on weekdays by the Spring of 2000.

IMPACTS ON OTHER TRANSPORTATION FACILITIES

The 1998 survey found that 81% of Old Colony riders were using the service for trips that they had previously made by some other means. (Some of the other 19% had coincidental changes in travel requirements after 1997 and would have begun traveling by other means if Old Colony service had not been provided.) Of the riders who had switched from other travel methods, the largest group (40%) consisted of former rapid transit riders. Diversions from driving alone for the entire distance were second (28%), followed by diversions from private carrier express bus routes (20%). Most of the rest came from older commuter rail lines and carpools, with under 2% coming from commuter boats.

With no other changes, the older transportation services and facilities would have been expected to show ridership losses equal to the number of Old Colony passengers diverted from each. Such was not the case, however. The Old Colony lines, like all lines in the MBTA commuter rail system, are used predominantly for work travel to and from Boston and Cambridge. The Old Colony lines opened during a time of continued growth in such travel. Therefore, on many of the older alternatives, diversions to Old Colony service have been largely or entirely offset by new users. Impacts on prior modes are summarized below, in order of their importance as sources of Old Colony riders.

Rapid Transit

The survey results showed that as of September 1998 inbound Old Colony riders included 2,070 former rapid transit users. Based on origins of rapid transit riders before the Old Colony startup, most all of these diversions would be expected to have come from the five Red Line Braintree Branch stations and Ashmont. Red Line before and after passenger counts were conducted in May 1997 and May 1998. (Overall Old Colony ridership was about 10% lower in June 1998 than in September.)

Of the six Red Line stations examined, only Quincy Adams had a net decrease in all-day ridership between 1997 and 1998. The loss there was only 275 inbound boardings. From 6:00 to 8:15 a.m. alone, however, there was a drop of 1,010 riders, equivalent to about 80% of the passengers from the Old Colony service area who boarded at Quincy Adams in the same hours in 1997. At Braintree station despite a net gain in riders, there was a drop of about 600 prior to 7:30 a.m. This was equivalent to about half of the

passengers from the Old Colony service area who boarded the Red Line at Braintree in the same hours in 1997.

The most common means of access to Quincy Adams and Braintree from towns in the present Old Colony service area was driving. The results above imply that parking spaces at these stations vacated by Old Colony riders were largely re-filled by new Red Line users who were formerly unable to find spaces in the hours when they needed to travel. Additional counts conducted in May 2000 showed a net decrease of 335 boardings at Braintree but a gain of 230 at Quincy Adams between 6:15 and 10:00 a.m. compared with 1998. The most likely explanation for this would be additional diversions to Old Colony service not fully offset by new Red Line riders and some shifting of Red Line riders between the two outer stations.

Driving Alone

The survey results showed that as of September 1998 inbound Old Colony riders included 1,450 people who formerly drove alone for the entire trip. About 1,600 Old Colony riders formerly drove to Red Line stations. The survey did not ask which highways these riders were diverted from. Based on their origins and destinations, about 1,300 would have used the Southeast Expressway into Boston. Including these and riders going to the Red Line, about 1,700 would have been on Route 3 and about 1,200 on Route 24 south of Braintree.

As far as can be determined from traffic counts, the impact of Old Colony diversions alone on any of these highways was very limited. With no other changes, diversions from the Southeast Expressway would have caused a reduction of about 1.4% in typical daily traffic, and should theoretically have shortened the typical four to five hour duration of congestion by about seven minutes.

On Route 24 approaching the Expressway, traffic between 1997 and 1998 showed a net increase larger than the average annual increase over the preceding five years. The growth rate was also above the regionwide average. Old Colony diversions were equivalent to about 1.9% of average daily traffic on this segment as of 1997, and should theoretically have shortened the typical two to three hour duration of congestion by about eight minutes.

The greatest impact was on Route 3 in Braintree. The estimated Old Colony diversions were equivalent to about 2.5% of the average weekday traffic volume there, and should theoretically have shortened the typical three-hour duration of congestion by about 17 minutes. Counts on Route 3 in Norwell indicated that the rate of traffic growth between 1997 and 1998 was slower than the average at that location for the preceding five years and was also below the regionwide average.

Private Carrier Express Bus Routes

The survey results showed that as of September 1998 inbound Old Colony riders included 1,085 former private carrier bus users, with most of these (1,020) having been diverted from A.M. peak bus trips. These diversions came from six bus companies with routes to downtown Boston from points now served directly or indirectly by the Old Colony lines. The overall number of bus riders shifting to the trains in the first year was equal to about 38% of the riders using the affected routes prior to the Old Colony startup, but the losses were not evenly distributed.

The Plymouth & Brockton Street Railway Company, which had accounted for the largest number of A.M. peak riders, (1,365) experienced the largest absolute loss (605, or 44%). P&B had run six basic routes to Boston with several variations. The majority of the loss (465) came from the Plymouth - Boston route, which had a 76% decrease. P&B has made substantial service reductions since Old Colony service started, including discontinuance of routes from Brockton and Pembroke Center, and near elimination of the route from Scituate. Nevertheless, overall P&B ridership in Spring 2000 had improved compared with September 1998. (The losses above do not include a drop of 45 of 90 riders on the P&B route from Marshfield to Braintree, because these were counted as Red Line diversions in the survey results).

Interstate Coach had the second-largest total ridership loss of any carrier, (185 of 240 A.M. peak riders) resulting in the largest percentage loss (78%) up to September 1998. This company had been running routes from Middleborough and Easton with several variations. Since 1997, Interstate has reduced service substantially, including complete elimination of the Easton route. Ridership in Spring 2000 was about the same as at the time of the survey, however.

Carey's Bus Lines had the third-largest loss of the six carriers, at 85 of 155 A.M. peak riders (56%). The company had been running one basic route (from Whitman), with variations. Carey's reduced service more than 50% when the Old Colony lines opened and went out of business six months later. JBL Bus lines took over the route at the reduced service level, but ridership had declined even further by Spring 2000.

American Eagle Motor Coach, which operated one route (from New Bedford) had lost 50 of 350 A.M. peak riders (15%) to Old Colony trains at the time of the survey. The company has eliminated some trips and has lost some additional riders since then.

Bloom's Bus Lines which operated one route (from Taunton) had lost 35 of 225 A.M. peak riders (16%) to Old Colony trains at the time of the survey. The company has eliminated some trips and has lost some additional riders since then.

Bonanza Bus Lines operates a large route system, but only two routes were affected by Old Colony service. The Woods Hole/Buzzards Bay route had lost 45 of 205 A.M. peak riders (21%) to Old Colony trains and the Newport/Fall River route had lost 13 of 135 (9%) at the time of the survey. Since then, Bonanza has reduced service slightly on the

Woods Hole/Buzzards Bay route without further ridership losses. Service on the Newport/Fall River route has not changed, and ridership has increased to a higher level than before Old Colony service started.

The private carrier totals above exclude losses from the Brockton Area Transit (BAT) route from Brockton to Ashmont Station, because these are already counted in the Red Line diversions. At the time of the survey, BAT busses arriving at Ashmont from 6:00 a.m. to 3:30 p.m. had lost 120 of 330 riders (36%) to Old Colony trains. Subsequent ridership figures are not available, but BAT has discontinued a peak-period express variation of this route entirely.

Other Commuter Rail Lines

The survey results showed that as of September 1998 inbound Old Colony riders included 310 former users of other MBTA commuter rail lines, with most of these having used the Attleboro/Stoughton Line. Passenger counts suitable for before and after comparisons on that line are not available. The number of A.M. peak Old Colony diversions was equivalent to about 3% of the A.M. peak riders on the Attleboro/Stoughton Line in the Spring of 2000. Normal growth and day-to-day variation would have concealed the impacts of Old Colony diversions even if before and after counts had been done.

Carpooling

The survey results showed that as of September 1998 inbound Old Colony riders included 275 people who formerly carpooled for the entire trip and another 60 who formerly carpooled to the Red Line. The impacts of these diversions on highway traffic would depend on what other members of the carpool did afterwards. At most, the number of vehicles removed from the highways would be less than half of the number of carpools diverted, since by definition each carpool would have carried at least two people. At worst, there would be an increase in traffic, if one carpool member shifted to commuter rail and the others began driving alone. In any case, the reduction in traffic would be much smaller than that from diversions of people who formerly drove alone. As discussed above, the impacts of reductions in driving alone were too small to be recognizable in highway traffic counts.

Commuter Boats

The survey results showed that as of September 1998 inbound Old Colony riders included 100 people who formerly used South Shore commuter boats. Almost all of these came from the MBTA-funded Hingham boat route, but ridership on that route showed a net increase of 360 riders a day between April 1997 and April 2000. Fewer than five riders were diverted from the Hull boat route, but ridership on that route grew from 60 to 85 between April 1997 and April 2000. Therefore, Old Colony diversions at most slowed the rate of growth of commuter boat ridership.

MBTA Bus Service

The MBTA has never operated bus service through to downtown Boston from the present Old Colony service area. Any Old Colony riders who formerly rode MBTA busses would have used them in combination with rapid transit service, and would be included in the rapid transit diversion totals. The locations of Old Colony stations relative to MBTA feeder bus routes are such that the majority of people who rode busses to the Red Line before 1997 would still find doing so more convenient than switching to Old Colony trains. The ridership losses on most MBTA bus routes in the area were therefore insignificant.

The largest ridership loss apparently attributable to Old Colony diversions from any one route was a drop of about 70 riders each way on the segment of Route 240 south of Crawford Square, Randolph. A secondary effect was loss of about 80 interline riders each way between Routes 238 and 240 as a result of reconfiguring these routes to serve the Holbrook/Randolph Station. The new route segment serves about 60 new riders each way, but most of them are not using the commuter rail line.

CONCLUSION

Because the Old Colony lines began operating during a time of rising demand for transportation to Boston from the area they now serve, most of the riders who switched to Old Colony trains from older transportation facilities have been replaced by new users of those facilities. Therefore, it can be concluded that Old Colony trains have helped to reduce the amount of congestion that would otherwise have occurred on the other alternatives.

The most notable exception to the general trends has been on private carrier bus routes to Boston from the Old Colony service area. As a group, these bus lines lost nearly 40% of their riders in the first year of Old Colony operations. With a few exceptions, they have continued losing riders since then, and have reduced capacity accordingly. Among former bus users, as among Old Colony riders in general, nearly 70% cited convenience as a reason for using Old Colony service. Thus, although many Old Colony riders are not new transit users, they are being provided with a more convenient travel alternative than was formerly available to them.

1. Introduction

In September 1997 the Massachusetts Bay Transportation Authority (MBTA) reinstated passenger service on two routes of the former Old Colony Railroad system. Previous passenger service on these lines, currently designated as the Middleborough/Lakeville Line and the Plymouth/Kingston Line, had ended in 1959. The outer terminals of both lines are about 35 miles from downtown Boston. (The innermost 11 miles between Braintree and Boston are shared by the two lines.) This report presents the final results of a study conducted for the MBTA by the Central Transportation Planning Staff (CTPS) of the impacts that restoration of Old Colony passenger service has had on other transportation facilities.

In planning for the Old Colony service restoration, it was anticipated that the majority of riders would be drawn from the pre-existing services rather than making new trips. Overcrowding of many of the older facilities was in fact one of the primary motivations for the Old Colony restoration. This study examines the extent to which travel by each of the major alternatives has actually been impacted thus far. The findings in this report should prove useful not only in documenting the Old Colony impacts but also in predicting impacts of future rail extensions in greater Boston and elsewhere.

In conjunction with this study, CTPS conducted a survey of riders using the Old Colony Lines at the end of the first year of service. The results of that survey are presented in detail in a separate volume.¹

The Old Colony lines, like all lines in the MBTA commuter rail system, are used predominantly for travel to and from the cities of Boston and Cambridge, with trips between home and work accounting for the largest share of these. Prior to the resumption of service on the Old Colony lines, residents of the area that they now serve had a variety of options for making the trips now made by Old Colony trains. Most of the cities and towns with stations on the Middleborough/Lakeville Line have direct limited-access highway connections to Boston via state Route 24 and Interstate Route 93, which includes the Southeast Expressway. Some of the towns with stations on the Plymouth/Kingston Line have direct limited-access highway connections to Boston via state Route 3 and I-93, but several are served directly only by older arterial routes.

The MBTA's Red Line rapid transit route parallels the Old Colony lines between downtown Boston and Braintree, and a network of local bus routes provides feeder service to Red Line stations from several cities and towns in the Old Colony service area. Each of the Red Line stations also has a large parking facility serving riders from a wide area. Many of the cities and towns in the Old Colony service area have private

¹CTPS, *MBTA Old Colony Commuter Rail Service Restoration 1998 Passenger Survey*, June 2000

carrier express bus service to Boston, and most of these serve park-and-ride lots in addition to providing local collection and distribution.

The northern fringe of the Old Colony service area is served by several commuter boat routes to Boston via Boston Harbor. The MBTA's Attleboro and Stoughton commuter rail lines run to the west of the Old Colony direct service area.

The 1998 survey found that 81% of Old Colony riders were using the service for trips that they had previously made by some other means. Of those diverted from other alternatives, the largest group (40%) consisted of former rapid transit riders. Diversions from driving alone for the entire distance were second(28%), followed by diversions from private carrier express bus routes (20%). Most of the rest came from older commuter rail lines and carpools, with only 2% coming from commuter boats.

Because of differences in former market shares, losses of former users affected prior modes quite differently from their relative importance as sources of Old Colony riders, however. As a group, private carrier bus routes were affected the most. Some routes that had provided service directly to cities and towns that now have Old Colony service lost 75% or more of their riders, resulting in service curtailment or termination. Several routes serving points not directly on the Old Colony lines but within convenient driving distance had losses of around 25%. In contrast, since 1997 growth in highway traffic and in ridership on the Red Line, older commuter rail lines, and commuter boats has more than offset diversions to Old Colony service.

Table 1-1
Former Modes of Old Colony Inbound Riders
In Fall 1998 Survey

<u>Former Mode</u>	<u>Total Riders</u>	<u>Percent of Total</u>	<u>Percent of Prior Trip-makers</u>
Rapid Transit	2,105	32.2%	39.5%
Drove Alone Entire Distance	1,475	22.5%	27.7%
Private Carrier Express Bus	1,055	16.1%	19.8%
Other Commuter Rail Lines	310	4.7%	5.8%
Carpooled Entire Distance	275	4.2%	5.2%
Commuter Boat	100	1.5%	1.9%
Other	10	0.2%	0.2%
Did Not Make Trip	<u>1,215</u>	<u>18.6%</u>	<u>NA</u>
Total	6,545	100.0%	100.0%

2. Impact on Red Line and Other MBTA Services

This chapter examines the impacts of Old Colony service on ridership at selected stations on the Red Line, on older commuter rail lines, on MBTA buses, and on MBTA-subsidized commuter boats used by residents of the Old Colony service area. Table 2-1 summarizes the results for each of these services. As discussed below, some subgroups of ridership on older services were impacted much more than others by Old Colony service. With no changes other than Old Colony diversions, each of the older services would have shown a relatively small percentage decrease in ridership. Because of growth in overall travel to Boston since 1997, Old Colony diversions found in the 1998 survey have been largely or entirely offset by new riders.

Table 2-1
Former Ridership on Other MBTA Services
in Present Old Colony Service Area
and Diversions Found in 1998 Survey

<u>Service</u>	<u>Inbound Ons Pre-Old Colony</u>	<u>1998 Survey Diversions</u>	<u>% of Riders Diverted</u>
Red Line Braintree Branch and Ashmont Station (1997 6:00 a.m. to 10:00 p.m.)	30,400	2,100	6.9%
Attleboro/Stoughton Commuter Rail (1997 A.M. peak interpolation)	8,400	290	3.5%
MBTA Quincy Garage Bus Routes (All routes, 1996 all-day ride checks)	9,325	220	2.4%
MBTA-Funded Commuter Boats (1997 all-day)	1,630	100	6.1%

IMPACT ON RED LINE

Based on geographic location and on origins reported in the 1994 systemwide passenger survey, the only Red Line stations that would have been expected to show significant decreases in inbound boardings or outbound alightings as a result of Old Colony diversions were the five Braintree Branch stations (Braintree, Quincy Adams, Quincy Center, Wollaston, and North Quincy) and Ashmont. "Before" counts at these stations were conducted in April or May 1997, as part of the larger Rapid Transit Counts project. "After" counts were conducted in May 1998, one year after the before counts and seven months after the startup of Old Colony service.

As discussed below, the count results imply that contrary to expectations, overall Red Line ridership at the selected stations did not decrease in the first seven months after the opening of the Old Colony lines, but in fact increased slightly. Braintree and Quincy

Adams, the two stations that would have been expected to be impacted most by Old Colony service, did both have net decreases in A.M. peak boardings between 1997 and 1998. Quincy Adams was the only station to show a net drop in all-day boardings, and this was more than offset by gains at other Braintree Branch stations.

Examined at a finer level of detail, the counts indicate that boardings at most of the stations peaked later in the morning in 1998 than in 1997. One possible explanation is that passengers who had formerly used the Red Line and continued to use it found that because of Old Colony diversions they did not have to arrive at stations as early as before to get parking spaces. In addition, freed-up parking probably attracted new riders at times when parking was formerly unavailable. It is not possible to determine how much Red Line ridership would have changed anyway as a result of other factors (such as growth in Boston employment) if Old Colony service had not been implemented.

A.M. peak counts at Quincy Adams and Braintree in May 2000 indicate that after the dropoff in A.M. peak Red Line ridership from 1997 to 1998 there were further, but much smaller, losses. Growth in total Old Colony ridership since the Spring of 1998 has greatly exceeded the additional observed Red Line losses. Overall demand for travel to Boston in that time was increasing because of economic growth. Therefore, it is reasonable to assume that many, if not all, of the additional lost Red Line riders also shifted to Old Colony service.

The 1997 and 1998 Red Line count results for each station are discussed in separate sections below. Results for stations on the Braintree Branch are presented in order from Braintree to North Quincy, followed by those for Ashmont station. Hourly summaries of boardings and alightings at each station are presented in tabular form, in the same order in appendix A of this report.

Braintree Station

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that 46% of the riders boarding Red Line trains at Braintree station between 6:00 a.m. and 3:30 p.m. had trip origins in cities or towns that now have Old Colony stations (excluding Braintree itself). These origins included Weymouth, Holbrook, Brockton, Abington, Randolph, Whitman, Plymouth, Kingston, Hanson, Halifax, Bridgewater, and Middleborough. In absolute numbers, there were about 1,420 origins in these communities.² Another 11% (330) had trip origins in cities or towns that do not have Old Colony stations but directly adjoin other cities or towns that do.

Bus service to Braintree from Holbrook is provided by MBTA Route 230, which originates at the Holbrook/Brockton border. Private carrier bus routes provide limited

²In this chapter, the 1994 survey results have been re-expanded using the 1997 CTPS counts as control totals. Therefore, the absolute numbers differ from those in the final report on the Red Line survey.

peak-period service to Braintree station from South Weymouth and from Plymouth. None of the other towns listed above have bus service to Braintree. Of the passengers originating in the towns that now have direct Old Colony service, about 150 (11%) reported using bus access to Braintree in the Red Line survey. Most of the remainder parked at the station or were dropped off there from private autos. Passengers who formerly drove to Braintree would have had greater flexibility in shifting to Old Colony stations than those who depended on bus access. The MBTA garage at Braintree station has 1,228 spaces, and there is some additional parking not under control of the MBTA in the vicinity. The survey results indicate that there were 1,717 park-and-ride access trips to the station from all origins combined. Overall, the figures above indicate that parking supply and demand at Braintree would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Results of Before and After Passenger Counts

Despite the apparent large potential for ridership diversion to the Old Colony Lines, Braintree station had more total riders in the 1998 count than in the 1997 count. As shown in Table A.1, over the entire count span inbound boardings increased 8% from 3,149 to 3,404 and outbound alightings increased 11%, from 3,309 to 3,677. A more detailed examination, however, shows a significant decrease in early morning boardings, offset by increases later in the day. The counts shown in Table A.1 begin at 6:30 a.m., because the before counts for earlier trains were incomplete. For the first full hour counted, from 6:30 to 7:30, there was a ridership loss of 445, or 27% between 1997 and 1998. The first train left Braintree at 5:15 a.m., and there were eight scheduled departures before the first count. Based on the available information, it is likely that there were about 600 additional Braintree boardings before 6:30 a.m. in 1997, but of these, about 160 would have required Boston arrival times too early for Old Colony service to have been a viable alternative. With the same rate of decrease as that between 6:30 and 7:30 applied to the other 440, about 150 riders would have been lost before 6:30. The total estimated loss of 595 prior to 7:30 is equivalent to about half of the passengers from the Old Colony service area who boarded the Red Line at Braintree in the same hours in 1997.

Diversions of passengers from Red Line trains to Old Colony trains at Braintree station itself played a relatively small role in overall Braintree diversions. For example, between 6:30 and 7:30 a.m. only one inbound Old Colony train is scheduled to stop at Braintree. June 1998 counts showed 16 passengers boarding this train there, and another 20 boarding a train leaving at 7:32. The 1998 survey results indicate that about 70% of the riders boarding all A.M. peak Old Colony trains at Braintree were former Red Line riders. Assuming that these riders also formerly boarded the Red Line at Braintree, only 25 of the 445 Red Line riders lost from that station between 7:30 and 8:30 (6%) shifted to boarding Old Colony trains there. The most recent CTPS counts indicate that by October 1999 Old Colony boardings at Braintree on the same two trains had grown to 70, but figures on former travel modes of these riders were not obtained.

Between 7:30 a.m. and 9:00 p.m., the 1998 counts showed more Red Line boardings in every hour than the 1997 counts. (Ridership after 9:00 p.m. was slightly lower in 1998.) Including an allowance for losses before 6:30 a.m., cumulative total boardings in 1998 began to exceed those of 1997 somewhere around 3:30 p.m. As discussed below, there appears to have been some shift of Red Line riders from Quincy Adams to Braintree as a result of later filling of the Braintree garage.

Prior to 2:00 p.m. outbound alightings at Braintree showed decreases in some hours and increases in others between the 1997 and 1998 counts. From 2:00 p.m. to 9:00 p.m. every hour showed an increase in alightings. Outbound morning ridership would be expected to consist mostly of reverse commuters, or night-shift workers returning home. Between 6:30 and 10:00 a.m., Braintree alightings showed a 10% drop, but the total loss was only 25 riders. Four outbound Old Colony trains stop at Braintree in this interval but the June 1998 counts showed only three passengers alighting from these trains at Braintree. Some passengers who formerly rode outbound Red Line trains to Braintree and continued to points further south by other means may have been diverted to Old Colony trains, however. Outbound Old Colony trains that passed through Braintree between 6:30 and 10:00 showed a total of 67 passengers boarding at South Station and another nine at Quincy Center in the June 1998 counts. (By October 1999, these totals had increased to 115 and 19.)

From 1997 to 1998 Braintree Red Line alightings increased by 38% (26 riders) between 10:00 a.m. and noon, but fell by 20% (38 riders) between noon and 2:00 p.m. Some of these differences may have resulted from time shifts in non-work trips made on the Red Line in both counts. As in the A.M. peak, Old Colony service at Braintree itself had little to do with these changes. Only three outbound Old Colony trains stop at Braintree between 10:00 a.m. and 2:00 p.m., and they had only five Braintree alightings in the June 1998 counts. Old Colony trains passing through Braintree in the same hours had 165 riders boarding at South Station or Quincy Center and riding to points south of Braintree, however. (This had increased to 206 by October 1999.)

Further Changes Since 1998

Since 1998, there has been a further drop in the number of A.M. peak inbound Red Line boardings at Braintree. As shown in Table A.7, a CTPS count in May 2000 found that between 6:15 and 10:00 a.m. there were 2,171 boardings, compared with 2,507 in the same span in 1998, or a decline of 336. Boardings grew by 143 from 6:15 to 7:15 a.m., but then fell by 490 between 7:15 and 9:00 a.m. Between 9:00 and 10:00 a.m., there was a net gain of only 11 riders. The pattern of changes contrasts with that between 1997 and 1998, when ridership declined before 7:30 but increased after that.

Some of the losses after 7:30 appear to have resulted from passengers shifting to earlier boarding times, but the largest losses appear to have resulted from diversions to Quincy Adams Station. From 6:15 to 9:15 a.m., while boardings at Braintree fell by a net of 346, Quincy Adams boardings increased by a net of 334. The comparisons above of 1998 and 1997 boardings indicate that some riders had shifted from Quincy Adams to Braintree

during the first few months of Old Colony operation as a result of parking capacity freed up at Braintree. The change between 1998 and 2000 suggests that some of these riders concluded after trying Braintree for awhile that they preferred Quincy Adams. Although riders approaching from the south on Route 3 would pass Braintree first, the link from that highway into the Braintree garage requires use of local streets for a short distance. In contrast, the Quincy Adams station has direct dedicated ramps on and off Route 3. The choice between the two stations is likely also affected by the electronic signs on the highway that are supposed to show when each garage is full but do not always show status accurately.

At the time that the 1998 Red Line counts were conducted, about 80 riders a day boarded Old Colony trains at Braintree before 9:00 a.m. By October 1999 (the most recent CTPS Old Colony counts at Braintree) this had grown to 115, or an increase of 35. To the extent that these were former Red Line riders, they would result in fewer Red Line boardings. To the extent that they were new park-and-ride passengers, they would leave fewer spaces for Red Line riders in the garage. The impact of these riders remained small in comparison with the decline in Red Line boardings, however.

Quincy Adams Station

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that 39% of the riders boarding Red Line trains at Quincy Adams station between 6:00 a.m. and 3:30 p.m. had trip origins in cities or towns that now have Old Colony stations (excluding Braintree and Quincy). These origins included Weymouth, Randolph, Brockton, Plymouth, Abington, Holbrook, Hanson, Whitman, Bridgewater, Kingston, Middleborough, Lakeville, and Halifax. In absolute numbers, there were about 1,465 origins in these communities. Another 10% (375) had trip origins in cities or towns that do not have Old Colony stations but directly adjoin other cities or towns that do.

Bus service from Randolph to Quincy Adams is provided by MBTA Route 238. There is no other MBTA or private carrier bus service to Quincy Adams from points served by the Old Colony lines, but several employer-sponsored shuttle vans make reverse-commuting connections there. The Red Line survey showed that about 98% of the riders who boarded at Quincy Adams from the towns that now have Old Colony service drove and parked there or were dropped off from private autos. Thus, almost all would have had a means of access to Old Colony stations. The MBTA garage at Quincy Adams has 2,227 spaces. The survey results indicate that there were 3,277 park-and-ride access trips to the station. The excess of park-and-ride trips over parking spaces would be attributable to carpooling, turnover of spaces during the day, and use of non-MBTA spaces. Overall, the figures above suggest that the imbalance of parking supply and demand at Quincy Adams would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Results of Before and After Passenger Counts

Quincy Adams was the only Red Line station in the before and after counts to show overall decreases in inbound boardings and outbound alightings between 1997 and 1998. As shown in Table A.2, over the entire count span inbound boardings decreased 6% from 4,248 to 3,972 and outbound alightings decreased 14%, from 4,587 to 3,939. A more detailed examination shows a very large decrease in early morning boardings, partly offset by increases later in the day. Between 7:00 and 8:15 a.m. alone, boardings dropped by 41%, from 2,450 to 1,455. The before and after counts both started with the 6:10 a.m. train. From then until 7:00 a.m., boardings dropped by only 4%, or 14 riders. The sharp contrast with the pattern after 7:00 reflects use of Braintree station by park-and-ride passengers from points south of there until the garage is full. The net ridership increases at Braintree after 7:30 a.m. probably resulted in part from diversions of riders from Quincy Adams. Red Line fares and parking fees are the same at both stations, so for passengers who have to pass Braintree to reach Quincy Adams, parking availability would be one of the main deciding factors in choosing between the two. The total observed drop of 1,010 riders from 6:00 to 8:15 a.m. was equivalent to about 80% of the passengers from the Old Colony service area who boarded the Red Line at Quincy Adams in the same hours in 1997. Not all of these were actually lost by the Red Line, however.

After 9:00 a.m. Quincy Adams had more boardings in 1998 than in 1997 in every hour in the count except from 2:00 to 3:00, when there was a slight decrease. The checkers in the 1998 count noted that many of the passengers boarding between 4:00 and 7:00 p.m. were heading for a Red Sox game at Fenway Park. It was not possible to distinguish these riders completely from others, but it appears that they accounted for about 200 boardings. Without them, all-day Quincy Adams boardings would have been about 10% lower in 1998 than in 1997.

Most of the overall decrease in outbound alightings was accounted for by P.M. peak results. Between 4:00 and 7:00 p.m. there were 845 fewer alightings in 1998 than in 1997, or a drop of 28%. This was not as great as the drop in inbound boardings between 7:00 and 8:15 (1995, or 41%), but was somewhat greater than the inbound boarding drop from 6:10 to 9:00 a.m. (760, or 24%).

Inbound alightings and outbound boardings, which account for only a small part of total activity at Quincy Adams station, both showed large percentage increases, but small absolute increases from 1997 to 1998. Inbound offs increased from 33 to 52 (58%) and outbound ons from 64 to 76 (19%). Old Colony trains do not serve Quincy Adams station directly. The Old Colony survey results showed that 10 riders transferred from Plymouth/Kingston Line trains to the Red Line at Braintree to ride to Quincy Adams. There were no Red Line transfers from the Middleborough/Lakeville Line at Braintree for Quincy Adams, however. MBTA bus Route 230, which runs from the Brockton-Holbrook border to Quincy Center, has a stop within walking distance of Quincy Adams, although it does not run directly to that station.

Further Changes Since 1998

Since the 1998 counts, riders diverted from Quincy Adams to Old Colony trains have been being replaced gradually by new riders or by riders shifting from other Red Line stations. As shown in Table A.8, a one-day A.M. peak count conducted by CTPS in May 2000 found a total of 3,003 riders boarding inbound trains that departed between 6:10 and 10:00 a.m. This was an increase of 234, or 8.5% compared with boardings in the same span in May 1998, but was lower than the May 1997 count by 426 (12.4%).

All of the increase from 1998 to 2000 occurred prior to 9:15 a.m., when there was a gain of 340. This was partially offset by a decrease of 106 between 9:15 and 10:00. This pattern was directly related to parking capacity at the station. Observations on the day of the May 2000 count showed that at 8:20 a.m. 160 authorized parking spaces (or about 7% of official capacity) were still vacant. This had declined to 60 by 8:45, and the final spaces were taken at about 9:05. In order to board a train that would reach downtown Boston by 9:00 a.m., a passenger would have had to arrive at Quincy Adams by about 8:30. Therefore, there was sufficient parking capacity for riders working the most common Boston work shifts, but little more beyond that. It was noted that vehicles were still entering the garage after it was full, suggesting that some drivers were accustomed to finding spaces available later than 9:05.

The ridership increase at Quincy Adams between 1998 and 2000 appears to have resulted largely from a shift in the split of boardings between Quincy Adams and Braintree as discussed in more detail in the Braintree section above.

The 1997 and 1998 counts did not include observations of when parking capacity was filled. With the same mix of access modes as in the 2000 counts, the ridership observed in 1997 would have resulted in parking being filled at around 8:30 a.m. Riders diverted from Quincy Adams to Old Colony service were much more likely to have used park-and-ride-access than were riders who continued to use Quincy Adams, however. Therefore, parking capacity would have been filled even earlier than 8:30 in 1997. The mix of access modes in 1998, after most of the Old Colony diversions had taken place, would have been much more similar to that in 2000. This implies that in 1998 the number of vehicles entering to park would not have equaled parking capacity until around noon. By that time, or shortly afterward, some spaces would have been vacated by riders returning from non-work trips to Boston.

Inbound alightings at Quincy Adams increased significantly from 1998 to 2000. Between 6:10 and 9:00 a.m. there were 30 inbound alightings in 2000, compared with only 11 in 1998. It was not determined how many of these alightings were from Old Colony transfers, but alightings were heaviest from Red Line trains that would have connected with Old Colony trains at Braintree. (Total alightings from inbound Old Colony trains at Braintree before 9:00 a.m. increased from 63 to 163 between June 1998 and October 1999.)

Quincy Center Station

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that 15% of the riders boarding Red Line trains at Quincy Center station between 6:00 a.m. and 3:30 p.m. had trip origins in cities or towns that now have Old Colony stations (excluding Braintree and Quincy). These origins included Weymouth, Brockton, Randolph, Plymouth, Kingston, Bridgewater, and Hanson. In absolute numbers, there were about 725 origins in these communities, with the vast majority (665) originating in Weymouth alone. Another 7% (350) had trip origins in cities or towns that do not have Old Colony stations but directly adjoin other cities or towns that do.

Bus service from Weymouth to Quincy Center is provided by MBTA Routes 220, 221, 222, and 225. These routes all serve areas in the northern half of the town, but the Old Colony station is in the southern half. Bus service from Randolph to Quincy Center is provided by MBTA Route 238, but buses on this route also stop at Quincy Adams on the way to Quincy Center. Bus service from the northern border of Brockton to Quincy Center is provided by MBTA Route 230, but buses on this route also stop at Braintree on the way to Quincy Center. There is no other bus service to Quincy Center from points served directly by the Old Colony Lines. Of the passengers originating in the towns that now have direct Old Colony service about 545 (62%) reported using bus access to Quincy Center in the Red Line survey. Most of these were from Weymouth. This was much higher than the proportion of passengers from the Old Colony direct service area using buses to access either Braintree (11%) or Quincy Adams (2%) in 1997. This implies that a much smaller proportion of those who went to Quincy Center would have had a means of access to Old Colony stations. The MBTA Quincy Center garage has 872 spaces for MBTA riders, compared with 1,328 reported park-and-ride access trips to the station. This suggests that the imbalance in parking supply and demand at Quincy Center would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Results of Before and After Passenger Counts

The impact of Old Colony service on ridership at Quincy Center was unclear. As shown in Table A.3, over the entire count span, inbound boardings increased 5%, from 5,999 to 6,287. Ridership was up during most individual hours, but decreased before 7:00 a.m., from 9:30 a.m. to noon, and from 1:00 to 2:00 p.m. The increases indicate that at least during peak hours any loss in ridership from Quincy Center caused by diversions to Old Colony trains was more than offset by new ridership from other sources.

Between 7:00 and 9:00 a.m., the June 1998 counts showed a total of 95 passengers boarding inbound Old Colony trains at Quincy Center alone. The 1998 survey indicated that 80% of the riders boarding A.M. peak Old Colony trains at Quincy Center were former Red Line users. If all of them had also formerly boarded at Quincy Center, this

would have resulted in a decrease of 76 Red Line boardings there. Nevertheless, inbound A.M. peak Quincy Center Red Line boardings increased by 218 between the 1997 and 1998 counts. As at Quincy Adams, late afternoon boardings at Quincy Center in the 1998 count included patrons of a Red Sox game. It appears that they accounted for about 160 boardings, or over half of the all-day gain at the station.

The midday ridership decreases at Quincy Center may have resulted in part from park-and-ride passengers shifting to spaces freed up at Quincy Adams or Braintree by Old Colony diversions from those stations.

Most of the passengers who reported taking buses from Weymouth to Quincy Center in the Red Line survey began their trips by walking to their bus boarding stops. The Old Colony station in Weymouth would be beyond convenient walking distance for most of them, however, requiring some form of auto access to be used. This would account in part for the low level of diversions from Quincy Center.

Outbound Red Line alightings at Quincy Center increased less than 1% over the entire count span between 1997 and 1998. Alightings increased in some hours and decreased in others, with no clear pattern. In most hours, the increase or decrease did not exceed 15%. In the June 1998 counts, outbound Old Colony train alightings at Quincy Center were concentrated most heavily between 4:00 and 7:00 p.m., with a total of 125. During the same hours, Red Line alightings there decreased by only 46 between 1997 and 1998.

Outbound boardings and inbound alightings account for about 3% of total Red Line activity at Quincy Center. Both showed gains of 13% (25 riders) between 1997 and 1998. This was consistent with the finding in the 1998 Old Colony survey that 32 passengers a day transferred from inbound Plymouth/Kingston Line trains to the Red Line at Braintree to ride to Quincy Center. (Most Plymouth/Kingston trains do not stop directly at Quincy Center, but all Middleborough/Lakeville Line trains do stop there.) Between June 1998 and October 1999, total inbound A.M. peak alightings from Plymouth/Kingston trains at Braintree increased from 73 to 147. Presumably, part of this gain included riders transferring to the Red Line to continue to Quincy Center.

Wollaston

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that 10% of the riders boarding Red Line trains at Wollaston station between 6:00 a.m. and 3:30 p.m. had trip origins in cities or towns that now have Old Colony stations (excluding Braintree and Quincy). These origins included Weymouth, Randolph, Brockton, Abington, Hanson, Bridgewater, Halifax, Holbrook, and Whitman. In absolute numbers, there were about 335 origins in these communities, with nearly two-thirds of them (215) originating in Weymouth alone.

There is no through bus service to Wollaston from any of these communities, and no bus access trips to Wollaston from any of them were reported in the Red Line survey.

Since all of these riders used some form of automobile transportation to access Wollaston, all or most of them could presumably have used the same means to access Old Colony stations instead. The MBTA parking lot at Wollaston has 522 spaces, compared with 1,161 reported park-and-ride trips to the station. This suggests that the imbalance in parking supply and demand at Wollaston would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Results of Before and After Passenger Counts

Because the cities and towns now served by the Old Colony Lines formerly accounted for a small part of Wollaston ridership, it is difficult to distinguish impacts of the Old Colony service from normal day-to-day ridership variation. As shown in table A.4, over the entire count span, inbound boardings increased 4% from 1997 to 1998. Gains were registered in every hour of the day after 8:00 a.m., except from noon to 1:00 p.m. Ridership decreases prior to 8:00 a.m. may have included some shifting of park-and-ride passengers to stations further out on the line where parking capacity had been freed up by Old Colony diversions. Riders shifting from Wollaston would, however, have had to pay higher inbound fares (full fare of \$1.70 vs. \$0.85) at Quincy Center, Quincy Adams, or Braintree and would also have to pay exit fares at the latter two. The outer three stations also had higher parking fees than Wollaston (\$2.50 vs. \$2.00). The extra cost would be a disincentive to station-shifting for passengers already accustomed to going to Wollaston.

Outbound Wollaston alightings showed an overall gain of 16%, with over two-thirds of the absolute gain occurring in the P.M. peak. In the 1997 counts, all-day inbound ons at Wollaston exceeded outbound offs by 580 (18%). This could be explained by passengers boarding inbound at Wollaston but alighting outbound at Quincy Center because of the higher inbound fare at Quincy Center. This explanation is supported by the results at Quincy Center, where outbound offs in the 1997 counts exceeded inbound ons by 880. In the 1998 counts, inbound ons at Wollaston exceeded outbound offs by 213, but outbound offs at Quincy Center exceeded inbound ons by 635. This indicates that there was an increase in the proportion of Wollaston boarding passengers also alighting at Wollaston. Although such a change is not clearly related to Old Colony service, it does suggest that there was a significant difference between travel habits of Wollaston riders in 1997 and 1998. Such a large change is more likely to have resulted from a turnover in the riders using the station than in the habits of the same riders, so Old Colony service may indeed have been a contributing factor.

The 1997 counts at North Quincy show almost exact balance between inbound ons and outbound offs there but the 1998 counts show a large excess of inbound ons over outbound offs. If these findings are representative, some new boarding and alighting trade-offs between North Quincy, Wollaston, and Quincy Center may have developed.

Inbound alightings and outbound boardings together represented about 8% of the total ridership activity at Wollaston in both the before and after counts. Both showed gains

from 1997 to 1998. Old Colony impacts, if any, would be expected to consist of passengers traveling between Old Colony points and Wollaston by transferring at Braintree or Quincy Center. The Old Colony survey showed only three passengers transferring to the Red Line to travel to Wollaston, compared with increases of 32 inbound offs and 9 inbound ons at that station. Therefore, most of the increases were not directly related to Old Colony service.

North Quincy

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that 6% of the riders boarding Red Line trains at North Quincy station between 6:00 a.m. and 3:30 p.m. had trip origins in cities or towns that now have Old Colony stations (excluding Braintree and Quincy). These origins included Weymouth, Brockton, Randolph, Abington, Kingston, and Plymouth. In absolute numbers, there were about 250 origins in these communities, with about 110 originating in Weymouth alone. Another 2% (100) had trip origins in cities or towns that do not have Old Colony stations but directly adjoin other cities or towns that do.

There is no through bus service to North Quincy from any of these communities, and no bus access trips to North Quincy from any of them were reported in the Red Line survey. Since all of these riders used some form of automobile transportation to access North Quincy, all or most of them could presumably have used the same means to access Old Colony stations instead. The MBTA parking lots at North Quincy have 1,203 spaces, compared with 1,809 reported park-and-ride trips to the station. This suggests that the imbalance in parking supply and demand at North Quincy would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Results of Before and After Passenger Counts

Because of the relatively small portion of North Quincy ridership formerly accounted for by cities and towns that now have stations on the Old Colony Lines, any ridership diversions from North Quincy are concealed by other changes. As shown in Table A.5, over the entire count span, inbound boardings at North Quincy increased by 24%, or 1,152 riders, between 1997 and 1998. Gains were registered in almost all hours of the day. Forty percent of the total increase took place between 4:00 and 7:00 p.m., when the largest component of ridership is reverse commuters going home from work in the State Street South office complex. This large gain in ridership (451 new riders) would be consistent either with increased employment at the complex or with increased employer efforts to encourage workers to use the Red Line.

Outbound alightings at North Quincy increased by 15%, or 727 over the entire count span. Over one third of the gains occurred between 6:00 and 10:00 a.m., when outbound alightings grew by 262 (28%). Again, this would be an indication either of

increased employment at the State Street South complex or of increased transit use by workers there.

In the before counts, inbound ons and outbound offs at North Quincy were nearly equal over the full count span, but in the after counts inbound ons exceeded outbound offs by 421 (7%). This may have been partly a result of drop-off riders boarding inbound at North Quincy but alighting outbound at Quincy Center, where outbound offs exceeded inbound ons by 635 (10%). Outbound riders exited free at both stations, but the inbound fare at Quincy Center was twice that at North Quincy. Results from Wollaston also indicate that some passengers boarding there alighted at Quincy Center, as discussed above.

Inbound alightings and outbound boardings are larger components of ridership at North Quincy than at any other station on the Braintree Branch. Together, they accounted for 15% of North Quincy station activity in the 1997 counts and for 13% in 1998. These proportions are attributable both to the large number of work and school trip attractions within walking distance of North Quincy, and to the fact that all four other stations on the branch are in the outbound direction from North Quincy.

The results in Table A.5 indicate that between 1997 and 1998 inbound offs at North Quincy increased by 11%, (86 riders) but that outbound ons decreased by about 8% (73 riders). The increase in inbound offs is slightly greater than the number of riders found to be transferring from Old Colony trains to the Red Line at Quincy Center or Braintree to travel to North Quincy (76). Based on the overall pattern of Old Colony boardings, most of the return trips from North Quincy would have been expected to occur between 3:00 and 6:00 p.m. Outbound boardings in that span alone increased by 72 between 1997 and 1998, which is consistent with the Old Colony survey results.

The reason for the net decrease in all-day outbound ons at North Quincy is unclear, but it may be partly a result of problems in allocation of counted boardings between the inbound and outbound sides of the platform. The relatively high off-direction traffic, entrances at both ends of the station, and obstructed sight lines create more potential for errors in splits of inbound and outbound boarding counts at North Quincy than at the other stations on the branch. Except when inbound and outbound trains arrive close together, travel directions of alighting passengers are clear.

Decreased Red Line ridership because of Old Colony diversions would be expected to have resulted in a reduction in the number of inbound riders from North Quincy who started their trips by riding to stations further outbound in order to gain a seating advantage. The greatest decreases in outbound boardings at North Quincy occurred in off-peak hours, when such a strategy would not have been worthwhile, however.

Ashmont Station

Former Use of Station by Old Colony Service Area Residents

The 1994 survey found that about 9% of the riders boarding Red Line trains at Ashmont between 6:00 a.m. and 3:30 p.m. had trip origins in Brockton or Randolph, both of which now have stations on the Old Colony Middleborough/Lakeville Line. In absolute numbers, there were about 600 Brockton or Randolph origins.³ Ashmont boardings with origins in other towns now served by the Old Colony lines were negligible.

Bus service from Randolph to Ashmont is provided by MBTA Route 240. Bus service from Brockton to Ashmont is provided by Brockton Area Transit (BAT). Of the riders originating in Brockton or Randolph, 465 (78%) arrived at Ashmont by bus. Ashmont station has only 15 MBTA-controlled parking spaces, but 266 Ashmont riders from all origins combined reported park-and-ride as the mode of access to the station. Most of these must have used on-street parking or private lots. This indicates that parking supply and demand at Ashmont would have given riders who drove there from the Old Colony service area an incentive to switch to Old Colony trains.

Riders who depended on busses for access to Ashmont would have had less flexibility in switching to Old Colony service than passengers using auto access. The Old Colony Middleborough/Lakeville Line has three stations in Brockton and one on the border of Randolph and Holbrook, however, so some riders who formerly walked to bus stops could now walk to Old Colony stations.

Results of Before and After Passenger Counts

The Spring 1997 A.M. peak boarding count at Ashmont station appeared to be unusually low, either because of a data collection error or because of unusual conditions on the count day. Unfortunately, this was not discovered until it was too late to conduct a re-count representing conditions before Old Colony service started. A re-count conducted in November 1997 supported the conclusion that the Spring count was low, but Old Colony peak-period service had already been in operation for several weeks when the re-count was done. Therefore, it is necessary to analyze the Ashmont results mainly on the basis of outbound alightings.

As shown in Table A.6, in the Spring 1997 counts a total of 8,895 passengers alighted from outbound Red Line trains at Ashmont between 6:00 a.m. and 11:00 p.m. During the same time span the Spring 1998 counts showed 8,886 alightings, or virtually no change over the day as a whole. Between 4:00 and 7:00 p.m., when outbound ridership is heaviest, alightings increased from 3,941 to 3,995, or a gain of 1%. Between 5:00 and 6:00 alone, alightings increased from 1,618 to 1,949, or a gain of 20%. Alightings decreased from 1,228 to 1,002, or a drop of 18% between 4:00 and 5:00, however. Such a

³ The origin table for Ashmont in the Red Line survey report excludes passengers transferring from the Mattapan trolley line. The 9% figure above is based on all Ashmont boardings.

shift toward later outbound alighting times would be consistent with a shift toward later inbound boarding times, assuming that passengers in 1997 and 1998 spent about the same amount of time at their inner trip destinations. (Since relatively few Ashmont passengers use park-and-ride access, the main incentive to shift to later trains would be reduced crowding on the trains themselves rather than later availability of parking spaces.)

In Table A.6, the 1997 column for inbound boardings is based on November counts from 6:00 to 10:00 a.m. and on May counts for the rest of the day. Overall, the 1997 composite count shows 8,128 inbound boardings. The 1998 count shows 8,389 boardings, or an increase of 261. This was slightly greater than the increase between 6:00 and 9:00 a.m. alone (247), with gains and losses approximately in balance over the course of the rest of the day. Since the A.M. peak counts were all done after the implementation of Old Colony peak service, the change from 1997 to 1998 may represent new riders replacing riders diverted in the first few weeks of Old Colony service.

In the Old Colony survey, responses from passengers who were diverted from the Red Line did not specify which stations they formerly used. Passengers who indicated that they had shifted from BAT buses were presumed to have transferred to the Red Line at Ashmont, although it was also possible to transfer from a BAT bus to MBTA bus route 230 at the Brockton-Holbrook border and ride to Braintree or Quincy Center. The survey showed 131 former BAT bus riders on Old Colony lines all day, with 103 of these using A.M. peak trains. To arrive in downtown Boston at about the same time as they did by using these trains, the same riders would have had to board Red Line trains leaving Ashmont between 6:00 and 8:45 a.m. The 1997 Ashmont counts show a total of 3,712 boardings in this span. The number of BAT riders diverted to Old Colony trains was equivalent to 2.8% of this total, so normal day-to-day variation could have concealed such a loss even if accurate figures for boardings before the Old Colony startup had been obtained.

The Old Colony survey results show that about 150 trips from Randolph were diverted from all Red Line stations combined. The Red Line survey results show that before the Old Colony startup, 27% of all Red Line trips from Randolph were made via Ashmont. With diversions distributed among stations in proportion to former boardings, about 40 Randolph riders would have been diverted from Ashmont, almost all during A.M. peak hours. Because of the much heavier reliance on bus access among Randolph riders going to Ashmont than among those going to other Red Line stations, however, it would be expected that a smaller share of those going to Ashmont would have been diverted to Old Colony trains. The upper-bound estimate of 40 diversions would have been equivalent to 0.9% of total A.M. peak Ashmont boardings in the 1997 count.

Further Analysis of Red Line Diversion Rates

The Old Colony survey results indicate that as of September 1998, after just under one year of service, Old Colony ridership included about 1,975 former Red Line users from

origins other than Braintree or Quincy. Based on the combined results of the Old Colony and Red Line surveys, 26% of all former Red Line users from cities and towns south of Braintree that now have Old Colony stations or that directly adjoin cities or towns with stations were diverted to Old Colony service. The average diversion rate was slightly higher from cities and towns with stations (27%) than from adjoining towns (24%). These rates at first appear lower than might have been anticipated, especially when compared with the diversions from some of the private carrier bus routes in the area. This section examines reasons for the rates not having been higher than they were.

Factors Affecting Choice Between Red Line and Old Colony Service at Outer Trip End

The 1998 survey results showed that the vast majority of Old Colony riders used the service by choice rather than by necessity. Only 5% of all the riders indicated that they used the service because it was the only transportation available. Overall, 96% of the respondents were licensed drivers, and 89% would have had vehicles available for the same trips on the days when they were surveyed. Since surveys were distributed only to Old Colony riders, they did not reveal characteristics of other residents of the service area who could have used Old Colony trains but did not. Most passengers who drove to the Red Line before the startup of Old Colony service presumably still had licenses and vehicles at the time the survey was conducted. Based on overall vehicle availability rates, many of those who used feeder buses to Red Line stations did so out of necessity, but some did so by choice.

Riders using auto access to the Red Line would have had the most flexibility in choosing alternate boarding locations. As would be expected, the largest numbers and percentages of diversions from the Red Line were observed at Braintree and Quincy Adams, where the vast majority of access trips from the Old Colony service area had been made by auto. At Quincy Center and Ashmont, where bus access was used by the majority of riders from the Old Colony service area, diversions were too small to distinguish from normal variation when comparing 1997 and 1998 boarding counts.

In most cases, the survey results do not reveal the former access modes of riders diverted from the Red Line, but those who formerly rode BAT buses to Ashmont are an exception. Among the riders who switched from taking BAT buses to Ashmont to taking Old Colony trains in Brockton, 58% walked to their Old Colony boarding stations and 26% drove and parked. In contrast, among all other riders using the same three Brockton stations, only 16% walked in and 64% drove and parked. This supports an assumption that among Red Line riders who used feeder bus access, the largest numbers diverted to Old Colony service had trip origins within walking distance of Old Colony stations. It can further be assumed that among residents of the Old Colony service area who continued using feeder buses to the Red Line, the ability to walk to a bus stop instead of driving or being driven to an Old Colony station was a major consideration.

In the survey, the most common reason for using Old Colony service, cited by 73% of respondents, was to avoid driving or traffic. Red Line riders, regardless of access mode,

would already have been avoiding driving and traffic on the Southeast Expressway, and those using feeder buses accessed by walking would have been avoiding any driving. Therefore, the service aspect most appealing to Old Colony riders in general was of much less concern to prior Red Line users.

The second most common reason for using Old Colony service, cited by 69% of respondents, was convenience. This was a much less specific reason than avoiding driving or traffic, but presumably took into consideration ease of access and egress and frequency of service. Prior Red Line riders who continued using the Red Line can be assumed to have found that to be more convenient than switching to Old Colony service. As discussed above, for many riders who accessed the Red Line by walking to feeder bus stops, using Old Colony trains would have required driving or being driven to a boarding station.

Factors Affecting Choice Between Red Line and Old Colony Service at Inner Trip End

At the inner trip end, the only station in Boston served directly by Old Colony trains is South Station. The Red Line offers several other choices of Boston stations both north and south of South Station, and also provides direct access to six stations in Cambridge. The 1998 survey showed that 27% of all Old Colony riders alighting at South Station continued their trips by transferring to the Red Line. Such transfers were only slightly less common among riders who had used the Red Line before Old Colony service started (25%) than among those who switched to Old Colony service from other alternatives (28%). At first, this would seem to indicate that there was little difference between the two groups in the impact of the need for such a transfer. A further examination shows that of Red Line riders boarding in 1997 at the three stations with the largest potential for Old Colony diversions, (Braintree, Quincy Adams, and Quincy Center) about 60% traveled further than South Station. Therefore, of the Red Line riders who did shift to Old Colony service, a disproportionately large number apparently had destinations within walking distance of South Station.

For former Red Line riders who switched to a combination of Old Colony and Red Line service, the convenience of shorter access distance presumably outweighed the inconvenience of the additional transfer. Almost all Old Colony riders who formerly boarded the Red Line at Braintree, Quincy Adams, or Quincy Center accessed those stations by driving or being dropped off. Of those among this group who had to transfer from Old Colony trains to the Red Line at South Station to complete their trips, 11% walked to their boarding stations.

Further Considerations in Diversions from Towns Nearest to Red Line

The average diversion rate of former Red Line users with trip origins in towns with Old Colony stations was heavily weighted by the rates in Weymouth and Randolph. These are the on-line towns nearest the Red Line on the two Old Colony branches, and they were also the largest sources of Red Line riders on their respective branches before Old Colony service started. The Old Colony diversion rate of Red Line riders was about

11% from Weymouth and 16% from Randolph. Both towns have multiple bus connections to the Red Line. The locations of the Old Colony stations in both towns are such that the majority of town residents would have to start by traveling in the opposite direction from Boston to access them. The stations in these towns are the innermost ones before Braintree, so Old Colony trains are already heavily loaded before reaching them.

The only other town served both by Old Colony trains and by MBTA feeder bus service to the Red Line is Holbrook. That town was the third-largest source of Red Line ridership from the Middleborough/Lakeville Line corridor before Old Colony service started. Holbrook and Randolph share a station on their border, but on average the convenience of access to that station compared with Red Line stations is higher from Holbrook than from Randolph. This accounts in part for a higher diversion rate of former Red Line riders from Holbrook (24% versus 16%).

In 1998 for a passenger paying the full cash fare, a trip from Randolph to Boston via feeder bus to Ashmont would have cost \$1.45 each way from north of Crawford Square or \$1.85 from south of there. A trip to Boston via feeder bus to Quincy Center from either Randolph or Weymouth would have cost an average of \$1.88 each way. A trip to Boston from Holbrook via feeder bus to the Red Line would have cost an average of \$2.28 each way with a transfer at Quincy Center or \$2.30 with a transfer at Braintree. With a Combo pass used for 21 round trips per month, the cost of any of the trips via Ashmont or Quincy Center would have dropped to \$1.10 each way. The cost via Braintree with a Combo Plus pass would have been \$1.14 each way.

The South Weymouth and Holbrook/Randolph stations are both in commuter rail fare Zone 3. The one-way cost from there to Boston was \$2.50 with a single -ride ticket, \$2.08 with a 12-ride ticket, or \$1.95 with a monthly pass used for 21 round trips. Thus, for a daily commuter from Randolph, Weymouth, or Holbrook, switching to Old Colony service from a combination of feeder bus and Red Line would have resulted in a fare increase of 71% to 77%. In addition, a rider who needed to park at an Old Colony station would have had to pay a parking fee of \$1.00 a day.

The Quincy Center, Quincy Adams, and Braintree garages all had parking fees of \$2.50. For a passenger driving to Quincy Center and using a Combo pass, the combined fare and parking fee for a trip to Boston would have averaged \$2.35 each way. Driving to Quincy Adams or Braintree and using a Combo Plus pass would have cost \$2.39 each way. The cost of driving to the Holbrook/Randolph or South Weymouth station, parking, and using a Zone 3 pass would have been only slightly greater, at \$2.45 one way. Therefore, for Red Line riders from Weymouth, Randolph, or Holbrook the cost of shifting to Old Colony service would have been much less of a consideration if they usually drove to the Red Line than if they usually rode an MBTA bus.

Further Considerations in Diversions from Brockton

The only city or town with a station further out on the Old Colony lines than Weymouth, Randolph, or Holbrook that has MBTA bus service to the Red Line is Brockton. Prior to the Old Colony startup, and at the time of the survey, the only MBTA bus service in Brockton was provided by Route 230 from Quincy Center, which made one stop just inside the northern border of Brockton. (This route was extended to Montello station in December 1999.) Brockton also has BAT bus service to Ashmont station, but has three Old Colony stations. Two of these (Montello and Brockton) are close to stops on the BAT route. The survey results indicate that about 35% of the Red Line trips from Brockton were diverted to Old Colony service. The one-way BAT fare from Brockton to Ashmont was \$1.50. The combined BAT and MBTA fare from Brockton to Boston would have been \$2.35 one way, but this could have been reduced to \$1.96 with a Subway pass and a BAT pass used for 21 round trips a month.

The Montello and Brockton stations are in commuter rail Zone 4. The fare from these stations to Boston was \$3.00 one way, \$2.50 with a 12-ride ticket, or \$2.24 with a pass. Thus, for a daily rider walking to an Old Colony station, the cost would have been 14% greater than using a combination of the BAT bus and Red Line. At the opposite extreme, including the parking fee, an infrequent rider would have paid 49% more by driving to Montello or Brockton to take an Old Colony train than by taking a BAT bus to Ashmont.

The Campello station in Brockton is in fare Zone 5, making the 1998 one-way cost to Boston \$3.25 with a single-ride ticket, \$2.71 with a 12-ride ticket, or \$2.48 with a monthly pass. At most times of day there is no through BAT service from the Campello area to the Red Line, but a local BAT bus from Campello connects with the Ashmont busses in downtown Brockton. For a rider using a BAT pass daily, the total fare to Boston from Campello via the Red Line would have been the same as from Brockton or Montello (\$1.96) but for a single trip the cost would have been \$3.10. The cost increase from switching to Old Colony service would have ranged from 5% for a single ride with walking access to Campello station to 52% for a daily rider parking at Campello.

Because of very limited parking capacity at Ashmont station, 85% of Brockton residents who drove to the Red Line before the start of Old Colony service used one of the stations on the Braintree Branch rather than Ashmont. At either Quincy Adams or Braintree, used in 66% of the Brockton park-and-ride trips, the Red Line fare and parking fee together resulted in a 1998 cost of \$2.95 one way for a cash fare passenger, or \$2.39 for a pass user. A cash-fare passenger parking at Montello or Brockton would have paid \$3.50 one way, or 18% more than the cost by driving to the Red Line. A pass user walking to Montello or Brockton would have paid \$2.24, or a decrease of 6% compared with the cost via the Red Line. The survey results showed that only about 20 riders from Brockton who were diverted from Quincy Adams or Braintree walked to Montello or Brockton, however.

Further Considerations in Diversions from Towns south of Weymouth or Brockton

As discussed above, for many residents of Weymouth, Randolph, Holbrook, and Brockton, the Red Line remains a more convenient and less costly alternative than the Old Colony lines for travel to downtown Boston. This would account for the low diversion rates of Red Line users from Weymouth and Randolph and the moderate diversion rates from Holbrook and Brockton.

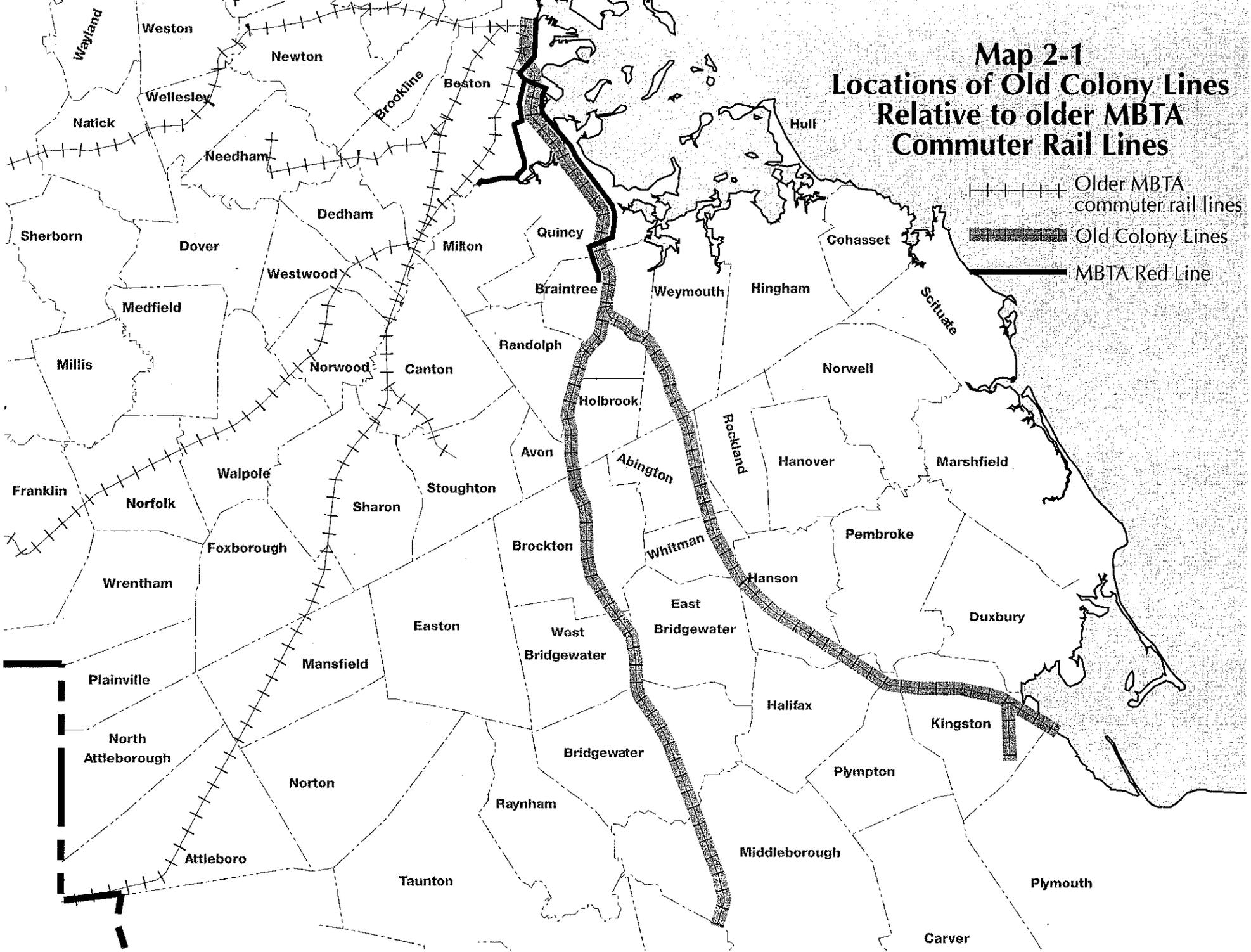
None of the other towns with Old Colony stations have MBTA or Regional Transit Authority feeder bus service to the Red Line. Only Plymouth has a private carrier bus route to the Red Line, and it has always had infrequent service and carried few riders. The combined results of the Old Colony and Red Line surveys indicate that Red Line diversions have been much higher from points along the outer ends of the Old Colony Lines than from points along the inner ends. The average diversion rate of former Red Line riders from towns south of Weymouth and Brockton that now have Old Colony station was 68%. Because Red Line ridership from these towns was always fairly low, the Red Line survey obtained a less reliable sample than the Old Colony survey. It appears, however, that the Old Colony lines have captured almost all of the former Red Line riders from Bridgewater, Lakeville, Whitman, and Hanson. From Abington, the diversion rate was 64%, and from Halifax it was 69%. The lowest diversion rates in this group were from Kingston (36%), Middleborough (40%), and Plymouth (49%).

Abington is near enough to Braintree and Quincy Adams to make the lower combined Red Line fare and parking fee attractive for trips starting from beyond walking distance of the Abington station. Kingston, Middleborough, and Plymouth are three of the farthest towns from the Red Line on the Old Colony Lines, and might therefore be expected to have had higher rates of diversion of Red Line users than they did. State Route 3 provides a direct limited-access highway link from Kingston and Plymouth to both Braintree and Quincy Adams, however. There are two interchanges in Kingston, with a third just over the border in Duxbury, and six interchanges in Plymouth.

The Kingston station is near the southern edge of that town, so it is used predominantly by residents of other towns. The survey found that only 12% of all riders boarding at Kingston station had trip origins in that town, and that of all Old Colony riders with trips starting in Kingston, only 53% boarded at Kingston station. The Plymouth station has train service only during midday hours, but there is good access to the Kingston station from Plymouth via Route 3. This helps to explain the higher diversion rate of Red Line riders from Plymouth compared with Kingston.

Middleborough has a continuous limited-access highway link to Quincy Adams station provided by a combination of Routes I-495, 24, and I-93. There are four interchanges on I-495 within the town. The parking lot at Middleborough/Lakeville station was one of the first on the Old Colony Lines at which demand for spaces exceeded supply. Therefore, some Red Line users from Middleborough who would have preferred to switch to Old Colony trains may have been deterred from doing so by the parking shortage.

Map 2-1 Locations of Old Colony Lines Relative to older MBTA Commuter Rail Lines



- +----- Older MBTA commuter rail lines
- ===== Old Colony Lines
- MBTA Red Line

IMPACT ON OTHER MBTA COMMUTER RAIL LINES

In the 1998 survey, diversions from older commuter rail lines were the fourth-largest source of former trip-makers on the Middleborough/Lakeville Line at 13%, but were only sixth, at under 1%, on the Plymouth/Kingston Line. In absolute terms, about 285 Middleborough/Lakeville Line riders and about 25 Plymouth/Kingston Line riders had previously made the same trips using other commuter rail lines. In contrast, the 1993 survey showed 475 riders a day with trips starting in cities and towns now served directly by the Middleborough/Lakeville Line and another 510 from towns adjoining it but not served directly by any other line. The 1993 survey also showed about 30 riders a day just from the towns now served directly by the Plymouth/Kingston Line.

These results imply that large numbers of commuters who had trip origins in the present Middleborough/Lakeville Line service area in 1993 either continued using their former rail lines, switched to travel modes other than the Old Colony, or were no longer making the same trips by 1998. About 20% of the riders on each Old Colony branch reported that they were riding to make trips that they had not made before. The survey did not distinguish between passengers making new trips specifically because of Old Colony service and passengers with coincidental changes in home, work, or school locations. Some of the latter would probably have used older commuter rail lines for their new trips if Old Colony service had not been available.

The Old Colony survey results indicate that most of the 1993 commuter rail riders from Lakeville, Middleborough, and Bridgewater were diverted to the Middleborough/Lakeville Line, but that only about one third of the riders from Brockton or Randolph were diverted. This was largely a result of Old Colony lines not providing direct service to Back Bay or Ruggles station. The number of riders from both Brockton and Randolph alighting at those two stations in 1993 was equal to about two thirds of the difference between the 1993 totals and the Old Colony diversions. For some other riders, stations on older lines would have continued to be more attractive than Old Colony stations because of access, parking, or train schedules. In 1993 the most common commuter rail boarding location for Brockton residents was Stoughton station, which is in a town directly adjoining Brockton. From Randolph, the most common boarding locations in 1993 were the Stoughton and Route 128 stations, both of which are in adjoining towns.

Among towns adjoining those served directly by the Middleborough/Lakeville Line and not themselves served directly by any other line, diversions of trips from East Bridgewater, West Bridgewater, Freetown, and Rochester were all close to their 1993 commuter rail totals. On the other hand, diversions from Easton and Taunton were equivalent to only about 5% of the 1993 commuter rail riders from these towns. From Raynham, the ratio was about 20%. Easton directly adjoins Stoughton, Mansfield and Sharon. Boardings from Easton in 1993 were divided among the stations in those towns plus Route 128 and the two stations in Canton. Easton also borders directly on Brockton and most of the Middleborough/Lakeville Line boardings from Easton took place at the Montello or Campello stations in Brockton.

Taunton borders directly on Lakeville and does not border directly on any town with a station on an older commuter rail line. Nevertheless, population distribution and highway layout are such that older stations are still more convenient than Middleborough/Lakeville station for a majority of Taunton residents. Most of the 1993 commuter rail boardings from Taunton took place at Mansfield station.

Raynham borders directly on Middleborough and Bridgewater, and does not border directly on any town with a station on an older commuter rail line. In 1993 most commuter rail users from Raynham boarded at Mansfield or Stoughton. Most of these riders still found those to be the most convenient stations in 1998.

On the Plymouth/Kingston Line only about 25 riders reported having been former commuter rail users, with about 10 of these having trip origins in one of the towns served directly. In contrast, the 1993 survey results showed about 30 riders a day just from the towns now served directly by this line. (The low percentage of riders with South Shore origins in the overall 1993 sample reduced the reliability of expansion of responses from that survey somewhat.) Nearly half of the passengers from points on the Plymouth/Kingston Line in 1993 were going to destinations around Back Bay station. These riders probably preferred to continue using trains that went there directly. Almost all of the diversions came from the Attleboro/Stoughton Line, with the most common former boarding locations being Stoughton and Route 128.

Of the 310 riders diverted to Old Colony trains on both branches from other MBTA commuter rail lines, 300 previously boarded at stations on the Attleboro/Stoughton Line. Of these riders, 290 used Old Colony trains arriving in Boston before 9:30 a.m. Presumably, they had also used Attleboro/Stoughton Line trains arriving in Boston in the same time span. CTPS on-board counts conducted in the Spring of 2000 showed that Attleboro/Stoughton Line trains arriving in Boston before 9:30 a.m. carried a combined total of 8,885 riders at the peak load point. (This was approaching Ruggles station for trains that stopped there; otherwise it was approaching Back Bay.) Comparable figures from before the Old Colony startup are not available, but the Old Colony diversions were equivalent to 3.3% of the peak load in 2000. Overall this was insignificant compared with typical daily variation, although some trains were probably affected more than others. For the most heavily loaded trains, Old Colony diversions would have helped reduce the number of standees, but the majority came from Stoughton trains, most of which do not have capacity problems.

In conclusion, there was not a significant overlap between the service areas of the Old Colony Lines and those of the previously established MBTA commuter rail lines. The Old Colony Lines were of some benefit in reducing peak crowding on the Attleboro/Stoughton Line, but the reduction was too small to allow any redeployment of rolling stock.

IMPACT ON MBTA BUS ROUTES

The MBTA has no through bus routes to downtown Boston from any of the cities and towns served by the Old Colony lines.⁴ MBTA feeder bus service to the Red Line is operated from Quincy, Braintree, Weymouth, Randolph, and Holbrook, as shown on map 2-1. Prior to the start of Old Colony service, the only MBTA bus route serving Brockton terminated at the northern border of the city, where passengers could transfer to and from BAT busses. This route was extended to Montello station in December 1999, but it makes no other stops within Brockton. Among towns that are not served directly by the Old Colony Lines but that generate some Old Colony ridership, only Hingham and Avon have MBTA bus service to the Red Line.

The impacts of Old Colony service on MBTA bus ridership in each of the cities and towns listed above are discussed below. In the 1998 survey, among Old Colony passengers who previously used a combination of MBTA busses and the Red Line, some listed both and some listed only the Red Line as the former travel mode. The survey form did not include a place to specify which MBTA bus routes had been used, however. To estimate bus ridership changes attributable to Old Colony service, it was necessary to rely on a combination of the results of the Old Colony survey, the 1994 Red Line survey, 1997 and 1998 Red Line passenger counts, and 1996 and 1998 bus ridechecks. The conclusion is that no MBTA bus routes had significant changes in overall ridership because of Old Colony service although short segments of some routes did have large losses.

Impact on Routes Serving Quincy

At the time of the 1998 survey, most Old Colony trips originating in Quincy and all such trips made by former Red Line users were made by boarding Old Colony trains at Quincy Center. The survey responses did not show which Red Line stations these trips were diverted from, but based on origin addresses, Quincy Center was also the most likely "before" station. The Old Colony and Red Line stations there are part of the same complex, so the same access paths and modes could be used for both. Old Colony trains run less frequently than Red Line trains, however, so bus connections to Old Colony trains would be less convenient from some points. Therefore, some former bus riders might have changed access modes.

Of a total of 69 former Red Line users from Quincy diverted to Old Colony service, 40 walked to Quincy Center Station and had probably also done so to take the Red Line. Another 10 rode MBTA buses to the station, as they had probably done previously. No impacts on bus service would have resulted from either of these sub-groups. The other 19 riders arrived at Quincy Center by driving or being dropped off. Even if some of these were former bus riders, the impact on ridership on any individual bus route or on all Quincy routes combined would have been negligible. None of the inbound Old

⁴Impacts on private-carrier bus service from the Old Colony area to downtown Boston funded through the MBTA/EOTC Interdistrict Transportation Service Program are discussed in chapter 3 of this report.

Colony passengers from Quincy who were not former Red Line users took MBTA busses to Quincy Center, so they generated no new bus trips. None of the passengers who alighted from inbound Old Colony trains at Quincy Center, regardless of former travel mode, reported that they transferred to MBTA busses there.

In conclusion, during at least the first year of Old Colony service there was little or no impact on MBTA bus boardings in Quincy.

Impact on Routes Serving Braintree

At the time of the 1998 survey, boardings of Old Colony trips originating in Braintree were divided among the Braintree, Quincy Center, Holbrook/Randolph, and South Weymouth stations. The choice of station apparently depended on proximity to trip origin and on whether a train with a convenient Boston arrival time stopped at Braintree. The survey responses did not show which stations former Red Line trips among these were diverted from. Based on origin addresses, most of them would have come from either Braintree or Quincy Center. The Old Colony and Red Line stations at both locations are part of the same complexes, so people who formerly rode buses to one of these stations to board the Red Line could have used the same routes for Old Colony access. Some former bus riders might have changed access modes because of less convenient connections between busses and Old Colony trains, however.

None of the 68 Braintree-based trips that were diverted from the Red Line to Old Colony trains used bus access to the latter, suggesting that the majority had not used busses previously either. Twelve of these trips had formerly been made by driving to the Red Line. Twelve Old Colony trips with walking access to Braintree station were probably Red Line walk-in trips before. Five trips specified as being formerly made via bus Route 230 to Braintree switched to drop-off access. Of the remaining 39 trips, 14 had origins from which there would have been no convenient bus access to the Red Line. The other 25 riders could theoretically have used MBTA busses to get to the Red Line, but did not necessarily do so. No more than seven of these would have used any one route.

None of the inbound Old Colony trips from Braintree that were not made by former Red Line users included MBTA bus access, so they generated no new bus trips. None of the passengers who alighted from inbound Old Colony trains at Braintree, regardless of former travel mode, reported that they transferred to MBTA busses there. Comparisons of boardings at MBTA bus stops in Braintree in 1996 and 1998 show no changes that are clearly attributable to Old Colony service.

In conclusion, during at least the first year of Old Colony service there was little impact on MBTA bus boardings on any one route or on all routes combined in Braintree.

Impact on Routes Serving Weymouth

At the time of the 1998 survey, boardings of most Old Colony trips originating in Weymouth took place at the South Weymouth station, but a few were made at Braintree

or Quincy Center. Nearly 60% of these trips (226 of 381) had formerly been made via the Red Line. The survey responses did not show which Red Line stations these trips were diverted from. The 1994 Red Line survey showed significant numbers of trips from Weymouth boarding at every station from Braintree to North Quincy. The only Red Line station with MBTA bus service from Weymouth was and still is Quincy Center. Bus access to Quincy Center was used in 22% of all Red Line trips from Weymouth.

If Old Colony diversions from the Red Line were drawn equally from all groups of Weymouth Red Line trips, they would include a total of 50 former bus trips to Quincy Center. This would have been equivalent to about 5% of the weekday boardings in Weymouth on busses going toward Quincy Center. As a group, however, bus riders would have had less flexibility than park-and-ride or drop-off passengers to change their boarding stations. Most passengers riding busses from Weymouth to Quincy Center walk to their boarding stops, but no points within typical maximum walking distance of any of the MBTA bus stops in Weymouth are also within walking distance of an Old Colony station. Consequently, former bus passengers would have to drive or be dropped off in order to switch to Old Colony service. Therefore, it is reasonable to assume that diversions of Red Line riders using bus access were disproportionately low, and that the number of bus riders lost was much lower than 50.

Bus access to Quincy Center from Weymouth is distributed among four routes, and it is probable that no one of these lost more than 20 riders a day. Among Old Colony riders from Weymouth who were not former Red Line riders, four accessed Old Colony service by riding MBTA busses to Quincy Center. In conclusion, during at least the first year of Old Colony service there was little impact on MBTA bus boardings on any one route or on all routes combined in Weymouth.

Impact on Routes Serving Randolph

Of the towns with MBTA bus service to the Red Line, Randolph experienced the greatest amount of change in service configuration and ridership in the first year after the Old Colony startup. For this reason, the findings for that town are presented in greater detail than are those for other towns discussed in this chapter.

Expected Impacts based On Old Colony Survey Results and Prior Red Line Access

At the time of the 1998 survey, boardings of most Old Colony trips originating in Randolph took place at the Holbrook/Randolph station, but a few were made at Braintree. Slightly over half of these trips (149 of 284) had formerly been made via the Red Line. Almost all of these riders used trips arriving in Boston before 4:00 p.m. The survey responses did not show which Red Line stations these trips were diverted from. The 1994 Red Line survey showed that most Red Line riders from Randolph boarded at Ashmont, Quincy Adams, or Braintree. Among those Randolph riders boarding at Ashmont, 90% used MBTA bus Route 240 for access. Only about 8% of access trips

from Randolph to other Red Line stations were made by bus, however. All of these riders rode Route 238 to Quincy Adams or Quincy Center.

If Old Colony diversions from the Red Line as of 1998 were drawn equally from all groups of Randolph Red Line trips, they would have included a total of about 35 former trips to Ashmont via Route 240 and 10 trips to Quincy Adams or Quincy Center via Route 238. Prior to the start of Old Colony service, Route 240 averaged about 1,200 riders each way per weekday and Route 238 averaged about 960, so diversions of the amounts above would have represented decreases of 3% and 1%. As a group, however, bus riders would have had less flexibility than park-and-ride or drop-off passengers to change their boarding locations. Most passengers riding busses from Randolph to Red Line stations walk to their boarding stops, but only a small area in the southern edge of the town is within typical maximum walking distance of both a stop on MBTA Route 240 or 238 and the Holbrook/Randolph station.

In conjunction with the Old Colony service startup, most trips on Route 238 and about half of the trips on Route 240 (interlined with Route 238) were extended directly to the Holbrook/Randolph station. This made it possible for passengers who formerly rode inbound on these routes to access the Red Line to switch to riding outbound to access Old Colony trains. Headways on the bus routes were not adjusted to coordinate them with the train schedules, however, so many of the train trips do not have good bus connections.

In the 1998 survey, only 18 of the former Red Line users from Randolph reported that they walked to Holbrook/Randolph station, and only five of these specified that they had previously ridden MBTA busses to the Red Line. Five more switched from riding MBTA busses to the Red Line to riding the new extension of Route 238/240 to Holbrook/Randolph. Another 18 specified that they had switched from riding busses to the Red Line to driving or being dropped off at Holbrook/Randolph. (Nine of these had formerly driven to their bus stops.) Any other former bus passengers from Randolph who switched to Old Colony service would have to have driven to or been dropped off at their new boarding stations. Therefore, it would be reasonable to expect that diversions of former Red Line riders using bus access were disproportionately low, and that the number of bus riders lost was somewhere between the 23 identified in the survey and the pro-rated estimate above of 45.

Comparisons of 1996 and 1998 Bus Ridership

Comparisons of weekday ridechecks for Route 238 from 1996 and 1998 show net decreases of 57 riders on northbound busses as they exited Randolph, and of 105 on southbound busses as they entered Randolph. The ridechecks do not show origin-destination pairs, but the composite results of the Red Line survey and ridechecks indicate that about 100 Randolph riders transferred from Route 238 to the Red Line prior to the start of Old Colony service. Of these transfers, 70 took place at Quincy Adams, but the ridechecks show that Route 238 had net increases of seven northbound alightings and four southbound boardings there between 1996 and 1998. Activity there

also includes riders going to and from stops in Braintree and Quincy, but net changes in ridership at those stops was too small to have offset significant losses in Randolph passengers. The largest losses in northbound offs and southbound ons on Route 238 occurred at the South Shore Plaza in Braintree. These appear to have accounted for at least half of the reduction in Randolph ridership.

Losses in ridership between Randolph and the South Shore Plaza would not have been directly related to Old Colony competition. The reconfiguring of Routes 238 and 240 to serve Holbrook/Randolph station increased the travel time between stops north of Crawford square on the two routes on through-routed trips by about 10 minutes, however. Between 1996 and 1998 the number of passengers riding through from Route 240 southbound to Route 238 northbound fell by 66 (27%), and the number riding through in the opposite direction fell by 90 (44%). It is likely that these losses were largely if not entirely a result of the longer travel times for through-routed passengers.

Comparisons of weekday ridechecks for Route 240 from 1996 and 1998 show a net increase of about 115 passengers boarding northbound busses at stops in Randolph and still aboard at the point where the busses left the town. Southbound busses showed an increase of about 95 passengers destined for Randolph as they entered the town. Comparisons of ons and offs at stops outside Randolph imply that the majority of the new Randolph riders were going to or from the Red Line at Ashmont, but that some were going to or from other stops in Dorchester or Milton.

An increase in the number of riders taking Route 240 to Ashmont to transfer to the Red Line is the opposite of the expected consequence of Old Colony service competition. A finer breakdown of ridership by segment of Route 240 shows that there was a loss of riders in the segment between the Avon town line and Crawford Square, concealed by larger gains on other sections. The segment south of Crawford Square would be most susceptible to Old Colony diversions, as it serves the area of the town nearest to the Holbrook/Randolph station. Most passengers who had used route 240 stops in this segment could get to the station with little or no doubling back. Between 1996 and 1998 northbound boardings in this segment of Route 240 fell by about 60 and southbound alightings fell by about 40. These losses equaled about half of the 1996 ridership in that segment, and exceed the pro-rated loss of 35 estimated for Route 240.

On the segment within Randolph north of Crawford Square, northbound boardings increased by 110 and southbound alightings by 135, both equal to about 20% of the 1996 totals in the same segment. Factors in this growth included new residential development in Randolph and increased employment in downtown Boston, along with the relatively inconvenient location of the Holbrook/Randolph station for travel from the section of Randolph served by this part of Route 240.

The extension of Routes 238 and Route 240 to the Holbrook/Randolph Station attracted limited new ridership to these routes. The 1998 survey showed that of the Old Colony riders from Randolph who were not former Red Line riders, only two used Route 238 and none used Route 240 for access to Holbrook/Randolph. These were in addition to

the five riders who switched from riding one of these routes northbound to the Red Line to riding southbound to Holbrook/Randolph.

The 1998 ridechecks on Route 240 show 19 weekday boardings and 13 alightings at the Holbrook/Randolph Station. The Route 238 counts show an additional 25 boardings and 18 alightings there, for a combined total of 44 ons and 31 offs. Since both figures are much larger than the total of seven transfers found in the 1998 survey, the Route 238/240 extension is evidently being used by some new riders for purposes other than commuter rail connections. Ridership at the station probably includes some passengers from beyond the end of the route in Holbrook.

In addition to Holbrook/Randolph station, the extension has three other stops on Union Street in Randolph that previously had no bus service. These stops were used for a combined total of nine ons on trips toward Ashmont or Quincy Center and for 30 offs on trips leaving these terminals. Combined with boardings at Holbrook/Randolph station, the extension was used by an average of about 50 people a day each way who did not use Old Colony trains. Prior to the implementation of the extension, the nearest stop to Union Street on Routes 238 and 240 would have been at Crawford Square, about 0.9 miles from Holbrook/Randolph. Some of the riders boarding on Union Street may formerly have boarded at Crawford Square, but any diversions from there were offset by gains in riders going to the Red Line.

Summary of Bus Ridership Impacts in Randolph

In summary, the only bus route segment in Randolph to show a net ridership drop apparently attributable to Old Colony diversions was the section of Route 240 between the Avon town line and Crawford Square. Ridership there dropped by about 50% from 1996 to 1998, but this was an average of only 50 riders a day each way. An indirect impact of Old Colony service was that the re-configuring of routes 238 and 240 to serve Holbrook/Randolph station made interline travel between the segments of these routes north of Crawford Square less convenient. This contributed to a loss of an average of about 80 interline riders each way per day. The loss in interline riders was partly offset by the average of about 60 riders a day each way using stops on the new route segment on Union Street, most of whom were not transferring either to or from Old Colony trains. The greatest change in bus ridership within Randolph was a gain of 110 inbound boardings and 135 outbound alightings on Route 240 north of Crawford Square, but this was not related to Old Colony service in any obvious way.

Impact on Route Serving Holbrook

At the time of the 1998 survey, boardings of most Old Colony trips originating in Holbrook took place at the Holbrook/Randolph station, but a few were made at Braintree. About 60% of these trips (92 of 153) had formerly been made via the Red Line. The survey responses did not show which Red Line stations these trips were diverted from. The 1994 Red Line survey showed that almost all Red Line trips from Holbrook were made by boarding at either Braintree or Quincy Adams. Among those

boarding at Braintree, about 40% used MBTA bus Route 230 for access, but no bus access trips from Holbrook to other Red Line stations were found.

If Old Colony diversions from the Red Line as of 1998 were drawn equally from all groups of Holbrook Red Line trips, they would have included a total of about 25 former trips to Braintree via Route 230. Prior to the start of Old Colony service, Route 230 averaged about 540 riders each way per weekday, so this would be a loss of about 5%. As a group, however, bus riders would have had less flexibility than park-and-ride or drop-off passengers to change their boarding stations. Most passengers riding busses from Holbrook to Red Line stations walk to their boarding stops, but only a small area near the center of the town is within typical maximum walking distance of both a stop on Route 230 and the Holbrook/Randolph station. The Old Colony survey was conducted more than a year before Route 230 was revised to serve this station directly.

In the 1998 survey, only five of the former Red Line users from Holbrook reported that they walked to Holbrook/Randolph station, and only two of these specified that they had previously ridden MBTA busses to the Red Line. Another 22 specified that they had switched from riding busses to the Red Line to driving or being dropped off at Holbrook/Randolph. Any other former bus passengers from Holbrook who switched to Old Colony service would also have to have driven to or been dropped off at their new boarding stations. The total of 24 bus diversions found in the survey is close to the pro-rated estimate of 25 above. No riders from Holbrook regardless of prior travel mode used MBTA busses to access Old Colony service.

Comparisons of weekday ridechecks for Route 230 from 1996 and 1998 show little evidence of Old Colony diversions in Holbrook. On trips going toward the Red Line there was a net decrease of six Holbrook boardings, compared with the 24 diversions indicated by the survey. On trips going away from the Red Line there was a net decrease of 14 alightings in Holbrook. Therefore, Old Colony diversions were largely offset either by growth in ridership from other sources or by normal day-to-day variation.

In conclusion, during at least the first year of Old Colony service there was little impact on MBTA bus ridership in Holbrook.

Impact on Route Serving Brockton

At the time of the 1998 survey, boardings of most Old Colony trips originating in Brockton took place at one of the three stations in that city, but a few were made at stations in adjoining towns, including Holbrook, Abington, and Whitman. About 42% of the trips from Brockton (375 of 885) were former Red Line trips. Of these, at least 105 rode BAT busses to Ashmont, leaving at most 270 accessing the Red Line by other means. (Impacts on the BAT route to Ashmont are discussed in chapter 3 of this report.)

Prior to the start of Old Colony service, the only MBTA bus service in Brockton was provided by Route 230, which terminated just south of the Holbrook town line and

connected there with BAT local bus service. Overall, only about 10% of Brockton trips to the Red Line were made on MBTA busses, with most of these using Route 230 to Braintree station. Some points in Brockton are within walking distance of both the end of Route 230 and Montello station, but the largest portions of the walk-in markets of the two services are separate. Passengers who transferred to Route 230 from the connecting local BAT bus could now take the same bus to Montello. Some riders who would need to use the BAT connection to Route 230 could walk to Montello instead. (Route 230 itself was extended to Montello in December 1999.)

Ridechecks of Route 230 from 1996 show that the stops in Brockton were used for a total of 44 boardings on trips going toward the Red Line and for 30 alightings on trips going away from the Red Line. These accounted for 8.5% and 5.0% of total ridership in the respective directions, but would have included some local travel.

The 1998 survey results indicate that about 40 Old Colony riders from Brockton formerly rode MBTA busses to the Red Line, but does not identify the routes used. The total is about equal to the number of Brockton riders going to the Red Line on all MBTA bus routes combined in the Red Line survey, most of whom used Route 230. Based on these figures, it would be expected that there would be no almost no remaining Route 230 boardings and alightings in Brockton. Ridechecks from 1998 show a decrease of only 16 Brockton boardings (from 44 to 28) and an increase of two alightings (from 28 to 30) compared with 1996, however. The 1998 totals show much closer directional balance than those from 1996, implying that most of the lost riders were those who formerly used Route 230 only for travel toward the Red Line. The difference between diversions indicated by the survey and by the ridechecks is attributable either to imprecision in survey expansion or to new riders replacing some of those lost to Old Colony service. No Old Colony riders from Brockton reported using MBTA busses to access their new boarding stations, so any new ridership would not be directly attributable to Old Colony service.

In conclusion, during at least the first year of Old Colony service there was little impact on MBTA bus boardings made as part of trips starting in Brockton.

Impact on Routes Serving Hingham

Hingham is not served directly by the present Old Colony lines, but it adjoins Weymouth which has a station. MBTA bus Routes 220 and 222 connect portions of Hingham with Quincy Center Station. The 1998 survey found a total of only 16 trips from Hingham on the Old Colony lines, with 11 boardings at South Weymouth and five at Braintree. Only the Braintree trips showed the Red Line as the former mode. The access mode was unspecified, but the origins were within walking distance of Route 220. Of the trips boarding at South Weymouth, six were diverted from private carrier busses or commuter boats and the remainder were new trips. Therefore, at most five riders were diverted from Route 220 in Hingham to Old Colony service. Before Old Colony service started, Route 220 carried an average of 835 riders each way per day so the maximum loss from Hingham diversions was 0.6%.

Impact on Route Serving Avon

Avon is not served directly by the Old Colony lines, but it adjoins Brockton, Holbrook, and Randolph which have stations. Bus service from Avon to the Red Line is provided by MBTA bus Route 240. Avon is outside the MBTA District, and Route 240 officially terminates at the border of Randolph and Avon. In order to turn around, however, busses continue south one third of a mile to Avon Square. As a courtesy, passengers are allowed to board and alight in this segment.

The 1998 survey found a total of 28 Old Colony trips originating in Avon, with 24 boardings at Holbrook/Randolph and the rest at Montello. Fourteen trips, all boarding at Holbrook/Randolph, were reported to be former Red Line trips. Only two of these specified MBTA bus service as the former access mode, but ten others had origins within walking distance of the end of Route 240. If all 12 of these riders were in fact diverted from Route 240, this would have resulted in a decrease of 1% in average weekday boarding on the route as a whole.

A comparison of ridechecks from 1996 and 1998 shows a decrease of 19 northbound boardings (from 28 to 9) and of 12 southbound alightings (from 40 to 28) at the Route 240 stops in Avon. Old Colony diversions would be the most likely reason for these losses. The directional imbalance in ridership in both ridechecks is attributable to riders who take Route 240 buses to Ashmont but return on BAT Ashmont - Brockton busses, which also stop at Avon Square. BAT busses have a higher cash fare for this trip (\$1.25 versus \$1.00) but provide shorter travel times and offer different departure times from Ashmont.

The difference between the 12 diversions from Avon indicated in the 1998 survey and the drop of 19 riders shown in the ridechecks can be explained by imprecision in the survey expansion or by loss of riders from outside Avon who formerly went to Avon Square to board Route 240. The Red Line survey results indicate that a small number of trips from Brockton were made that way, probably because of the lower fare compared with boarding BAT busses in Brockton.

Impacts of Other Old Colony Diversions on MBTA Bus Ridership

In addition to the bus diversions from trips originating in the towns discussed above, 30 Old Colony trips were reported to have been diverted from MBTA combination bus and Red Line trips originating in 11 towns that have no MBTA bus service. There was insufficient information in the survey returns to show which bus routes were used, and most of the towns were too far from any route to suggest a likely choice. It is reasonable to assume that these trips were diverted from several different routes, and that the impact on any one of them was insignificant.

IMPACT ON COMMUTER BOATS

The Old Colony survey results show that as of 1998 about 100 Old Colony riders were former commuter boat riders. The wording of the survey asked specifically about MBTA commuter boats. Prior to the start of Old Colony service, the only MBTA-funded commuter boat that could reasonably have been used as an alternate means of travel to Boston from most of the origins listed in the survey was that from Hingham.

There were also three unsubsidized commuter boat routes in 1997. One of these followed the same route as the MBTA Hingham commuter boat, but was run by a different operator and provided only one round trip per day. Another route ran from Hull, and also had only one round trip per day but was well established. (The MBTA began subsidizing this route in July 1997.) The third route ran from Quincy and had all-day service but had been running only since December 1996. It is possible that some respondents who indicated that they had formerly used commuter boats were referring to one of these routes. As discussed below, a fairly small percentage of total commuter boat ridership was lost to Old Colony service, and the losses have been more than offset by new boat riders. Map 2-3 shows the locations of the Old Colony lines relative to commuter boat routes.

Hingham Route

Commuter boats have greater seasonal variation in ridership than most commuting alternatives because of the effect of weather both on the boat trip itself and on the relatively long average access trips required at the outer end. On the MBTA Hingham commuter boat, average one-way weekday ridership in 1996 (the last full year without Old Colony competition) ranged from a low of 1,270 in March to a high of 1,570 in October, or a variation of 300 (24%). Old Colony diversions from commuter boats, if they were all from the Hingham route, would have been equivalent to about 8% of the lower average and 6% of the higher one.

A one-day count on this route from April 2000 showed an average of 1,880 riders each way with close balance by direction. For comparison, one-way ridership averaged 1,315 per day in April 1996 and 1,520 per day in April 1997. Therefore, any losses in ridership because of Old Colony diversions have been more than offset by new riders. The MBTA changed operating contractors for the Hingham route in mid-1997. This resulted in changes in the vessels used on the route and in some increase in service frequency, both of which contributed to the ridership growth. It is unclear how much ridership would have grown if there had been no Old Colony competition.

Ridership figures for the independent commuter boat route from Hingham to Boston are not available. As of the Spring of 2000, this route still had one P.M. peak trip and A.M. peak service had increased to two trips. This suggests that the route has not been harmed significantly by Old Colony diversions.

Hull Route

Before the start of Old Colony service, the Hull commuter boat route had only one round trip per day. In mid-1997, the MBTA began funding this route, and a second round trip was added in 1998. Because of the infrequent service and the outer terminal location, the Hull commuter boat is used almost exclusively by residents of that town. Of the Old Colony riders diverted from commuter boats, only three were from Hull, and they did not necessarily come from the Hull boat.

Ridership figures for this route prior to the start of MBTA funding are not available. In the last few months preceding the Old Colony startup, the route was carrying about 60 riders each way per day. A loss of three riders would have equaled 5% of this. The addition of the second round trip was reported to have increased ridership by 51% in the first year. A one-day count from April 2000 showed an average of 85 riders each way, so the ridership attracted by the increased frequency has more than offset any losses from Old Colony diversions.

Quincy Route

The Quincy commuter boat has always been unsubsidized. For many commuter boat riders who shifted to Old Colony trains, access to the outer terminal of the Quincy route would have been about as convenient as that to the Hingham terminal. For reasons discussed below, however, it is probable that most of the Old Colony diversions were from Hingham.

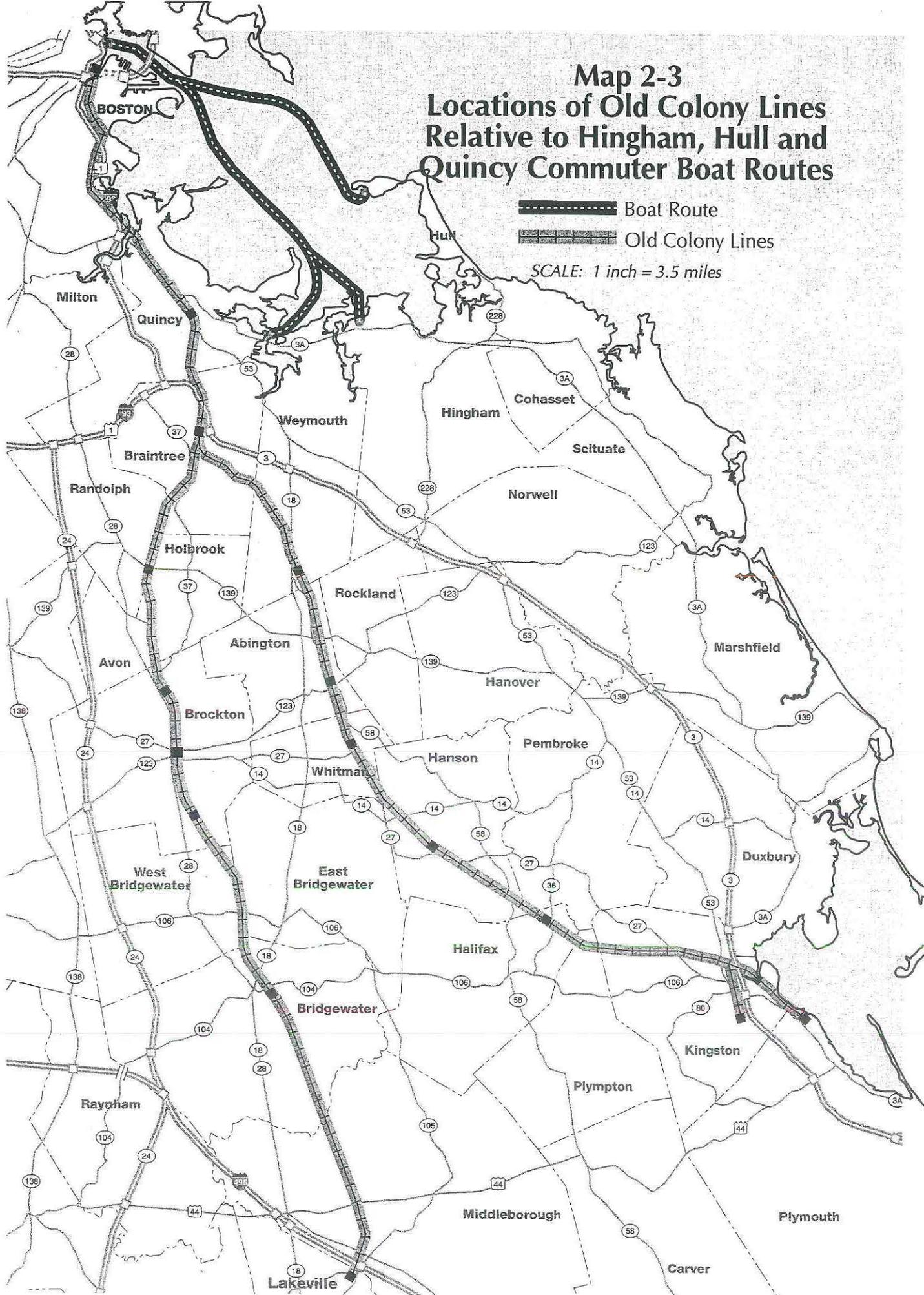
The Hingham service had been running for many more years than the Quincy service, and offered lower fares as the result of the MBTA operating assistance. Therefore, the Quincy boat would not have been expected to draw many riders from the present Old Colony service area during the few months between the startup of the Quincy boat and the Old Colony startup. Ridership figures for the Quincy boat are not available for either before or after the Old Colony startup. The frequency of trips serving downtown Boston has increased slightly, from 21 round trips a day in August 1997 to 22 by May 2000, implying that ridership is greater than or equal to the pre-Old Colony level.

The Quincy boat route was originally established to provide transportation from the South Shore to Logan Airport, mainly for airline passengers. This is still its primary function, with Boston commuter service being an adjunct. Fares to downtown Boston in Spring 2000 were \$5.00 one way, \$4.50 each way with a weekly 10-ride ticket, or \$3.40 each way with a monthly 40-ride ticket. For comparison, on the MBTA Hingham boat the fare was \$4.00 one way, \$3.40 with a 10-ride ticket, or \$3.24 with a monthly pass if used for 21 round trips. The Hingham boat does not serve the airport, but fares on the Quincy boat are even less conducive to airport commuting than to downtown Boston commuting. The Spring 2000 Quincy to Logan fares were \$11.00 one-way, \$10.50 each way with a round trip ticket, or \$9.00 each way with a 10-ride ticket.

Map 2-3 Locations of Old Colony Lines Relative to Hingham, Hull and Quincy Commuter Boat Routes

 Boat Route
 Old Colony Lines

SCALE: 1 inch = 3.5 miles



Old Colony service captures little Logan traffic of any kind, as it is necessary to transfer to another vehicle at South Station to complete the trip. Commuter rail and airport bus schedules there are not well coordinated. In addition, the present transfer path from the Old Colony platforms to the airport bus berth is long and awkward. The rapid transit connection from South Station to the airport involves either a half-mile walk to the Blue Line at Aquarium station or a roundabout transfer to the Blue Line via the Red Line and the Orange or Green lines.

The 1998 survey showed a total of only 26 Old Colony riders a day destined for Logan, and none indicated that they were former boat riders. Fifteen of these riders were commuting to work at the airport and all but two of them indicated that they completed their journeys via the Blue Line.

3. Impact on Private Carrier Bus Ridership and Service

SUMMARY OF ROUTES

Just prior to the implementation of Old Colony commuter rail service, six private bus companies operated fixed-route service to Boston from cities and towns now served directly or indirectly by the Old Colony lines. Of these companies, four had been receiving assistance from the MBTA/EOTC Interdistrict Transportation Service (IDTS) program, and two had not. Results of the 1998 Old Colony survey and ridership figures from before and after Old Colony implementation show that each of the six carriers experienced ridership losses ranging from moderate to severe. As would be expected, the largest losses were incurred by the carriers with which the rail service competes most directly.

One of the six companies went out of business a few months after the Old Colony startup. Another company has taken over that company's one route, but at a reduced service level. The other five companies have all made service reductions ranging from a small percentage of scheduled trips to complete route discontinuances. The present six carriers and their routes are as follows:

- American Eagle Motor Coach - Operates one route from Fairhaven to Boston with stops in New Bedford and Taunton.
- Bloom's Bus Lines - Operates one route from Taunton to Boston with stops in Raynham, Easton, and Brockton. One round trip on this route extends south of Taunton to Fall River via Dighton.
- Bonanza Bus Lines - Operates a bus network in southern New England and eastern New York. Routes affected by Old Colony service run to Boston from Woods Hole with stops in Falmouth and Bourne; Buzzards Bay with stops in Wareham, and Newport, Rhode Island, with stop in Fall River.
- Interstate Coach - Operates service to Boston from Middleborough, Bridgewater, and West Bridgewater. Former service to Boston from Easton and Stoughton was discontinued after Old Colony startup.
- JBL Bus Lines - Operates a route to Boston from Whitman, with stops in Abington and Weymouth. This route was taken over from Carey's Bus lines, which went out of business after the Old Colony startup.
- Plymouth & Brockton Street Railway Company - Operates routes to Boston originating in Plymouth, Duxbury, Scituate, Hyannis, and Orleans, with intermediate stops in Kingston, Pembroke, Hanover, Norwell, Rockland, Marshfield, Cohasset,

Hingham, Barnstable, Sagamore, and Harwich. Also operates connecting service from Provincetown to Hyannis, and a route from Marshfield and Hanover to the Braintree rapid transit terminal. Additional routes from Brockton and Pembroke Center to Boston were discontinued after the startup of Old Colony service, and frequency on most other P&B routes has been reduced substantially.

Also discussed in this chapter is the Brockton Area Transit (BAT) route from Brockton to the Ashmont rapid transit terminal. Prior to the Old Colony startup, this route had two main variations. One of these, which provided express service in peak hours, has been discontinued. The other, which provided all-day service on a local routing is still running and has had no service reduction despite ridership losses.

DATA SOURCES USED

In the analysis of each carrier and route below, an attempt has been made to separate the impacts of Old Colony service alone from ridership trends that were occurring anyway. Unfortunately, the ridership information that could be obtained for most of the routes subsequent to the Old Colony startup was much less detailed than that available for earlier years. All of the routes that operate directly into Boston use the Southeast Expressway. As part of a project to monitor the impacts of implementation of the Expressway High Occupancy Vehicle (HOV) Lane, CTPS had obtained monthly ridership totals for each inbound A.M. peak and outbound P.M. peak bus trip using the HOV lane from November 1994 to October 1996. These were used as the main source of "before" data in the present analysis. All of the carriers were either unwilling or unable to furnish data at a similar level of detail either for the final year of operation prior to the September 1997 Old Colony startup or for any time since then.

The September 1998 CTPS Old Colony survey results provide figures on total numbers of riders diverted from private carrier and BAT bus routes after one year of rail service operation. These results are expanded from an overall sample of 49% of all Old Colony riders. Nevertheless they are subject to some expansion errors, especially with respect to former riders of lightly patronized bus routes. CTPS counts show that at the end of the second year of Old Colony service, train ridership had increased by about 14% compared with that at the end of one year. The additional riders may have included further diversions from buses. This is especially likely in cases where major bus service reductions were made after the survey was conducted.

The majority of routes in the analysis receive some funding through the MBTA/EOTC Interdistrict Transportation Service (IDTS) Program. Ridership figures submitted to the MBTA by most of the carriers show only total monthly ridership for all IDTS-funded trips, but in many cases it is unclear which subgroup of trips this includes. In other cases, ridership is reported on a trip-by-trip basis, but only for passengers boarding at certain stops on the route. Because of these uncertainties, CTPS conducted one-day mid-week counts of A.M. peak alightings or P.M. peak boardings at the downtown Boston stops on most of the routes in the analysis during April and May 2000. Additional on-board counts on many of the routes were conducted by CTPS between

April and June 2000 in conjunction with surveys of passengers on IDTS-funded services. All of these counts provide general checks on the current level of ridership on these routes, but do not show effects of normal day-to-day variation.

Most of the private carrier bus routes in the Old Colony service area prior to the restoration of rail service had been operated for many years, either by the same carriers or by predecessors. Counts taken by CTPS in 1983 and 1984 in conjunction with the Southeast Expressway reconstruction project provide a basis for examining long-term ridership trends on these routes. Comparisons of these counts with the HOV study figures show that despite significant population growth in the territory served, most of the carriers had had either steady or declining ridership during the decade from 1984 to 1994. Some attempts had been made to increase ridership by providing more frequent service, but for the most part these had failed. Therefore, it is likely that even if Old Colony service had not been implemented that private carrier bus service would have continued to play a small and diminishing role in transporting commuters to Boston from southeastern Massachusetts.

Within the limitations of the available data, the impacts of Old Colony service on the ridership on each of the six private carriers and BAT are discussed below. Additional background information and details on past service and ridership trends on these routes appear in appendix D of this report.

SUMMARY OF FINDINGS

Ridership losses attributable to Old Colony service are summarized in this section, in descending order of absolute volumes. More detailed discussions of each company and route appear in the following section, but are arranged there alphabetically by company name and then by route number, if applicable.

Table 3-1
Private Carrier Express Bus Routes
A.M. Peak Ridership Before Old Colony and
Diversion Shown in 1998 Survey

<u>Carrier</u>	<u>A.M. peak riders pre-Old Colony</u>	<u>1998 Survey A.M. Peak Diversion</u>	<u>% of Former Riders Diverted</u>
Plymouth & Brockton St. Ry.	1,365	605	44.3%
Interstate Coach	240	185	77.1%
BAT (Ashmont Route)	330	120	36.4%
Carey's/JBL Bus Lines	155	85	54.8%
Bonanza (Cape Cod and Newport)	335	60	17.9%
American Eagle	350	50	14.3%
Bloom's Bus Lines	225	35	15.6%
Total	3,000	1,140	38.0%

Plymouth & Brockton Street Railway Company

Prior to the start of Old Colony service, the Plymouth & Brockton Street Railway Company ran the largest number of routes in the present Old Colony service area. Overall, these had been losing riders for several years, and most of them had been at least partly funded through the IDTS program. Since the Old Colony startup two P&B routes have been discontinued entirely and others have had significant service reductions. In 1996 all P&B routes to Boston combined were carrying about 1,365 inbound A.M. peak riders per day. The 1998 survey results indicate that about 605 of these (44%) were lost to Old Colony service. The Plymouth Route alone lost 465 peak riders (76%). Spring 2000 counts showed a net decrease of about 525 from 1996, indicating that ridership had stabilized and even recovered slightly since 1998. P&B also lost 45 of 90 riders each way on the Marshfield - Braintree route. These are included in Red Line diversions in the survey results.

Plymouth Route

The express and local variations of the P&B Plymouth route together had the largest absolute ridership losses by far of any bus route impacted by Old Colony service. The combined route was carrying about 615 inbound A.M. peak riders and 595 outbound P.M. peak riders in October 1996. The 1998 survey results indicate that about 465 peak riders each way were diverted from this route to Old Colony trains, which would have left only about 150 riders inbound and 130 outbound. CTPS Spring 2000 one-day counts found 255 inbound A.M. peak riders and 215 outbound P.M. peak riders, however. Some riders have shifted from other P&B routes that have been dropped or curtailed, but some new riders have apparently been gained since 1998 as well.

Scituate Route

In October 1996 this route had five peak round trips carrying about 175 inbound and 135 outbound riders a day. One year after the Old Colony startup, ridership had fallen to 70 inbound and 85 outbound riders, and service had been reduced to three peak round trips. The Old Colony lines do not provide direct service to any of the towns on this route. The 1998 survey results indicate that only about 15 riders were lost from towns in which this was the only P&B route. Most of the passenger losses occurred at the Rockland park-and-ride lot, but some of these riders switched to other P&B routes that also stop there. Further cutbacks left two round trips after July 1999, and one starting in June 2000. Prior to the latter cutback, a one-day count had found 75 outbound riders.

Marshfield - Boston Route

The P&B Marshfield route was carrying 70 to 75 riders each way per day on two peak round trips in October 1996. One year after the Old Colony startup this had dropped to 45 inbound and 60 outbound. The Old Colony survey results indicate that only about 20 riders were lost from towns in which this was the only P&B route. The Old Colony

lines do not provide direct service to any towns on this route. Some shifting of Rockland riders between this route and other P&B routes has also occurred. By the Spring of 2000, ridership had recovered to about 60 inbound and 70 outbound, with about 60% of the riders going to or from Rockland.

Hyannis/Orleans Route

In the Spring of 1996 ridership on this route included about 455 outbound P.M. peak riders a day boarding in downtown Boston. The Old Colony lines do not provide direct service to any towns with peak-period stops on this route, but the 1998 survey indicated that about 40 of the riders had switched to Old Colony trains. One-day counts in the Spring of 2000 showed a drop of only about 20 riders from 1996, indicating that about half of the initial loss had been offset by new or returning riders.

Brockton Route

One of the two routes discontinued by P&B since 1997 ran from Brockton to Boston. Brockton now has three Old Colony stations. In 1996, peak-period bus ridership was 30 to 35 riders a day on three trips each way. Just prior to the discontinuance in September 1998 ridership had fallen to 12 riders each way. The Old Colony survey found that the majority of the former bus riders had switched to the trains.

Pembroke Center Route

The other P&B route discontinued after the Old Colony startup ran from Pembroke Center to Boston. In 1996 this route had only one round trip per day, with about 35 riders each way. Just prior to the discontinuance in September 1998 ridership had fallen to 25 riders each way, but this included boardings at the Rockland park-and-ride lot which is also served by several other P&B routes. Available information indicates that the majority of the former riders of this route have switched either to Old Colony trains or to other P&B service. (The Old Colony Lines do not directly serve any of the same towns as the former Pembroke route.)

Marshfield - Braintree Route

This is the only P&B route that requires a Red Line transfer to reach Boston, and it is not included in the results in Table 3-1. Just before the Old Colony startup, this route was carrying 90 peak riders each way per day on four round trips. The Old Colony lines do not provide direct service to any towns on this route, but after one year of Old Colony service ridership had fallen to about 45 each way. After a service cutback to two round trips in 1999 ridership initially fell to 25 to 30 each way, but by the Spring of 2000 it had recovered to about 40.

Interstate Coach

Interstate Coach had the second-largest absolute ridership loss of any bus operator impacted by Old Colony service. The company's main route, from Middleborough Bridgewater, and West Bridgewater to Boston had about 225 inbound A.M. peak riders and 220 outbound P.M. peak riders in the Spring of 1996. Middleborough and Bridgewater are both served directly by Old Colony trains. The 1998 survey found that about 180 peak riders each way had switched from this route to Old Colony service. Service on the bus route has been reduced substantially since 1997. Figures from the winter and Spring of 2000 show ridership ranging between 35 and 50 each way per day.

Before the Old Colony startup, Interstate Coach also had a route from Easton and Stoughton to Boston. It had only one round trip a day, and was carrying only 13 riders each way in the Fall of 1997. Half of these riders had been lost by June 1998, when the route was discontinued. The Old Colony survey found that most of the riders lost while the bus route was still running had switched to the trains, but those who stayed with the bus until the end apparently shifted to alternatives other than Old Colony.

Brockton Area Transit (BAT)

The Brockton Area Transit (BAT) bus route from Brockton to Ashmont station had the third-largest ridership loss of any bus route in the present Old Colony service area. In 1994 about 330 riders a day rode to Ashmont on this route between 6:00 a.m. and 3:30 p.m. The 1998 survey found that about 120 of these riders had switched to Old Colony trains. BAT subsequently discontinued an express variation of this route.

JBL Bus Lines/Carey's Bus Lines

The fourth-largest ridership loss of any bus operator in the present Old Colony service area was that of Carey's Bus Lines, which formerly ran a route from Whitman to Boston. In 1996 this route was carrying 155 inbound and 130 outbound riders a day. Carey's reduced service to two round trips when the Old Colony lines opened, and had only 60 to 70 riders each way remaining four months later. The 1998 survey showed that most of the lost riders had switched to the trains. Carey's went out of business in March 1998, but JBL Bus Lines took over the route and has continued running two round trips a day. A CTPS count in May 2000 found a total of only 33 outbound riders remaining.

Bonanza Bus Lines

With two routes impacted by Old Colony service, Bonanza Bus Lines initially had the fifth-largest ridership loss of any affected carrier, but Bonanza ridership has recovered to a greater extent than most of the others since 1998.

At the time of the 1998, survey the Bonanza route from Woods Hole and Buzzards Bay to Boston had lost slightly fewer riders to Old Colonytrains than the Amercian Eagle New Bedford route, and slightly more riders than the Bloom's Taunton route. Losses

on the Bonanza route, unlike the losses on those two routes, have not increased since 1998, however. In October 1996 the Bonanza route had about 205 inbound and 185 outbound peak riders. The 1998 survey found that about 45 of these had shifted to trains. CTPS Spring 2000 counts found ridership still down by about this amount compared with 1996.

The Bonanza route from Newport and Fall River to Boston was impacted only slightly by Old Colony service. In October 1996 this route had about 130 peak riders each way. The 1998 survey showed that 13 of these had shifted to the trains, but a CTPS Spring 2000 count found about 35 more riders than there had been in 1996.

American Eagle Motor Coach

American Eagle Motor Coach initially had the sixth-largest ridership loss of any carrier affected by Old Colony service. In 1996 this company's New Bedford - Boston route was carrying about 350 riders a day each way during peak hours. The 1998 survey found that about 50 of these had switched to the trains. By Spring 2000 service had been reduced slightly and P.M. peak ridership was about 75 lower than in 1996.

Bloom's Bus Lines

At the time of the 1998 survey Bloom's Bus Lines showed the smallest ridership loss of any carrier affected by Old Colony service in absolute terms, but the percentage loss was slightly greater than that of American Eagle. In 1996 the Taunton - Boston route was carrying about 225 inbound and 165 outbound riders a day during peak hours. The 1998 survey found that about 35 inbound peak riders had switched to the trains. By Spring 2000 peak ridership was lower by about 70 each way than it had been in 1996.

DETAILED RIDERSHIP IMPACTS BY CARRIER AND ROUTE

American Eagle Motor Coach

Fairhaven, New Bedford, and Taunton to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 American Eagle busses from the Fairhaven/New Bedford/Taunton route arriving in Boston between 6:15 and 9:30 a.m. were carrying an average of 353 riders per day. Trips departing Boston between 3:00 and 6:15 p.m. were carrying an average of 344 riders per day. These totals were about 3% and 8% higher than corresponding averages from the Fall of 1994.

Ridership figures for off-peak service are not available. The trips included in the counts represented 55% of the service provided on the route in 1996, but would be expected to have carried a much higher percentage of the daily ridership.

This was the only private carrier route in the study area that not only had significantly higher ridership in the 1990s than it had had a decade earlier, but was also still experiencing ridership growth prior to the start of Old Colony service. One-day counts taken by CTPS during the same span of P.M. peak hours in conjunction with the Southeast Expressway reconstruction project showed 198 passengers boarding outbound buses on the New Bedford route in December 1983 and 187 in April 1984. The October 1996 total was 78% higher than the average of these two counts. The number of peak departures had increased 50% in the intervening years. Factors involved in the ridership gain included an approximate doubling of the total number of New Bedford residents working in Boston between 1980 and 1990, extension of the outer end of the route from New Bedford to Fairhaven in 1992, and the addition of a stop at the Galleria Mall in Taunton on some trips.

The Old Colony lines do not provide direct service to any of the same cities or towns as the American Eagle route. Nevertheless, the 1998 survey results indicated that 64 Old Colony riders were former American Eagle riders. Of these, 52 used trains arriving in Boston before 9:30 a.m. This was equivalent to 14% of the A.M. peak ridership on the bus route in October 1996, and was about equal to the seating capacity of one bus.

Ridership figures for American Eagle subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study. All-day averages provided for the MBTA New Bedford/Fall River Commuter Rail Extension EIR show a decline of 98 riders each way per day on the bus route between 1997 and 1999 (from 445 to 347). This implies that there were additional diversions after the Old Colony survey was conducted.

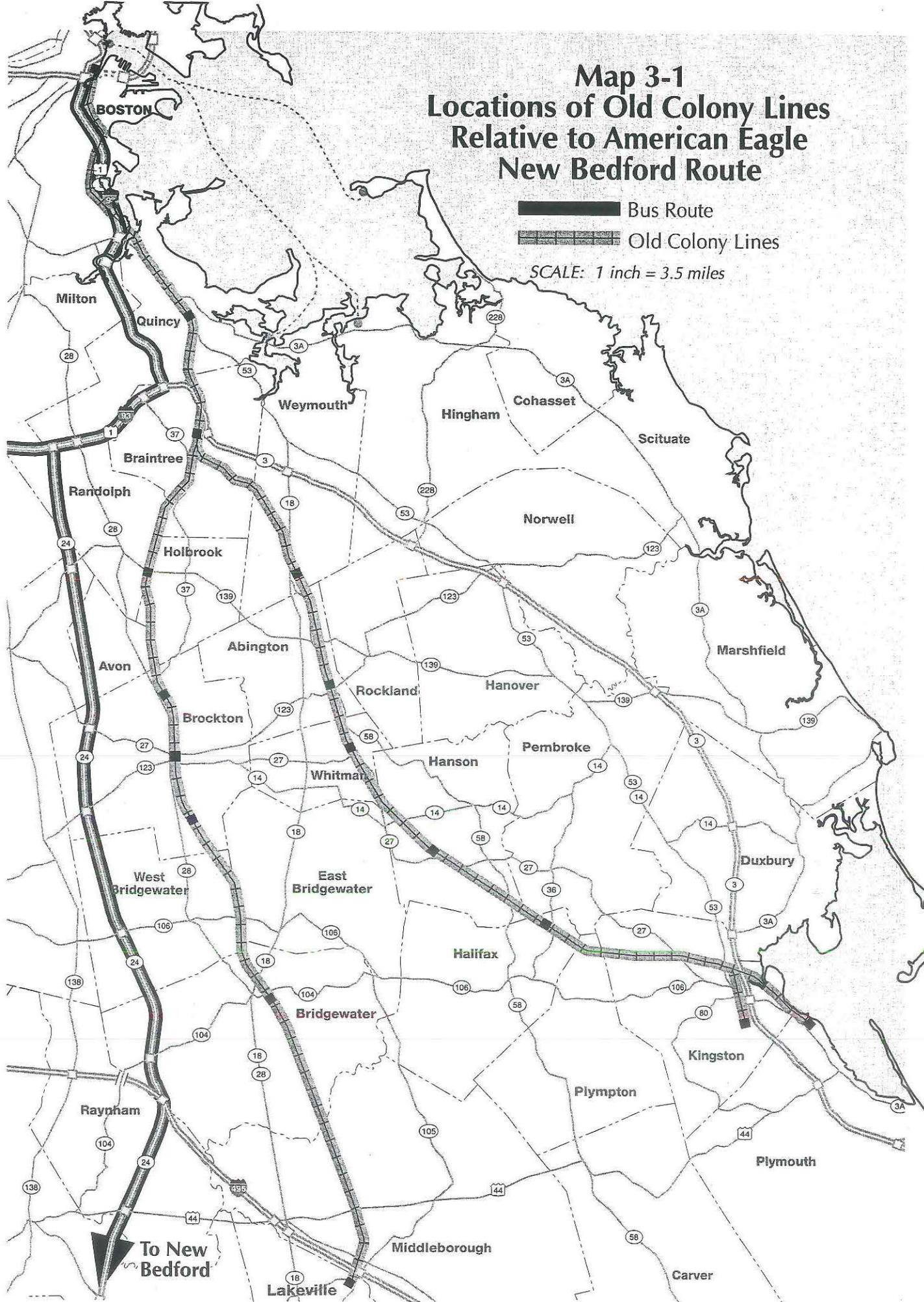
In August 1998, American Eagle discontinued two inbound A.M. peak trips, one outbound P.M. peak trip, and one late-night outbound trip. Departure times of several P.M. peak trips were revised at the same time. A second outbound P.M. peak trip was dropped in January 2000. These changes are consistent with the level of ridership diversions indicated by the survey and EIR figures above. The first bus service cutback preceded the survey, but the remaining service frequency was sufficiently great that the cutback itself probably did not cause many riders who would not otherwise have shifted to the trains to do so.

A one-day CTPS count in April 2000 showed 269 passengers boarding American Eagle busses leaving Boston between 4:30 and 6:00 p.m. This was a decrease of 75 riders compared with the October 1996 average reported for the same time span. It implies that after the Old Colony survey, peak ridership had the largest absolute losses, but that off-peak ridership declined at a slightly faster rate.

Map 3-1 Locations of Old Colony Lines Relative to American Eagle New Bedford Route

Bus Route
Old Colony Lines

SCALE: 1 inch = 3.5 miles



Bloom's Bus Lines

Taunton, Raynham, and Easton to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 Bloom's Taunton busses arriving in Boston between 6:30 and 9:00 a.m. were carrying an average of 224 riders per day. Trips departing Boston between 4:30 and 6:00 p.m. were carrying an average of 164 riders per day. Compared with Fall 1994, the morning total was unchanged but the evening total was down about 15%. Evening service did not change between these counts, but morning departure times were changed and there was a net reduction of one trip. Some of the losses in those years may have resulted from park-and-ride passengers at the Galleria Mall in Taunton shifting to American Eagle buses that also stopped there. The net gain in American Eagle riders in the same time interval was much lower than the drop in Bloom's ridership, however.

The trips included in the counts represented only 35% of the service provided on the Bloom's route at the time, but accounted for about 70% of the weekday riders. Available figures do not show how many riders traveled through to or from Fall River, Somerset, or Dighton on the single trip in each direction extending south of Taunton. Average total ridership on the morning and evening Fall River trips did not usually differ significantly from average loads on the trips originating or terminating in Taunton, however.

Peak-period ridership on the route was nearly the same in 1996 as it had been in 1984, despite the addition of service to South Easton and East Taunton in the interim. One-day counts taken by CTPS during the same span of P.M. peak hours in conjunction with the Southeast Expressway reconstruction project showed 174 passengers boarding outbound buses on the Taunton route in December 1983 and 152 in April 1984. The October 1996 total was the same as the average of these two counts. The number of peak departures was the same in 1996 as in 1983 and 1984, but there had been some changes in specific departure times. During the older counts buses on this route stopped only in downtown Taunton and Raynham before proceeding to Boston. About 1992, a stop was added at Route 106 in the south edge of Easton, and some trips were extended to the Silver City Galleria Mall or to Route 79 in East Taunton.

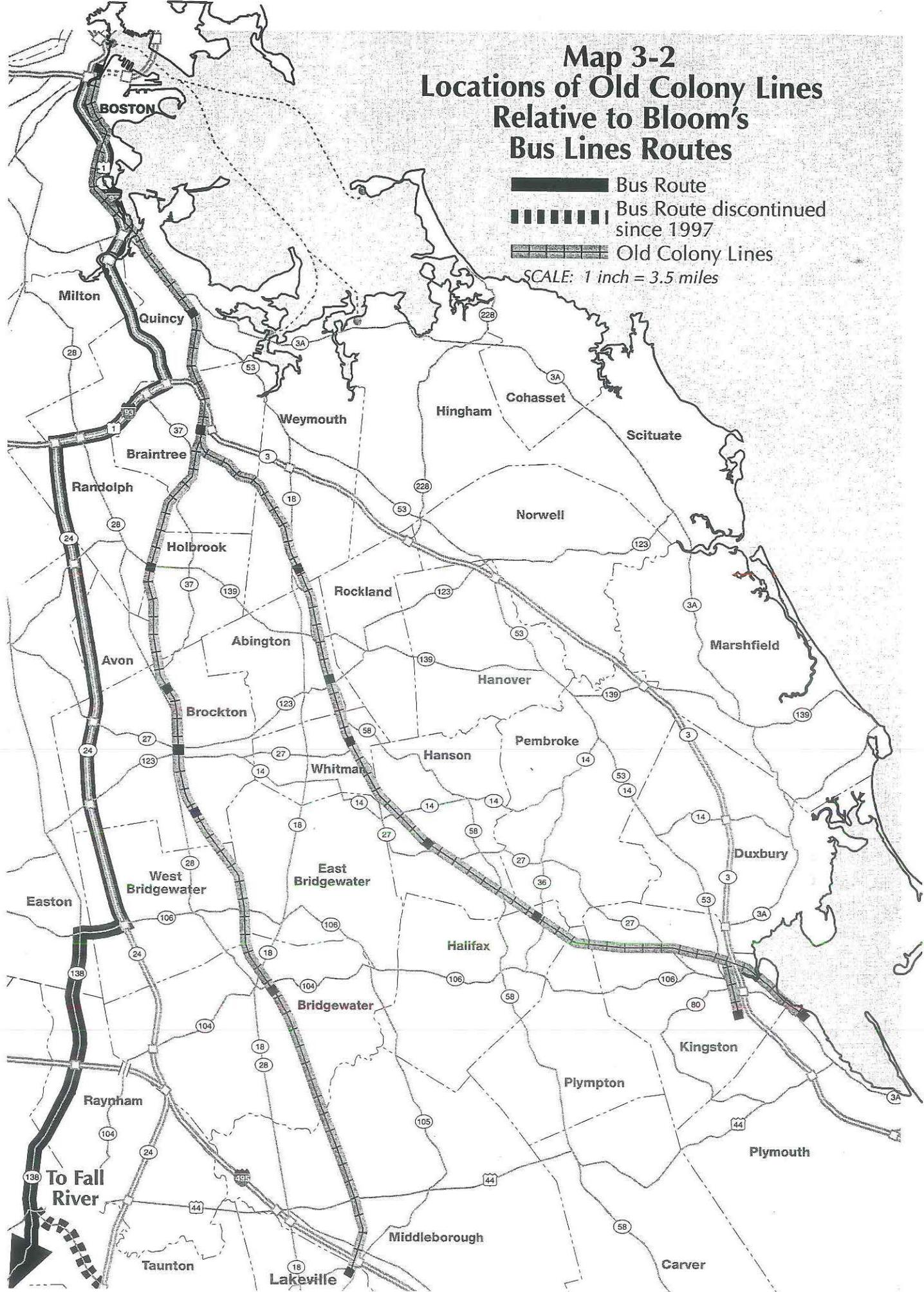
The number of Taunton residents employed in Boston was four times as great in 1990 as in 1980. Improvements in commuter rail service on the Attleboro/Stoughton Line were partly responsible for the lack of growth in bus ridership from Taunton. The results of the 1993 commuter rail survey showed a much smaller number of Taunton residents using trains than using busses in any of the counts, however.

The Old Colony lines do not provide direct service to any of the same cities or towns as the Bloom's route. Nevertheless, The 1998 survey results indicated that 46 Old Colony riders were former Bloom's Bus riders. Of these, 36 used trains arriving in Boston

Map 3-2 Locations of Old Colony Lines Relative to Bloom's Bus Lines Routes

-  Bus Route
-  Bus Route discontinued since 1997
-  Old Colony Lines

SCALE: 1 inch = 3.5 miles



before 9:30 a.m. This was equivalent to 16% of the A.M. peak Bloom's ridership in October 1996, and was about 75% of the seating capacity of one bus.

Ridership figures separated by peak and off-peak service for Bloom's subsequent to the Old Colony startup are unavailable. Bloom's has received IDTS funding since the mid-1980s, but the number of trips covered in the contracts, and hence the number for which ridership totals have been reported to the MBTA, has varied.

IDTS figures indicate that in September 1997, the last month before the start of Old Colony service, the Taunton route was carrying an all-day average of 543 riders per weekday in both directions combined, or 272 each way. In September 1998, after one year of Old Colony operation, Bloom's ridership had dropped to 424 total or 212 one way. The drop of 60 (22%) is higher than the 46 all-day diversions to rail found in the survey which was conducted the same month. The difference could have resulted from imprecision in survey expansion or from ridership losses unrelated to the rail service. As noted above, Bloom's ridership had already shown some decline before 1997. In September 1999, after two years of Old Colony service, Bloom's ridership had dropped to 387 total or 194 one way. This was a loss of 78, or 29% from 1997.

Bloom's did not make any changes in service from pre-Old Colony levels until January 2000. At that time one peak round trip and one midday round trip were dropped and the East Taunton/Galleria Mall extension was discontinued entirely. The reduction in peak seats provided exceeded the number of peak rider diversions found in the survey, but was less than the loss implied by the IDTS reports. Most peak trips had been running at well below seating capacity even before the start of Old Colony service.

A one-day CTPS count in April 2000 showed 95 passengers boarding Bloom's busses leaving Boston between 4:30 and 6:00 p.m. This was a decrease of 69 riders compared with the October 1996 average reported for the same time span. On-board counts in June 2000 showed a total of 155 passengers riding to Boston on Bloom's busses arriving there before 9:30 a.m. this was also a drop of 69 compared with the October 1996 average reported for the same time span. These results indicate that most of the ridership diversions from Bloom's service after the Old Colony survey were from peak-period trips.

The on-board counts show that 80% of the riders (122) boarded in Taunton. Raynham was the next-largest source of riders, with 15% (23) followed by Easton, with 4% (6). Only two riders who boarded at points south of Taunton rode through to Boston on the one trip originating in Fall River.

Bonanza Bus Lines

Route 2030 - Woods Hole and Buzzards Bay to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 Bonanza Woods Hole/Falmouth and Buzzards Bay/Wareham busses

arriving in downtown Boston between 6:45 and 9:40 a.m. were carrying an average of 199 riders per day. (Of these trips, three terminated downtown and three continued to Logan Airport.) Trips departing downtown Boston between 3:00 and 6:00 p.m. were carrying an average of 187 riders per day. (Two of the six trips originated at Logan.) These were about 8% lower than the November 1994 counts (adjusted for seasonal variation). Some of the dropoff may have been caused by passengers shifting to Plymouth & Brockton buses because of improvements in that company's Cape Cod service.

Ridership figures for off-peak service are not available. The trips included in the counts represented 48% of the service provided on the route in October 1996, but would be expected to have carried a higher percentage of the daily ridership.

This route always has substantial seasonal variation in service and ridership because of the large component of vacation and recreational travel to and from Cape Cod. This must be taken into account when comparing results of various counts. One-day counts taken by CTPS for buses leaving downtown Boston on this route between 4:00 and 6:00 p.m. in conjunction with the Southeast Expressway reconstruction project showed 124 boardings in December 1983 and 133 in April 1984. Buses departing in the same time span had 139 riders in December 1995 and 152 in April 1996. This was a gain of 12% in the December counts and 14% in the April counts.

The Old Colony lines do not provide direct service to any of the same cities or towns as the Woods Hole/Buzzards Bay route. Nevertheless, the 1998 survey results indicated that 51 Old Colony riders were former users of this route. Of these, 44 used trains arriving in Boston before 9:30 a.m. This was equivalent to 22% of the A.M. peak ridership on the bus route in October 1996, and was slightly less than the seating capacity of one bus.

This route does not currently receive IDTS funding. Ridership figures subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study. Peak-period service on the route was still the same in January 2000 as it had been prior to the start of Old Colony service, but in off-peak hours most service to Wareham (which had been provided by through buses to or from Woods Hole) had been eliminated.

A one-day CTPS count in May 2000 showed a total of 160 passengers aboard Bonanza Woods Hole/Buzzards Bay busses scheduled to arrive in Boston between 6:45 and 9:40 a.m. (This included South Station alightings and passengers continuing to Logan Airport.) For comparison, figures from the HOV lane study showed an average of 206 riders per day on the same trips in May 1996. The decrease of 46 is very close to the 44 diversions indicated by the 1998 survey. From May 1996 to May 2000, buses originating in Woods Hole or Falmouth lost 28 riders, and those originating at Buzzards Bay lost 18. In contrast, the survey results indicated losses of 15 and 29 respectively. The overall pattern of changes suggests that some riders who formerly used the Woods Hole bus scheduled to arrive in Boston at 8:30 have taken advantage of parking capacity in

Wareham freed-up by commuter rail diversions and are now using the bus scheduled to arrive in Boston from there at 8:00.

Route 2040 - Newport and Fall River to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 Bonanza Newport and Fall River busses arriving in Boston between 7:25 and 9:40 a.m. were carrying an average of 132 riders per day. Trips departing Boston between 4:00 and 6:00 p.m. were carrying an average of 129 riders per day. These were about the same as the November 1994 averages (adjusted for holidays).

Ridership figures for off-peak service are not available. The trips included in the counts represented 50% of the service provided on the route in October 1996, but would be expected to have carried a higher percentage of the daily ridership.

Peak-period ridership on the route was slightly higher in 1996 than it had been in 1984, but the absolute gain was insignificant. One-day counts taken by CTPS during the same span of P.M. peak hours in conjunction with the Southeast Expressway reconstruction project showed 113 passengers boarding outbound buses on the Newport/Fall River route in December 1983 and 120 in April 1984. The HOV lane study results show that ridership on this route in December and January is usually much lower than in other months, so the April 1984 counts are better for purposes of long-range comparisons.

The Old Colony lines do not provide direct service to any of the same cities or towns as the Newport/Fall River route. Nevertheless, the 1998 survey results indicated that 13 Old Colony riders were former users of this route. All of them used trains arriving in Boston before 9:30 a.m. This was equivalent to 10% of the A.M. peak ridership on the bus route in October 1996, and was about 25% of the seating capacity of one bus.

This route does not currently receive IDTS funding. Ridership figures subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study, but the low diversion rate in the survey is consistent with the distance between the bus and rail lines. Service on the bus route was the same in early 2000 as it had been before the Old Colony startup.

A one-day CTPS count in May 2000 showed a total of 172 passengers alighting at South Station from Bonanza Fall River/Newport busses scheduled to arrive there between 7:25 and 9:40 a.m. For comparison, the HOV lane study results showed an average of only 137 riders on the same trips in May 1996. The gain of 35, or 25%, indicates that ridership growth on this route has more than offset any diversions to the Old Colony Lines. The increase may include some riders who formerly drove from Fall River or Newport to stations on the Attleboro/Stoughton commuter rail line but have stopped doing so because of increasing uncertainty of finding parking spaces.

Interstate Coach

Middleborough, Bridgewater, and West Bridgewater to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of March 1996 Interstate Coach busses arriving in Boston between 6:30 and 9:00 a.m. were carrying an average of 224 riders per day. (This was the last month for which the company provided figures for that project.) Of these riders, 176 used buses covering the full route from Middleborough and 48 used busses originating at the Bridgewater park-and-ride lot or in East Bridgewater. In the same month, trips departing Boston between 4:00 and 6:45 p.m. were carrying an average of 219 riders per day, with 175 on Middleborough trips and 45 on Bridgewater or East Bridgewater trips. These figures were about 1% higher than those from the Fall of 1994, but the absolute gain was only three riders each way. The trips included in the counts represented 83% of the service provided on the route at the time, and probably accounted for an even higher percent of weekday riders.

Peak-period ridership on the route was only 3% higher in 1996 than it had been in 1984 despite a 67% increase in the number of peak trips operated. One-day counts taken by CTPS during the same span of P.M. peak hours in conjunction with the Southeast Expressway reconstruction project showed 213 passengers boarding outbound Middleborough and Bridgewater buses in April 1984. These were carried on only seven trips, compared with the ten run in 1996. In the A.M. peak, only five trips were run in 1984, compared with ten in 1996. In contrast with the low ridership gain, the number of Middleborough, Bridgewater, and West Bridgewater residents employed in Boston Proper increased by about 30% between 1980 and 1990.

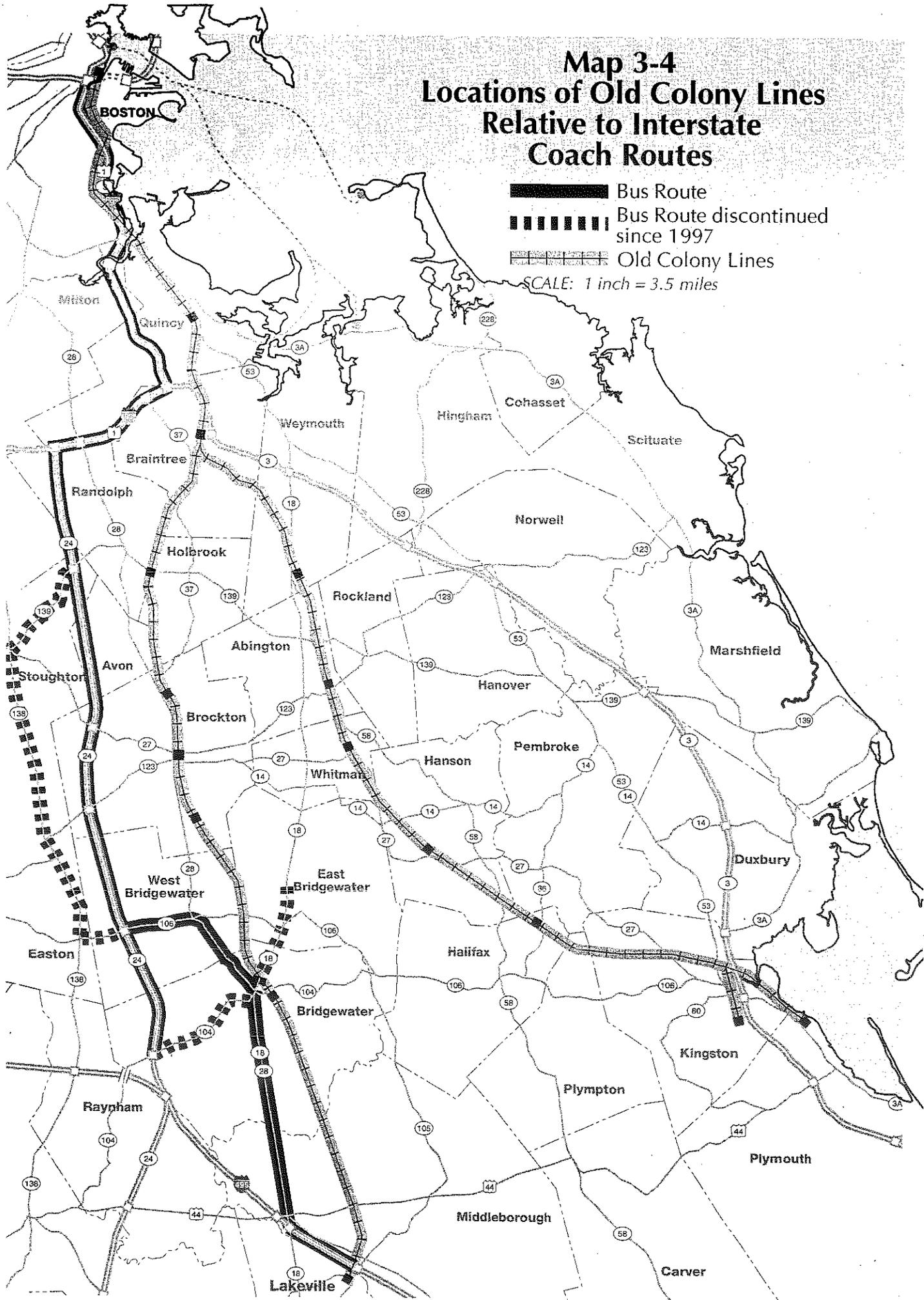
The Old Colony Middleborough/Lakeville Line provides direct service to Middleborough and Bridgewater. West Bridgewater is not served directly, but has convenient access to Campello Station in Brockton. The 1998 survey results indicated that 190 Old Colony riders were former Interstate Coach riders. Of these, 181 used trains arriving in Boston before 9:30 a.m. This was equivalent to 81% of the A.M. peak Interstate Coach ridership in October 1996, and was equal to the seating capacity of four busses. This would have left about 45 inbound A.M. peak riders per day on the busses if they had no other gains or losses after March 1996.

Interstate Coach ridership figures subsequent to the Old Colony startup are not available at the same level of detail provided for the HOV lane study. Ridership reported under the IDTS program during the first two years of Old Colony operation did not include all Middleborough trips. Figures starting with September 1999 include all remaining Interstate Coach service. This consists of one inbound trip each from Middleborough and Bridgewater and three from West Bridgewater in the A.M. peak. In the P.M. peak there are two outbound trips each to West Bridgewater and Bridgewater and one to Middleborough. From September 1999 to February 2000, monthly ridership on this service averaged 35 to 40 riders each way per day, compared with the 45 that the survey indicates would have remained. Some of the difference would represent

Map 3-4 Locations of Old Colony Lines Relative to Interstate Coach Routes

-  Bus Route
-  Bus Route discontinued since 1997
-  Old Colony Lines

SCALE: 1 inch = 3.5 miles



additional diversions to trains since September 1998. Some former bus riders who no longer use the bus service because of the frequency reduction may not have switched to trains, however.

One-day on-board counts conducted by CTPS during April and May 2000 found a combined total of 49 riders on the five inbound trips. This implies that there has been some improvement since earlier in the year. The IDTS figures are combined two-way totals, and the one-way numbers calculated above assume equal ridership in both directions. If ridership is typically higher inbound than outbound, the actual ridership gain since early 2000 would be smaller than implied, however.

On the one trip still serving Middleborough, there were no boardings in that town on the count day. The bus driver reported that there was usually one passenger there. The same trip is also the only one serving stops in Bridgewater other than the park-and-ride lot. There were no boardings at these stops on the count day, but the driver reported that there were sometimes as many as five. The one trip serving the Bridgewater park-and-ride lot had no boardings there. Of the total 49 boardings in West Bridgewater, 45 took place at the park-and-ride lot at routes 106 and 24.

Boarding counts by individual stop prior to the Old Colony startup are not available. The CTPS Spring 2000 counts show total boardings in West Bridgewater (which is not served directly by commuter rail) to have been almost exactly the same as boardings on the East Bridgewater and Bridgewater short-turns alone in 1996. This suggests that most of the riders on those trips in 1996 also boarded at the West Bridgewater lot. On the count day, the route segment in Middleborough showed a 100% ridership loss, compared with an 83% service reduction from 1996.

Easton and Stoughton to Boston

For several years preceding the startup of Old Colony service, the Interstate Coach Easton/Stoughton route was served by only a midday round trip variation of the Middleborough route, and by the last outbound Middleborough trip, leaving Boston at 6:45 p.m. Only the latter trip was among those for which ridership was reported for the HOV lane monitoring project. In March 1996, the last month for which figures are available, that trip carried an average of 18 riders a day, but this included passengers for West Bridgewater, Bridgewater, and Middleborough as well as for Stoughton and Easton. This was about the same level of ridership on that trip as in Fall 1994.

In March 1984, when there were still three outbound P.M. peak bus trips running from Boston to Stoughton and Easton as a separate route, CTPS one-day counts found only 18 riders per day. Therefore, this route was clearly failing long before the start of Old Colony service.

In July 1997, Interstate Coach discontinued the operation of Middleborough buses via the Easton/Stoughton route, but began running an early-morning trip from Easton due in Boston at 6:20 a.m., and an early P.M. peak trip to Easton leaving Boston at 4:00 p.m.

Both trips were designed to fill in gaps in the Stoughton commuter rail schedule, and received IDTS funding. Just prior to the start of Old Colony service, these Easton trips were carrying an average of 13 riders each way per day. No information is available on the origins of these riders. Because of the availability of more frequent bus service to Boston from adjoining towns, it is reasonable to assume that all or most Easton route riders had outer trip ends in Easton or Stoughton.

The Old Colony lines do not serve Easton or Stoughton directly. Stoughton is the outer terminal of a commuter rail line that pre-dated the bus route but had had service greatly increased starting in March 1984. For passengers still boarding busses in Stoughton, Old Colony service would have been no more convenient than going to Stoughton station for commuter rail service. The 1998 survey found a total of only eight Old Colony trips originating in Stoughton and none were former bus users. Easton adjoins Brockton, and some Easton residents find stations in that city more convenient than other commuter rail stations that they formerly used. The survey indicated that only four Easton residents were former users of the Interstate Coach bus route.

Ridership on the Easton/Stoughton busses dropped to an average of seven each way per day immediately after the start of Old Colony service. It was down to five or six by the time the bus route was discontinued entirely at the end of June 1998. The level of implied diversions from this route to Old Colony service is somewhat greater than found in the survey, but the absolute difference is insignificant. The survey was conducted after the bus route was discontinued, however, so some of the bus users apparently switched to alternatives other than Old Colony trains.

JBL Bus Lines/Carey's Bus Lines

Whitman to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 busses on the Whitman to Boston bus route (then run by Carey's Bus Lines) arriving in Boston between 7:00 and 9:00 a.m. were carrying an average of 155 riders per day. There were four trips from Whitman (one via Rockland) and one short-turn from South Weymouth. Trips departing Boston between 4:30 and 6:00 p.m. were carrying an average of 132 riders per day. There were four trips, all to Whitman, of which one ran via Rockland. There was no other service on this route, so about 15% of the passengers who rode it inbound each day used alternate means of returning outbound.

Compared with Fall 1994, the morning and evening totals both showed gains of 32%. Schedules did not change between the two counts, except for a minor adjustment in the departure time of one morning trip. These gains represented a continuing recovery of ridership that had been lost between 1991 and 1994. Ridership in October 1996 was almost exactly the same as it had been in October 1991. After October 1996, ridership leveled off again. In September 1997, the last month before Old Colony service started, ridership averaged 152 inbound and 128 outbound per day.

Ridership on the same route had been much higher in the 1980s. One-day counts taken by CTPS during the same span of P.M. peak hours in conjunction with the Southeast Expressway reconstruction project showed 221 passengers boarding outbound South Weymouth, Rockland, and Whitman buses in December 1983, and 187 in April 1984. The September 1997 total was 38% lower than the average of these. The number of scheduled trips had been reduced by 41% in the same time.

Of the towns that were served by the Whitman bus route prior to the start of Old Colony service, Whitman, Abington, Weymouth, and Braintree all have stations on the Plymouth/Kingston Line. Rockland does not have direct train service, but the Abington station is only about one half mile from the border of Rockland. Because of this close competition, the IDTS program contract for this bus route called for funding to be terminated upon the start of Old Colony service.

The bus service had required a subsidy for many years even without Old Colony service. Carey's did not wait to see how much ridership would be lost, but announced that effective one week after the Old Colony startup, service would be reduced to the two most heavily patronized trips in each direction. The discontinued trips included the only one each way that had served Rockland. By January 1998, total ridership had fallen to an average of 60 to 70 each way per day, or about what the retained trips alone had carried before the cutback. Carey's planned to cease operations entirely in March 1998, but as a result of lobbying by the remaining passengers, JBL Bus Lines agreed to take over the service with no operating subsidy.

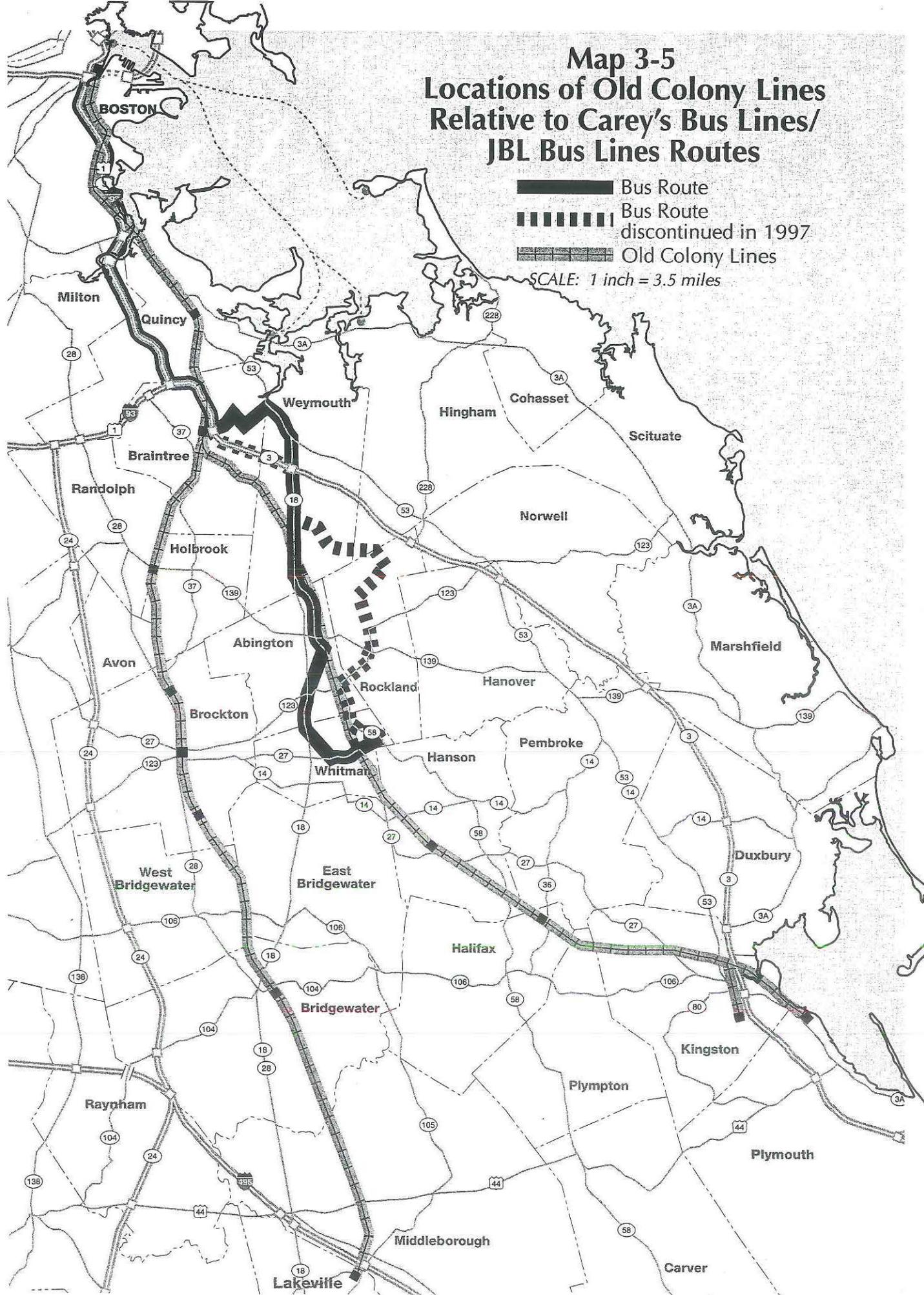
The September 1998 Old Colony survey results indicated that 87 former users of the Carey's/JBL bus route had switched to trains by then. Most of them used the Plymouth/Kingston Line. These diversions were equivalent to 57% of the inbound ridership on the bus route in September 1997, and would have left 68 riders on the buses. This agrees with the January 1998 bus ridership total, implying that riders not lost to the train in the first few months had stayed with the busses.

JBL was still providing two round trips a day in 2000, but ridership figures were not available. A one-day count by CTPS in May 2000 found a combined total of 33 outbound boardings at all of the Boston stops, with ridership about equally divided between the two trips. This was only half the level of ridership reported to have remained when JBL took over the route in 1998. Some of the additional loss is probably a result of further diversions to Old Colony service. It is also likely that with the reduced service frequency and higher fares, the bus route has failed to attract new riders to replace old riders who left for various reasons such as changes in work or home locations.

Map 3-5 Locations of Old Colony Lines Relative to Carey's Bus Lines/ JBL Bus Lines Routes

-  Bus Route
-  Bus Route discontinued in 1997
-  Old Colony Lines

SCALE: 1 inch = 3.5 miles



Plymouth & Brockton Street Railway Company

Overview of Problems in Ridership Comparisons

Changes from year to year in ridership on most P&B routes are difficult to assess accurately because of frequent service re-configurations and overlap in the service provided by several routes. At present, only the Hyannis route has direct service to Logan Airport, and most busses going to or from Logan bypass downtown Boston. At many times in the past, however, much or all of the Logan service was provided by extensions of downtown Boston trips. Available ridership figures for such combined trips do not separate Logan riders from downtown riders. Consequently, apparent changes in ridership may be largely a result of differences in the ways that riders are accounted for. With most P&B Logan busses bypassing downtown Boston, riders from other P&B routes that do not go to Logan can no longer transfer in Boston to travel to the airport. Transfers are possible at some outlying points served by multiple routes, but the connections are not well publicized.

The P&B Plymouth terminal, in addition to being the outer end of the Plymouth local and express routes, is served as an intermediate stop on many Hyannis trips in both directions. The park-and-ride lot in Rockland is served by selected trips on the Hyannis and Plymouth routes and also by the Duxbury/Marshfield and Scituate routes. Changes in the number of trips on each route serving the common stops and in the scheduled arrival or departure times of these trips would be expected to have resulted in some shifting of passengers among routes.

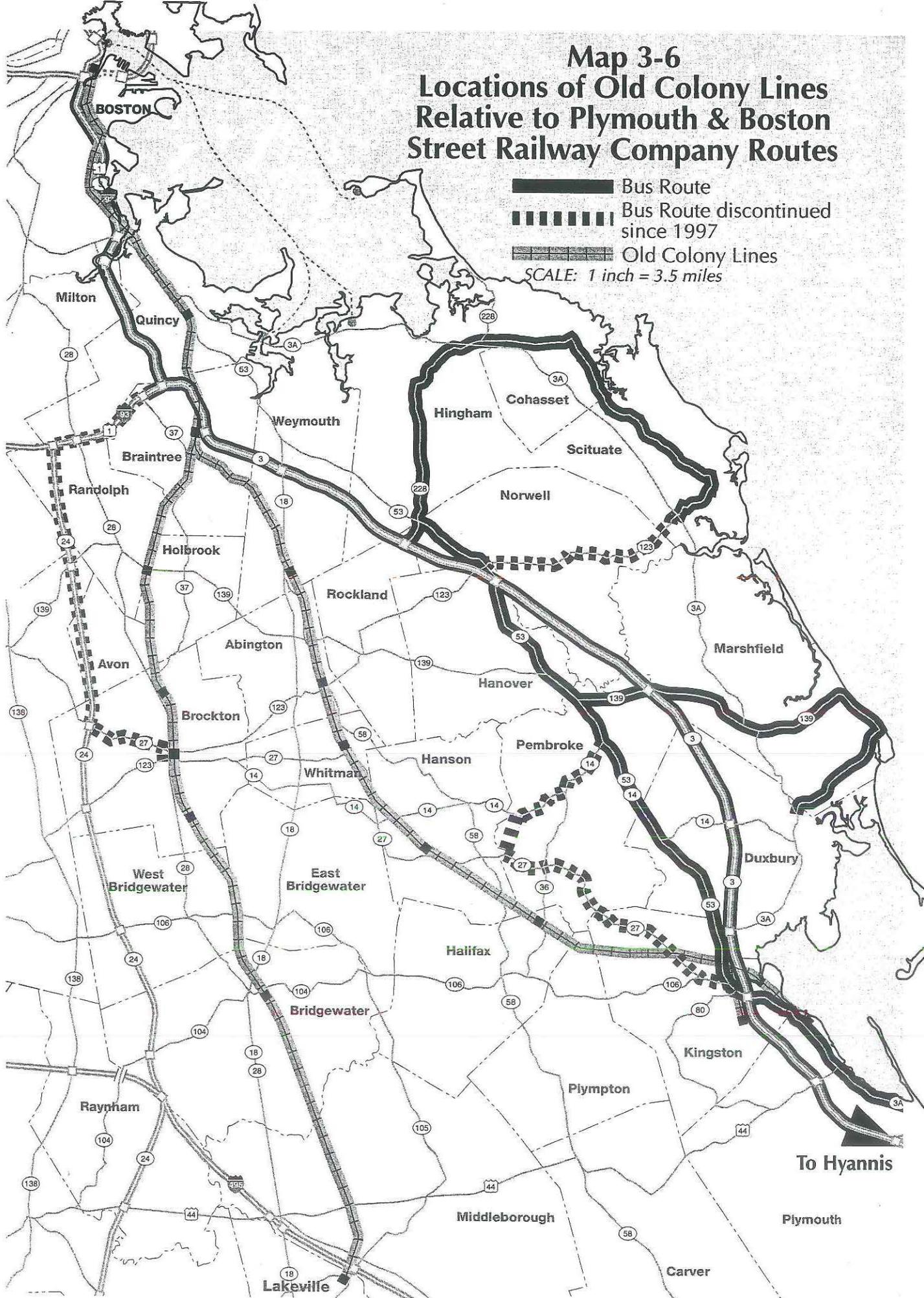
Route 2451 Hyannis or Orleans to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of September 1996 P&B Hyannis or Orleans busses arriving in downtown Boston between 6:00 and 9:40 a.m. were carrying an average of 485 riders per day. Of 15 scheduled trips in this span, four continued on to Logan Airport. There were no trips to Logan by-passing downtown Boston. Trips departing downtown Boston or Logan between 2:45 and 6:15 p.m. were carrying an average of about 540 riders per day. Of 17 scheduled trips in this span, four picked up both downtown and at Logan, four at Logan only, and nine only downtown. Of the total riders, an estimated 60 originated at Logan and 480 in downtown Boston. The morning and evening totals were both about the same as the corresponding totals from two years earlier. Ridership figures for off-peak service are not available. The trips included in the counts represented 50% of the service provided on the route in September 1996, but would be expected to have carried a much higher percentage of the daily ridership.

This route always has substantial seasonal variation in service and ridership because of the large component of vacation and recreational travel to and from Cape Cod. This must be taken into account when comparing results of various counts. Two one-day counts taken by CTPS in March and April 1984 for buses leaving downtown Boston on this route between 3:45 and 6:00 p.m. showed an average of 432 boardings. Two of the

Map 3-6 Locations of Old Colony Lines Relative to Plymouth & Boston Street Railway Company Routes

-  Bus Route
 -  Bus Route discontinued since 1997
 -  Old Colony Lines
- SCALE: 1 inch = 3.5 miles



buses originated at Logan Airport, and the counts included passengers who boarded there. There were no trips serving Logan exclusively. P&B Hyannis buses leaving downtown Boston in the same span in March and April 1996 carried an average of 387 riders a day. Another 46 riders used buses picking up only at Logan, making a combined total of 433 boardings. This was almost exactly the same as the 1984 count results.

The Old Colony lines do not provide direct service to any of the same towns as the P&B Hyannis route during peak hours. During off-peak hours, the Plymouth/Kingston Old Colony line and Hyannis buses both serve Plymouth. (Most off-peak service by P&B buses originating in Plymouth had been discontinued before the start of Old Colony service.) The 1998 survey showed ridership diversions from buses by company but not by individual route. Based on the specified trip origins, 38 former users of P&B Hyannis/Orleans buses (excluding boardings at Plymouth or Rockland) had switched to trains by September 1998. All of these used trains arriving in Boston between 6:00 and 9:30 a.m. This was equivalent to 8% of the A.M. peak ridership on the bus route in September 1996, and was about 75% of the seating capacity of one bus.

Ridership figures for the P&B Hyannis/Orleans route subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study. The main change in service on the route since the Old Colony startup is that service to Logan Airport and to downtown Boston has been separated more. As of January 2000, only one round trip in the early morning and three in the evening served both the airport and downtown.

One-day counts by CTPS in late April and early May 2000 found 314 boardings at South Station and 119 at Park Square, or a total of 433, on buses departing between 3:00 and 6:35 p.m. Logan boardings were not counted. Excluding Logan boardings, the corresponding service in April and May 1996 had carried an average of about 455 riders a day. The Spring 2000 counts indicate a decrease of 22, compared with the 38 diversions to commuter rail found in the survey. This implies that growth since 1998 has offset about half of the ridership lost to Old Colony service from this route.

Route 2453 - Duxbury and Marshfield to Boston

This route has always had relatively infrequent service. Since 1992 it has had only two inbound A.M. peak and two outbound P.M. peak trips, all with the outer ends at state Routes 3A and 139 in the north edge of Duxbury. The Rockland park-and-ride lot is the only outlying stop served both by this route and by other P&B routes.

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 the two inbound trips on this route were carrying a combined total of 76 riders a day. The two outbound trips were carrying 70 riders a day. Overall, this was an increase of 55% compared with late 1994. The gain appears to have resulted from schedule changes on the Plymouth route that made the Marshfield/Duxbury buses relatively more convenient for some Rockland passengers, and from improved travel

times attributable to use of the HOV lane. Other routes did not show a net decrease, so system ridership as a whole increased.

One-day counts taken by CTPS in March and April 1984 had found an average of 143 outbound P.M. peak riders on the route. At that time, there were five outbound P.M. peak trips, including two that continued beyond the present outer terminal to South Duxbury. (One of the three shorter trips had been added experimentally, and carried almost no riders, however.) Ridership in October 1996 was slightly less than half that in the Spring of 1984, but average loads were slightly higher because of the service reduction. The decrease in Marshfield and Duxbury riders was even greater, however, as most buses on the route did not stop at the Rockland park-and-ride lot in 1984.

The Old Colony lines do not provide direct service to any of the same towns as the P&B Marshfield/Duxbury route, but the 1998 survey shows that the rail lines attract some riders from Marshfield and Duxbury. The survey shows ridership diversions from buses by company but not by individual route. Based on the specified trip origins, 21 former users of P&B Marshfield/Duxbury buses (excluding boardings at Rockland) had switched to trains by September 1998. This was equivalent to 28% of the A.M. peak ridership on the bus route in September 1996, and would have left 55 riders inbound and 49 outbound if there were no diversions from Rockland.

Service on the Marshfield/Duxbury route is currently funded under the IDTS program, IDTS reports show that the two round trips on the route were carrying 46 riders a day inbound and 59 outbound as of November 1998. The lower A.M. peak ridership compared with the survey calculation probably resulted from Rockland diversions, which could not be assigned to specific routes from the survey information. The higher-than-expected P.M. ridership can be explained by diversions of Rockland riders to the Marshfield/Duxbury route from trips discontinued on other routes in September 1998.

Starting in 1999, ridership figures reported under the IDTS program excluded passengers boarding or alighting at the Rockland park-and-ride lot, so they are not directly comparable with earlier figures. CTPS one-day counts in late April and early May 2000, which did not separate riders by destination, showed 44 boardings at South Station and 24 at Park Square, or a total of 68, on the two outbound trips. This was only slightly lower than the 70 outbound riders that were being carried one year before the start of Old Colony service. On-board inbound counts, also from May 2000, showed a total of 62 riders, of which 38 (61%) boarded at the Rockland park-and-ride lot and the other 24 in Marshfield. (There were no boardings at the Duxbury stop.)

These counts are consistent with the IDTS figures for January 2000. Those show that excluding Rockland riders, there were 28 inbound and 27 outbound riders a day on the Marshfield/Duxbury route. Compared with the CTPS count, the IDTS total implies that nearly 60% of the outbound riders on the route were going to Rockland.

Route 2455A/2455B - Plymouth to Boston

At present, P&B identifies express service from Plymouth to Boston with stops only in Kingston and Rockland as Route 2455A. Service from Plymouth to Boston serving stops along state Route 53 in Duxbury, Pembroke, Hanover, and Norwell is identified as Route 2455B. In the past, this service was all identified as variations of a single Route 2455. Because of that, and the ability of some riders to use service on either variation, they are examined together here.

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996, P&B Plymouth route busses arriving in downtown Boston between 6:20 and 8:55 a.m. were carrying an average of 614 riders per day. Trips departing downtown Boston between 3:00 and 6:00 p.m. were carrying an average of 593 riders per day. The morning and evening totals were both about 10% higher than the corresponding totals from two years earlier, with the most likely factor being improved travel times from use of the HOV lane.

Ridership figures for off-peak service are not available. The trips included in the counts represented 78% of the service provided on the route in September 1996, but would be expected to have carried a higher percentage of the daily ridership. Despite the tourist attraction of Plymouth, seasonal variation in ridership on the route has been insignificant in recent years. Two one-day counts taken by CTPS in 1984 showed 713 boardings in March and 675 in April, or an average of 694 on Plymouth route buses leaving downtown Boston between 3:00 and 6:00 p.m. The October 1996 average was a decrease of 101, or 15%, from this.

Of the towns served by the P&B Plymouth bus routes, only Plymouth and Kingston are served directly by the Old Colony Lines, and Plymouth is served only during off-peak hours. The Kingston station is only a short distance from the border of Plymouth, however. Duxbury, Pembroke, and Rockland each adjoin one or more towns on the Old Colony Plymouth/Kingston line. Hanover and Norwell are one town removed from that line. The 1998 survey showed ridership diversions from buses by company but not by individual route. Based on the specified trip origins, about 430 former users of P&B Plymouth buses (excluding boardings at Rockland) had switched to trains by September 1998. Of these, 405 used trains arriving in Boston between 6:30 and 9:30 a.m. Another 85 riders were diverted to A.M. peak trains from the Rockland park-and-ride lot. Allocating the latter to routes based on the number from each serving the lot in the A.M. peak, about 60 would have used Plymouth route buses. This would make a total of 465 diversions, equivalent to 76% of the A.M. peak ridership one year before the start of Old Colony service. With no other changes, this would have left 194 inbound A.M. peak and 173 outbound P.M. peak riders on the bus route.

Some cutbacks in service on the Plymouth route were made in June 1998, three months before the survey was conducted. More substantial cutbacks were made one week after the survey was distributed. The survey results do not show the number of riders who switched to the trains because of the later cutbacks.

Ridership figures for the P&B Plymouth route subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study. All service on the route has been included in the IDTS program since mid-1999, but the ridership figures for that program do not include passengers going to or from the Rockland park-and-ride lot.

CTPS one-day counts in late April and early May 2000, which did not separate riders by destination, showed 122 boardings at South Station and 61 at Park Square, or a total of 183 on trips leaving Boston between 3:00 and 6:00 p.m. The schedule in effect on the Plymouth bus route since September 1998 includes only two outbound trips outside the span covered in the HOV lane figures. These are an express trip leaving South Station at 6:25 p.m. and a local trip at 6:40 p.m. The CTPS Spring 2000 counts showed an additional 34 riders on these trips, making a grand total of 217. Of these, 135 rode one of the seven trips on the express variation (Route 2455A) and 82 rode one of the four trips on the local variation (Route 2455B).

Inbound on-board counts from May 2000 found a total of 254 riders. The inbound and outbound counts were both significantly higher than the remaining ridership implied by the Old Colony survey results. The difference was partly attributable to riders who switched to peak-period Plymouth buses from discontinued off-peak trips on the same route or from discontinued trips on other P&B routes, however.

Of the inbound riders counted, 179 rode one of the seven trips on the express variation, including 51 boarding at the Rockland park-and-ride lot and 128 at other stops. The other 75 passengers rode one of the three local trips, including 53 boarding at Rockland and 22 at other stops.

The express variation counts were very consistent with IDTS figures for January 2000. Those show that excluding Rockland riders, there were 130 inbound and 134 outbound riders a day. Only one of the seven outbound trips on this variation stops at the Rockland lot, so most of the total 135 outbound ones counted would have been going to stops other than Rockland.

For the local variation, on which all trips stop at Rockland, the January 2000 IDTS figures showed 29 riders a day inbound and 31 outbound at stops other than Rockland, so the CTPS count of 22 at those stops indicates a continuing decline.

Route 2456 - Scituate to Boston

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 P&B Scituate route buses arriving in downtown Boston between 6:30 and 9:00 a.m. were carrying an average of 177 riders per day. Trips departing downtown Boston between 4:30 and 6:30 p.m. were carrying an average of 133 riders per day. The directional imbalance resulted from a combination of passengers using an outbound afternoon trip outside the HOV count span and passengers riding Scituate buses inbound from Rockland but using buses on other P&B routes outbound. The morning

total was about 7% higher than the corresponding total from two years earlier, but the evening total showed a gain of 44% in the same span. The gain appears to have resulted from schedule changes on the Plymouth route that made the Scituate buses relatively more convenient for some Rockland passengers and from improved travel times attributable to use of the HOV lane. Other routes did not show a net decrease, so system ridership as a whole increased.

One-day counts taken by CTPS in March and April 1984 found an average of 431 outbound P.M. peak riders on the route in the same span of hours covered in the HOV lane study. In 1984, there were 13 trips in that span, compared with only four in 1994 and 1996. Therefore, ridership had decreased by 59% and service by 69% between 1984 and 1996. The ridership loss has previously been attributed to improvements in Hingham commuter boat service starting in the early 1980s.

The Old Colony lines do not provide direct service to any of the same towns as the P&B Scituate route, but the 1998 survey shows that the rail lines attract some riders from Hingham, Scituate, and portions of Marshfield for which the Scituate bus route would have been the most convenient one. The survey shows ridership diversions from buses by company but not by individual route. Based on the specified trip origins, 15 former users of P&B Scituate buses (excluding boardings at Rockland) had switched to trains by September 1998. This was equivalent to 9% of the A.M. peak ridership on the bus route in September 1996. Based on the percentage of total Rockland service provided by Scituate buses, 25 Rockland riders who formerly boarded Scituate busses at Rockland were diverted to Old Colony trains. This would have left the Scituate route with 137 inbound A.M. peak riders.

Service on the Scituate route was cut back to three inbound A.M. peak trips and three outbound P.M. peak trips in June 1998, three months before the survey was conducted. It was further reduced to two trips each way in July 1999. The survey results do not show the number of riders who switched to the trains because of the later cutbacks.

Ridership figures for the P&B Scituate route subsequent to the Old Colony startup are unavailable at the level of detail provided for the HOV lane study. The route was included in the IDTS program only from mid 1998 to mid 1999, and Rockland boardings were included only in the 1998 reports. Figures from November 1998 show an average of 71 riders a day inbound and 84 outbound on the Scituate route. This was a much larger inbound drop than would be accounted for by the diversions shown in the Old Colony survey. The difference is mainly attributable to the reduction in the level of service provided. Figures from April 1999 indicate that excluding Rockland riders, the route was carrying only 32 passengers a day each way.

CTPS one-day counts in late April and early May 2000, which did not separate riders by destination, showed 42 boardings at South Station and 33 at Park Square, or a total of 75 on the two remaining outbound Scituate trips. The decrease of nine compared with the November 1998 IDTS figures indicates that when the third outbound trip (which had averaged 23 riders a day) was dropped, some of the riders shifted to the remaining

trips. Others either switched to other P&B routes or were lost from that system. Service on the route was reduced to one round trip in June 2000.

Route 2459 - Pembroke Center to Boston

This route, like the Marshfield/Duxbury route, always had relatively infrequent service. After 1988 it had only one inbound A.M. peak trip and one outbound P.M. peak trip. It was one of two P&B routes discontinued entirely in September 1998 because of ridership diversions to Old Colony trains.

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 the inbound trip on the Pembroke route was carrying an average of 37 riders a day. The outbound trip was carrying 30 riders a day. Both trips stopped at the Rockland park-and-ride lot, which was also served by several other P&B routes. Inbound ridership was up substantially from 10 riders a day reported two years earlier, but outbound ridership was down from the 36 reported in Fall 1994. The directional imbalance in 1994 implies that the majority of P.M. riders then were returning to the Rockland park-and-ride lot after traveling inbound on other P&B routes. The large gain in A.M. peak ridership appears to have come largely from an increase in the proportion of Rockland riders using the Pembroke bus.

In March and April 1984, CTPS one-day counts found an average of 34 outbound riders a day on the Pembroke route, with no stop at Rockland. Service then had been experimentally increased to three round trips from the former one trip, but the main result was a redistribution of Pembroke riders rather than attraction of new ones. By 1994 most of the riders using stops served exclusively by the Pembroke route had apparently been lost.

The Old Colony lines do not provide direct service to any of the towns that were served by the Pembroke bus route, but Pembroke and Rockland adjoin Hanson and Abington, which have stations on the Plymouth/Kingston Line, and Hanover is one town removed from Abington. For the last few years it was run, the Pembroke route was funded under the IDTS program. Reports for that program indicate that after the opening of the Old Colony lines the Pembroke route initially lost about 12 riders a day each way, leaving 25 inbound and 18 outbound. Inbound ridership remained at about this level until the route was discontinued, but outbound ridership recovered to about 25 riders a day.

The Old Colony survey results show ridership diversions from buses by company but not by individual route. Based on the specified trip origins, the Pembroke route would have been the nearest one for 35 Pembroke residents who switched from P&B buses to trains, but this is much greater than the ridership loss indicated in the IDTS reports. Therefore, the largest share of Pembroke diversions probably came from the P&B Plymouth local route, which also runs through Pembroke. Nevertheless, the Pembroke route would have been left with very few riders using stops not also served by other

P&B routes. This resulted in the decision to discontinue the Pembroke route one year after the start of Old Colony service.

Route 2458 - Brockton to Boston

This route had been performing poorly for many years prior to the startup of Old Colony service. Most of the riders were quickly lost to the trains, and in September 1998 the bus route was discontinued entirely.

Reports for the Southeast Expressway HOV lane monitoring project show that as of October 1996 the three Brockton busses scheduled to arrive in Boston between 7:00 and 9:00 a.m. were carrying a total of 34 riders a day. The three trips leaving Boston between 3:30 and 6:00 p.m. were carrying 31 riders a day. All stops outside Boston on this route were in Brockton and were not served by any other P&B routes. Inbound ridership was down slightly from 37 riders a day reported two years earlier, and outbound ridership was down from 40 reported in Fall 1994.

In April 1984, CTPS counts found 164 outbound P.M. peak riders a day on the Brockton route. Service in the count span had been experimentally increased to six trips from the former five, but the main result had been a redistribution of riders rather than attraction of new ones. Peak service was cut back to four trips each way in 1985, and after 1993 there were only three peak trips each way. Despite the smaller number of trips provided, average ridership per trip also fell substantially.

The Old Colony Middleborough/Lakeville Line has three stations in Brockton. (No other city or town has more than one Old Colony station.) IDTS reports show that peak-period ridership on the Brockton bus route fell to 12 riders a day each way soon after the start of Old Colony service and was still at this level in August 1998, the last full month of operation. The Old Colony survey was conducted one week prior to the discontinuance of the bus route. The results indicates that 31 Old Colony riders were former users of the bus route. Of these, 27 used A.M. peak trains. When deducted from The October 1996 ridership level, this would have left only seven riders on the buses, compared with 12 remaining according to the IDTS figures. Some additional riders may have switched by the time the survey was conducted, in anticipation of the loss of bus service.

Route 2457 - Marshfield to Braintree

This is the only P&B route that terminates at a suburban rapid transit station instead of running directly to downtown Boston. Since it does not use the Southeast Expressway, it was not included in the HOV Lane study. It has been funded through the IDTS program since the mid 1980s, however. Figures from that program show that ridership was averaging about 40 each way per day in 1989. In 1983, when the same bus route was run directly by the MBTA as Route 250, a one-day CTPS count had found a total of 63 outbound P.M. peak boardings. After 1989, ridership improved again, reaching a peak of 80 each way per day in 1997 prior to an experimental service increase.

According to the 1994 Red Line passenger survey, there were 62 transfers from this bus route to the Red Line at Braintree Station on the survey day. This is consistent with the IDTS average for the route for the same year. The time span of the survey would have included passengers from both A.M. peak trips then provided, but not those from the one P.M. peak trip. The survey would not have included any passengers who used the bus without transferring to the Red Line, but informal observations indicate that there were few such riders.

Expanded service implemented on the bus route in July 1997 was in effect for too short a time before the Old Colony startup to determine its full potential. In September 1997, the last month prior to Old Colony service, the bus route was averaging 90 riders a day each way. Therefore although service frequency had been doubled, ridership had increased by only 13%.

Peak-direction trips on the bus route stop only at park-and-ride lots in Plymouth, Marshfield, and Hanover. The Old Colony lines do not serve Marshfield or Hanover directly, and Plymouth is not served during the same times of day that the bus route runs. All towns have convenient access to stations in nearby towns, however. Former users of the Marshfield - Braintree bus are difficult to identify in the 1998 survey responses, as some listed Red Line and others P&B busses as their prior means of travel. IDTS figures show that by the time the survey was conducted, ridership on the Marshfield - Braintree bus route had fallen to about 45 riders a day each way, or about half the level reached briefly prior to the Old Colony startup. Since the ridership trend on the route had been steady growth, it is reasonable to assume that all or most of the losses from 1997 to 1998 consisted of diversions to Old Colony trains.

Ridership on the bus route remained at about 45 each way until July 1999, when service was reduced to two trips inbound and one outbound in the A.M. peak and two trips outbound and one inbound in the P.M. peak. After that, ridership immediately fell to 25 to 30 each way per day. Almost all of this ridership was on the peak direction trips. The off-peak direction trips, which are run mainly for equipment positioning, often carry no riders.

CTPS on-board counts in May 2000 showed some improvement, with a total of 41 inbound riders. Gains were equally distributed between the two trips. All but three of the passengers boarded at the park-and-ride lot in Marshfield, and the remainder at the Hanover Mall. The Marshfield lot is served only by this route. The Hanover Mall is also served by the Plymouth local route, but the latter had no passengers boarding there.

Brockton Area Transit (BAT)

Route 12 - Brockton to Ashmont

This route operates as a rapid transit service feeder rather than running into downtown Boston as most of the other routes examined in this chapter do. Information available for analysis of the impact of Old Colony service on the route is very limited. Prior to the start of Old Colony service, most buses on the route followed state Route 28 and local streets for the entire distance. In addition to these, five inbound A.M. peak trips and four outbound P.M. peak trips used an express routing on state Route 24 between Brockton and the northern border of Randolph. These trips were partially funded under the IDTS program.

The expanded results of the 1994 Red Line survey show that on a typical week day 330 passengers transferred from BAT busses to the Red Line at Ashmont between 6:00 a.m. and 3:30 p.m. The Brockton route was the only BAT route serving that station, but the survey results do not distinguish between passengers using the local and express variations. The survey results also do not show the number of BAT riders alighting at Ashmont without transferring to the Red Line, but such riders would have been unlikely to be diverted to Old Colony service. At the time of the survey, 61% of all BAT busses arriving at Ashmont would have done so within the hours surveyed. A much higher percentage of all BAT transfers would be expected to have occurred in these hours, however. The 1997 CTPS rapid transit counts showed that 80% of total passenger boardings at Ashmont from all sources combined occurred between 6:00 a.m. and 3:30 p.m.

Because of the overlap of the BAT Brockton - Ashmont route with MBTA Route 240, the BAT buses are only supposed to pick up passengers within Brockton and Avon. Brockton has three stations on the Old Colony Middleborough/Lakeville Line. Avon does not have a station, but has good access to stations in Brockton and Randolph.

The 1998 survey results indicate that 131 Old Colony riders had previously used the BAT Brockton - Ashmont busses. Of these, 120 used trains arriving in downtown Boston within the same hours that passengers transferring to the Red Line between 6:00 a.m. and 3:30 p.m. would have arrived downtown. With no other ridership changes on the BAT route between 1994 and 1998, Old Colony diversions would have resulted in a 36% decrease in the number of passengers transferring from the buses to the Red Line before 3:30 p.m. each day. In March 1999 BAT discontinued all trips on the express variation of the Ashmont route, but service on the local variation has not been reduced.

4. Impact on the Highway System

Two data sources are available which can help estimate the impact of the restoration of Old Colony commuter rail service on the regional highway system: responses from the on-board passenger survey, and traffic counts on the highways themselves. Neither of these sources can give a precise estimate of the impact, for reasons discussed below, and even if they could, the estimate would only apply to the time that the data were collected, September and October of 1998. Given that people's travel habits change over time and vary from season to season, if not from day to day, it is impossible to say that the estimated impact represents anything more than the number of vehicles that appear to have been removed from the highway system after one year of service on the two Old Colony lines. Map 4-1 shows the locations of the Old Colony lines relative to major highways.

PASSENGER SURVEY RESULTS

As discussed in detail in chapter 4 of the 1998 Passenger Survey report, survey respondents were asked in October 1998 what means of transportation they had used prior to the opening of service on the Old Colony lines. Over 1,200 riders indicated that they had not previously made the trip at all, because they had only recently moved to the area or obtained new jobs in Boston, or for a variety of other reasons. This figure translates into 19% of the riders on the two lines combined (20% on the Middleborough/Lakeville line and 18% on the Plymouth/Kingston line).

Of the remaining 81% of riders, approximately one quarter stated that they drove alone before Old Colony service was reinstated. This figure translates into approximately 1,300 automobile trips diverted from the urban core of downtown Boston, Cambridge and the immediately surrounding areas. Such trips presumably traveled on Route 24, Route 3, or other arterial roads before joining traffic on the Southeast Expressway and the Central Artery. It is impossible to say with any precision what the traffic reduction was on each of the routes leading to the Southeast Expressway because survey respondents were not asked which roads they formerly used. Assigning these passengers to the most likely routes based on their towns of origin yields an estimate of 700 vehicles removed from Route 3 and 600 vehicles removed from Route 24.

The automobile diversions from Route 3, Route 24, and other arterial roads serving the South Shore was greater than the 1,300 vehicles mentioned above, because an additional 40% of the riders who had made the trip previously (32% of the total ridership) formerly used the rapid transit system. The vast majority of these 2,100 riders boarded subway trains at Ashmont or at one of the five stations on the Braintree branch of the Red Line. Survey respondents were not asked about their former access modes to the rapid transit system, but based on the origin locations and other indications on the survey forms, it appears that 1,600 people who formerly drove to rapid transit stations now drive to Old

Colony stations instead. The other 500 most likely rode MBTA, Brockton Area Transit, or private carrier buses to reach the Red Line.

Assigning the 1,600 people to the routes they most likely used yields an estimate of 1,000 vehicles removed from Route 3 and 600 vehicles removed from Route 24. Some of these people likely still use these highways to reach the Old Colony stations, but their trips are significantly shorter than their former trips to Braintree, Quincy, or Ashmont.

Combining the subtotals of the number of people diverted from driving all the way to Boston and the number driving to a rapid transit station yields estimates of 1,700 vehicles removed from Route 3 and 1,200 vehicles removed from Route 24.⁵

Presumably, each of these vehicles would have been making a trip north in the morning and one south in the evening. These figures shown in table 4-1 double the estimates of the number of people developed in this section to represent the total number of vehicle trips removed from the highways, northbound and southbound.

Table 4-1
Estimated Number of Vehicles Removed from Expressways

Expressway	Drove to Boston	Drove to Red Line	Total
I-93*	2,600	0	2,600
Route 3	1,400	2,000	3,400
Route 24	1,200	1,200	2,400

*Note: The 2,600 vehicles removed from I-93 are the same vehicles removed from routes 3 and 24 (1,400+1,200).

Taken alone, these estimates of vehicles removed from the highways are not particularly meaningful. Using formulas developed at CTPS based on the relationship of the observed number of hours of congestion on a highway facility to the average weekday traffic volume, the effect of these estimated traffic reductions on congestion was estimated.⁶ The formula predicts that for each 1,000 vehicles per lane removed from a highway facility over a 24-hour period, the duration of congested conditions on the highway as a whole will be reduced by about 20 minutes in both the morning and afternoon peak periods. The results of this calculation are shown in table 4-2.

⁵Although guessing which interchange on the expressways Old Colony passengers formerly used is inexact at best, it appears that the interchange on Route 3 likely to have experienced the greatest reduction is #16 in Weymouth (Route 18). The interchange on Route 24 with the potential greatest reduction was #20 in Stoughton, assuming that the 106 people from Holbrook and Randolph who claimed to have previously used the Red Line and not to have used a bus to reach the Red Line, actually drove to Red Line stations. As will be seen later in this chapter, traffic counts at these two interchanges provide the best evidence for the restoration of Old Colony service having led to actual traffic reductions.

⁶See memorandum by Thomas Lisco, dated March 18, 1997 for more information.

Map 4-1 Locations of Old Colony Lines Relative to Major Highways

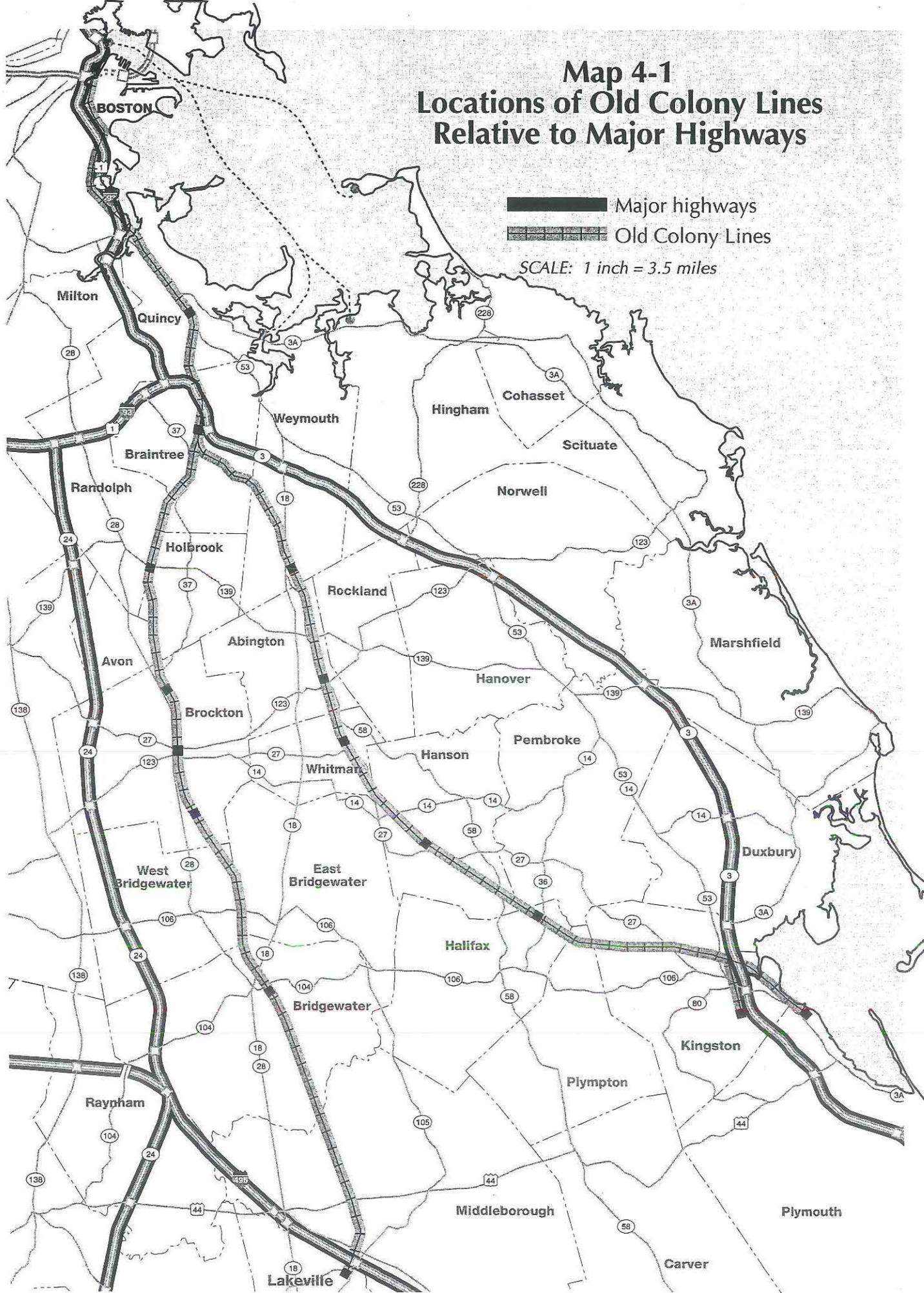


Table 4-2
Estimated Reduction in Congestion Due to Old Colony

Expressway	Vehicles removed	Lanes at most congested point	Reduction per lane	Current duration of congestion	Minutes of congestion saved
I-93	2,600	8	325	4-5 hours	6.5
Route 3	3,400	4	850	3 hours	17.0
Route 24	2,400	6	400	2-3 hours	8.0

If the vehicles diverted from Route 3, Route 24, and Route I-93 were not replaced by other vehicles shifting onto the highways during periods of congestion because of the diversions, then Old Colony commuter rail service has led to a reduction of the duration of congestion in each peak period of 17 minutes, 8 minutes and 6.5 minutes, respectively, compared to what conditions would have been like if Old Colony service had not been restored. These reductions are not particularly significant, given the 3-hour (or more) duration of congestion seen on these roads during each peak period.

In fact, as discussed below, traffic volumes have actually increased on these expressways, most likely due to the expanding economy. It is impossible to say how many of those additional vehicles would not be on the expressways if the diversions due to Old Colony had not occurred, but it is likely that if Old Colony had not been built, traffic conditions would be marginally worse.

TRAFFIC COUNTS

In order to try to gauge the impact of the restoration of Old Colony service on the highway system, and for other transportation planning purposes as well, a series of traffic counts were undertaken immediately before service began in September 1997. On Route 3 between Quincy and the Sagamore bridge and on Route 24 between I-93 and I-495, the number of vehicles on each and every entrance and exit ramp were counted over a three-day period to yield average weekday traffic volumes (AWDT).

One year later, in September 1998, these counts were repeated, although interchanges which were felt to be relatively unaffected by diversions to commuter rail were excluded in order to reduce costs. On Route 3, the excluded interchanges were exits 2 through 6 in southern Plymouth, and exits 10 through 14 in Duxbury, Marshfield, Hanover, and Rockland. On Route 24, only exits 18A/B and 19A/B in Brockton and Avon were excluded from the 1998 counts.

These ramp counts were supplemented by traffic counts collected by MassHighway as part of their regular traffic monitoring system. MassHighway maintains a number of permanent count stations on express highways throughout the state, and conducts periodic counts at a large number of additional locations.

Unfortunately, the most recent available traffic counts for the Southeast Expressway predate the startup of Old Colony service. In 1996, the Expressway just south of downtown Boston carried an average of about 90,000 vehicles each way in 24 hours. A reduction of 1,300 vehicles would have been equal to 1.4% of this, and would have been less than typical day-to-day variation.

The analysis of the highway traffic count data on other routes consists of two elements: an evaluation of total traffic volumes on the expressways affected by the restoration of Old Colony commuter rail service, and a detailed examination of the ramp counts on routes 3 and 24. Before analyzing changes in traffic counts in the Old Colony corridor, though, it is important to establish baseline trends.

Baseline Trends

The economy in eastern Massachusetts expanded in 1997 and 1998, continuing the expansion begun in 1992. This expansion has resulted in increased commuter traffic, since an increase in the number of jobs entails an increase in the number of commuters, as well as growth in goods movement and person-trips for shopping and other purposes. In order to determine the effect of the restoration of Old Colony commuter rail service on the highway system, it is necessary to calculate what traffic would have been like in 1998 if Old Colony service had not been restored.

Unfortunately, such a calculation is difficult to achieve. It was attempted to eliminate the effect of seasonal variation by conducting counts during the same week in September two years in a row. Furthermore, to reduce the effect of daily variation, the counts used in the analysis are the average of three weekdays during the week.

Two methods are used to estimate the hypothetical growth on routes 3 and 24: calculating the regional average growth rate from 1997 to 1998, and calculating the annual growth rates on routes 3 and 24 during the five years prior to 1997. To calculate a regional average traffic growth factor, traffic count data from various points of the eastern Massachusetts expressway system were gathered. Only counting stations for which both September 1997 and September 1998 data were available were included. Table 4-3 shows the counts included in calculating the regional average.

All of these counts are average weekday counts for mid-September, except for the counts for Route I-90 which are average daily traffic for the year. The final result of 2.1% growth can be thought of as a regional average, but it is clear that the individual count locations vary significantly from that average and that some corridors are growing faster than others. Route I-95 north of the city and the Massachusetts Turnpike (I-90) exhibited growth much faster than 2.1%, while Route 128 and I-93 north of the city grew more slowly in percentage terms.

The growth in traffic in absolute terms shows less variation than the percentage changes. While the percent growth in Hopkinton is nearly five times that of Andover, the absolute change in Hopkinton is only 2.6 times that of Andover. Thus, to say that

Table 4-3
Traffic Volumes at Selected Locations: 1997 vs. 1998

Route	Location	Sept. 1997	Sept. 1998	Abs. Change	Pct. Change
I-95	Topsfield north of Rte 1	79,112	82,363	3,251	4.1%
I-95	Georgetown north of Rte 133	61,533	63,086	1,553	2.5%
I-93	Wilmington north of Rte 62	155,112	158,057	2,945	1.9%
I-93	Andover north of Rte 133	133,607	134,994	1,387	1.0%
128	Waltham south of Winter St.	202,143	204,500	2,357	1.2%
128	Needham at Great Plain Ave.	162,518	164,400	1,882	1.2%
I-90	Framingham east of Exit 13	107,225	110,731	3,506	3.3%
I-90	Hopkinton east of Exit 11A	75,754	79,359	3,605	4.8%
Total/Average		977,004	997,490	2,561	2.1%

traffic on Route 3 and Route 24 would have grown at 2.1% if Old Colony had not been built, has, at best, a minimal basis. Saying that an increase of 2,500 vehicles would have been expected has a somewhat stronger basis.

Growth rates for Route 3 and Route 24 from 1992 to 1997 are discussed in the sections below.

Total Traffic Volumes

Route 3

September counts for both 1997 and 1998 are available for one permanent count station on Route 3 and one on Route 24. The Route 3 station is located in Norwell south of Route 53. The average weekday traffic at this station is shown in table 4-4. Much of the traffic diverted to Old Colony trains would have entered Route 3 further north, however. In 1996 and 1997 average daily traffic at the Norwell count station was only 53% as high as that at Union Street in Braintree, but 1998 counts for the latter station are not available.

The growth in traffic at the Norwell location is less in absolute terms than that seen at the other locations included in the calculation of the regional average, and well below the "average" increase of 2,500 vehicles. In percentage terms, this location exhibits slower growth than the "regional average," but faster growth than several other locations.

Considered as part of a longer-term trend, the growth of traffic on Route 3 from 1997 to 1998 is somewhat slower than that seen on the roadway during the period from 1992 to 1997. Although detailed counts are not available for every year in that span, the overall trend has been an increase of approximately 1,200 vehicles per year.

Table 4-4
Average Weekday Traffic Volume on Route 3 at Norwell, South of Route 53

September 1997	September 1998	Absolute Change	Percent Change
75,066	76,145	1,079	1.4%

The reduction in the growth rate of traffic on Route 3, and the fact that growth there was slower than in other parts of the region together provide some justification for the assertion that the Old Colony commuter rail restoration has had some impact on traffic. While it is clear that Old Colony did not result in an absolute reduction of traffic on Route 3 from 1997 to 1998, it may have caused traffic to grow more slowly than it might have if commuter rail service had not been restored. The estimated Old Colony diversions were equivalent to about 2.5% of the average weekday traffic volume on Route 3 in Braintree.

Route 24

The count location on Route 24 is located immediately south of the interchange with Route I-93. The average weekday traffic at this station is shown in table 4-5.

Contrary to what was seen on Route 3, traffic growth on Route 24 was significantly faster than the growth in other parts of the region, both in absolute terms and percentage terms. During the 1990s, traffic on Route 24 had been growing at a very fast pace, reflecting active land development along that corridor. Since 1992, traffic has been increasing at a rate of roughly 3,500 vehicles per year, although there are several years in that span for which there are no reliable count data. The 1997 to 1998 growth is even faster than the average rate for the rest of the decade, indicating an acceleration in land development.

It is impossible to say whether the Old Colony restoration had some beneficial effect on Route 24 traffic based merely on this total traffic count. As discussed elsewhere in this chapter, there is evidence from the passenger survey and from some ramp counts that commuter rail has removed some cars from the road. The estimated Old Colony diversions were equivalent to about 1.9% of the average weekday traffic volume on Route 24 at this location in 1997. Thus, it is likely that traffic would have increased at an even faster rate had the Old Colony lines not been built.⁷

⁷Of course, it is also possible that some of the acceleration in the pace of land development is a result of the Old Colony restoration. Such investigation is outside the scope of this study.

Table 4-5
Average Weekday Traffic Volume on Route 24 at Randolph, South of the Split

September 1997	September 1998	Absolute Change	Percent Change
123,514	128,304	4,790	3.9%

Ramp Counts

The counts conducted by MassHighway in September 1997 and September/October 1998 resulted in estimates of traffic volumes by hour for each ramp at interchanges located near stations on the two Old Colony branches. Following is a detailed analysis of these counts for those interchanges exhibiting changes in volume which seem to be related to the restoration of Old Colony service.

Route 3

Interchange #8

The Plymouth/Kingston line runs near to Route 3 at its northern and southern ends. The primary outer terminal, at Kingston/Route 3, is closest to interchange #8 on Route 3.⁸ The ramp counts at this interchange are shown in Table 4-6.

Given that 70% of the more than 900 people boarding at Kingston/Route 3 commuter rail station come from towns southeast of Kingston (primarily Plymouth and towns on Cape Cod), and that 95% of those people either drive and park at the station or are dropped off, one would expect the largest changes in the ramp counts at interchange #8 to be increases in northbound offs and southbound ons. Indeed the ramp counts bear this out, and the magnitude of the change, on the order of 600 vehicles, matches very

Table 4-6
Ramp Counts at Route 3 Interchange #8

		September 1997	September 1998	Absolute Change	Percent Change
Northbound	Off ramp	2,524	3,091	567	22.5%
	On ramp	4,058	4,509	451	11.1%
Southbound	Off ramp	5,309	5,119	-190	-3.6%
	On ramp	2,524	3,138	614	24.3%

⁸The other terminal location, at Cordage Park in Plymouth, is served only by midday trains. The relatively light ridership there would not have a noticeable impact on traffic at interchange #7, the nearest exit to the railroad station.

well to the total number of expanded survey responses for drive access trips to Kingston from the southeast (596).

The increase of 450 vehicles in northbound ons is not readily explicable as a result of the Old Colony restoration. Most of that increase occurred during the hours from 12:00 noon to 8:00 p.m., and thus appears to be unrelated to regular commuter traffic. One might have expected a slight drop in northbound ons, as there was in southbound offs, due to the diversion of commuters from Route 3 to the Old Colony station. Such a slight drop was experienced at interchange #7 in Plymouth, where northbound ons dropped by 3.5% and southbound offs dropped by 14%, although it is not clear how much of this drop is related to Old Colony service. Presumably, at least some people who formerly drove to Boston and used this interchange to enter and exit from Route 3 have changed to using local roads to reach the commuter rail station in Kingston.

Interchange #15

In Hingham and Weymouth, Route 3 and the commuter rail line converge again, having been more than seven miles apart. At interchange #15 in Hingham, ramp counts were nearly stable from 1997 to 1998, with slight decreases in northbound ons and offs (changes of less than 150 vehicles) and very slight increases in southbound ons and offs (changes of less than 50 vehicles). Since there has been relatively little population growth in Hingham (according to U.S. Census estimates), and since fewer than 20 Hingham residents used Old Colony service (according to the passenger survey), it is not surprising that counts for this exit were essentially unchanged from 1997 to 1998.

Interchange #16

Interchange #16 in Weymouth, where Route 3 intersects Route 18, one of the primary arterials on the South Shore, is nearly a full cloverleaf, with only the northbound Route 3 to southbound Route 18 move not served. The ramp counts are shown in Table 4-7.

Table 4-7
Ramp Counts at Route 3 Interchange #16

			September	September	Absolute	Percent
			1997	1998	Change	Change
Northbound	Off ramp	to Rte 18 NB	4,754	5,106	352	7.4%
	On ramp	from Rte 18 NB	13,167	11,992	-1,175	-8.9%
	On ramp	from Rte 18 SB	9,202	8,746	-456	-5.0%
Southbound	Off ramp	to Rte 18 SB	12,596	12,123	-473	-3.8%
	On ramp	from Rte 18 SB	3,877	3,935	58	1.5%
	Off ramp	to Rte 18 NB	9,066	8,096	-970	-10.7%
	On ramp	from Rte 18 NB	1,832	1,821	-11	-0.6%

Route 18 would be the primary access route to the South Weymouth commuter rail station from Route 3, but such an access trip for people traveling northbound on Route 3

would entail approximately three miles of backtracking, more than most people are willing to do. Indeed, the passenger survey shows fewer than 100 people, less than 15% of the boardings at Weymouth, originating in towns to the southeast served by Route 3.

Assuming that relatively few people would be using interchange #16 for access to the commuter rail station, the primary impact of the commuter rail restoration would be expected to be a reduction in northbound ons and southbound offs to the extent that people who formerly drove are diverted to commuter rail. The counts do show such reductions with a drop of more than 1,100 vehicles traveling from northbound Route 18 to northbound Route 3, and a drop of nearly 500 vehicles traveling from southbound Route 3 to southbound Route 18. Most of the northbound decrease occurred during the morning peak period, as one would expect if it was related to the commuter rail restoration, but the southbound reduction occurred more during the midday period than during the afternoon peak. The reduction in morning northbound traffic is more than could be accounted for by South Weymouth station alone, but the combined ridership at South Weymouth, Abington, and Whitman, for which towns Route 18 is the main access route to Route 3 and Boston, could account for this decrease in traffic.

The other move showing a significant reduction in traffic is from southbound Route 18 to northbound Route 3 and its converse, from southbound Route 3 to northbound Route 18. Most of the reduction among traffic entering Route 3 occurred in the morning peak, while the reduction in traffic exiting from Route 3 occurred during the afternoon peak. Even though this timing implies that the reductions seem to be happening among commuters, it is unclear how they could be related to the Old Colony restoration, because fewer than 50 of the 340 Weymouth residents who boarded at South Weymouth station came from the part of town north of Route 3. It is possible that other factors are causing a shift in commuting travel patterns, or that either the 1997 or 1998 counts might be unrepresentative because of unusual occurrences during the week of data collection.

Overall, it is reasonable to conclude that the Old Colony restoration has led to some decrease in traffic at this interchange, particularly among cars traveling from northbound Route 18 to northbound Route 3 in the morning.

Interchange #17

Ramp counts at interchange #17, at Union Street in Braintree, do not provide any evidence of an impact of the restoration of Old Colony service. Counts on all four ramps of the interchange rose from 1997 to 1998, with a large increase in the northbound on-ramp. There is some evidence that northbound travelers use this interchange as a bypass for Route 3 at the times of the most severe congestion; that is, they exit and then reenter the highway immediately to save a few tenths of a mile of waiting in the traffic queue. Such behavior obscures the pattern of actual exits and entries at the interchange, and thus prevents any conclusions from being drawn.

Interchange #19

The final exit before Route 3 splits to I-93 northbound and southbound is the exit to the Quincy Adams MBTA station and local roads to Quincy Center. The counts for this interchange are shown in table 4-8.

**Table 4-8
Ramp Counts at Route 3 Interchange #19**

		September 1997	September 1998	Absolute Change	Percent Change
Northbound	Off ramp	12,374	11,739	-635	-5.1%
Southbound	On ramp	14,328	13,593	-735	-5.1%

Both the northbound and southbound ramps exhibit decreases in traffic of the same magnitude. Further, the northbound decrease occurred during the morning peak period and the southbound decrease occurred during the afternoon peak period. This evidence presents a compelling case that the Old Colony restoration reduced traffic at this interchange. Of course, the traffic being reduced is traffic to and from the Red Line station. Passenger counts at Quincy Adams, discussed elsewhere in this report, indicate a drop in ridership on the order of 600 passengers over the whole day, matching quite well to the decrease in vehicle trips to and from Route 3. It is reasonable to conclude that roughly 600 vehicles formerly using Route 3 to reach Quincy Adams station have been diverted from the northern stretch of the highway to various Old Colony stations.

Route 24

Route 24 is the nearest expressway to the Middleborough/Lakeville Line, but none of the stations on that line are in the immediate vicinity of the highway. Access to these stations (except for the terminal station which is located close to Route I-495) requires travel for at least two to three miles on local streets. As a result, they draw passengers mostly from immediately surrounding areas and relatively little from the regional highway system. Thus, unlike the case of Route 3 interchange #8 which experienced increases in traffic directly attributable to people driving to the Kingston station, ramps leading to and from Route 24 showed no traffic increases that could be directly attributed to the impact of commuter rail.

Ramp counts for interchanges #15 through #17 in Bridgewater, West Bridgewater, and Brockton show mostly growth in traffic. Given the fast growth on this highway discussed above, it would have to be the case that traffic volumes on most of the ramps are increasing. The few cases of declining traffic volumes are small enough to be well within the margin of error for the types of counting devices used to collect the data.

The only Route 24 interchange which did not exhibit significant increases in traffic was interchange #20 in Stoughton near the Randolph border. Most of the ramps of this interchange exhibited slight to moderate decreases in traffic, as shown in table 4-9.

The important ramps with respect to a potential connection to Old Colony service are the on ramp from Route 139 westbound to Route 24 northbound and the off ramp from Route 24 southbound to Route 139 eastbound. These two ramps had the largest drops in traffic, although not so great as to be a completely reliable indicator of a change in travel pattern. For the traffic entering Route 24 northbound, almost all of the decrease in traffic occurred during the morning peak period, lending credence to a claim that the reduction may be due to people diverted from driving on Route 24 to taking commuter rail at the nearby Holbrook/Randolph station. Nevertheless, the decrease in southbound traffic exiting from Route 24 also occurred during the morning peak, rather than the afternoon peak as one would have expected if the change were due to diversions to commuter rail.

Thus, although the restoration of Old Colony service may have helped to reduce traffic at interchange #20, the count data do not provide sufficient corroborative evidence to be able to make this claim with certainty.

**Table 4-9.
Ramp Counts at Route 24 Interchange #20**

			September	September	Absolute	Percent
			1997	1998	Change	Change
Northbound	Off ramp	to Rte 139 EB	5,158	5,528	370	7.2%
	On ramp	from Rte 139 EB	6,995	6,936	-59	-0.8%
	Off ramp	to Rte 139 WB	1,560	1,468	-92	-5.9%
	On ramp	from Rte 139 WB	6,117	5,927	-190	-3.1%
Southbound	Off ramp	to Rte 139 WB	8,061	8,240	179	2.2%
	On ramp	from Rte 139 WB	5,732	5,654	-78	-1.4%
	Off ramp	to Rte 139 EB	8,101	7,927	-174	-2.1%
	On ramp	from Rte 139 EB	1,909	1,837	-72	-3.8%

SUMMARY

The results of the passenger survey and some of the traffic counts conducted on the regional highway system indicate that the restoration of Old Colony service has reduced traffic congestion slightly. Because of the growth of the regional economy, traffic on the highways continued to rise in spite of the diversion of some vehicles from the highways to Old Colony stations. At three interchanges, two on Route 3 and one on Route 24, Old Colony commuter rail service may have led to an actual reduction in traffic.

Given that Old Colony service has not caused an absolute reduction in traffic on the mainline expressways serving the southern part of Massachusetts, it is still likely that traffic conditions are marginally better now than they would have been if Old Colony service had not been restored. Results from the passenger survey indicate that the periods of congested conditions on Route 3, Route 24 and Route I-93 (the Southeast Expressway and the Central Artery) are 6.5 to 17 minutes shorter than they would have been without the Old Colony lines.

Appendix A. Passenger Counts at Selected Red Line Stations, 1997, 1998, and 2000

As part of this study, CTPS conducted one-day counts of passenger boardings and alightings at six Red Line stations in May 1997 and again in May 1998. These stations were Braintree, Quincy Adams, Quincy Center, Wollaston, North Quincy, and Ashmont. The counts were limited to these six stations because passenger origin information from the 1994 Red Line survey indicated that they were the only ones where significant diversions of riders to Old Colony service would be likely to occur. The results of these counts are discussed in chapter 2 of this report. The most significant finding was that of these six stations only Braintree and Quincy Adams showed large ridership losses that were clearly related to Old Colony service. Further, it was found that at Braintree all of the ridership losses occurred during A.M. peak hours, and that these were entirely offset by gains later in the day.

Overall ridership on the Old Colony lines has grown further since 1998. To determine the extent to which this growth has included additional Red Line diversions, one-day passenger counts were conducted at Braintree and Quincy Adams between 6:00 and 10:00 a.m. in May 2000. Comparisons of these counts with those from 1998 show that the main change has been a shift in boardings from Braintree to Quincy Adams. The two stations combined showed a net decrease of about 100 riders. In contrast, between Spring 1998 and Spring 2000 alightings at South Station from Old Colony trains arriving there before 9:30 a.m. increased by over 2,000 per day. Therefore, most of the gains in Old Colony riders between 1998 and 2000 came from prior modes other than the Red Line or from new trips unless almost all Old Colony diversions were offset by new Red Line riders from other sources.

The remainder of this appendix presents hourly summaries of the 1997 and 1998 counts at the six Red Line stations and of the A.M. peak 2000 counts at Braintree and Quincy Adams. Appendix B shows results of several one-day Old Colony boarding and alighting counts taken at South Station, Quincy Center, and Braintree between 1997 and 2000.

Table A.1 - BRAINTREE STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:30 - 7:00 a.m.	518		736		-218	-29.6%		
7:00 - 8:00 a.m.	1,209		1,284		-75	-5.8%		
8:00 - 9:00 a.m.	469		386		83	21.5%		
9:00 - 10:00 a.m.	137		68		69	101.5%		
10:00 - 11:00 a.m.	115		61		54	88.5%		
11:00 a.m.- Noon	93		58		35	60.3%		
Noon - 1:00 p.m.	113		59		54	91.5%		
1:00 - 2:00 p.m.	86		64		22	34.4%		
2:00 - 3:00 p.m.	110		41		69	168.3%		
3:00 - 4:00 p.m.	108		70		38	54.3%		
4:00 - 5:00 p.m.	153		117		36	30.8%		
5:00 - 6:00 p.m.	106		71		35	49.3%		
6:00 - 7:00 p.m.	51		39		12	30.8%		
7:00 - 8:00 p.m.	45		25		20	80.0%		
8:00 - 9:00 p.m.	41		10		31	310.0%		
9:00 - 10:00 p.m.	30		34		-4	-11.8%		
10:00 - 11:00 p.m.	20		26		-6	-23.1%		
Total	3,404		3,149		255	8.1%		

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:20 - 7:00 a.m.		58		65			-7	-10.8%
7:00 - 8:00 a.m.		90		82			8	9.8%
8:00 - 9:00 a.m.		68		87			-19	-21.8%
9:00 - 10:00 a.m.		34		41			-7	-17.1%
10:00 - 11:00 a.m.		43		28			15	53.6%
11:00 a.m.- Noon		52		41			11	26.8%
Noon - 1:00 p.m.		65		85			-20	-23.5%
1:00 - 2:00 p.m.		91		109			-18	-16.5%
2:00 - 3:00 p.m.		139		76			63	82.9%
3:00 - 4:00 p.m.		312		220			92	41.8%
4:00 - 5:00 p.m.		557		513			44	8.6%
5:00 - 6:00 p.m.		1,139		1,108			31	2.8%
6:00 - 7:00 p.m.		476		421			55	13.1%
7:00 - 8:00 p.m.		226		205			21	10.2%
8:00 - 9:00 p.m.		165		110			55	50.0%
9:00 - 10:00 p.m.		97		64			33	51.6%
10:00 - 11:00 p.m.		65		54			11	20.4%
Total		3,677		3,309			368	11.1%

Table A.2 - QUINCY ADAMS STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:10 - 7:00 a.m.	334	4	348	1	-14	-4.0%	3	300.0%
7:00 - 8:00 a.m.	1,024	3	1,755	4	-731	-41.7%	-1	-25.0%
8:00 - 9:00 a.m.	1,101	4	1,117	1	-16	-1.4%	3	300.0%
9:00 - 10:00 a.m.	293	5	209	4	84	40.2%	1	25.0%
10:00 - 11:00 a.m.	150	0	104	0	46	44.2%	0	
11:00 a.m.- Noon	115	1	58	2	57	98.3%	-1	-50.0%
Noon - 1:00 p.m.	89	1	77	1	12	15.6%	0	0.0%
1:00 - 2:00 p.m.	64	1	59	0	5	8.5%	1	
2:00 - 3:00 p.m.	72	2	76	7	-4	-5.3%	-5	-71.4%
3:00 - 4:00 p.m.	92	10	83	4	9	10.8%	6	150.0%
4:00 - 5:00 p.m.	138	9	121	2	17	14.0%	7	350.0%
5:00 - 6:00 p.m.	192	2	107	0	85	79.4%	2	
6:00 - 7:00 p.m.	200	4	70	3	130	185.7%	1	33.3%
7:00 - 8:00 p.m.	36	2	19	2	17	89.5%	0	0.0%
8:00 - 9:00 p.m.	22	1	18	1	4	22.2%	0	0.0%
9:00 - 10:00 p.m.	19	1	15	0	4	26.7%	1	
10:00 - 11:00 p.m.	31	2	12	1	19	158.3%	1	100.0%
Total	3,972	52	4,248	33	-276	-6.5%	19	57.6%

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:15 - 7:00 a.m.	1	61	1	55	0	0.0%	6	10.9%
7:00 - 8:00 a.m.	2	105	13	151	-11	-84.6%	-46	-30.5%
8:00 - 9:00 a.m.	1	135	5	111	-4	-80.0%	24	21.6%
9:00 - 10:00 a.m.	7	31	1	36	6	600.0%	-5	-13.9%
10:00 - 11:00 a.m.	0	33	2	47	-2	-100.0%	-14	-29.8%
11:00 a.m.- Noon	2	50	4	58	-2	-50.0%	-8	-13.8%
Noon - 1:00 p.m.	3	82	0	69	3		13	18.8%
1:00 - 2:00 p.m.	2	88	0	103	2		-15	-14.6%
2:00 - 3:00 p.m.	4	135	3	101	1	33.3%	34	33.7%
3:00 - 4:00 p.m.	8	265	8	217	0	0.0%	48	22.1%
4:00 - 5:00 p.m.	16	387	12	570	4	33.3%	-183	-32.1%
5:00 - 6:00 p.m.	20	1,075	3	1,466	17	566.7%	-391	-26.7%
6:00 - 7:00 p.m.	3	743	3	1,014	0	0.0%	-271	-26.7%
7:00 - 8:00 p.m.	7	321	1	308	6	600.0%	13	4.2%
8:00 - 9:00 p.m.	0	212	2	126	-2	-100.0%	86	68.3%
9:00 - 10:00 p.m.	0	101	5	78	-5	-100.0%	23	29.5%
10:00 - 11:00 p.m.	0	115	1	77	-1	-100.0%	38	49.4%
Total	76	3,939	64	4,587	12	18.8%	-648	-14.1%

Table A.3 - QUINCY CENTER STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:00 - 7:00 a.m.	528	2	552	3	-24	-4.3%	-1	-33.3%
7:00 - 8:00 a.m.	1,302	18	1,241	17	61	4.9%	1	5.9%
8:00 - 9:00 a.m.	1,380	14	1,223	17	157	12.8%	-3	-17.6%
9:00 - 10:00 a.m.	454	16	499	10	-45	-9.0%	6	60.0%
10:00 - 11:00 a.m.	262	14	352	14	-90	-25.6%	0	0.0%
11:00 a.m.- Noon	204	8	269	19	-65	-24.2%	-11	-57.9%
Noon - 1:00 p.m.	276	9	243	5	33	13.6%	4	80.0%
1:00 - 2:00 p.m.	238	9	250	9	-12	-4.8%	0	0.0%
2:00 - 3:00 p.m.	309	18	248	22	61	24.6%	-4	-18.2%
3:00 - 4:00 p.m.	230	20	211	19	19	9.0%	1	5.3%
4:00 - 5:00 p.m.	252	31	248	21	4	1.6%	10	47.6%
5:00 - 6:00 p.m.	241	32	188	18	53	28.2%	14	77.8%
6:00 - 7:00 p.m.	210	20	133	8	77	57.9%	12	150.0%
7:00 - 8:00 p.m.	127	4	90	4	37	41.1%	0	0.0%
8:00 - 9:00 p.m.	93	4	96	2	-3	-3.1%	2	100.0%
9:00 - 10:00 p.m.	93	2	81	3	12	14.8%	-1	-33.3%
10:00 - 11:00 p.m.	88	1	75	5	13	17.3%	-4	-80.0%
Total	6,287	222	5,999	196	288	4.8%	26	13.3%

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:15 - 7:00 a.m.	8	119	17	140	-9	-52.9%	-21	-15.0%
7:00 - 8:00 a.m.	19	364	21	343	-2	-9.5%	21	6.1%
8:00 - 9:00 a.m.	23	350	16	334	7	43.8%	16	4.8%
9:00 - 10:00 a.m.	13	241	12	220	1	8.3%	21	9.5%
10:00 - 11:00 a.m.	10	117	10	99	0	0.0%	18	18.2%
11:00 a.m.- Noon	15	149	13	131	2	15.4%	18	13.7%
Noon - 1:00 p.m.	15	301	9	261	6	66.7%	40	15.3%
1:00 - 2:00 p.m.	9	244	7	302	2	28.6%	-58	-19.2%
2:00 - 3:00 p.m.	19	382	12	342	7	58.3%	40	11.7%
3:00 - 4:00 p.m.	12	522	9	594	3	33.3%	-72	-12.1%
4:00 - 5:00 p.m.	19	791	15	794	4	26.7%	-3	-0.4%
5:00 - 6:00 p.m.	21	1,434	11	1,519	10	90.9%	-85	-5.6%
6:00 - 7:00 p.m.	10	920	11	878	-1	-9.1%	42	4.8%
7:00 - 8:00 p.m.	4	353	8	335	-4	-50.0%	18	5.4%
8:00 - 9:00 p.m.	2	293	4	236	-2	-50.0%	57	24.2%
9:00 - 10:00 p.m.	4	198	5	172	-1	-20.0%	26	15.1%
10:00 - 11:00 p.m.	8	144	6	181	2	33.3%	-37	-20.4%
Total	211	6,922	186	6,881	25	13.4%	41	0.6%

Table A.4 - WOLLASTON STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:00 - 7:00 a.m.	499	10	572	2	-73	-12.8%	8	400.0%
7:00 - 8:00 a.m.	1,076	10	1,100	9	-24	-2.2%	1	11.1%
8:00 - 9:00 a.m.	966	11	923	10	43	4.7%	1	10.0%
9:00 - 10:00 a.m.	282	11	234	11	48	20.5%	0	0.0%
10:00 - 11:00 a.m.	182	11	154	10	28	18.2%	1	10.0%
11:00 a.m.- Noon	157	12	145	24	12	8.3%	-12	-50.0%
Noon - 1:00 p.m.	60	10	90	17	-30	-33.3%	-7	-41.2%
1:00 - 2:00 p.m.	88	23	82	22	6	7.3%	1	4.5%
2:00 - 3:00 p.m.	131	41	97	33	34	35.1%	8	24.2%
3:00 - 4:00 p.m.	85	33	80	31	5	6.3%	2	6.5%
4:00 - 5:00 p.m.	75	36	66	26	9	13.6%	10	38.5%
5:00 - 6:00 p.m.	105	31	101	18	4	4.0%	13	72.2%
6:00 - 7:00 p.m.	56	28	45	20	11	24.4%	8	40.0%
7:00 - 8:00 p.m.	60	17	28	16	32	114.3%	1	6.3%
8:00 - 9:00 p.m.	34	8	18	11	16	88.9%	-3	-27.3%
9:00 - 10:00 p.m.	22	9	22	8	0	0.0%	1	12.5%
10:00 - 11:00 p.m.	36	6	20	7	16	80.0%	-1	-14.3%
Total	3,914	307	3,777	275	137	3.6%	32	11.6%

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:10 - 7:00 a.m.	18	21	18	7	0	0.0%	14	200.0%
7:00 - 8:00 a.m.	69	27	28	31	41	146.4%	-4	-12.9%
8:00 - 9:00 a.m.	31	36	31	37	0	0.0%	-1	-2.7%
9:00 - 10:00 a.m.	18	29	24	28	-6	-25.0%	1	3.6%
10:00 - 11:00 a.m.	9	50	14	30	-5	-35.7%	20	66.7%
11:00 a.m.- Noon	19	60	13	72	6	46.2%	-12	-16.7%
Noon - 1:00 p.m.	23	94	24	117	-1	-4.2%	-23	-19.7%
1:00 - 2:00 p.m.	6	100	21	84	-15	-71.4%	16	19.0%
2:00 - 3:00 p.m.	11	247	27	222	-16	-59.3%	25	11.3%
3:00 - 4:00 p.m.	19	453	30	266	-11	-36.7%	187	70.3%
4:00 - 5:00 p.m.	19	403	27	400	-8	-29.6%	3	0.8%
5:00 - 6:00 p.m.	27	984	33	816	-6	-18.2%	168	20.6%
6:00 - 7:00 p.m.	22	506	8	454	14	175.0%	52	11.5%
7:00 - 8:00 p.m.	14	291	11	252	3	27.3%	39	15.5%
8:00 - 9:00 p.m.	5	151	1	158	4	400.0%	-7	-4.4%
9:00 - 10:00 p.m.	7	93	1	121	6	600.0%	-28	-23.1%
10:00 - 11:00 p.m.	5	156	2	102	3	150.0%	54	52.9%
Total	322	3,701	313	3,197	9	2.9%	504	15.8%

Table A.5 - NORTH QUINCY STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:00 - 7:00 a.m.	420	37	366	53	54	14.8%	-16	-30.2%
7:00 - 8:00 a.m.	1,219	240	1,158	213	61	5.3%	27	12.7%
8:00 - 9:00 a.m.	1,451	169	1,252	118	199	15.9%	51	43.2%
9:00 - 10:00 a.m.	420	54	347	30	73	21.0%	24	80.0%
10:00 - 11:00 a.m.	217	46	247	25	-30	-12.1%	21	84.0%
11:00 a.m.- Noon	157	28	164	32	-7	-4.3%	-4	-12.5%
Noon - 1:00 p.m.	160	9	181	17	-21	-11.6%	-8	-47.1%
1:00 - 2:00 p.m.	164	31	131	24	33	25.2%	7	29.2%
2:00 - 3:00 p.m.	233	31	116	61	117	100.9%	-30	-49.2%
3:00 - 4:00 p.m.	239	56	154	39	85	55.2%	17	43.6%
4:00 - 5:00 p.m.	360	24	224	50	136	60.7%	-26	-52.0%
5:00 - 6:00 p.m.	434	41	267	57	167	62.5%	-16	-28.1%
6:00 - 7:00 p.m.	289	30	141	25	148	105.0%	5	20.0%
7:00 - 8:00 p.m.	118	36	59	20	59	100.0%	16	80.0%
8:00 - 9:00 p.m.	36	11	36	9	0	0.0%	2	22.2%
9:00 - 10:00 p.m.	80	24	29	18	51	175.9%	6	33.3%
10:00 - 11:00 p.m.	56	16	29	6	27	93.1%	10	166.7%
Total	6,053	883	4,901	797	1,152	23.5%	86	10.8%

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:10 - 7:00 a.m.	26	125	30	87	-4	-13.3%	38	43.7%
7:00 - 8:00 a.m.	29	298	34	234	-5	-14.7%	64	27.4%
8:00 - 9:00 a.m.	18	546	24	478	-6	-25.0%	68	14.2%
9:00 - 10:00 a.m.	17	245	22	153	-5	-22.7%	92	60.1%
10:00 - 11:00 a.m.	9	87	25	77	-16	-64.0%	10	13.0%
11:00 a.m.- Noon	17	97	17	93	0	0.0%	4	4.3%
Noon - 1:00 p.m.	12	149	39	147	-27	-69.2%	2	1.4%
1:00 - 2:00 p.m.	14	118	50	147	-36	-72.0%	-29	-19.7%
2:00 - 3:00 p.m.	114	234	155	145	-41	-26.5%	89	61.4%
3:00 - 4:00 p.m.	137	406	133	295	4	3.0%	111	37.6%
4:00 - 5:00 p.m.	154	677	112	496	42	37.5%	181	36.5%
5:00 - 6:00 p.m.	164	1,215	138	1,269	26	18.8%	-54	-4.3%
6:00 - 7:00 p.m.	47	659	68	559	-21	-30.9%	100	17.9%
7:00 - 8:00 p.m.	20	291	27	322	-7	-25.9%	-31	-9.6%
8:00 - 9:00 p.m.	18	192	9	183	9	100.0%	9	4.9%
9:00 - 10:00 p.m.	25	167	12	130	13	108.3%	37	28.5%
10:00 - 11:00 p.m.	7	126	6	90	1	16.7%	36	40.0%
Total	828	5,632	901	4,905	-73	-8.1%	727	14.8%

Table A.6 - ASHMONT STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 1998 and May 1997

Time Interval	May 1998 Inbound		May 1997 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:10 - 7:00 a.m.	934		904		30	3.3%		
7:00 - 8:00 a.m.	1,619		1,420		199	14.0%		
8:00 - 9:00 a.m.	1,699		1,681		18	1.1%		
9:00 - 10:00 a.m.	558		691		-133	-19.2%		
10:00 - 11:00 a.m.	383		391		-8	-2.0%		
11:00 a.m.- Noon	287		378		-91	-24.1%		
Noon - 1:00 p.m.	334		297		37	12.5%		
1:00 - 2:00 p.m.	319		328		-9	-2.7%		
2:00 - 3:00 p.m.	554		577		-23	-4.0%		
3:00 - 4:00 p.m.	361		305		56	18.4%		
4:00 - 5:00 p.m.	424		358		66	18.4%		
5:00 - 6:00 p.m.	264		292		-28	-9.6%		
6:00 - 7:00 p.m.	207		179		28	15.6%		
7:00 - 8:00 p.m.	149		96		53	55.2%		
8:00 - 9:00 p.m.	89		72		17	23.6%		
9:00 - 10:00 p.m.	120		89		31	34.8%		
10:00 - 11:00 p.m.	88		70		18	25.7%		
Total	8,389		8,128		261	3.2%		

Time Interval	May 1998 Outbound		May 1997 Outbound		Ons		Offs	
	Ons	Offs	Ons	Offs	1998-	Percent	1998-	Percent
					1997	change	1997	change
6:05 - 7:00 a.m.		222		192			30	15.6%
7:00 - 8:00 a.m.		301		306			-5	-1.6%
8:00 - 9:00 a.m.		231		196			35	17.9%
9:00 - 10:00 a.m.		160		146			14	9.6%
10:00 - 11:00 a.m.		175		197			-22	-11.2%
11:00 a.m.- Noon		186		232			-46	-19.8%
Noon - 1:00 p.m.		295		260			35	13.5%
1:00 - 2:00 p.m.		419		364			55	15.1%
2:00 - 3:00 p.m.		556		639			-83	-13.0%
3:00 - 4:00 p.m.		739		864			-125	-14.5%
4:00 - 5:00 p.m.		1,002		1,228			-226	-18.4%
5:00 - 6:00 p.m.		1,949		1,618			331	20.5%
6:00 - 7:00 p.m.		1,044		1,095			-51	-4.7%
7:00 - 8:00 p.m.		554		632			-78	-12.3%
8:00 - 9:00 p.m.		383		428			-45	-10.5%
9:00 - 10:00 p.m.		422		290			132	45.5%
10:00 - 11:00 p.m.		248		208			40	19.2%
Total		8,886		8,895			-9	-0.1%

Note: 1997 inbound A.M peak counts were conducted in November, after start of Old Colony service

Table A.7 - BRAINTREE STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 2000 and May 1998

Time Interval	May 2000 Inbound		May 1998 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	2000-	Percent	2000-	Percent
					1998	change	1998	change
6:15 - 7:00 a.m.	786		692		94	13.6%		
7:00 - 8:00 a.m.	863		1,209		-346	-28.6%		
8:00 - 9:00 a.m.	374		469		-95	-20.3%		
9:00 - 10:00 a.m.	148		137		11	8.0%		
Total	2,171		2,507		-336	-13.4%		

Table A.8 - QUINCY ADAMS STATION
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 2000 and May 1998

Time Interval	May 2000 Inbound		May 1998 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	2000-	Percent	2000-	Percent
					1998	change	1998	change
6:15 - 7:00 a.m.	270	6	307	3	-37	-12.1%	3	100.0%
7:00 - 8:00 a.m.	1,154	16	1,024	3	130	12.7%	13	433.3%
8:00 - 9:00 a.m.	1,335	8	1,101	4	234	21.3%	4	100.0%
9:00 - 10:00 a.m.	194	2	293	5	-99	-33.8%	-3	-60.0%
Total	2,953	32	2,725	15	228	8.4%	17	113.3%

Table A.9 - BRAINTREE and QUINCY ADAMS COMBINED
RED LINE HOURLY BOARDINGS and ALIGHTINGS
May 2000 and May 1998

Time Interval	May 2000 Inbound		May 1998 Inbound		Ons		Offs	
	Ons	Offs	Ons	Offs	2000-	Percent	2000-	Percent
					1998	change	1998	change
6:15 - 7:00 a.m.	1,056	6	999	3	57	5.7%	3	100.0%
7:00 - 8:00 a.m.	2,017	16	2,233	3	-216	-9.7%	13	433.3%
8:00 - 9:00 a.m.	1,709	8	1,570	4	139	8.9%	4	100.0%
9:00 - 10:00 a.m.	342	2	430	5	-88	-20.5%	-3	-60.0%
Total	5,124	32	5,232	15	-108	-2.1%	17	113.3%

Appendix B. Old Colony Passenger Counts at South Station, Quincy Center, and Braintree

Summary of Old Colony Service During Counts

Old Colony commuter rail service first began operating on a limited basis on September 29, 1997. Because some track and signal construction work was still incomplete, the initial service ran only during weekday peak hours, in the peak directions. Each branch had four inbound A.M. peak trains and four outbound P.M. peak trains. The Plymouth/Kingston Line had no service from the Plymouth terminal.

Full service on both lines began two months later, on November 30, 1997. At that time, the weekday schedule on the Middleborough/Lakeville Line was expanded to 12 round trips, of which there were still four inbound in the A.M. peak and four outbound in the P.M. peak. (A fifth inbound trip arrived in Boston just before the start of the A.M. peak.) The weekday schedule on the Plymouth/Kingston Line was expanded to 15 round trips, including five inbound in the A.M. peak and four outbound in the P.M. peak. Midday service included four round trips between Boston and the Plymouth terminal rather than Kingston. On Saturdays and Sundays the Middleborough/Lakeville Line was served by seven round trips and the Plymouth/Kingston Line by eight, including three Plymouth round trips.

Under the initial limited schedule, all Middleborough/Lakeville Line trains stopped at Quincy Center but not Braintree and all Plymouth/Kingston Line trains stopped at Braintree but not Quincy Center. After November 1997, all Middleborough/Lakeville Line trains still stopped at Quincy Center and a few also stopped at Braintree. All Plymouth/Kingston Line trains still stopped at Braintree and a few also stopped at Quincy Center.

The frequency of service implemented on each line in November 1997 was still in effect as of May 2000, but adjustments made in May and October 1998 had resulted in slightly faster running times and slight differences in scheduled arrival or departure times for trains on both lines.

Information Obtained in CTPS Counts

In conjunction with the Impact Study, CTPS conducted one-day counts of Old Colony train boardings and alightings at South Station, Quincy Center, and Braintree in October 1997 and March 1998 and then at intervals of three to four months until October 1999. Counts of peak-period boardings and alightings at South Station only were also done during the Spring of 2000 as part of a more general study of commuter rail ridership. The first several counts were done by checkers working on the platforms at each of the three count stations. Because of problems in counting heavy volumes, or because of

trains boarding or detraining passengers simultaneously on shared platforms at South Station, some of the later counts were done by checkers riding on trains between Quincy Center or Braintree and South Station.

In addition to the series of counts at South Station, Quincy Center, and Braintree, boarding and alighting counts at all stations south of Braintree were done in October 1998 to obtain control totals for expanding the results of the Old Colony passenger survey. Those counts showed that only 2.3% of all riders on the Middleborough/Lakeville Line and only 0.3% on the Plymouth/Kingston Line made trips entirely south of Braintree. Assuming that these shares did not increase significantly after the first year, the other CTPS counts taken at only South Station, Quincy Center, and Braintree would have included almost all Old Colony riders.

The results of all of the CTPS Old Colony counts are summarized in tables B.1 to B.36 at the end of this appendix. Tables B.1 to B.32 provide comparisons of ridership by train in each of the counts taken at South Station, Braintree, and Quincy. Train numbers and scheduled times used in these tables are those that went into effect on October 26, 1998. These had not changed by the Spring of 2000. Tables B.33 to B.36 show the results of the survey control counts at all stations. At the time these counts were done, the schedule of May 11, 1998 was still in effect.

From the outset, all Old Colony trains scheduled to arrive at South Station in Boston between 6:30 and 9:30 a.m. or to depart from there between 3:30 and 6:30 p.m. have been officially classified as peak-hour trains, and all others as off-peak trains. (At present, this distinction is applied mainly in calculating surcharges for tickets purchased on board trains.) The first inbound A.M. peak train on the Middleborough/Lakeville Line (Train 002) originally had a scheduled Boston arrival time of 6:30. It was changed to 6:27 in November 1997, and to 6:19 in May 1998, placing it outside the official peak. Passenger volumes on Train 002 have always been more similar to those of peak trains than of off-peak trains, however, and exceed those on some peak trains on other lines. Ridership on Train 002, like that on most peak trains, is made up predominantly of work trips from suburban homes to jobs in Boston. For these reasons, in the tables and discussion Train 002 and the official A.M. peak trains are placed in a category identified as "Arrive before 9:30 a.m."

Summary of Ridership Patterns

In all of the CTPS counts, the Plymouth/Kingston Line has been the more heavily patronized of the two Old Colony branches in terms of all-day and peak ridership in each direction. It has also had the heavier ridership on outbound trains leaving Boston before the start of the P.M. peak. The Middleborough/Lakeville Line has had the heavier inbound ridership of the two lines after 9:30 a.m. in most counts, and has always had heavier outbound ridership on trains leaving Boston after the P.M. peak. The latter two patterns are interrelated, since many riders who travel to Boston after the end of the A.M. peak would not return outbound until after the P.M. peak.

In most of the counts on both Old Colony branches from March 1998 to Fall 1999, combined inbound offs and outbound ons at South Station, Quincy Center, and Braintree increased compared with the preceding counts. The Fall 1999 counts on the Middleborough/Lakeville showed a slight dropoff, but this was mainly a result of inbound midday ridership having been unusually heavy in the June 1999 counts. The Plymouth/Kingston Line counts showed a slight dropoff in March 1999 that had been more than recovered by June 1999. Peak ridership on both lines showed signs of leveling off as of the Fall 1999 counts. The Spring 2000 counts, which included only peak-period line volumes in and out of South Station showed further growth in both peaks, but the gains were larger inbound than outbound.

The first CTPS counts of inbound alightings at South Station were conducted when Old Colony service had been operating for only two weeks, with peak-period service only. On the Middleborough/Lakeville Line South Station A.M. peak alightings in the Spring of 2000 were 2.3 times as large as those in October 1997. The December 1998 counts were the first to show a doubling of ridership from the initial level. On the Plymouth/Kingston Line, the Spring 2000 A.M. peak South Station alightings were the first to show a doubling of ridership compared with October 1997.

Because of the absence of off-peak service, the initial counts included some riders who would have preferred later inbound departures and switched to midday trains when they became available. Ridership on both lines has been prevented from reaching its maximum potential both by limited parking capacity and by limited train capacity. Inspections by CTPS in the Spring of 2000 found that all Old Colony parking facilities except for the one in Plymouth and the three in Brockton were filled to at least 85% of capacity at midday, with several at 98% or greater. The Spring 2000 peak load counts showed that two of the five trains on the Middleborough/Lakeville Line and three of the five on the Plymouth/Kingston Line arriving in Boston before 9:30 a.m. had more passengers than seats. Even on trains with more seats than passengers there were some standees mostly because of three-passenger seats being occupied by only two passengers.

Relative Use of South Station, Quincy Center, and Braintree

South Station was by far the most heavily used of the three stations included in all CTPS Old Colony counts from October 1997 to the Fall of 1999. On the Middleborough/Lakeville Line, for both all-day and peak-period service counts, 95% to 97% of the Fall 1999 inbound alightings and outbound boardings at South Station, Quincy Center, and Braintree combined took place at South Station. On the Plymouth/Kingston Line, the comparable South Station proportions ranged from 94% to 96%. These figures varied little among all of the CTPS counts of Old Colony riders.

Informal observations during the counts indicated that many of the P.M. peak outbound Old Colony passengers at Quincy Center and Braintree were transferring from the Red Line, as they arrived on the Old Colony platforms in groups following arrivals of Red Line trains. The 1998 survey, which included only inbound riders,

found that 54% of those alighting at Braintree and 48% of those alighting at Quincy Center were transferring to the Red Line.

Ridership Trends for Selected Subgroups

The CTPS counts provide sufficient information show to show ridership trends in several Old Colony market subgroups. These include travel from stations south of Braintree to South Station, Braintree, and Quincy Center from each Old Colony branch and travel to South Station from Braintree and from Quincy. Passengers riding Old Colony trains only between Braintree or Quincy Center and South Station are, in effect, using Old Colony trains as an express alternative to the Red Line, which also connects these three stations but makes many more intermediate stops.

For reasons discussed in detail in a separate section of this appendix, all passengers boarding inbound Old Colony trains at Quincy and most of those boarding at Braintree can be presumed to alight at South Station. Conversely, all outbound passengers alighting at Quincy and most of those alighting at Braintree can be presumed to have boarded at South Station. Therefore, the number of passengers using Old Colony trains to travel between South Station and points south of Braintree is, for all practical purposes, equal to the difference between total South Station boardings and alightings and Quincy and Braintree outbound alightings and inbound boardings. Tables B.29 through B.32 show the number of passengers using Old Colony trains to travel between South Station and points south of Braintree in each of the CTPS counts using this calculation method.

In absolute terms, the largest subgroup in all counts was travel between South Station and Plymouth/Kingston Line stations south of Braintree, followed by travel between South Station and Middleborough/Lakeville Line stations south of Braintree. The fastest-growing subgroup over the two-year count span was travel between Quincy Center and South Station. In the Fall 1999 counts, Old Colony trains on both routes combined had 187 inbound ons and 235 outbound offs at Quincy Center. This was 3.4 times as many riders as in October 1997, but was still small compared with Red Line activity at the same location. (CTPS counts in May 1998 found 6,287 Red Line inbound ons and 6,922 outbound offs at Quincy Center between 6:00 a.m. and 11:00 p.m.)

The second-largest growth rate in Old Colony service was found in travel between South Station and Middleborough/Lakeville Line stations south of Braintree. This increased by a factor of 2.5 (reaching about 3,125 each way) from October 1997 to the Fall of 1999. Travel between Braintree station and South Station increased by an only slightly lower factor of 2.4, to 133 inbound and 171 outbound. As at Quincy Center, this was still small compared with Red Line activity at the same location. (CTPS counts in May 1998 found 3,404 Red Line inbound ons and 3,677 outbound offs at Braintree between 6:30 a.m. and 11:00 p.m.)

Travel between South Station and Plymouth/Kingston Line stations south of Braintree, although still the largest subgroup in absolute terms, had the fourth-largest growth rate.

It increased by a factor of 2.2 (to 3,493 inbound and 3,690 outbound). The slightly lower rate of growth was mainly a result of initial ridership having been much greater in this subgroup than in any of the others.

Ridership between Quincy Center or Braintree and Old Colony stations south of Braintree has grown much less than that in any of the subgroups discussed above. At Braintree, inbound offs and outbound ons for Plymouth/Kingston trains (all of which stop there) were 1.8 times as great in October 1999 as they had been in October 1997, at 177 offs and 188 ons. During the two years, these figures have fluctuated rather than showing steady growth.

At Quincy Center, inbound offs and outbound ons for Middleborough/Lakeville trains (all of which stop there) were only 1.7 times as great in October 1999 as they had been in October 1997, at 162 off and 132 on. As at Braintree, these figures have fluctuated rather than showing steady growth.

Distribution of Ridership South of Braintree

The October 1998 counts, conducted to provide control totals for expansion of the Old Colony survey responses, are the only CTPS counts thus far to include boardings and alightings at stations south of Braintree. The results are summarized in tables B.33 to B.36. In addition to showing the relative importance of individual stations, these counts show that the amount of ridership between any pair of stations south of Braintree was very small. Because of the rapid transit and bus connections available at Braintree and Quincy Center in addition to final destinations served by these stations, it would be expected that they would continue to be more important than any stations south of Braintree as inner ends of interzone trips. The limited growth observed in interzone trips to Quincy or Braintree suggests that interzone travel entirely south of Braintree would also have shown little growth since October 1998.

Middleborough/Lakeville Line

The Middleborough/Lakeville Line serves six stations south of Braintree. All trains in both directions are scheduled to stop at all of these stations. In the October 1998 counts, 95.9% of the inbound boardings and 94.5% of the outbound alightings on the line took place at these stations, with the remainder being divided between Braintree and Quincy. Middleborough/Lakeville was the single most heavily patronized station, with 696 inbound ons (23.5%) and 706 outbound offs (23.1%). Brockton Station had the lowest ridership activity south of Braintree, with 249 inbound ons (8.4%) and 283 outbound offs (9.3%), but the Campello and Montello stations are also located in the city of Brockton. The three Brockton stations combined accounted for 1,024 inbound ons (34.5%) and 1,145 outbound offs (37.4%).

These counts supported the presumption of other Old Colony counts that passengers with both trip ends south of Braintree account for a relatively small part of ridership on the Middleborough/Lakeville line. Only 76 inbound offs (2.6%) and 63 outbound ons

(2.1%) took place south of Braintree all day. Brockton station alone was a trip end for over 40% of this traffic, with 33 inbound offs and 27 outbound ons. This activity was scattered over the entire service day, and it was not possible to determine trip purposes or opposite trip ends from the counts.

For comparison, the same counts showed 189 inbound offs and 152 outbound ons at Braintree or Quincy Center for Middleborough/Lakeville Line trains. By October 1999, inbound offs at these two stations had increased slightly to 193, but outbound ons had fallen to 137. This suggests that interzone travel entirely south of Braintree would also have changed little since October 1998.

Reverse commuting is also of relatively limited importance on this line. Only the first two outbound trips of the day would allow passengers to arrive at destinations prior to 9:00 a.m. In October 1998, these trains carried a combined total of 55 riders, or 1.8% of the all-day outbound total. Of these riders, 44 boarded at South Station, Quincy Center, or Braintree. Bridgewater station accounted for the largest share of alightings, with 26. (The most likely destination for these trips was Bridgewater State College.) Brockton station had the second-largest share, with 14 offs. The return halves of most reverse-commuting work trips would be expected to be made on one late-afternoon train, which had a total of 33 riders. (Returns of student trips would be more dispersed.) Only 20 of these riders rode to Boston, and none to Braintree or Quincy.

By October 1999, South Station, Quincy Center, or Braintree boardings on the two outbound A.M. peak trains had nearly doubled, to 87. Alightings at these station from the late afternoon train had increased by 80%, to 36.

Plymouth/Kingston Line

The Plymouth/Kingston line serves seven stations south of Braintree. All trains in both directions are scheduled to stop at either Plymouth or Kingston and all five of the other stations, except that one afternoon inbound Kingston train runs non-stop between Halifax and Braintree. No town on the line has more than one station. In the October 1998 counts, 96.1% of the inbound boardings and 95.5% of the outbound alightings on the line took place at these stations, with the remainder being divided between Braintree and Quincy. Kingston was the single most heavily patronized station, with 907 inbound ons (25.3%) and 941 outbound offs (26.4%). Plymouth Station, which is served by only four round trips, all in off-peak hours, was the least patronized station with 65 inbound ons (1.8%) and 55 outbound offs (1.5%). Of the stations south of Braintree with all-day service, Hanson had the lowest overall activity, with 421 inbound ons (11.8%) and 384 outbound offs (10.8%), but was only slightly behind Halifax and Whitman.

The number of trips on the Plymouth/Kingston Line with both ends south of Braintree was negligible, with only 11 inbound offs (0.3%) and 12 outbound ons (0.3%) in that segment all day. This activity was scattered over the line. Whitman had the largest share, with four offs and three ons.

For comparison, the same counts showed 190 inbound offs and 131 outbound ons at Braintree or Quincy Center for Plymouth/Kingston Line trains. By October 1999, inbound offs at these two stations had increased to 212, and outbound ons had risen to 207, or an average gain of 30%. Even with a rate of growth twice as great as this, there would have been fewer than 20 interzone trips each way entirely south of Braintree on this line by October 1999.

Reverse commuting is also of relatively limited importance on the Plymouth/Kingston Line. Only the first outbound trip of the day would allow passengers to arrive at destinations prior to 9:00 a.m. In October 1998 this train carried a total of 22 riders, all boarding at South Station or Braintree. The greatest number of offs at any single station was four at Whitman. The train with times most suitable for return trips from work carried a total of 37 riders, but none of them boarded at Whitman. By October 1999 boardings on the outbound A.M. peak train had increased 23%, to 27, but alightings from the inbound P.M. peak train had fallen 16%, to 31.

Reasons for Directional Imbalances in Ridership

On both lines, differences between inbound offs and outbound ons can be attributed to several factors. Some riders use Old Colony trains in one direction and either other public transportation alternatives or private transportation in the other direction. Some passengers making round trips on Old Colony trains use South Station in one direction but use Quincy Center or Braintree in the other direction. Some non-work trips may include only one-way travel by any means on the count day. Because none of the sets of counts was done on a single day, normal day-to-day variation could also affect the inbound/outbound balances.

Further Details on Calculation of Ridership to South Station from South of Braintree

At the time of all of the Old Colony passenger counts discussed in this appendix, there were no intermediate stations between Quincy Center and South Station. (Construction of one intermediate station adjacent to the JFK/UMass Red Line station began in the Spring of 2000.) Therefore, at Quincy Center, Old Colony passengers boarding inbound trains or alighting from outbound trains could only have traveled to or from South Station on those trains. The majority of Old Colony trains stopping at Braintree made no intermediate stops between there and South Station, but some also stopped at Quincy Center.

It is possible that some Old Colony riders counted at Braintree were going to or from Quincy Center, but most inbound boardings and outbound alightings at Braintree were probably also South Station passengers. During all of the counts, the Red Line full fare between Braintree and Quincy Center was 85 cents. The Old Colony full fare between the same two stations was \$1.75. The scheduled trip time between the two stations was 5 to 6 minutes on the Red Line versus 7 minutes on the Old Colony trains. It would be very unlikely for a passenger to board an inbound Old Colony train at Braintree, ride to Quincy Center, and transfer to another Old Colony train there, as both trains would

continue to South Station. (A passenger boarding a train at Braintree and finding it overcrowded might choose to transfer to the next train, but repeat riders would soon learn how to avoid crowded trains in the first place.)

Outbound at Quincy Center, passengers can take trains that stop both there and at Braintree in order to transfer at the latter station to trains that do not stop at Quincy. Under the schedules in effect during the CTPS counts, however, the only pair of trains between which such a transfer would be convenient is from the Middleborough/Lakeville train that now stops at Braintree at 5:04 p.m. (Train 015) to the Kingston train that now stops there at 5:14 (Train 045). Direct observations by the CTPS checkers found that five to 15 riders per day made this transfer. To avoid double counting, the tables in this appendix treat such transfers as Braintree station boardings for Train 045 but do not include them in the Quincy boardings or Braintree alightings for Train 015.

Table B.1 - SOUTH STATION
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND ALIGHTINGS
Oct. 1997 to Sept. 1999 and Spring 2000

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Sept. 99	Spring 00
		In Offs	In Offs							
OO2	6:19 AM	172	260	263	268	266	287	274	338	333
OO4	7:05 AM	310	403	400	472	445	526	628	525	558
OO6	7:52 AM	462	488	492	645	669	847	794	884	911
OO8	8:14 AM	386	505	581	641	882	630	783	721	838
O10	9:00 AM		198	267	349	405	354	367	442	433
O12	10:34 AM		91	135	124	146	118	190	111	(not counted)
O14	12:04 PM		44	79	56	82	64	151	72	(not counted)
O16	1:55 PM		35	60	39	49	62	63	65	(not counted)
O18	4:21 PM		24	43	39	77	49	40	61	51
O20	5:50 PM		15	33	20	28	20	47	30	40
O22	7:01 PM		12	15	25	21	15	25	25	9
O24	10:18 PM		8	39	25	34	22	36	27	(not counted)
Arrive before 9:30 a.m.		1,330	1,854	2,003	2,375	2,667	2,644	2,846	2,910	3,073
Arrive after 9:30 a.m.		0	229	404	328	437	350	552	391	(Incomplete)
Total		1,330	2,083	2,407	2,703	3,104	2,994	3,398	3,301	(Incomplete)

Table B.2 - SOUTH STATION
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND BOARDINGS
Oct. 1997 to Sept. 1999 and Spring 2000

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Sept. 99	Spring 00
		Out Ons	Out Ons							
OO3	6:45 AM		8	8	11	13	25	22	23	14
OO5	8:22 AM		13	21	26	21	30	25	46	34
OO7	9:57 AM		21	15	25	23	19	16	30	(not counted)
OO9	11:50 AM		27	50	44	48	52	60	49	(not counted)
O11	2:15 PM		125	112	125	128	145	125	129	(not counted)
O13	3:45 PM	259	267	344	393	385	441	414	421	419
O15	4:45 PM	284	407	518	593	623	740	707	723	717
O17	5:14 PM	450	489	673	660	588	753	750	774	796
O19	5:53 PM	279	405	436	513	521	589	628	580	618
O21	6:45 PM		234	179	237	252	251	279	326	(not counted)
O23	8:10 PM		88	121	135	161	240	172	148	(not counted)
O25	10:30 PM		49	68	82	71	63	110	87	(not counted)
Depart in PM peak		1,272	1,568	1,971	2,159	2,117	2,523	2,499	2,498	2,550
Depart off-peak		0	565	574	685	717	825	809	838	(Incomplete)
Total		1,272	2,133	2,545	2,844	2,834	3,348	3,308	3,336	(Incomplete)

Table B.3 - SOUTH STATION
 PLYMOUTH/KINGSTON LINE INBOUND ALIGHTINGS
 Oct. 1997 to Sept. 1999 and Spring 2000

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Sept. 99	Spring 00
		In Offs	In Offs							
O32	6:31 AM	333	406	395	417	450	511	461	442	565
O34	7:24 AM	576	618	698	830	695	750	825	878	900
O36	8:06 AM	551	647	717	853	784	845	876	986	997
O38	8:30 AM	286	468	566	686	823	615	814	767	837
O40	9:28 AM		163	175	262	240	223	235	253	237
O60	11:00 AM		56	129	61	77	52	90	67	(not counted)
O42	11:43 AM		53	68	85	98	49	75	80	(not counted)
O62	1:05 PM		45	44	37	34	42	75	31	(not counted)
O44	2:15 PM		52	37	25	24	40	36	23	(not counted)
O64	3:20 PM		46	23	34	33	17	38	27	16
O48	4:32 PM		13	17	16	22	7	25	8	13
O66	5:30 PM		17	24	31	34	22	50	22	30
O52	7:25 PM		12	11	23	10	3	16	14	(not counted)
O54	8:55 PM		5	5	10	4	6	8	13	(not counted)
O56	9:45 PM		9	12	9	4	17	15	26	(not counted)
Arrive before 9:30 a.m.		1,746	2,302	2,551	3,048	2,992	2,944	3,211	3,326	3,536
Arrive after 9:30 a.m.		0	308	370	331	340	255	428	311	(Incomplete)
Total		1,746	2,610	2,921	3,379	3,332	3,199	3,639	3,637	(Incomplete)

Table B.4 - SOUTH STATION
 PLYMOUTH/KINGSTON LINE OUTBOUND BOARDINGS
 Oct. 1997 to Sept. 1999 and Spring 2000

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Sept. 99	Spring 00
		Out Ons	Out Ons							
O33	7:05 AM		22	18	20	17	24	26	24	29
O61	8:50 AM		4	13	18	10	13	15	15	11
O35	9:35 AM		6	7	13	8	15	9	7	(not counted)
O63	10:50 AM		11	18	18	24	12	39	23	(not counted)
O39	12:10 PM		37	29	59	76	58	48	42	(not counted)
O65	1:20 PM		50	59	64	48	38	54	55	(not counted)
O41	2:25 PM		48	84	128	116	87	116	98	(not counted)
O67	3:00 PM		85	132	101	150	121	123	122	(not counted)
O43	4:15 PM	419	504	479	624	583	657	640	583	647
O45	4:55 PM	510	494	632	804	762	780	777	784	785
O47	5:30 PM	460	603	807	843	920	914	1008	1063	956
O49	6:15 PM	214	339	428	498	566	619	551	610	678
O51	7:30 PM		202	174	198	237	217	243	287	(not counted)
O55	9:30 PM		74	91	71	110	97	92	123	(not counted)
O57	10:40 PM		21	49	69	38	51	56	46	(not counted)
Depart in PM peak		1,603	1,940	2,346	2,769	2,831	2,970	2,976	3,040	3,066
Depart off-peak		0	560	674	759	834	733	821	842	(Incomplete)
Total		1,603	2,500	3,020	3,528	3,665	3,703	3,797	3,882	(Incomplete)

Table B.5 - QUINCY CENTER STATION
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND ALIGHTINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Offs							
OO2	6:06 AM	4	11	10	10	7	8	15	12
OO4	6:50 AM	17	16	23	20	19	38	25	23
OO6	7:38 AM	40	27	21	48	35	30	27	33
OO8	8:00 AM	38	18	29	37	38	31	40	32
O10	8:45 AM		16	19	22	21	16	22	25
O12	10:20 AM		7	8	2	1	9	14	12
O14	11:50 AM		3	3	5	4	9	4	4
O16	1:42 PM		3	5	10	7	4	2	8
O18	4:07 PM		2	8	8	5	8	7	5
O20	5:34 PM		1	1	0	7	9	9	6
O22	6:48 PM		0	3	4	4	6	2	2
O24	10:05 PM		1	0	3	3	2	4	0
Arrive before 9:30 a.m.		99	88	102	137	120	123	129	125
Arrive after 9:30 a.m.		0	17	28	32	31	47	42	37
Total		99	105	130	169	151	170	171	162

Table B.6 - QUINCY CENTER STATION
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND BOARDINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Ons							
OO3	6:56 AM		1	2	1	0	5	2	8
OO5	8:33 AM		3	6	5	4	10	1	10
OO7	10:08 AM		0	1	4	3	0	5	8
OO9	12:01 PM		2	3	5	7	14	3	6
O11	2:26 PM		3	8	5	7	9	18	11
O13	3:56 PM	24	3	17	18	23	17	30	13
O15	4:56 PM	28	23	23	37	27	35	29	29
O17	5:25 PM	20	24	24	22	24	29	33	20
O19	6:05 PM	2	13	10	24	9	13	14	12
O21	6:57 PM		5	6	12	6	12	9	7
O23	8:21 PM		8	7	3	2	4	6	5
O25	10:41 PM		2	7	2	1	5	3	3
Depart in PM peak		74	63	74	101	83	94	106	74
Depart off-peak		0	24	40	37	30	59	47	58
Total		74	87	114	138	113	153	153	132

Table B.7 - QUINCY CENTER STATION
 PLYMOUTH/KINGSTON LINE INBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Offs							
O32	6:18 AM		8	14	9	7	9	5	10
O34	7:07 AM								
O36	7:51 AM		24	24	29	20	23	29	25
O38	8:14 AM								
O40	9:13 AM								
O60	10:44 AM								
O42	11:28 AM								
O62	12:49 PM								
O44	1:59 PM								
O64	3:04 PM								
O48	4:17 PM								
O66	5:15 PM								
O52	7:10 PM								
O54	8:40 PM								
O56	9:30 PM								
Arrive before 9:30 a.m.		0	32	38	38	27	32	34	35
Arrive after 9:30 a.m.		0	0	0	0	0	0	0	0
Total		0	32	38	38	27	32	34	35

Table B.8 - QUINCY CENTER STATION
 PLYMOUTH/KINGSTON LINE OUTBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Ons							
O33	7:16 AM								
O61	9:01 AM		2	1	1	3	1	4	1
O35	9:45 AM								
O63	11:01 AM								
O39	12:21 PM								
O65	1:31 PM								
O41	2:36 PM								
O67	3:11 PM								
O43	4:26 PM								
O45	5:05 PM								
O47	5:41 PM		8	9	13	21	19	10	18
O49	6:25 PM								
O51	7:40 PM								
O55	9:40 PM								
O57	10:50 PM								
Depart in PM peak			8	9	13	21	19	10	18
Depart off-peak			2	1	1	3	1	4	1
Total			10	10	14	24	20	14	19

Table B.9 - BRAINTREE STATION
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND ALIGHTINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Offs							
OO2	6:00 AM		2	2	1	2	2	2	4
OO4	6:44 AM								
OO6	7:32 AM		5	2	16	18	20	8	20
OO8	7:54 AM								
O10	8:39 AM								
O12	10:14 AM								
O14	11:44 AM								
O16	1:36 PM		0	2	1	5	1	0	5
O18	4:01 PM		1	0	1	1	2	3	1
O20	5:28 PM								
O22	6:42 PM					0	1	0	1
O24	10:00 PM		0	0	1	0	0	0	0
Arrive before 9:30 a.m.		0	7	4	17	20	22	10	24
Arrive after 9:30 a.m.		0	1	2	3	6	4	3	7
Total		0	8	6	20	26	26	13	31

Table B.10 - BRAINTREE STATION
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND BOARDINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Ons							
OO3	6:59 AM		0	1	1	0	2	0	0
OO5	8:49 AM								
OO7	10:19 AM								
OO9	12:09 PM								
O11	2:29 PM								
O13	4:04 PM								
O15	5:04 PM		5	17	13	7	7	5	5
O17	5:35 PM								
O19	6:12 PM								
O21	7:04 PM								
O23	8:29 PM								
O25	10:49 PM								
Depart in PM peak		0	5	17	13	7	7	5	5
Depart off-peak		0	0	1	1	0	2	0	0
Total		0	5	18	14	7	9	5	5

Table B.11 - BRAINTREE STATION
 PLYMOUTH/KINGSTON LINE INBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Offs							
O32	6:21 AM	12	4	6	13	20	12	12	13
O34	7:11 AM	20	29	29	50	51	50	12	78
O36	7:54 AM	53	16	10	20	18	21	13	24
O38	8:11 AM	30	14	14	26	14	10	24	24
O40	9:06 AM		9	14	15	4	1	0	8
O60	10:38 AM		11	1	4	8	0	4	5
O42	11:26 AM		2	2	5	3	0	1	4
O62	12:51 PM		3	2	5	3	3	4	3
O44	2:01 PM		3	1	3	7	2	11	1
O64	3:21 PM		5	3	1	1	5	8	0
O48	4:16 PM		1	3	1	0	4	1	0
O66	5:14 PM		5	6	6	0	4	8	9
O52	7:04 PM		1	1	2	2	4	3	4
O54	8:53 PM		0	3	0	3	2	2	3
O56	9:31 PM		3	1	1	4	1	2	1
Arrive before 9:30 a.m.		115	72	73	124	107	94	61	147
Arrive after 9:30 a.m.		0	34	23	28	31	25	44	30
Total		115	106	96	152	138	119	105	177

Table B.12 - BRAINTREE STATION
 PLYMOUTH/KINGSTON LINE OUTBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Ons							
O33	7:29 AM		0	1	2	3	1	4	3
O61	9:06 AM		1	1	0	1	0	6	5
O35	9:54 AM		0	1	3	0	1	2	2
O63	11:07 AM		2	1	1	0	1	3	2
O39	12:29 PM		0	2	4	4	2	4	7
O65	1:39 PM		5	7	5	4	8	2	5
O41	2:39 PM		9	8	12	12	12	2	18
O67	3:19 PM		4	7	6	15	15	5	13
O43	4:34 PM	36	32	25	23	43	30	23	39
O45	5:14 PM	37	31	33	30	32	31	30	36
O47	5:50 PM	17	8	12	10	10	16	14	24
O49	6:34 PM	3	8	13	9	5	15	8	13
O51	7:49 PM		4	1	8	8	9	5	8
O55	9:49 PM		2	3	3	2	2	2	7
O57	10:59 PM		0	2	1	3	1	3	6
Depart in PM peak		93	79	83	72	90	92	75	112
Depart off-peak		0	27	34	45	52	52	38	76
Total		93	106	117	117	142	144	113	188

Table B.13 - SOUTH STATION, QUINCY CENTER, and BRAINTREE
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND ALIGHTINGS
October 1997 to Fall 1999

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		In Offs							
OO2	6:19 AM	176	273	275	279	275	297	291	354
OO4	7:05 AM	327	419	423	492	464	564	653	548
OO6	7:52 AM	502	520	515	709	722	897	829	937
OO8	8:14 AM	424	523	610	678	920	661	823	753
O10	9:00 AM		214	286	371	426	370	389	467
O12	10:34 AM		98	143	126	147	127	204	123
O14	12:04 PM		47	82	61	86	73	155	76
O16	1:55 PM		38	67	50	61	67	65	78
O18	4:21 PM		27	51	48	83	59	50	67
O20	5:50 PM		16	34	20	35	29	56	36
O22	7:01 PM		12	18	29	25	22	27	28
O24	10:18 PM		9	39	29	37	24	40	27
Arrive before 9:30 a.m.		1,429	1,949	2,109	2,529	2,807	2,789	2,985	3,059
Arrive after 9:30 a.m.		0	247	434	363	474	401	597	435
Total		1,429	2,196	2,543	2,892	3,281	3,190	3,582	3,494

Table B.14 - SOUTH STATION, QUINCY CENTER, and BRAINTREE
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND BOARDINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		Out Ons							
OO3	6:45 AM		9	11	13	13	32	24	31
OO5	8:22 AM		16	27	31	25	40	26	56
OO7	9:57 AM		21	16	29	26	19	21	38
OO9	11:50 AM		29	53	49	55	66	63	55
O11	2:15 PM		128	120	130	135	154	143	140
O13	3:45 PM	283	270	361	411	408	458	444	434
O15	4:45 PM	312	435	558	643	657	782	741	757
O17	5:14 PM	470	513	697	682	612	782	783	794
O19	5:53 PM	281	418	446	537	530	602	642	592
O21	6:45 PM		239	185	249	258	263	288	333
O23	8:10 PM		96	128	138	163	244	178	153
O25	10:30 PM		51	75	84	72	68	113	90
Depart in PM peak		1,346	1,636	2,062	2,273	2,207	2,624	2,610	2,577
Depart off-peak		0	589	615	723	747	886	856	896
Total		1,346	2,225	2,677	2,996	2,954	3,510	3,466	3,473

Table B.15 - SOUTH STATION, QUINCY CENTER, and BRAINTREE
 PLYMOUTH/KINGSTON LINE INBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		In Offs							
O32	6:31 AM	345	418	415	439	477	532	478	465
O34	7:24 AM	596	647	727	880	746	800	837	956
O36	8:06 AM	604	687	751	902	822	889	918	1035
O38	8:30 AM	316	482	580	712	837	625	838	791
O40	9:28 AM		172	189	277	244	224	235	261
O60	11:00 AM		67	130	65	85	52	94	72
O42	11:43 AM		55	70	90	101	49	76	84
O62	1:05 PM		48	46	42	37	45	79	34
O44	2:15 PM		55	38	28	31	42	47	24
O64	3:20 PM		51	26	35	34	22	46	27
O48	4:32 PM		14	20	17	22	11	26	8
O66	5:30 PM		22	30	37	34	26	58	31
O52	7:25 PM		13	12	25	12	7	19	18
O54	8:55 PM		5	8	10	7	8	10	16
O56	9:45 PM		12	13	10	8	18	17	27
Arrive before 9:30 a.m.		1,861	2,406	2,662	3,210	3,126	3,070	3,306	3,508
Arrive after 9:30 a.m.		0	342	393	359	371	280	472	341
Total		1,861	2,748	3,055	3,569	3,497	3,350	3,778	3,849

Table B.16 - SOUTH STATION, QUINCY CENTER, and BRAINTREE
 PLYMOUTH/KINGSTON LINE OUTBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		Out Ons							
O33	7:05 AM		22	19	22	20	25	30	27
O61	8:50 AM		7	15	19	14	14	25	21
O35	9:35 AM		6	8	16	8	16	11	9
O63	10:50 AM		13	19	19	24	13	42	25
O39	12:10 PM		37	31	63	80	60	52	49
O65	1:20 PM		55	66	69	52	46	56	60
O41	2:25 PM		57	92	140	128	99	118	116
O67	3:00 PM		89	139	107	165	136	128	135
O43	4:15 PM	455	536	504	647	626	687	663	622
O45	4:55 PM	547	525	665	834	794	811	807	820
O47	5:30 PM	477	619	828	866	951	949	1032	1105
O49	6:15 PM	217	347	441	507	571	634	559	623
O51	7:30 PM		206	175	206	245	226	248	295
O55	9:30 PM		76	94	74	112	99	94	130
O57	10:40 PM		21	51	70	41	52	59	52
Depart in PM peak		1,696	2,027	2,438	2,854	2,942	3,081	3,061	3,170
Depart off-peak		0	589	709	805	889	786	863	919
Total		1,696	2,616	3,147	3,659	3,831	3,867	3,924	4,089

Table B.17 - QUINCY CENTER STATION
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND BOARDINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
OO2	6:06 AM	8	4	3	8	5	6	4	7
OO4	6:50 AM	5	24	13	17	16	11	12	16
OO6	7:38 AM	32	35	28	28	41	35	47	42
OO8	8:00 AM	18	19	11	14	24	28	32	30
O10	8:45 AM		8	15	18	16	29	25	33
O12	10:20 AM		0	3	1	1	2	0	0
O14	11:50 AM		0	2	4	4	0	0	4
O16	1:42 PM		1	1	0	3	2	2	2
O18	4:07 PM		1	1	0	1	2	3	4
O20	5:34 PM		0	3	1	6	0	1	1
O22	6:48 PM		0	3	2	1	0	0	0
O24	10:05 PM		0	0	1	0	0	1	0
Arrive before 9:30 a.m.		63	90	70	85	102	109	120	128
Arrive after 9:30 a.m.		0	2	13	9	16	6	7	11
Total		63	92	83	94	118	115	127	139

Table B.18 - QUINCY CENTER STATION
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND ALIGHTINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
OO3	6:56 AM		0	0	1	1	0	0	0
OO5	8:33 AM		1	0	5	1	1	2	0
OO7	10:08 AM		1	2	4	0	0	2	1
OO9	12:01 PM		2	3	5	3	1	1	1
O11	2:26 PM		1	6	5	6	5	5	2
O13	3:56 PM	10	1	11	18	6	14	12	46
O15	4:56 PM	10	19	23	47	10	23	35	35
O17	5:25 PM	28	39	43	22	7	51	46	52
O19	6:05 PM	14	23	39	24	26	39	35	36
O21	6:57 PM		14	14	12	17	20	20	19
O23	8:21 PM		2	5	3	11	5	4	5
O25	10:41 PM		0	1	2	0	0	2	1
Depart in PM peak		62	82	116	111	49	127	128	169
Depart off-peak		0	21	31	37	39	32	36	29
Total		62	103	147	148	88	159	164	198

Table B.19 - QUINCY CENTER STATION
 PLYMOUTH/KINGSTON LINE INBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
O32	6:18 AM		2	5	1	4	3	1	2
O34	7:07 AM								
O36	7:51 AM		17	41	48	32	34	38	46
O38	8:14 AM								
O40	9:13 AM								
O60	10:44 AM								
O42	11:28 AM								
O62	12:49 PM								
O44	1:59 PM								
O64	3:04 PM								
O48	4:17 PM								
O66	5:15 PM								
O52	7:10 PM								
O54	8:40 PM								
O56	9:30 PM								
Arrive before 9:30 a.m.		0	19	46	49	36	37	39	48
Arrive after 9:30 a.m.		0	0	0	0	0	0	0	0
Total		0	19	46	49	36	37	39	48

Table B.20 - QUINCY CENTER STATION
 PLYMOUTH/KINGSTON LINE OUTBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
O33	7:16 AM								
O61	9:01 AM		0	0	0	1	0	4	0
O35	9:45 AM								
O63	11:01 AM								
O39	12:21 PM								
O65	1:31 PM								
O41	2:36 PM								
O67	3:11 PM								
O43	4:26 PM								
O45	5:05 PM								
O47	5:41 PM		15	30	27	18	18	10	37
O49	6:25 PM								
O51	7:40 PM								
O55	9:40 PM								
O57	10:50 PM								
Depart in PM peak			15	30	27	18	18	10	37
Depart off-peak			0	0	0	1	0	4	0
Total			15	30	27	19	18	14	37

Table B.21 - QUINCY CENTER STATION
 COMBINED OLD COLONY LINES INBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
OO2	6:06 AM	8	4	3	8	5	6	4	7
O32	6:18 AM		2	5	1	4	3	1	2
OO4	6:50 AM	5	24	13	17	16	11	12	16
OO6	7:38 AM	32	35	28	28	41	35	47	42
O36	7:51 AM		17	41	48	32	34	38	46
OO8	8:00 AM	18	19	11	14	24	28	32	30
O10	8:45 AM		8	15	18	16	29	25	33
O12	10:20 AM		0	3	1	1	2	0	0
O14	11:50 AM		0	2	4	4	0	0	4
O16	1:42 PM		1	1	0	3	2	2	2
O18	4:07 PM		1	1	0	1	2	3	4
O20	5:34 PM		0	3	1	6	0	1	1
O22	6:48 PM		0	3	2	1	0	0	0
O24	10:05 PM		0	0	1	0	0	1	0
Arrive before 9:30 a.m.		63	109	116	134	138	146	159	176
Arrive after 9:30 a.m.		0	2	13	9	16	6	7	11
Total		63	111	129	143	154	152	166	187

Table B.22 - QUINCY CENTER STATION
 COMBINED OLD COLONY LINES OUTBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
OO3	6:56 AM		0	0	1	1	0	0	0
OO5	8:33 AM		1	0	5	1	1	2	0
O61	9:01 AM		0	0	0	1	0	4	0
OO7	10:08 AM		1	2	4	0	0	2	1
OO9	12:01 PM		2	3	5	3	1	1	1
O11	2:26 PM		1	6	5	6	5	5	2
O13	3:56 PM	10	1	11	18	6	14	12	46
O15	4:56 PM	10	19	23	47	10	23	35	35
O17	5:25 PM	28	39	43	22	7	51	46	52
O47	5:41 PM		15	30	27	18	18	10	37
O19	6:05 PM	14	23	39	24	26	39	35	36
O21	6:57 PM		14	14	12	17	20	20	19
O23	8:21 PM		2	5	3	11	5	4	5
O25	10:41 PM		0	1	2	0	0	2	1
Depart in PM peak		62	97	146	138	67	145	138	206
Depart off-peak		0	21	31	37	40	32	40	29
Total		62	118	177	175	107	177	178	235

Table B.23 - BRAINTREE STATION
MIDDLEBOROUGH/LAKEVILLE LINE INBOUND BOARDINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
OO2	6:00 AM		4	4	2	9	5	5	10
OO4	6:44 AM								
OO6	7:32 AM		12	20	22	21	20	21	25
OO8	7:54 AM								
O10	8:39 AM								
O12	10:14 AM								
O14	11:44 AM								
O16	1:36 PM		0	1	1	0	0	1	0
O18	4:01 PM		0	0	1	3	3	0	0
O20	5:28 PM								
O22	6:42 PM					0	0	1	0
O24	10:00 PM		0	1	1	0	2	0	2
Arrive before 9:30 a.m.		0	16	24	24	30	25	26	35
Arrive after 9:30 a.m.		0	0	2	3	3	5	2	2
Total		0	16	26	27	33	30	28	37

Table B.24 - BRAINTREE STATION
MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND ALIGHTINGS
October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
OO3	6:59 AM		0	0	0	0	0	2	0
OO5	8:49 AM								
OO7	10:19 AM								
OO9	12:09 PM								
O11	2:29 PM								
O13	4:04 PM								
O15	5:04 PM		10	13	11	8	5	14	16
O17	5:35 PM								
O19	6:12 PM								
O21	7:04 PM								
O23	8:29 PM								
O25	10:49 PM								
Depart in PM peak		0	10	13	11	8	5	14	16
Depart off-peak		0	0	0	0	0	0	2	0
Total		0	10	13	11	8	5	16	16

Table B.25 - BRAINTREE STATION
 PLYMOUTH/KINGSTON LINE INBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
O32	6:21 AM	12	9	13	8	6	10	10	7
O34	7:11 AM	15	27	16	38	28	36	21	44
O36	7:54 AM	18	9	12	18	9	8	9	12
O38	8:11 AM	8	8	15	12	13	16	12	17
O40	9:06 AM		0	3	4	4	3	2	4
O60	10:38 AM		0	0	0	2	2	3	4
O42	11:26 AM		1	0	0	1	0	0	0
O62	12:51 PM		2	2	0	1	0	2	1
O44	2:01 PM		0	1	0	0	1	1	3
O64	3:21 PM		0	0	0	0	1	1	0
O48	4:16 PM		0	0	3	0	0	0	0
O66	5:14 PM		2	0	5	2	1	1	3
O52	7:04 PM		0	0	2	0	0	0	1
O54	8:53 PM		0	0	0	0	1	0	0
O56	9:31 PM		0	0	0	0	0	1	0
Arrive before 9:30 a.m.		53	53	59	80	60	73	54	84
Arrive after 9:30 a.m.		0	5	3	10	6	6	9	12
Total		53	58	62	90	66	79	63	96

Table B.26 - BRAINTREE STATION
 PLYMOUTH/KINGSTON LINE OUTBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
O33	7:29 AM		1	1	0	1	1	1	3
O61	9:06 AM		0	1	0	1	1	7	0
O35	9:54 AM		1	1	1	1	0	2	1
O63	11:07 AM		0	1	0	2	0	0	0
O39	12:29 PM		1	2	0	1	1	0	1
O65	1:39 PM		0	2	0	2	3	3	4
O41	2:39 PM		0	4	2	4	1	2	3
O67	3:19 PM		3	6	9	8	10	7	11
O43	4:34 PM	22	14	25	20	24	21	21	16
O45	5:14 PM	20	20	15	27	25	22	28	32
O47	5:50 PM	20	30	42	41	33	43	36	37
O49	6:34 PM	15	18	14	20	25	16	23	36
O51	7:49 PM		3	8	8	4	7	10	5
O55	9:49 PM		0	0	2	0	2	6	2
O57	10:59 PM		0	1	4	1	1	5	4
Depart in PM peak		77	82	96	108	107	102	108	121
Depart off-peak		0	9	27	26	25	27	43	34
Total		77	91	123	134	132	129	151	155

Table B.27 - BRAINTREE STATION
 COMBINED OLD COLONY LINES INBOUND BOARDINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		In Ons							
OO2	6:00 AM		4	4	2	9	5	5	10
O32	6:21 AM	12	9	13	8	6	10	10	7
O34	7:11 AM	15	27	16	38	28	36	21	44
OO6	7:32 AM		12	20	22	21	20	21	25
O36	7:54 AM	18	9	12	18	9	8	9	12
O38	8:11 AM	8	8	15	12	13	16	12	17
O40	9:06 AM		0	3	4	4	3	2	4
O60	10:38 AM		0	0	0	2	2	3	4
O42	11:26 AM		1	0	0	1	0	0	0
O62	12:51 PM		2	2	0	1	0	2	1
O16	1:36 PM		0	1	1	0	0	1	0
O44	2:01 PM		0	1	0	0	1	1	3
O64	3:21 PM		0	0	0	0	1	1	0
O18	4:01 PM		0	0	1	3	3	0	0
O48	4:16 PM		0	0	3	0	0	0	0
O66	5:14 PM		2	0	5	2	1	1	3
O22	6:42 PM					0	0	1	0
O52	7:04 PM		0	0	2	0	0	0	1
O54	8:53 PM		0	0	0	0	1	0	0
O56	9:31 PM		0	0	0	0	0	1	0
O24	10:00 PM		0	1	1	0	2	0	2
Arrive before 9:30 a.m.		53	69	83	104	90	98	80	119
Arrive after 9:30 a.m.		0	5	5	13	9	11	11	14
Total		53	74	88	117	99	109	91	133

Table B.28 - BRAINTREE STATION
 COMBINED OLD COLONY LINES OUTBOUND ALIGHTINGS
 October 1997 to October 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Oct. 98	Dec. 98	Mar. 99	Jun. 99	Oct. 99
		Out Offs							
OO3	6:59 AM		0	0	0	0	0	2	0
O33	7:29 AM		1	1	0	1	1	1	3
O61	9:06 AM		0	1	0	1	1	7	0
O35	9:54 AM		1	1	1	1	0	2	1
O63	11:07 AM		0	1	0	2	0	0	0
O39	12:29 PM		1	2	0	1	1	0	1
O65	1:39 PM		0	2	0	2	3	3	4
O41	2:39 PM		0	4	2	4	1	2	3
O67	3:19 PM		3	6	9	8	10	7	11
O43	4:34 PM	22	14	25	20	24	21	21	16
O15	5:04 PM		10	13	11	8	5	14	16
O45	5:14 PM	20	20	15	27	25	22	28	32
O47	5:50 PM	20	30	42	41	33	43	36	37
O49	6:34 PM	15	18	14	20	25	16	23	36
O51	7:49 PM		3	8	8	4	7	10	5
O55	9:49 PM		0	0	2	0	2	6	2
O57	10:59 PM		0	1	4	1	1	5	4
Depart in PM peak		77	92	109	119	115	107	122	137
Depart off-peak		0	9	27	26	25	27	45	34
Total		77	101	136	145	140	134	167	171

Table B.29 - SOUTH STATION
MIDDLEBOROUGH/LAKEVILLE LINE OFFS from STATIONS SOUTH OF BRAINTREE
October 1997 to Fall 1999

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		In Offs							
OO2	6:19 AM	164	252	256	258	252	276	265	321
OO4	7:05 AM	305	379	387	455	429	515	616	509
OO6	7:52 AM	430	441	444	595	607	792	726	817
OO8	8:14 AM	368	486	570	627	858	602	751	691
O10	9:00 AM		190	252	331	389	325	342	409
O12	10:34 AM		91	132	123	145	116	190	111
O14	12:04 PM		44	77	52	78	64	151	68
O16	1:55 PM		34	58	38	46	60	60	63
O18	4:21 PM		23	42	38	73	44	37	57
O20	5:50 PM		15	30	19	22	20	46	29
O22	7:01 PM		12	12	23	20	15	24	25
O24	10:18 PM		8	38	23	34	20	35	25
Arrive before 9:30 a.m.		1,267	1,748	1,909	2,266	2,535	2,510	2,700	2,747
Arrive after 9:30 a.m.		0	227	389	316	418	339	543	378
Total		1,267	1,975	2,298	2,582	2,953	2,849	3,243	3,125

Table B.30 - SOUTH STATION
MIDDLEBOROUGH/LAKEVILLE LINE ONS to STATIONS SOUTH OF BRAINTREE
October 1997 to Fall 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		Out Ons							
OO3	6:45 AM		8	8	10	12	25	20	23
OO5	8:22 AM		12	21	21	20	29	23	46
OO7	9:57 AM		20	13	21	23	19	14	29
OO9	11:50 AM		25	47	39	45	51	59	48
O11	2:15 PM		124	106	120	122	140	120	127
O13	3:45 PM	249	266	333	375	379	427	402	375
O15	4:45 PM	274	378	482	535	605	712	658	672
O17	5:14 PM	422	450	630	638	581	702	704	722
O19	5:53 PM	265	382	397	489	495	550	593	544
O21	6:45 PM		220	165	225	235	231	259	307
O23	8:10 PM		86	116	132	150	235	168	143
O25	10:30 PM		49	67	80	71	63	108	86
Depart in PM peak		1,210	1,476	1,842	2,037	2,060	2,391	2,357	2,313
Depart off-peak		0	544	543	648	678	793	771	809
Total		1,210	2,020	2,385	2,685	2,738	3,184	3,128	3,122

Table B.31 - SOUTH STATION
 PLYMOUTH/KINGSTON LINE OFFS from STATIONS SOUTH OF BRAINTREE
 October 1997 to Fall 1999

Train No.	Sched. Arr. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		In Offs							
O32	6:31 AM	321	395	377	408	440	498	450	433
O34	7:24 AM	561	591	682	792	667	714	804	834
O36	8:06 AM	533	621	664	787	743	803	829	928
O38	8:30 AM	278	460	551	674	810	599	802	750
O40	9:28 AM		163	172	258	236	220	233	249
O60	11:00 AM		56	129	61	75	50	87	63
O42	11:43 AM		52	68	85	97	49	75	80
O62	1:05 PM		43	42	37	33	42	73	30
O44	2:15 PM		52	36	25	24	39	35	20
O64	3:20 PM		46	23	34	33	16	37	27
O48	4:32 PM		13	17	13	22	7	25	8
O66	5:30 PM		15	24	26	32	21	49	19
O52	7:25 PM		12	11	21	10	3	16	13
O54	8:55 PM		5	5	10	4	5	8	13
O56	9:45 PM		9	12	9	4	17	14	26
Arrive before 9:30 a.m.		1,693	2,230	2,446	2,919	2,896	2,834	3,118	3,194
Arrive after 9:30 a.m.		0	303	367	321	334	249	419	299
Total		1,693	2,533	2,813	3,240	3,230	3,083	3,537	3,493

Table B.32 - SOUTH STATION
 PLYMOUTH/KINGSTON LINE ONS to STATIONS SOUTH OF BRAINTREE
 October 1997 to Fall 1999

Train No.	Sched. Dep. eff. 10/98	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
		Out Ons							
O33	7:05 AM		21	17	20	16	23	25	21
O61	8:50 AM		4	12	18	8	12	4	15
O35	9:35 AM		5	6	12	7	15	7	6
O63	10:50 AM		11	17	18	22	12	39	23
O39	12:10 PM		36	27	59	75	57	48	41
O65	1:20 PM		50	57	64	46	35	51	51
O41	2:25 PM		48	80	126	112	86	114	95
O67	3:00 PM		82	126	92	142	111	116	111
O43	4:15 PM	397	490	454	604	559	636	619	567
O45	4:55 PM	490	474	617	777	737	758	749	752
O47	5:30 PM	440	558	735	775	869	853	962	989
O49	6:15 PM	199	321	414	478	541	603	528	574
O51	7:30 PM		199	166	190	233	210	233	282
O55	9:30 PM		74	91	69	110	95	86	121
O57	10:40 PM		21	48	65	37	50	51	42
Depart in PM peak		1,526	1,843	2,220	2,634	2,706	2,850	2,858	2,882
Depart off-peak		0	551	647	733	808	706	774	808
Total		1,526	2,394	2,867	3,367	3,514	3,556	3,632	3,690

Table B.33 - MIDDLEBOROUGH/LAKEVILLE LINE INBOUND BOARDINGS and ALIGHTINGS by STATION, October 1998

Inbound Train No.	Due SSTA	Middleboro		Bridgewater		Campello		Brockton		Montello		Holbrook		Braintree		Quincy		South Sta.		Total Trips	Interzone Trips	Off Bef. Braintree
		Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs			
O02	6:19	58		55	0	55	0	24	0	32	0	45	0	2	1	8	10		268	279	11	0
O04	7:10	102		111	0	68	1	36	5	72	0	97	5			17	20		472	503	31	11
O06	7:52	211		149	0	81	1	54	4	68	0	108	7	22	16	28	48		645	721	76	12
O08	8:14	143		137	1	101	0	51	0	99	0	134	0			14	37		641	679	38	1
O10	9:00	79		74	0	69	2	32	4	40	2	69	2			18	22		349	381	32	10
O12	10:34	40		15	1	21	2	13	0	19	0	20	0			1	2		124	129	5	3
O14	12:04	16		13	0	2	0	9	2	5	1	15	0			4	5		56	64	8	3
O16	1:55	19		15	0	5	0	7	9	6	0	6	0	1	1	0	10		39	59	20	9
O18	4:21	9		28	0	3	1	7	4	4	3	4	0	1	1	0	8		39	56	17	8
O20	5:50	9		6	0	7	4	5	5	4	2	1	2			1	0		20	33	13	13
O22	6:57	5		11	1	4	2	4	0	5	0	2	1			2	4		25	33	8	4
O24	10:18	5		10	0	2	0	7	0	3	2	2	0	1	1	1	3		25	31	6	2
Due bef. 9:30 a.m.		593		526	1	374	4	197	13	311	2	453	14	24	17	85	137		2,375	2,563	188	34
Total		696		624	3	418	13	249	33	357	10	503	17	27	20	94	169		2,703	2,968	265	76

Table B.34 - MIDDLEBOROUGH/LAKEVILLE LINE OUTBOUND BOARDINGS and ALIGHTINGS by STATION, October 1998

Outbound Train No.	Lve. SSTA	South Sta.		Quincy		Braintree		Holbrook		Montello		Brockton		Campello		Bridgewater		Middleboro		Total Trips	Interzone Trips	On After Braintree
		Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs			
O03	6:30	11		1	0	1	0	0	0	5	1	2	5	1	1	0	10		4	21	10	8
O05	8:22	26		5	0			0	2	0	0	2	9	1	4	0	16		3	34	8	3
O07	9:57	25		4	2			0	3	0	5	3	5	0	3	0	8		6	32	7	3
O09	11:50	44		5	3			0	10	0	5	1	8	0	5	1	12		8	51	7	2
O11	2:15	125		5	6			1	10	0	13	1	15	2	17	0	29		44	134	9	4
O13	3:45	393		18	11			5	33	0	53	1	42	4	70	1	84		129	422	29	11
O15	4:45	583		37	23	13	11	3	106	1	87	6	39	0	113	0	106		158	643	60	10
O17	5:14	660		22	43			0	131	0	105	2	60	1	81	1	122		144	686	26	4
O19	5:53	513		24	39			0	98	1	90	4	43	1	76	0	97		100	543	30	6
O21	6:45	237		12	14			3	37	1	41	5	29	0	37	0	47		53	258	21	9
O23	8:10	135		3	5			1	17	1	19	0	15	0	14	1	41		30	141	6	3
O25	10:30	82		2	1			0	7	0	17	0	13	0	5	0	14		27	84	2	0
Depart P.M. peak		2,149		101	116	13	11	8	368	2	335	13	184	6	340	2	409		531	2,294	145	31
Total		2,834		138	147	14	11	13	454	9	436	27	283	10	426	4	586		706	3,049	215	63

Table B.35 - PLYMOUTH/KINGSTON LINE INBOUND BOARDINGS and ALIGHTINGS by STATION, October 1998

Inbound Train No.	Due SSTA	Plymouth		Kingston		Halifax		Hanson		Whitman		Abington		S. Weymouth		Braintree		Quincy		South Sta.		Total Trips	Interzone Trips	Off Bef. Braintree
		Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs			
O32	6:31			73		71	0	46	0	91	1	70	0	80	0	8	13	1	9		417	440	23	1
O34	7:24			241		127	0	106	2	105	0	123	0	142	0	38	50				830	882	52	2
O36	8:06			241		89	0	94	0	120	0	135	0	158	1	18	20	48	29		853	903	50	1
O38	8:30			132		81	0	104	0	51	0	147	0	185	0	12	26				686	712	26	0
O40	9:28			113		13	0	40	0	19	0	26	0	62	0	4	15				262	277	15	0
O60	11:00	21				4	0	4	0	14	0	10	0	12	0	0	4				61	65	4	0
O42	11:43			61		0	0	8	0	7	0	7	0	7	0	0	5				85	90	5	0
O62	1:05	11				5	0	4	0	4	2	8	0	12	0	0	5				37	44	7	2
O44	2:15			10		3	0	0	0	5	0	6	0	4	0	0	3				25	28	3	0
O64	3:20	13				2	2	7	0	5	1	8	0	3	0	0	1				34	38	4	3
O48	4:32			12		2	0									3	1				16	17	1	0
O66	5:30	20				2	0	5	0	0	0	2	0	3	0	5	6				31	37	6	0
O52	7:25			15		1	0	2	0	3	0	2	1	1	0	2	2				23	26	3	1
O54	8:55			6		1	0	0	0	2	0	0	0	1	0	0	0				10	10	0	0
O56	9:45			3		3	1	1	0	1	0	0	0	3	0	0	1				9	11	2	1
Due bef. 9:30 a.m.		0		800		381	0	390	2	386	1	501	0	627	1	80	124	49	38		3,048	3,214	166	4
Total		65		907		404	3	421	2	427	4	544	1	673	1	90	152	49	38		3,379	3,580	201	11

Table B.36 - PLYMOUTH/KINGSTON LINE OUTBOUND BOARDINGS and ALIGHTINGS by STATION, October 1998

Outbound Train No.	Lve. SSTA	South Sta.		Quincy		Braintree		S. Weymouth		Abington		Whitman		Hanson		Halifax		Kingston		Plymouth		Total Trips	Interzone Trips	On After Braintree
		Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs			
O33	7:10	20				2	0	0	3	0	2	0	4	0	1	0	2		10			22	2	0
O61	8:50	18		1	0	0	0	0	3	0	0	0	3	0	1	0	1				11	19	1	0
O35	9:35	13				3	1	0	3	0	2	0	3	0	1	0	1		5			16	3	0
O63	10:50	18				1	0	0	3	0	1	2	2	0	4	2	2				11	23	5	4
O39	12:10	59				4	0	0	12	0	10	0	6	0	13	0	3		19			63	4	0
O65	1:20	64				5	0	0	8	0	12	0	11	0	7	0	9				22	69	5	0
O41	2:25	128				12	2	0	11	0	11	0	15	0	16	0	22		63			140	12	0
O67	3:00	101				6	9	1	17	1	25	0	15	0	14	0	18				11	109	8	2
O43	4:15	624				23	20	1	93	0	78	0	104	0	67	0	93		193			648	24	1
O45	4:55	704				30	27	0	175	1	139	0	72	1	80	0	86		157			736	32	2
O47	5:30	843		13	27	10	41	1	156	0	138	0	98	0	82	0	108		217			867	24	1
O49	6:15	498				9	20	0	92	0	87	0	45	0	51	0	52		160			507	9	0
O51	7:30	198				8	8	0	32	0	29	1	20	0	26	0	22		70			207	9	1
O55	9:30	71				3	2	0	14	1	12	0	5	0	13	0	4		25			75	4	1
O57	10:40	69				1	4	0	10	0	13	0	6	0	8	0	7		22			70	1	0
Depart P.M. peak		2,669		13	27	72	108	2	516	1	442	0	319	1	280	0	339		727		0	2,758	89	4
Total		3,428		14	27	117	134	3	632	3	559	3	409	1	384	2	430		941		55	3,571	143	12

Table B.37 - SOUTH STATION, QUINCY CENTER, and BRAINTREE
 OLD COLONY LINES RIDERSHIP SUMMARY
 October 1997 to Fall 1999

Middleborough/Lakeville Line	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
Inbound Offs	1,429	2,196	2,543	2,892	3,281	3,190	3,582	3,494
Pct. Change from Oct. 97	+0.0%	+53.7%	+78.0%	+102.4%	+129.6%	+123.2%	+150.7%	+144.5%
Outbound Ons	1,346	2,225	2,677	2,996	2,954	3,510	3,466	3,473
Pct. Change from Oct. 97	+0.0%	+65.3%	+98.9%	+122.6%	+119.5%	+160.8%	+157.5%	+158.0%
Inbound Offs + Outbound Ons	2,775	4,421	5,220	5,888	6,235	6,700	7,048	6,967
Pct. Change from Oct. 97	+0.0%	+59.3%	+88.1%	+112.2%	+124.7%	+141.4%	+154.0%	+151.1%

Plymouth/Kingston Line	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
Inbound Offs	1,861	2,748	3,055	3,569	3,497	3,350	3,778	3,849
Pct. Change from Oct. 97	+0.0%	+47.7%	+64.2%	+91.8%	+87.9%	+80.0%	+103.0%	+106.8%
Outbound Ons	1,696	2,616	3,147	3,659	3,831	3,867	3,924	4,089
Pct. Change from Oct. 97	+0.0%	+54.2%	+85.6%	+115.7%	+125.9%	+128.0%	+131.4%	+141.1%
Inbound Offs + Outbound Ons	3,557	5,364	6,202	7,228	7,328	7,217	7,702	7,938
Pct. Change from Oct. 97	+0.0%	+50.8%	+74.4%	+103.2%	+106.0%	+102.9%	+116.5%	+123.2%

Combined Old Colony Lines	Oct. 97	Mar. 98	Jun. 98	Fall 98	Dec. 98	Mar. 99	Jun. 99	Fall 99
Inbound Offs	6,332	9,785	11,422	13,116	13,563	13,917	14,750	14,905
Pct. Change from Oct. 97	+0.0%	+54.5%	+80.4%	+107.1%	+114.2%	+119.8%	+132.9%	+135.4%
Outbound Ons	3,042	4,841	5,824	6,655	6,785	7,377	7,390	7,562
Pct. Change from Oct. 97	+0.0%	+59.1%	+91.5%	+118.8%	+123.0%	+142.5%	+142.9%	+148.6%
Inbound Offs + Outbound Ons	9,374	14,626	17,246	19,771	20,348	21,294	22,140	22,467
Pct. Change from Oct. 97	+0.0%	+56.0%	+84.0%	+110.9%	+117.1%	+127.2%	+136.2%	+139.7%

Appendix C. Background Information on Rail, Boat, and Highway Transportation in Old Colony Service Area

Immediately prior to the restoration of the Old Colony commuter rail lines, the only public transportation service linking Boston with most of the cities and towns in the present Old Colony service area was provided by private carrier express bus routes. Rapid transit, commuter boat, and commuter rail service were available on the fringes of the Old Colony area, with access to these being predominantly by auto. The most common means of travel to Boston from the area was driving alone for the entire distance, however.

At one time, the Old Colony area had been served by an extensive network of commuter rail lines. The first section of this appendix discusses the development of this network and the reasons for its discontinuance. This is followed by brief histories of the commuter boat routes and major highways serving the Old Colony area. Background information on the private carrier express bus network is contained in appendix D.

COMMUTER RAIL AND RAPID TRANSIT SERVICE

The implementation of commuter rail service on the Middleborough/Lakeville and Plymouth/Kingston Lines by the MBTA in September 1997 marked the start of the first year-round passenger service on either line since 1959. The Old Colony Lines were not the first in the Boston area on which passenger service has been discontinued and subsequently restored. They were, however, unusual in the size of the geographic area that had been left without access to alternate rail service. Most of the other commuter rail service restorations have consisted of extensions of existing lines beyond their former outer terminals, but the Old Colony lines restorations provided new service all the way from the outer terminals to Boston. This chapter summarizes the earlier history of the Old Colony lines along with some of the unique circumstances that resulted in their being without service for so long.

Overview of Development of the Boston Commuter Rail System

The greater Boston commuter rail network was originally built by many small independent companies, with most lines opening between 1834 and 1895. By 1900, the smaller lines had all been consolidated into three major systems. These systems and their corporate successors continued to provide all of Boston's rail passenger service (excluding rapid transit and street railway lines) for nearly 70 years.

In Massachusetts, as in the rest of the United States, most railroad construction and operation was originally left to private enterprise. Some Massachusetts lines received state or municipal assistance for initial construction, but this was mostly in the form of

loans that were paid off in the nineteenth century or shares of stock that lost any controlling power as the result of mergers and corporate reorganizations.

On the Boston commuter rail network as a whole, service frequency peaked before World War I, and ridership peaked shortly after the end of that war. After 1920 increasing costs and falling ridership attributed largely to highway competition set off a long decline in commuter rail service, with many lines being abandoned completely. Until the late 1950s, most railroad service discontinuances were viewed as private business decisions. The state had limited authority to regulate service, and such controls as existed served mainly to delay but not prevent service abandonments. Operating subsidies for commuter rail service were not seriously considered.

The heaviest ridership on the commuter rail lines came from towns that were within distances from Boston where electrified rapid transit service would have been much less costly to operate. Thus, by the 1940s long-range transportation plans were based on the assumption that railroad passenger service would eventually be replaced by rapid transit extensions running 10 to 15 miles out from downtown Boston. It was not until the mid 1970s that land use patterns and commuting distances changed sufficiently to ensure inclusion of commuter rail as a permanent element of Boston's transportation mix. With the future of the lines still in service secure, interest turned to restoration of lines that had previously been discontinued. Among these were the Old Colony Lines, discussed in more detail below.

Original Construction of Old Colony Lines 1845-1865

The Old Colony Railroad system developed in a manner similar to that of the Boston commuter rail system as a whole. In November 1845, the Old Colony Railroad opened its first line, from Boston to Plymouth. The route was mostly the same as that of the present MBTA Plymouth/Kingston Line, except for some relocations in the final approach to Boston made at various times. At the outer end, the line extended two miles beyond the present Cordage Park terminal, to downtown Plymouth. (The branch from the original main line to the present Kingston terminal was newly built as part of the 1997 MBTA restoration.)

Most of the route of the present MBTA Middleborough/Lakeville Line south of Braintree station was originally part of the main line of the Fall River Railroad, which opened in December 1846. (The last half mile into Middleborough/Lakeville station was originally the main line of the Cape Cod Branch Railroad, discussed below.) From downtown Middleborough the Fall River Railroad originally extended southwest on a now-abandoned route to Myricks station in the town of Berkley. It then continued on a line that is still used for freight service and that is part of the route of proposed MBTA commuter rail service to Fall River. Trains of the Fall River Railroad at first ran through from Braintree to Boston on the tracks of the Old Colony Railroad. The two companies merged in 1854, forming the Old Colony & Fall River Railroad.

Railroad service to Cape Cod commenced in 1848, with the opening of the Cape Cod Branch Railroad from Middleborough to Wareham in January and to Sandwich in May of that year. This line was extended from Sandwich to Hyannis Harbor in 1854, and was re-named the Cape Cod Railroad at about the same time. From Hyannis Harbor, steamboats were run to Martha's Vineyard and Nantucket.

The route of the MBTA's planned Greenbush Line originated as the South Shore Railroad, which opened from the Old Colony main line at Braintree to Cohasset in January 1849. This line was run under contract by the Old Colony from the time it opened until 1854, ran independently from then until 1877, and then became part of the Old Colony system again. The extension from Cohasset to Greenbush was originally part of the Duxbury & Cohasset Railroad. This line opened from Cohasset to South Duxbury in 1871, and was extended to a connection with the original Old Colony main line at Kingston in 1874. It was always run in conjunction with the South Shore Railroad, and was sold the Old Colony in 1878.

The Old Colony & Fall River Railroad merged in 1863 with the Newport & Fall River Railroad, still under construction between those points, forming the Old Colony & Newport Railroad. The Newport extension was completed the following year.

The last new main line feeding into the Boston - Braintree trunk of the Old Colony was the Dighton & Somerset Railroad, which diverged from the original Fall River Railroad at Braintree Highlands and ran south through Taunton, rejoining the Fall River Railroad at Somerset Junction in the northern edge of Fall River. This line was still under construction when it was merged into the Old Colony & Newport in 1865. It opened in 1866. (Part of the line in Easton included the former Easton Branch Railroad which had opened from Stoughton to North Easton in 1855.) After the Dighton & Somerset route opened, most passenger trains between Boston and Fall River were routed that way, but a few still ran via Middleborough.

Other System Consolidations 1872-1893

The Old Colony & Newport Railroad merged in 1872 with the Cape Cod Railroad, becoming the Old Colony Railroad again. A branch from Yarmouth to Orleans had been opened in 1865 by the Cape Cod Central Railroad, which sold out to the Cape Cod Railroad in 1868. A further extension of this line to Wellfleet had opened in 1871. At around the same time that the Cape Cod Railroad was merged into the Old Colony system, another branch was completed from Buzzards Bay to Woods Hole. The terminal for Martha's Vineyard and Nantucket steamboats was relocated from Hyannis Harbor to Woods Hole, shortening both the rail and water distance to the Vineyard, while increasing the water distance to Nantucket slightly. The Wellfleet line was extended to Provincetown in 1873.

The Old Colony Railroad system eventually grew to over 600 route-miles. Most lines not discussed above were either outside the area served by the MBTA's present and proposed Old Colony service or were never very important. In 1879, the Boston,

Clinton, Fitchburg, & New Bedford Railroad system was leased to the Old Colony. This included the former New Bedford & Taunton Railroad which connected those two cities and crossed the Old Colony's Dighton and Somerset line in Taunton. The NB&T had opened in 1840, and passenger service to Boston had always been provided via a connection with the Boston & Providence Railroad main line at Mansfield. The Old Colony Railroad began routing New Bedford passengers via the D&S line, but this would change many times during the remaining history of New Bedford passenger service.

From the earliest days of the Fall River Railroad, a steamboat line between Fall River and New York City was a major source of both passenger and freight traffic for the Old Colony system. In 1888, to guard against loss of this business to an all-rail route from Boston to New York the Old Colony leased the Boston & Providence Railroad. The B&P had opened between Boston and East Providence in 1835 and to downtown Providence in 1847. The branch from Canton Junction to Stoughton had opened in 1845. Control of the B&P main line was an essential part of the New York - Boston route planned by the New York, New Haven, & Hartford Railroad (New Haven Railroad). In order to obtain the B&P, the New Haven leased the entire Old Colony system in 1893.

Decline of Old Colony System

Most of the lines of the Old Colony Railroad system served lightly populated areas with limited industry. They were used mostly for traffic originating or terminating on line, as their locations did not lend themselves to being parts of bridge routes to other points. Consequently, they were always among the least profitable lines in the New Haven system. Of the four lines dividing in Braintree, the Dighton & Somerset route was the weakest, as it ran for many miles through unbuildable swamplands. Service on that route was reconfigured many times. After the lease of the Boston & Providence to the Old Colony, some Dighton & Somerset line trains were rerouted via Canton Junction and Stoughton instead of Braintree. This continued under the New Haven management. After 1911, except for a brief interval, the only trains on this line routed via Braintree terminated at Taunton, North Easton, or Randolph. Service south of Randolph via Braintree ended entirely about 1928.

The southern end of the Duxbury & Cohasset line between Greenbush and Kingston also had poor ridership because of sparse population and the one-sided service area resulting from the coastal location. By the early 1930s only one round trip per day continued south of Greenbush, supplemented by buses between Greenbush and South Duxbury operated by the New Haven's subsidiary New England Transportation Company.

A severe drop in revenue during the Great Depression forced the New Haven Railroad into bankruptcy in October 1935. Among the first steps of the trustees was to cancel the Old Colony Railroad lease in June 1936, resulting in bankruptcy for the Old Colony as well. The New Haven was ordered to continue operating the Old Colony system pending the outcome of the reorganization proceedings, but was allowed to make major

service cutbacks and track abandonments. Passenger service to Fall River via the Middleborough routing had ended in 1931, and the track from Middleborough to Myricks was abandoned in 1937. In 1938 passenger service on the Dighton & Somerset Line between Braintree Highlands and Randolph ended. The track between Randolph and Stoughton Junction was removed, leaving the Canton Junction connection as the only routing for subsequent passenger service on the remainder of the line.

In 1939 the remaining passenger trains on the Duxbury & Cohasset line south of Greenbush were discontinued and the track from Greenbush to Kingston was abandoned. The New England Transportation Company's bus service between South Duxbury and Greenbush also ended about the same time. (A few years later private carrier bus service from Marshfield to Greenbush was re-established under contract with the town of Marshfield. This was a fore-runner of the Plymouth & Brockton Street Railway Company's present Marshfield-Boston bus route.)

On Cape Cod, passenger train service between Yarmouth and Provincetown was discontinued in 1938 except for a brief unsuccessful experiment in 1940. Connecting bus service from Hyannis to Provincetown was maintained by the New England Transportation Company, however. (Plymouth & Brockton eventually became the operator of this route also.)

Following the 1938 cutbacks, the Old Colony lines still had passenger service to Boston from Greenbush, Plymouth, Hyannis, and Woods Hole, but many of the trains on each line were short turnbacks. More than half of all Old Colony trains ran only between Braintree and Boston.

Early Plans For Rapid Transit and Bus Replacement of Old Colony Service

In 1943 the Massachusetts legislature appointed a special commission to prepare a master plan for rapid transit service in Metropolitan Boston. The report of this commission, released in 1945, included a recommendation that Old Colony service be replaced by a branch of the Harvard - Ashmont Line (now the Red Line) to Braintree. Feeder bus routes to Braintree or Quincy from Middleborough, Plymouth, and Greenbush were also called for in the plan. A revised version of the plan, issued in April 1947, called for the line to continue to South Braintree. One immediate result of these studies was that the Metropolitan Transit Authority (MTA) was created later in 1947. The MTA assumed operation of the existing rapid transit, trolley, bus, and trackless trolley system of the Boston Elevated Railway Co. and was to construct and operate such rapid transit extensions as were authorized in the future by the legislature.

The New Haven Railroad's bankruptcy reorganization was completed in September 1947. As part of the proceedings, the New Haven was required to merge what remained of the Old Colony Railroad. As a further condition, however, the New Haven was to be allowed to end all Old Colony passenger service if losses on that service exceeded \$850,000 in any 12 months during the first two years after the merger. The loss in the first 12 months was \$3.5 million, leading the New Haven to announce the end

of Old Colony passenger service. Instead, however, a skeleton service with mostly peak-period trains was implemented in March 1949. Over the next few years, several independent bus companies began providing service from the Old Colony area to Boston. Operating rights for these routes initially contained restrictions on departure times in order to prevent competition with the few remaining trains.

Old Colony passenger service increased briefly in the early 1950s while the New Haven was under control of a pro-passenger management, which lasted only until 1954. In 1958, the New Haven announced that the right to end Old Colony passenger service under the bankruptcy proceeding would be exercised. Service was shut down on July 8, but resumed two days later when the state agreed to terms of a one-year \$900,000 subsidy to be paid by the cities and towns served. This contract was not renewed, resulting in the final shutdown of Old Colony passenger service on June 30, 1959.

The final weekday schedule had included eight round trips to Boston from Greenbush, six from Plymouth, and one from Whitman. The Middleborough Line had three round trips from Cape Cod points, four inbound and three outbound Middleborough trips, one outbound Campello trip, and five Brockton round trips. There were also 12 weekday short-turns between Braintree and Boston on the main line segment shared by all three branches. The Cape Cod trains split at Buzzards Bay, providing service to both Woods Hole and Hyannis. A passenger survey conducted in the final year showed that 42% of all Old Colony riders boarded at stations in Braintree or Quincy, and that another 26% boarded in the adjoining towns of Weymouth and Holbrook.

Service on the former Dighton & Somerset Line south of Stoughton was ruled to be covered by the provisions relating to Old Colony service in the New Haven reorganization plan, but was not included in the temporary subsidy agreement. During the late 1950s, this had consisted of two round trips from New Bedford, one from Fall River, and one from both New Bedford and Fall River combined north of Taunton. These trains were discontinued south of Stoughton in September 1958.

Among the arguments for not extending the contract were that a rapid transit extension to Braintree would be more cost-effective, that the Southeast Expressway and other new limited-access highways serving the Old Colony area were nearing completion, and that private bus companies could provide unsubsidized service. There was also still a prevailing belief in Massachusetts, as there was elsewhere across the country, that railroads were a private business that should not receive public funds. Private bus lines did, in fact, expand service to Boston from the Old Colony area after train service ended. These routes were generally self-supporting for many years, but by the mid 1980s most of them were funded in part by a new state program. It is this bus network that has in turn lost much of its ridership to the restored Old Colony lines.

Developments After 1959

After the shutdown of the Old Colony lines, the nearest remaining railroad passenger service for points in southeastern Massachusetts was that on the New Haven Railroad's

Boston & Providence main line and Stoughton Branch. Few former Old Colony riders switched to those lines, however.

In June 1960 a wooden trestle at the end of the Neponset River drawbridge between Dorchester and Quincy was heavily damaged by fire. This trestle had been used by trains on all of the Old Colony routes. The New Haven Railroad management chose to re-route freight to points south of the bridge by alternate routes rather than repair the trestle. Thus, the possibility of temporary restoration of Old Colony service pending construction of a rapid transit extension to Braintree was thwarted. The New Haven was again on the brink of bankruptcy, which it entered in 1961.

Shortly after the Old Colony shutdown, the state legislature created a temporary Mass Transit Commission (MTC) to study the commuter rail problem. After conducting various service and fare experiments, the MTC recommended that the MTA be replaced by an expanded authority. The new entity was to subsidize remaining commuter rail service while determining which lines to retain as such and which to replace with rapid transit extensions or other modes. This resulted in the creation, effective August 3, 1964 of the Massachusetts Bay Transportation Authority (MBTA).

A master plan released by the MTA in 1963 had again called for a rapid transit extension over the Old Colony right-of-way to Braintree. This extension became one of the top priorities of the MBTA. The segment of the railroad line needed was purchased from the New Haven trustees in 1965, and construction work began the following year. The extension, which diverged from the Red Line north of the present JFK/UMass station, was opened as far as Quincy Center in September 1971. Work was halted there for several years over design issues, but a further extension to South Braintree was opened in March 1980. The Quincy Adams station opened in 1983.

At the time of the Old Colony shutdown several of the affected towns already had feeder bus service to the Ashmont or Fields Corner rapid transit stations. The largest part of this service was operated by the Eastern Mass. Street Railway Company, and many of the routes had originated as trolley lines. The Eastern Mass. was bought out by the MBTA in 1968 in conjunction with the Red Line extension to Quincy. The routes were reconfigured to feed stations on the extension, and continue to do so. As discussed in chapter 2, the impact of the Old Colony restoration on ridership on these routes has been insignificant.

Events Leading to Old Colony Restoration

The MBTA began subsidizing commuter rail service as the railroads received regulatory authority to discontinue it. The first subsidy contracts began in January 1965, and by 1976 all Boston commuter rail service was being run under MBTA contract. Initially this was expected to be only a stop-gap measure. With changing population patterns and increasing construction and operating costs for rapid transit extensions, a decision was gradually reached to retain commuter rail as a permanent element of the Boston transit system.

The MBTA's 1977 Program for Mass Transportation (PMT) examined the feasibility of restoration of commuter rail service on all three Old Colony branches, either with through service to Boston or via transfer connections to the Red Line in Braintree. That document recommended further consideration of service on the Middleborough line as far as Brockton, but recommended against restoring service on the Plymouth and Greenbush lines. No substantive action was taken on these recommendations.

In 1983, in conjunction with planned major reconstruction work on the Southeast Expressway, the MBTA examined numerous strategies for temporary traffic reduction on that highway. CTPS was requested to examine the feasibility of operating temporary commuter rail service on any or all three of the Old Colony branches. It was concluded that for various reasons including poor track condition, inadequate station facilities, and insufficient available rolling stock it would be impossible to implement an attractive service within the time frame of the Expressway project.

During summer months from 1984 to 1988, a tourist railroad operation on the lines on Cape Cod included service to the Braintree Red Line terminal via Middleborough. In the first season, one inbound A.M. peak trip and one outbound P.M. peak trip were scheduled to allow commuting to Boston from points as far south as Buzzards Bay. A combination of infrequent service and slow travel times forced by deteriorated track resulted in very low ridership. (CTPS counts taken several times during the summer showed 25 or fewer riders per day each way.) This reaffirmed the conclusion that service without major track and station improvements and with a required transfer to the Red Line would be of little benefit.

Renewed interest in the Old Colony lines resulted in a directive from the legislature to the MBTA in 1984 for feasibility studies of permanent service restoration through to Boston. These studies eventually resulted in the implementation of the Old Colony service that is currently being operated and that is the subject of this report.

COMMUTER BOAT SERVICE

Modern-day commuter boat service is a relatively new component of greater Boston's public transportation system. Steamboats were run to Boston from several towns along the Massachusetts coast during the early 1800s. Most of these were unable to run in winter months due to severe weather. The boat lines were initially able to provide travel times competitive with those of overland stage routes. Commuter rail lines built in the mid 1800s reduced the market for boat service mostly to summer recreational travel. Boat service in Boston Harbor did not begin to be used again for a significant amount of journey-to-work travel until the 1970s.

Hull Route

The first scheduled steamboat service from the South Shore to Boston was reportedly a route from Hingham Harbor that was stated in 1819. By the early 1850s an intermediate stop was added at Pemberton in Hull. In the 1890s, the major focus of this route became

summer day-trips to Nantasket Beach, Paragon Park, and other amusement areas in Hull. By the early twentieth century, Hingham Harbor had become non-navigable because of silt deposits and the steamboat landing had been moved out to Crow Point.

The Nantasket - Boston route was operated by a series of different companies. In 1963 a newly-formed company, Mass. Bay Lines, took it over. In return for an exclusive contract to use the state-owned pier at Nantasket, the company agreed to run at least one round trip a day year round between Pemberton and Boston with schedules suitable for Boston commuting. By 1967, this route was averaging about 40 riders each way per day.

A decline in the popularity of the attractions at Nantasket led Mass. Bay Lines to give up both the Nantasket route and the Hull route in 1981. The service was then taken over by the Bay State, Spray, & Provincetown Steamship Company, which had been running summertime cruises in Boston Harbor and from Boston to Provincetown for a number of years. This company and its successor, Bay State Cruise Company, ran the Point Pemberton commuter boat route without a subsidy until 1997. At that time, the company requested a subsidy from the MBTA, but was underbid by Harbor Express, which had begun operating a route from Quincy to Boston in 1996. Under Harbor Cruises, Pemberton service was increased to two round trips, but both were run as variations of the Quincy route.

Hingham Route

The present Hingham commuter boat route originated in 1975. Starting in November of that year, one of the established operators of cruises on Boston Harbor was persuaded by the South Shore Chamber of Commerce to run one round trip per day to Boston from the former Hingham Shipyard on the Weymouth Back River. (The shipyard itself was a former battleship-building facility dating from World War II.) In the next few years, at least five cruise boat operators attempted to run the route, with service ranging from one to three round trips a day. Some state funding was provided beginning in May 1977. A high-speed hovercraft was tested from 1978 to 1980, but proved to be unreliable.

The original state subsidy program for the Hingham route was discontinued in 1981 because of budget constraints. Mass. Bay Lines, which had been running one round trip a day with a cruise boat since 1978, continued this service without a subsidy. In the Spring of 1983 a new company, Mass. Bay Commuter Services, Inc. began running eight round trips a day between the Hingham Shipyard and Boston using a high speed boat designed for commuter rather than cruise service. This company had been organized as an independent business specifically to run this route. The service proved to be unprofitable, but in March 1984 the Mass. Department of Public Works (now Mass. Highway Department) and the MBTA contracted with Mass. Bay Commuter Services and another new company, Boston Harbor Commuter Service, to provide greatly increased frequency on the Hingham route. Originally this was part of the effort to reduce traffic on the Southeast Expressway during the 1984-85 reconstruction project.

In 1985, after completion of the Expressway project, the MBTA continued the commuter boat program, but with Boston Harbor Commuter Service as the sole contractor. Service was cut back to eight round trips in non-summer months. Mass. Bay Lines was also still running one unsubsidized round trip. By 1987, the program had grown again and Boston Harbor Commuter Service was running 14 inbound and 15 outbound trips a day. The subsidized service had increased to 18 round trips by 1989 and varied between 17 and 18 round trips from then until 1997.

In July 1997 the MBTA awarded the operating contract for the Hingham route to a new company, Harbor Cruises, LLC. This was a consortium that included Boston Harbor Cruises, Inc., which had been running commuter boat service between the Charlestown Navy Yard and Long Wharf for the MBTA since the 1980s. BHC had also run cruises in the harbor since 1926, and had been one of the operators of the Hingham route during 1978.

After losing the operating contract, Boston Harbor Commuter Service maintained a few unsubsidized trips during peak hours, but gave them up after a few months. Harbor Cruises increased service to 21 round trips a day. Mass. Bay Lines continued to run one round trip a day with no subsidy, and had added a second morning trip by the Spring of 2000.

Quincy Route

The present Quincy route is the newest of the South Shore commuter boat routes. It was started in December 1996 by Harbor Express. This company had begun running service from Quincy to Logan Airport a few months earlier. The Boston commuting service is run as an adjunct to the Logan service. Inbound trips stop first at Logan, then continue to Long Wharf and return from there to Quincy. Since 1997 Harbor Express has also run the Hull commuter boat route under MBTA contract, and has increased service on that route from one round trip a day to two. In the A.M. peak, boats start at Pemberton Point, then run to the Quincy dock and continue on the Quincy - Boston route from there. In the P.M. peak boats run from Boston to Pemberton Point and then continue to Quincy.

The Quincy terminal for this service is located in the former Quincy Shipyard complex on the Fore River. Commuter boat service for the general public had not previously been run from this site. A previous attempt to run commuter boat service from Quincy to Boston had been made by another company, Harbour Crossing, in 1984. That route used Marina Bay in Squantum as the terminal, but lasted only a short time. Among the reasons it did not succeed were that Marina Bay was a less convenient boarding point than other transit terminals for most potential riders and that the fare was higher and frequency much lower on the boat than on the Red Line from North Quincy.

Likewise, an even earlier attempt to operate commuter boat service from Squantum to Boston lasted for only a few months in 1977. That service provided one round trip per day to a pier on Northern Avenue and attracted at most 20 riders each way.

HIGHWAY SYSTEM

Despite the range of public transportation alternatives available, prior to the Old Colony restoration driving alone was the most common means of travel to Boston from the present Old Colony service area. According to 1990 Census figures, this was the mode in 57% of work trips to Boston Proper from cities and towns south of Braintree that now have Old Colony stations. For trips to the rest of Boston or to Cambridge the percent driving alone was even higher.

The present limited-access highway routes linking the Old Colony service area with Boston were constructed at around the same time that previous Old Colony service was discontinued. The expectation that these highways would be able to serve most of the travel needs of the South Shore was one of the reasons that Old Colony service was not preserved, even though most of the highways were then still untested. In addition to private auto travel the limited-access highways are used to some extent by all of the private carrier bus routes to Boston from the Old Colony service area.

Before the limited-access highways in the Old Colony service area were built, their function was served by a network of older state highways which also carried both private autos and busses. Travel times on the older highways were much slower, however, making them much less practical for long-distance commuting.

Early History of State Highway System

The development of a state highway system in Massachusetts began with the establishment in 1894 of the Massachusetts Highway Commission. Up to that time, road construction and maintenance had been a local responsibility. A study completed the previous year by a special commission had found that the vast majority of the roads in the state were in poor condition, resulting in high transportation costs.

At first, the MHC did not envision a system of routes for long-distance travel, but merely acted as a funding agency for projects to upgrade existing roads. Projects were initiated by cities, towns, or counties, and typically involved a few miles of road within a single municipality. The Commission attempted to prioritize projects on their individual merits, without regard for any kind of statewide network. This philosophy began changing soon after the start of the twentieth century, with the advent of the automobile, and lobbying by auto owners' clubs to improve inter-town roads. This resulted in a shifting of funding priorities to projects that could form links in an eventual statewide road network.

Guidebooks published by automobile clubs show that by 1915 there were continuous paved roads from Boston to points throughout the present Old Colony service area. It was, however, necessary to rely on lengthy written instructions to follow any of these routes, as they were not officially marked in any way. Signs pointing the direction to the next town often indicated the shortest route rather than the one best suited for auto travel.

An attempt to remedy this situation was made about 1920, by attaching colored markers to utility poles, much in the fashion that hiking trails are marked by painted dots. This system, known as the banded pole routes, was limited by the possible color combinations, along with problems in distinguishing colors at night.

The MHC was succeeded on December 1, 1919 by the Massachusetts Department of Public Works (MDPW). Federal aid for highways had begun in 1916, in the form of a program under the Department of Agriculture to upgrade rural postal routes. This program was expanded in 1921 to cover routes that could be used for interstate travel. This was done primarily by providing funds to states for improving existing roads rather than building new ones. Roads receiving such funds were to be identified as U.S. Highways. As part of the program, states were required to post standardized route number signs along all such routes. The MDPW began posting such signs in 1926. For consistency, posting of numbers on other state highways began at the same time. Many of the numbers assigned then are still in use either for the same routes or for parallel ones. A few revisions were made in the early years to eliminate conflicts between numbers assigned to state and U.S. highways.

Construction of by-pass roads around town centers and of entirely new longer roads began on a large scale in the early 1930s, as a consequence of the large growth in automobile traffic. In 1905, the first year that registration of vehicles was required, there were under 5,000 autos in the state. By 1930, there were about 900,000.

Highway construction halted during World War II, but resumed in the late 1940s with completion of plans for the first limited-access highways. This trend was spurred on by rapid growth in suburban living after the war as well as the establishment in 1956 of the Interstate Highway system.

Histories of individual highways in the Old Colony service area appear below.

Southeast Expressway

At present, the Southeast Expressway is generally defined as extending from the south end of the Central Artery at Southamptton Street in South Boston to the interchange of Routes 3 and I-93 on the border of Braintree and Quincy. Originally, the portion of the present Route 3 between I-93 and Route 228 in Hingham was also identified as a part of the Expressway.

Currently, Routes 3 and I-93 and U.S. Route 1 all use the Southeast Expressway between Braintree and the Central Artery. The portion of the Southeast Expressway in Boston is also named the General Casimir Pulaski Skyway. The Central Artery, also known as the John F. Fitzgerald Expressway, extends from the end of the Southeast Expressway at Southamptton Street to the Junction of I-93 and the approach to the Mystic-Tobin Bridge in Charlestown.

According to Transportation Facts for the Boston Region, 1968/69 edition, compiled by the Boston Redevelopment Authority, the Southeast Expressway and Central Artery were completed in September 1959. The same publication states that the first section of the Fitzgerald Expressway (Central Artery) had opened from the end of the Mystic Bridge to Haymarket Square in October 1954. Based on maps and newspaper articles, the first section of the Southeast Expressway to open was that from Exit 9 (Adams Street) in Quincy to Exit 12 (Neponset) in Dorchester. This section opened in the Fall of 1956. By 1958, the Expressway had been extended north to Exit 15 (Massachusetts Avenue) and south to Exit 8 (West Quincy). The 1959 completion cited above extended the north end to Southampton Street and the south end to Derby Street in Hingham.

Route 3

At present, state Route 3 extends from the end of U.S. Route 3 on Memorial Drive at Harvard Bridge in Cambridge to the traffic circle on the north side of the Cape Cod Canal in Sagamore. Route 3 joins the Central Artery near North Station in Boston, and follows the Artery and the Southeast Expressway to Braintree. (The opening dates of these highways are stated in the previous section, as is that of Route 3 from Braintree to Derby Street in Hingham.) The portion of Route 3 south of Braintree is also called the Pilgrims Highway.

Maps indicate that the oldest section of Route 3 is that from Exit 6 (Route 44) in Plymouth to Exit 9 (Route 3A) in Kingston. This segment was open by 1950, and originally served as a by-pass around downtown Plymouth for through traffic. A further extension of this bypass to Exit 4 in Plymouth and a connector to Route 3A in South Plymouth were under construction in 1950 and were open by 1952.

The segment from Exit 4 to Sagamore Circle opened in 1956. The extension north from Exit 9 to Exit 10 in South Duxbury opened at about the same time. The extension from Derby Street, Hingham (Exit 15) to Route 53, Hanover (Exit 13) opened in 1961. The final link from Exit 13 to Exit 10 opened in 1963.

Route number 3 has been used as the designation of a route from Boston to Sagamore since the late 1920s.⁹ Before being shifted to its current location, Route 3 followed the present Route 3A alignment from the southern edge of Plymouth to Kingston, and from Washington Street at the Southern Artery in Quincy to Neponset. Between Kingston and Quincy, old Route 3 was the present Route 53. North of Neponset, Route 3 took a circumferential alignment, following the present Route 203 on Gallivan Boulevard, Morton Street, and the Arborway to Jamaica Plain, and the Jamaicaway, Riverway, Park Drive, Mountfort Street, and the B.U. Bridge to Memorial Drive.

⁹The number originally assigned in 1926 was Route 6. This was changed by 1930 because of the assignment of route number 6 to the U.S. Highway running west from Cape Cod. Similarly, Route 3A was originally 6A.

Prior to the opening of the Southeast Expressway, the most direct driving route from Neponset to downtown Boston was a combination of Morrissey Boulevard, Old Colony Avenue, and Dorchester Avenue, identified at one time as Route 37C. Another commonly used alternative was to follow the present Route 203 to Route 28, and Route 28 (Blue Hill Avenue, Seaver Street, and Columbus Avenue) into downtown Boston.

On the segment of old Route 3 that is now Route 53, several by-pass segments were completed about 1931. From north to south these bypasses were Washington Street between the two ends of Old Washington in Hanover; Columbia Road from Washington Street, Hanover to Washington Street, Pembroke; State Road from Washington Street, Pembroke to the Duxbury line; Summer Street, Duxbury from the Pembroke line to Franklin Street; Kingstown Way, Duxbury from Summer Street to the Kingston line; and Summer Street, Kingston to near Tremont Street. All other segments of Route 53 apparently follow roads that were in existence by 1900. Most of the original alignment was part of a recommended auto route from Boston to Plymouth by 1914. This was marked by blue banded poles around 1920.

Morrissey Boulevard (originally called Old Colony Parkway), Quincy Shore Drive, and the Southern Artery in Quincy were all built in the mid 1930s. Prior to that, the alignment of Route 3 ran from Quincy Center to Mattapan via Adams Street and Brook Road, then north on Blue Hill Avenue to Morton Street.

Route 3A

Route 3A, though not a limited-access highway, is still one of the main highway routes toward Boston from several coastal towns on the South Shore. Route number 3A has been used since the late 1920s to designate alternate routings for the middle portion of Route 3 between Boston and Cape Cod. Prior to construction of the present Route 3, Route 3A extended from the Southern Artery in Quincy on the north to the present intersection of routes 3A and 53 in Kingston. The segments of the present Route 3A north and south of these limits were part of Route 3.

In terms of alignment, the newest portions of Route 3A are State Road south of Ellenville in Plymouth, and Chief Justice Cushing Way, from Summer Street in Hingham to New Driftway in Scituate. Annual reports of the Massachusetts Department of Public Works show that the Ellenville bypass was completed in 1931, replacing a routing over Ellenville Road. Construction of Cushing Way began in 1932, to provide a bypass for congested sections of the original route. (The segment north of New Driftway followed an older dead-end road for about 1.5 miles). Before construction of Cushing Way, Route 3A followed Summer and East streets in Hingham, North and South Main streets in Cohasset, and Country Way in Scituate.

Currently, the designated south end of Route 3A is Route 3, Exit 2 in the Cedarville section of Plymouth. Old Route 3 continued from Cedarville to Sagamore Circle via State Road. This was designated Route 3A for a few years after present Route 3 was completed. The section of State Road in Bourne was built about 1935, in conjunction

with the construction of the Sagamore Bridge over the Cape Cod Canal. Route 3 had previously followed Old Plymouth Road to a drawbridge over the canal, which was removed when the canal was widened.

The next-newest portion of the Route 3A alignment is State Road between Warren's Cove and Ellisville in Plymouth, which was completed by the Mass. Highway Commission in 1899. All other segments of Route 3A apparently follow roads that were in existence well before 1900. Excluding the Cushing Way relocation, most of Route 3A was part of a recommended auto route from Boston to Cape Cod by 1914. Around 1920, it was marked with red banded poles.

Route 24

Route 24 (the Fall River Expressway) extends from I-93 in Randolph to Fall River. The oldest section is that from Exit 9 in Freetown to Exit 17 (Route 123) in Brockton. This section was completed about 1955. Route 24 was further extended north to Exit 18 (Route 27) in Brockton about 1957, and to I-93 (then part of Route 128) by 1959. The segment from Freetown to Fall River was completed about 1960.

Route 24 was a functional replacement for state Route 138, a few miles to the west. North of Bridgewater, it also superseded Route 28, a few miles to the east. Route number 138 has been used as the designation of a route from Boston to Fall River since 1926. The north end of Route 138 is Mattapan Square, from which point Route 28 serves as the link to downtown Boston. The alignment of Route 138 has changed little since the 1920s, the main exception being a new routing through Dighton built in the 1930s. Other than this, Route 138 mostly follows roads that were in existence before 1900. Most of the original alignment was part of a recommended auto route from Boston to Fall River by 1914, but it was apparently never a banded pole route.

Route number 28 was assigned to a route from Boston to Wareham in 1926. The present alignment between Boston and Bridgewater has not changed from the original one. Most of this was a recommended auto route by 1914, and was marked with blue banded poles around 1920. Excluding some short relocated sections, the roads followed were in existence before 1900. Route 28 south of Bridgewater is discussed under Route 25/I-495.

Route 25/I-495

Route I-495, also known as the Boston Outer Circumferential Highway, extends from Route I-95 in Salisbury, near the New Hampshire border, to Route I-195 in Wareham. The segment of I-495 serving the Old Colony area directly is that from Route 24 on the border of Bridgewater and Raynham to Wareham. This segment was originally built as state Route 25, but was re-designated as part of the Interstate highway system about 1982. Route 25 currently extends from the end of I-495 in Wareham to the Bourne Bridge over the Cape Cod Canal.

The oldest section of Route 25 was that from the present Exit 3 at Rock Village in Middleborough to U.S. Route 44, also in Middleborough. This segment opened in 1961, with Route 44 serving temporarily as the link between Route 25 and Route 24. Route 25 was opened directly to Route 24 in 1963. The section from Rock Village to East Wareham was opened by 1968. Because of a lengthy dispute over land taking, the final section from East Wareham to the Bourne Bridge did not open until 1987.

Between Bridgewater and Bourne, Route 25/I-495 is functionally a replacement for state Route 28. As noted above, Route number 28 was first assigned to a route from Boston to Wareham in 1926. The continuation from Wareham to Bourne and points on Cape Cod was initially designated Route 3, but was made part of Route 28 by 1930.

The Route 28 alignment has been shifted from the original designated one in some places. The longest change is between Bridgewater and Middleborough, where the original routing was Summer, Everett, and Wareham streets instead of Bedford and Grove. The latter routing was adopted after completion of a project begun in the 1930s to upgrade Bedford Street, a former private turnpike that had fallen into disuse. In Wareham, Route 28 originally followed King's Highway, Main Street and Sandwich Street instead of the present alignment between Rochester and East Wareham, but both alignments are on roads that existed before 1900.

Between East Wareham and Buzzards Bay, the present Route 28 alignment is the same as the one designated as Route 3 in 1926. Prior to about 1920, Onset Avenue was the main highway between East Wareham and Buzzards Bay. Sawyer Road became the main route following completion of the final link between Red Brook Road and the east end of Onset Avenue about 1920.

Excluding the alignment changes listed above, Route 28 was a recommended auto route from Boston to Cape Cod by 1914. Around 1920, it was marked with blue banded poles.

Route I-93 and Route 128

Route 128, the Inner Circumferential Highway, currently extends from Gloucester on the north to Route I-93 in Canton on the south. The Route 128 designation formerly continued south via the present routes I-93 to Braintree, Route 3 to Derby Street, Hingham, and Route 228 to Hull. Route 128, as such, no longer serves the Old Colony area directly.

Route I-93 extends from Northern to Hampshire through Boston to Route I-95 in Canton. From Charlestown to Braintree, it follows the Central Artery and Southeast Expressway, the histories of which appear above. From Braintree to Canton, I-93 was originally Route 128. The segment of Route 128 from Braintree to Route 24 was opened in 1959, at about the same time the Southeast Expressway was completed. The segment from Route 24 to Route 138 was completed by 1959, as part of the Route 24 project. The remaining section to the present junction with I-95 (and to Route 9 in Wellesley) had opened about 1956.

The Route 128 designation was originally applied in the 1920s to a series of pre-existing local roads forming a circumferential route around Boston. The specific roads included in the route changed at various times. A substantial upgrading and partial re-alignment of the segment between Canton and Needham was completed in the early 1930s.

Appendix D. Background Information on Private Carrier Bus Service in Old Colony Service Area

All of the private carrier bus routes connecting Boston with points on the South Shore and southeastern Massachusetts were well established before the resumption of commuter rail service on the Old Colony lines in 1997. Many of the bus routes had been instituted or expanded in direct response to cutbacks and eventual elimination of prior rail service in the 1940s and 1950s. Despite rapid population growth in the areas they served, most of the routes had been experiencing either steady or declining ridership during the 1980s and 1990s. On many of the routes, operating expenses had grown more rapidly than fare revenue, resulting either in service curtailments or in the need for financial assistance through the MBTA/EOTC Interdistrict Transportation Service Program. Ridership losses since 1997 have resulted in service reductions by all of the private carriers. These have ranged from elimination of a small number of the trips on a route to total or near-total route elimination.

The remainder of this appendix describes the backgrounds of each of the private carrier bus routes operating in the area now served directly or indirectly by the Old Colony lines prior to the resumption of rail service, and changes in these routes subsequent to rail service restoration. Because the private carrier bus routes as a group lost much larger percentages of ridership than any of the other transportation facilities used by residents of the Old Colony service area, their histories are described in somewhat greater depth than are those of the alternatives discussed in appendix C.

AMERICAN EAGLE MOTOR COACH

Fairhaven, New Bedford, and Taunton to Boston

American Eagle Motor Coach, Inc. has been the operator of the New Bedford - Boston bus route since 1981, when the company was formed by the owners of Medeiros Bus Company, Inc. That company had operated charter bus service in the New Bedford area since the early 1970s, and had taken over the Boston route in October 1979. The former operator, Almeida Bus Lines, had gone out of business in April 1979, after several unprofitable years. Emergency replacement service had been provided by Brander Bus Lines, of Rehoboth, in the interim. The Fairhaven - New Bedford extension has been shown in schedules only since 1992, but had been used to shift buses between the American Eagle garage and downtown New Bedford since 1979.

As the route is currently configured, buses make only four stops outside Boston. In addition to the garage in Fairhaven (where a private parking lot is available) the stops are at the Southeastern Regional Transit Authority (SRTA) terminal in downtown New Bedford, at the MHD park-and-ride lot at Mount Pleasant Street off Route 140 in New Bedford and at the Silver City Galleria Mall off Route 140 in Taunton. The only Boston

stop is at the South Station bus terminal. Between New Bedford and Boston, busses follow U.S. Route 6, state Routes 140 and 24, and Interstate 93 (including the Southeast Expressway).

The companies that took over former Almeida routes in 1979 obtained new operating rights rather than acquiring the old licenses and certificates. Service to Lakeville was discontinued then in favor of non-stop operation on Route 140 between Exit 9 and Route 24. In 1980, buses began using U.S. Route 6 from the downtown New Bedford terminal to Route 140 instead of running north to Exit 6 via Route 18. The MHD park-and-ride facility at Exit 4 has been used in place of two private lots since it opened in the mid-1980s. American Eagle began making intermediate stops at the Silver City Galleria Mall in Taunton on selected trips in 1992.

Just prior to shutting down, Almeida had been running 12 inbound and 13 outbound trips between New Bedford and Boston on weekdays. Of these, eight inbound and seven outbound stopped only in New Bedford and Boston. The rest made intermediate stops in Middleborough, Bridgewater, and West Bridgewater, and some stopped in Lakeville. There were also some additional short-turns from Middleborough to Boston. Since 1979, the New Bedford and Middleborough/Bridgewater/West Bridgewater services have been run by separate companies.

After taking over the New Bedford route, Medeiros Bus Co. initially ran nine round trips a day between New Bedford and Boston. This was a reduction from the final Almeida total, but all of the trips ran non-stop between New Bedford and Boston. (A few stops were made in New Bedford before buses entered Route 140.) This route has been one of the most successful ones in southeastern Massachusetts. By 1981, American Eagle had added a tenth round trip. Service was increased to 11 round trips in 1983, and to 16 by 1988 with some IDTS assistance. A seventeenth inbound trip was added in 1990, and an additional trip each way in 1991.

Starting in 1992 seven trips inbound and nine outbound stopped at the Silver City Galleria Mall. Two additional inbound trips originated there, and one additional outbound trip terminated in New Bedford. This was the peak level of service on the route.

In 1993 IDTS funding for the route was eliminated. Service was reduced slightly, to 16 inbound and 17 outbound trips, all through from Fairhaven to Boston, with nine each way stopping in Taunton (Galleria Mall). An A.M. peak inbound short turn from the mall was added again in January 1994. Except for minor running time adjustments, service did not change again until December 1996, when the morning Taunton short turn was extended to New Bedford.

Old Colony commuter rail service began in September 1997. In August 1998, American Eagle discontinued two weekday trips each way, including two inbound in the A.M. peak and one outbound in the P.M. peak. Another P.M. peak trip was dropped in January 2000. This left 14 trips each way on weekdays.

Earlier History of New Bedford - Boston Bus Service

Through bus service between New Bedford and downtown Boston was first established in 1947 by Almeida's Bus Service. Commuter rail service between New Bedford and Boston was still being operated at the time, but had declined to five round trips a day. The original bus route alignment was the present state Routes 18 and 105 from New Bedford to Middleborough, local roads to Bridgewater Center, and Routes 18, 28, 27, 138, and 28 again through Brockton and Stoughton to Park Square in Boston. A variation used Route 18 all the way from Lakeville to Bridgewater, bypassing downtown Middleborough.

Prior to starting the New Bedford - Boston route, Almeida's had begun running bus service from New Bedford to Bridgewater in 1944 and had extended that route to Brockton in 1945. It had been possible to continue to Boston from Bridgewater or Brockton by train. Prior bus service from New Bedford to Bridgewater and Brockton had been run by the New Haven Railroad's subsidiary New England Transportation Company from the late 1920s to the early 1930s. That was essentially an unsuccessful attempt to replace abandoned trolley service.

Almeida's Bus Service was succeeded in 1951 by Almeida Bus Lines, Inc., but the New Bedford - Boston bus routings remained as described above. In addition to New Bedford and Middleborough, passengers were carried to Boston from Lakeville, Bridgewater, and Stoughton, but restrictions in the operating rights did not allow passengers to be picked up at other points along the way.

Almeida first began shifting New Bedford - Boston service to limited-access highways shortly after the 1958 discontinuance of New Bedford commuter rail service. At that time, authority was obtained to use the new Route 140 from Exit 6 in New Bedford to Exit 9 in Lakeville, and Route 24 from Exit 12 in Taunton to Route 27 in Brockton. In addition, a cross-connection from West Bridgewater to Route 24 via Route 106 was authorized.

In 1961, service was improved further by shifting operation between Brockton and Boston from old state highways to the present Routes 24 and I-93. Almeida increased the number of non-stop New Bedford - Boston trips, and added short-turn service from Middleborough serving Bridgewater and West Bridgewater. Almeida apparently never shifted service on the south end of the route to the present Route 140, except for the segment between Exits 6 and 9.

BLOOM'S BUS LINES

Taunton to Boston

The bus route from Taunton to Boston was acquired by H&L Bloom, doing business as Bloom Bus Lines, in 1979. This company was succeeded by Bloom's Bus Lines, Inc. about 1992. Until 1979, Taunton was served by Bonanza Bus Lines as an intermediate

stop on their route from Newport and Fall River to Boston. Most of these trips ran non-stop between Taunton and Boston via Routes 44 and 24, but one inbound A.M. peak trip and one outbound P.M. peak trip followed Route 138, making stops in Raynham and South Easton. Since 1979, Bonanza has retained service running non-stop between Fall River and Boston via Route 24. Further details on the background of Fall River/Taunton - Boston bus service appear in the Bonanza Bus Lines section below.

Bonanza had been running eight round trips a day serving Taunton prior to the sale of the route. Bloom initially maintained the same level of service but gradually expanded it. Service to Raynham on all trips was established at or about the time the route was acquired, but service to South Easton Center was discontinued. A flag stop at Routes 138 and 106 in Easton was added about 1992, after Interstate Coach had discontinued most of their Easton - Boston service. An extension from downtown Taunton to the Silver City Galleria Mall and East Taunton was also added on selected trips about 1992.

Along with the Taunton - Boston route, Bloom also acquired Bonanza's rights to a local routing between Fall River and Taunton via Route 138. At the end, Bonanza had been using this only for the single Fall River - Boston round trip that also stopped in Raynham and South Easton. Bloom initially retained one Fall River - Boston round trip. By 1983 the Fall River - Taunton segment was shown in published schedules as a separate route with Boston connections, although buses were still usually through-routed.

Bloom's Taunton - Boston service reached a peak of 17 inbound and 15 outbound trips a day in 1995, but one inbound trip was dropped in 1996. The Galleria Mall extension had five inbound and six outbound trips from 1992 to 1996, when it was cut back to two in and five out.

The Old Colony commuter rail lines do not serve Taunton, Raynham, or Easton directly, but Raynham adjoins Middleborough and Easton adjoins Brockton. The Old Colony survey showed some diversions of riders from Bloom's, but many of these riders had previously had to travel several miles from off-line points to reach the buses.

In January 2000 Bloom's implemented their first post-Old Colony service reduction. One peak round trip and one midday round trip were dropped and the East Taunton/Galleria Mall extension was discontinued entirely. American Eagle Motor Coach has increased the number of trips stopping at the mall on their New Bedford - Boston route, however. Service on Bloom's Fall River - Taunton route has remained at two round trips a day since about 1985 after having reached a peak of three round trips in the early 1980s. (One trip each way is primarily an equipment positioning move.)

BONANZA BUS LINES

Route 2040 - Newport and Fall River to Boston

Bonanza Bus Lines was created in 1971, through a consolidation of The Short Line, Inc., and Interstate Busses Corp., which had been under common ownership for many years. The present Bonanza route between Newport, Fall River, and Boston is derived from a combination of Fall River - Boston routes that The Short Line acquired in 1964 from the Eastern Massachusetts Street Railway Company and Newport - Fall River service that The Short Line or predecessors had run since the 1930s. Currently, busses run non-stop between Fall River and Boston via Routes 24 and I-93 (including the Southeast Expressway). The only downtown Boston stop is at the South Station bus terminal.

Prior to the transfer of the service to The Short Line, Eastern Mass. had been running seven round trips on weekdays between Fall River and Boston, with intermediate stops including Taunton. Most of these trips followed the long-established local routing via state Routes 138 and 28. One round trip used a new express routing via Route 24 that the Eastern Mass. had begun in 1962, serving only Fall River, Taunton, and Boston.

The Short Line initially maintained about the same number of trips that had been run by Eastern Mass. between Fall River and Boston but used the local route south of Taunton and the non-stop route north of there on most of them. In addition to these, the non-stop route between Fall River and Boston was used on six round trips running through from Newport to Boston using the old Short Line routes south of Fall River. Additional service from Newport to Fall River was maintained as well. As operated by Eastern Mass., all trips used the old alignment via Routes 138 and 28 north of Route 128. The Short Line shifted the approach for all variations to the Southeast Expressway in 1967.

During the 1970s, Bonanza gradually reduced the overall number of trips and stops served by the Fall River routes. By 1979, all local trips running only between Newport and Fall River had been dropped. The number of separate Fall River - Boston trips had been reduced, with most making no intermediate stops except Taunton, but Taunton stops had been added on some of the Newport trips. That year, Bonanza sold the rights to the local routings between Fall River, Taunton and Boston to Bloom Bus Lines, and began running all Newport and Fall River service non-stop north of Fall River.

Immediately after this re-configuring Bonanza ran six Newport - Boston round trips and one Fall River - Boston round trip on weekdays. By 1981, the number of Newport round trips had increased to eight. A second Fall River round trip was added in 1984 during the Southeast Expressway reconstruction. This trip was retained afterwards, and until 1989 it was subsidized through the IDTS program. This was the peak of service on the route. In 1992, the number of Newport round trips was cut from eight to six. One of the two Fall River round trips was extended through to Newport in 1994, however. This has remained the service pattern since then. From 1987 to 1990 all Newport - Boston trips (but not Fall River short turns) were extended from downtown Boston to Logan Airport, initially with IDTS funding.

The number of intermediate stops served between Newport and Fall River has been reduced substantially over the years. In 1969 there were still six intermediate stops in Middletown, Portsmouth, and Tiverton. In the early 1980s Tiverton service was dropped and the number of stops in other towns was reduced to three. As of 1997, intermediate stops were reduced to one each in Middletown and Portsmouth.

Earlier History of Fall River - Boston Bus Service

Through bus service between Fall River and downtown Boston was first established by the Eastern Mass. Street Railway Company in 1939. This line ran on Route 138 most of the way from Fall River to Mattapan Square, continuing to Park Square on Route 28. It replaced a route that Eastern Mass. had been running since 1931 between Fall River and the Ashmont rapid transit terminal. That line had followed Route 138 between Fall River and South Easton, but then used Routes 123 and 28, Central Avenue and Dorchester Avenue to reach Ashmont. This was a slight change from a route that Eastern Mass. had started in 1930 between Fall River and Mattapan Station. The original Fall River - Mattapan bus routing was mostly a direct replacement of three connecting trolley lines that Eastern Mass. had previously operated.

Route 2030 - Woods Hole, Falmouth, Buzzards Bay and Wareham to Boston

Bus service to Boston from Woods Hole, Falmouth, Buzzards Bay, and Wareham has been operated by Bonanza Bus Lines since 1978, when the company acquired this service from Almeida Bus Lines. As the route is currently configured, busses originating at Woods Hole make one stop each in downtown Falmouth, at the Otis Air Force Base gate, and at a private park-and-ride lot in Bourne. From there, most trips run non-stop to Boston via Routes 25, I-495, 24, and I-93, including the Southeast Expressway. The only Boston stop is at the South Station bus terminal. Busses originating at Buzzards Bay follow Routes 28 and I-195 to I-495 in Wareham, then proceed as above. These trips make two intermediate stops in Wareham, one downtown and the other at a private park-and-ride lot.

Just prior to the sale to Bonanza, Almeida's non-summer weekday service on this route had consisted of six round trips through between Woods Hole and Boston plus one inbound and two outbound Buzzards Bay - Boston short turns. Intermediate stops varied among trips, but all trips stopped at Buzzards Bay, Onset, and Wareham, and all through trips also stopped at Falmouth and outside Otis Air Force Base.

Bonanza initially increased service to 10 round trips a day, all through from Woods Hole, but discontinued the Onset stop as well as stops at West Falmouth, North Falmouth, Pocasset, Monument Beach, West Wareham, Rock Village, South Middleborough, and Middleborough that had been served on only a few trips by the end of Almeida operation. After about 1970, South Middleborough and West Wareham had had no service suitable for Boston work trips. One outbound P.M. peak trip had stopped at Rock, but there was no inbound A.M. peak service there. Inbound A.M.

peak service had been discontinued at North Falmouth in 1976, and at West Falmouth about 1970.

In 1984, Bonanza replaced the downtown Wareham stop on the Woods Hole route with a stop at a new park-and-ride lot at the Wareham exit to Route 25. In 1987, following the completion of Route 25 from Wareham to the Bourne Bridge, Bonanza split the Woods Hole route into separate routes to Boston from Woods Hole and from Buzzards Bay. The Woods Hole route included the old stops at Falmouth and Otis Air Force Base. A new stop for Bourne was established at a supermarket on Trowbridge Road near the south end of the Bourne Bridge. Most trips on this route ran non-stop between there and Boston. Also starting at this time several Woods Hole and Falmouth trips were extended from downtown Boston to Logan Airport, originally with IDTS funding.

The new Buzzards Bay route included stops at downtown Wareham and at the Millpond Diner on Route 28 at Tihonet Road. The stop at the park-and-ride lot at Route 25 in Wareham was discontinued. Initially the new Buzzards Bay route had four inbound and five outbound trips on weekdays, plus two Wareham - Boston short turns. One Woods Hole trip in each direction also continued serving Wareham and Buzzards Bay.

Service on the Buzzards Bay - Boston route was reduced several times in the next few years. By 1991 it had only two trips inbound and one outbound. Wareham was served by these plus one short-turn round trip and stops by two inbound and three outbound Woods Hole trips. At that time, non-summer weekday service on the Woods Hole route consisted of ten round trips, with the first three inbound of the day originating at Falmouth rather than Woods Hole.

Since 1991 the level of Woods Hole/Falmouth weekday service has generally remained at 10 or 11 round trips except in the summer when four or five additional trips each way have been scheduled. The Buzzards Bay route has continued to have two trips inbound and one outbound, also stopping at Wareham. The remaining Wareham short-turn round trip was dropped in 1994. At that time three Woods Hole trips each way also stopped at Wareham but not Buzzards Bay. This was still the case at the time of the Old Colony service startup in September 1997, but the Wareham stops on Woods Hole trips were reduced to one inbound and two outbound in January 1998. As of January 2000, Wareham was served by only one Woods Hole trip each way in addition to the Buzzards Bay trips.

Earlier History of Woods Hole/Buzzards Bay - Boston Bus Service

Almeida Bus Lines first established service between Cape Cod and Boston in 1951 on two routes, one from Hyannis and the other from Otis Air Force Base. Both of these routes ran mostly on old state highways. Between the Bourne Bridge and Boston, the alignment was the present Routes 28, 27, and 138. South of the bridge, the Otis route continued on Route 28.

Rail passenger service between Boston and Cape Cod points ended on June 30, 1959. As a replacement for the Woods Hole branch of this service, Almeida's Otis Air Force Base - Boston route was extended to Woods Hole via the present Route 28A and local roads. Service was shifted to the present Routes I-495, 24, and I-93 north of Middleborough as sections of these highways were completed between 1959 and 1963. Service south of Middleborough continued to use Route 28. In the early 1960s stops were added at Pocasset, Monument Beach, West Wareham, South Middleborough and Rock Village. In 1963, operation between Otis AFB and Falmouth via the present Route 28 was authorized, but some trips continued running between these points via Route 28A, to serve North and West Falmouth. In 1969, following completion of the present Route I-495 between Middleborough and Wareham, most Woods Hole service was moved to that alignment. Some local trips remained on Route 28 to serve local stops. This configuration was still in effect up to the time of the sale of the route to Bonanza in 1978.

INTERSTATE COACH

Company Background

Interstate Coach originated in 1946 as a charter bus company owned by Joseph Unda, doing business as Unda's Bus Service. This company entered the fixed-route business in 1953, with the acquisition of some long-established local routes in Stoughton, Sharon, Canton and Easton. Over the next several years, the company took over more local routes in towns including Foxborough, Mansfield, Taunton, and Dighton. In 1967 after the death of Joseph Unda, the operating rights for these routes were transferred to Unda's Bus Service, Inc. doing business as Interstate Coach. This company was owned by Joseph Unda's son, Walter. In 1968 Interstate took over the operation of several former Eastern Mass. Street Railway routes between Brockton and surrounding towns. These were being discontinued as a result of the acquisition of the Eastern Mass. by the MBTA, as they were outside the MBTA district.

About 1974 Unda organized another company Bay State Bus Corporation. This company was originally mostly a contract operator of private routes for employers, but in the mid-1970s it also became the contractor for Brockton Area Transit (BAT). By the late 1970s Interstate Coach had discontinued operation of all non-contract local service. In 1979, with the acquisition of the Middleborough - Boston route discussed below, Bay State Bus Corporation began doing business as Bay State Commuter Lines. The corporate name was changed to the latter in 1981. By 1983 there was little practical distinction between Interstate Coach and Bay State Commuter Lines, although the separate company names were maintained. By the late 1990s the entire Boston commuter operation was conducted under the name Interstate Coach, Inc.

Middleborough/Bridgewater/West Bridgewater to Boston

Bus service from Middleborough to Boston was taken over by Bay State Commuter Lines in 1979. This service had previously been operated by Almeida Bus Lines, which went out of business at that time. Currently, busses originating in Middleborough

follow state Routes 28 and 106 to Route 24 in West Bridgewater. Stops are made at a limited number of locations in Middleborough, Bridgewater, and West Bridgewater. Busses then run non-stop to Boston via Routes 24 and I-93 (including the Southeast Expressway).

In the final years of operating this route, Almeida Bus Lines had run nine round trips a day between Boston and Middleborough, including a combination of Middleborough short turns and through trips to and from New Bedford. After taking over the Middleborough - Boston segment, Bay State initially maintained about the same level of peak-period service formerly run by Almeida, but reduced off-peak service. As of 1980 there were five inbound trips from Middleborough and one Bridgewater short turn, with all but two Middleborough trips arriving in Boston in the A.M. peak. Outbound, there were seven trips, with all but two in the P.M. peak. In December 1983 service was expanded with the addition of one A.M. peak trip from West Bridgewater and one P.M. peak trip each to Middleborough and Bridgewater.

Bay State began receiving IDTS assistance for this route in 1984. For some time subsequent to that, the main changes in service were extension of all A.M. trips to Middleborough with one additional early-morning trip and elimination of the outbound P.M. Bridgewater short turn. Also, one inbound and two outbound off-peak trips were combined with the former Interstate Coach Easton/Stoughton route, discussed below.

In the early 1990s, Bay State began serving the Mass. Highway park-and-ride lot at Routes 106 and 24 in West Bridgewater as a stop on the regular Middleborough route. In December 1993 Bay State started a new route, originating at a park-and-ride lot at Routes 104 and 24 in Bridgewater, not on the Middleborough route, and also stopping at the Route 106 lot. By mid-1995, the route serving the two park-and-ride lots had four inbound A.M. Peak and four outbound P.M. Peak trips in addition to the Middleborough schedule. Two of the park-and-ride lot trips in each direction were extended to the center of East Bridgewater in April 1996. As far as can be determined, this was the first time that through bus service from East Bridgewater to Boston was ever provided.

Beginning in 1995, most of the IDTS funding of Bay State Commuter Lines was applied to the park-and-ride lot route, with only one of the Middleborough trips each way nominally covered, although all continued to run. In July 1997 the Middleborough trips via Easton were replaced with an early A.M. peak inbound and an early P.M. peak outbound Easton short turn.

Old Colony commuter rail service began on September 29, 1997. The Middleborough/Lakeville branch has stations near the downtown stops in Middleborough and Bridgewater on the Middleborough - Boston bus route. The rail line does not serve East or West Bridgewater directly, but there is good access from both towns to the Bridgewater station and to Campello station in Brockton. East Bridgewater also has good access to Whitman station on the Plymouth/Kingston branch of the Old Colony.

Simultaneous with the Old Colony opening, IDTS funding of one Middleborough trip each way was eliminated and the trip was dropped. More substantial cutbacks were implemented in the Spring of 1998, when Middleborough service was reduced to three inbound A.M. peak trips and three outbound P.M. peak trips.

Service was reduced again in August 1999, with the Middleborough route being cut back to one round trip per day. The East Bridgewater extensions of the park-and-ride lot trips were dropped, and only one inbound and two outbound trips to the Route 104 lot were retained. The Route 106 lot continued to be served by the trips originating at Route 104 and at Middleborough, and by three inbound and two outbound short turns. The Route 106 short-turns replaced some service formerly provided by through trips to Middleborough and some formerly provided by Route 104 or East Bridgewater trips.

Earlier History of Middleborough - Boston Bus Service

Bus service to Boston from Middleborough and Bridgewater was started in 1947 by Almeida's Bus Service. Initially these towns were intermediate points on a route from New Bedford to Boston that followed old state highways and local roads. Starting in 1951, Middleborough and Bridgewater also became intermediate stops on new routes operated between Boston and points on Cape Cod by Almeida Bus Lines, successor to Almeida's Bus Service.

Between 1958 and 1961 Almeida obtained rights to operate over new limited-access highways most of the way from New Bedford to Boston as they opened. The downtown portions of Middleborough and Bridgewater had been directly on the original route, but were not on the new one. Almeida continued serving them with side diversions of some trips, but also began running some non-stop New Bedford - Boston trips supplemented by Middleborough short-turns.

Almeida buses originally ran closed-door through West Bridgewater to prevent competition with a route from West Bridgewater to Brockton operated by Eastern Mass. Street Railway. In late 1968, after the acquisition of the Eastern Mass. by the MBTA and the discontinuance of the West Bridgewater route, Almeida added stops in West Bridgewater on the trips that served Bridgewater and Middleborough.

Service to Middleborough, Bridgewater, and West Bridgewater on Cape Cod trips was phased out in the mid 1970s. Service to these towns via Middleborough short-turns and selected New Bedford trips continued until April 1979, when Almeida went out of business. Since then, New Bedford and Middleborough/Bridgewater/West Bridgewater services have been fully separated and operated by different carriers.

Easton/Stoughton to Boston

The route from Easton and Stoughton to Boston operated by Interstate Coach was short-lived compared with most of the other bus routes discussed here. Immediately after the "Great Blizzard" in February 1978, a ban on private automobile travel in the affected

areas was imposed for several days by the state. Several private bus companies were given emergency authority to run new express routes to Boston during the automobile ban. One such route was run from Stoughton to Boston by Interstate Coach. At the time, commuter rail service from Stoughton to Boston consisted of only three inbound and two outbound trips per day, all in peak hours.

Ridership on the 1978 emergency Stoughton bus service encouraged Interstate Coach to retain the route for a longer trial. Operating authority for bus service between Stoughton and Boston had been held by Almeida Bus Lines and a predecessor since 1947, as part of their New Bedford - Boston route, but Almeida had stopped carrying Stoughton-Boston passengers on this route about 1960. After the blizzard emergency, an agreement between Almeida and Interstate allowed the latter to continue running a Stoughton - Boston route via the present Routes 138 and I-93. This arrangement ended when Almeida went out of business in 1979.

Since 1975, Interstate Coach had also operated a bus route to Boston from Wheaton College in Norton and Stonehill College in Easton, but had been restricted to carrying students between Boston and the two campuses. When Almeida went out of business, the Department of Public Utilities amended the restrictions on the Wheaton/Stonehill route to allow Interstate to provide service for the general public, with stops in Norton, Easton and Stoughton as well as at the colleges. Most trips on the route actually began at Easton Crossroads, continuing to Boston via Routes 138, 139, 24 and I-93. All service south of Easton Crossroads was discontinued in December 1983.

When Interstate Coach began operating this route in April 1979, bus service between South Easton and Boston was also being provided by one weekday peak round trip between Fall River, Taunton, and Boston run by Bonanza Bus Lines. Service had been reduced to this level by 1970. When Bloom Bus Lines took over Bonanza's Taunton-Boston route in 1979, the remaining service to South Easton on that route ended, leaving the Interstate Coach route as the only provider of Easton - Boston service.

A local bus route from Stoughton to the MBTA's Mattapan Trolley Line terminal had been operated by Brush Hill Transportation Company since 1938, but service had been dwindling during the 1970s. By 1981 there was only one remaining round trip per day, and it was discontinued in 1986.

Counts taken by CTPS in 1983 and 1984 in conjunction with the Southeast Expressway reconstruction project showed fewer than 20 P.M. peak boardings at all Boston stops on Interstate's Easton route. Commuter rail service on the Stoughton Line was increased to 11 inbound and 10 outbound trips a day in March 1984 as part of the mitigation efforts for the Expressway project. Shortly after that, Interstate reduced Easton and Stoughton service to a few off-peak diversions of trips on the Bay State Middleborough - Boston route. About 1992, Bloom's Bus Lines added a flag stop at Routes 138 and 106 in Easton on their Taunton - Boston route, but this is further south than the portion of Route 138 that had been served by most Interstate Coach trips.

In July 1997, three months before the startup of Old Colony service, Interstate Coach discontinued the operation of Middleborough buses via the Easton/Stoughton route, which had included one midday round trip and one late P.M. peak trip. These were replaced by an early-morning trip from Easton due in Boston at 6:20 a.m., and an early P.M. peak trip to Easton leaving Boston at 4:00 p.m. These trips were discontinued at the end of June 1998, leaving no service on the route.

JBL BUS LINES/CAREY'S BUS LINES

Whitman to Boston

In late 1984 Carey's Bus Lines took over operation of the service previously operated by Hudson Bus Lines between the South Shore and Boston. Just prior to that, Hudson had been running nine inbound A.M. peak trips and eight outbound P.M. peak trips, with practically every trip using a different route variation.

Of Hudson's morning trips, three ran to both South Station and Government Center, with one originating in South Weymouth, one in Rockland, and one in Hull. (The latter trip also served Hingham and East Weymouth.) Two other trips ran from South Weymouth to Government Center only. Four trips ran to South Station only, with two each originating in Whitman and in Rockland.

Of the evening trips, three picked up at South Station only, with one going to Rockland and two to Whitman. Four picked up at Government Center only, with three going to South Weymouth and one to Hingham and Hull. One trip picked up at both South Station and Government Center, and went to Rockland, continuing to Abington or Whitman on demand. All of the Rockland trips in both directions and all of the Whitman trips except one inbound made stops in South Weymouth.

Hudson had begun operating through service from South Weymouth and Hingham to Government Center in 1968, supplementing long-established feeder service to the Ashmont Red Line terminal. Service from Whitman and Rockland had been diverted from Ashmont to South Station on an emergency basis following the February 1978 blizzard, and continued running to South Station permanently thereafter. The extension of the Hingham trips into Hull began in the late 1970s when Hudson was also operating service from Point Pemberton to Hingham Square under contract with the MBTA.

Soon after taking over the former Hudson routes, Carey's began receiving operating subsidies through the IDTS program, but the number of trips was shortly reduced to five inbound and four outbound. Some reconfiguration of the service was required for IDTS eligibility, because several of the trips had run entirely within the MBTA District. The Hingham/Hull and South Weymouth trips were eliminated except for one inbound morning South Weymouth trip. The outer end for all other trips became Whitman, with one trip in each direction also serving Rockland. In Boston, all trips served both South

Station and Government Center, except that the first outbound trip served only Government Center.

Old Colony service began on September 29, 1997, and at the same time IDTS funding of Carey's service was terminated. Consequently, on October 6, Carey's reduced service to two trips each way between Whitman, South Station and Government Center. Service to Rockland was discontinued. The Plymouth/Kingston branch of the Old Colony Lines serves the same territory that had been served by the Carey's route. The rail line has stations in Braintree, South Weymouth, Abington, and Whitman, and the Abington station is less than one half mile from the border of Rockland.

Because of greatly decreased ridership and the ending of financial assistance. Carey's left the bus business entirely in March 1998. As a result of lobbying efforts by commuters who still found the bus service more convenient than the rail service, JBL Bus Lines of Braintree agreed to take over the remaining two round trips a day. JBL does not receive direct funding for this service, but does have the use of two leased buses from EOTC.

Earlier History of JBL/Carey's Routes

The service described above evolved gradually out of a network of routes originally established to provide local transportation service within and between several South Shore towns. Many of the segments in Braintree, Weymouth, and Rockland had replaced Eastern Mass. Street Railway trolley lines in the 1920s. Eastern Mass. had sold the rights to these routes to an independent company, Lovell Bus Lines, in 1932.

Hudson Bus Lines acquired the core of this network in 1948, when Lovell withdrew from the territory after losing the Weymouth school bus contract. Coincidentally, at about the same time, the New Haven Railroad was reducing service on the Old Colony Lines that connected many of the same towns with Boston. In 1949, Hudson began through-routing trips from several of the local South Shore routes to Ashmont station via Granite Avenue. Following the complete shutdown of Old Colony service in 1959, Hudson began using an even faster routing to Ashmont via the Southeast Expressway.

The route from South Weymouth to Government Center started by Hudson in 1968 resulted in restoration of through service from Weymouth Landing and Braintree to downtown Boston after an absence of several years. From 1949 until the early 1960s, the Plymouth & Brockton Street Railway Company had included stops at Weymouth Landing and Braintree on some trips from Plymouth to Boston, but most of these trips had run in off-peak hours. By 1967, P&B had diverted all service to the present Route 3 and the Southeast Expressway north of Hingham.

The opening of the MBTA's Red Line extension to Quincy Center in 1971 contributed to substantial ridership losses on Hudson's feeder service to Ashmont station. In 1975, Hudson attempted to re-route service from Whitman, Rockland, Abington and Weymouth into Quincy Center Station, but permission to use the station busway was

denied. As a result, over the next few years Hudson discontinued all off-peak and strictly local service in the area and retained only downtown Boston commuting service.

Buses for Hudson's South Shore service were based at a garage in Weymouth. After this garage burned, it became necessary to relocate the operating base, with a resulting increase in expense for non-revenue mileage. This contributed to Hudson's decision to sell the entire South Shore operation to Carey's Bus Lines in 1984.

PLYMOUTH & BROCKTON STREET RAILWAY COMPANY

Company Background

Of the six bus companies affected by the Old Colony restoration, Plymouth & Brockton had the greatest number of routes experiencing direct competition from the trains. The 1998 survey results show that P&B had the largest absolute ridership losses, although some of the other carriers had higher percentage losses. P&B had previously had large ridership losses in the late 1980s and early 1990s and had reduced service drastically on most routes. Prior to the startup of Old Colony service, P&B ridership had been increasing slowly, but was still far below the levels of the mid 1980s. P&B routes in operation at the time of the Old Colony startup are discussed individually below.

In schedules and promotional literature P&B currently uses the slogan "Established in 1888 - America's Most Experienced Bus Line." This claim is based on the fact that the oldest corporate predecessor of P&B was established in 1888 to build a street railway line between Plymouth & Kingston. The present Plymouth & Brockton Street Railway Company was organized in 1922, as successor to the bankrupt Brockton & Plymouth Street Railway Company, which then had a single trolley route between Whitman and Plymouth. P&B began operating busses in 1927, but for the next two decades ran only short local routes linking Plymouth with nearby towns.

The development of the present network of P&B commuter bus routes between South Shore points and Boston began in 1948 as a response by P&B and other independent carriers to cutbacks in Old Colony commuter rail service. The operating rights for these bus routes granted by the Department of Public Utilities originally contained restrictions on departure times, intended to prevent diversions of railroad passengers. These restrictions were gradually lifted, but it was only after the complete discontinuance of Old Colony service and the opening of the Southeast Expressway in 1959 that P&B began to run frequent service aimed at the Boston work travel market.

Route 2451 - Orleans or Hyannis to Boston

Plymouth & Brockton has operated service to Boston from Cape Cod points since 1951, when some trips on the company's older Plymouth to Boston route (discussed below) were extended to Sagamore Circle. In 1961, two years after the discontinuance of rail passenger service between Cape Cod and Boston, the P&B Sagamore Circle route was extended to Hyannis. Bus service between Hyannis and Boston had been provided

since 1951 by Almeida Bus lines, which also continued to serve this route, but the Department of Public Utilities found that there was sufficient demand to justify service by two carriers in this corridor.

P&B became the sole operator of Hyannis - Boston bus service in 1979, when Almeida Bus Lines went out of business. At that time, P&B took over the operation of a connecting route between Hyannis and Chatham that had been run by Almeida's subsidiary, Southern Massachusetts Bus Lines.

Another connecting route had been run from Hyannis to Provincetown by an independent company, Cape Cod Bus Lines. P&B acquired control of that company in the early 1980s and took over direct operation of the route in 1988. Some trips were then through-routed to Boston, but frequency was always much lower on the extension than between Boston and Hyannis. At the same time, service on the Chatham route was reduced to one round trip per day. In 1990, one Hyannis round trip was re-routed through Chatham, but by 1991 Chatham service had been dropped entirely. This also eliminated service to Harwich until 1996, when the outer terminal of several Boston - Hyannis trips in each direction was changed to Orleans, with an intermediate Harwich stop. Unlike the Provincetown trips and former Chatham trips, the Orleans trips bypassed Hyannis.

In the early 1980s P&B extended some trips on the Hyannis route from downtown Boston to Logan Airport. The number of trips running to the airport gradually increased, and about 1992 operation of some Hyannis - Logan trips bypassing downtown Boston was begun.

Further Details of Orleans/Hyannis - Boston Service History

When P&B first began running service between Sagamore and Boston in 1951, the present state Route 3A was followed at the outer end, and the present Route 53 was used between North Plymouth and Quincy. The final entry to Boston was via Dorchester Avenue. The Hyannis extension of 1961 used the Mid-Cape Highway (present Route 6). The present Route 3 between Boston and the Sagamore Bridge was built in several stages, with most sections being opened between 1956 and 1963. By 1964, P&B had obtained operating rights over all of this route. Nevertheless, most Boston - Hyannis trips continued to be run via Route 53 as extensions of Plymouth trips until about 1970.

The bus routes from Hyannis to Chatham and Provincetown were originally started by the New Haven Railroad's bus subsidiary, the New England Transportation Company, in the 1920s. These routes supplemented, and eventually replaced, rail passenger service to the towns they ran through. Service on both routes was originally scheduled to connect with trains from Boston at Hyannis. In 1955 New England Transportation sold the rights to both routes to the Falmouth Bus and Taxi Company. In the early 1960s this company was succeeded by Cape Cod Bus Lines, which kept the

Provincetown route. The Chatham route was transferred to Southern Massachusetts Bus Lines.

When Hyannis - Boston bus service first started, few people commuted from Cape Cod to Boston. Prior to extending service to Hyannis, P&B had been running only two round trips a day between Sagamore Circle and Boston, including one trip each way scheduled for Boston work travel. By 1967, P&B ran only six round trips per day between Hyannis and Boston, including only one inbound A.M. peak trip and one outbound P.M. peak trip. (Both of these ran non-stop between Sagamore Circle and Boston.) In non-summer months, Almeida Bus Lines was then running seven round trips a day between Hyannis and Boston, including two each way suitable for Boston work trips.

Between 1967 and 1978, P&B's weekday Hyannis service tripled, to 19 inbound and 17 outbound trips. These included nine trips in and seven out at times suitable for Boston work trips. Almeida's Hyannis service had increased only slightly, to nine inbound and eight outbound trips, however. When Almeida shut down in 1979, P&B service was expanded to about the combined total number of trips previously run by both companies. This proved to be excessive, and about 1983 P&B service was reduced to around its 1979 level. Soon after that, however, service began to expand again, with partial IDTS funding. In 1990 there were 24 inbound and 25 outbound trips on weekdays, of which 12 inbound and 11 outbound had schedules suitable for Boston work trips.

Just prior to the startup of Old Colony service in September 1997, P&B was running 32 round trips a day on the Cape Cod route, including one inbound Sagamore short trip and four Orleans round trips by-passing Hyannis. In all, 15 inbound and 11 outbound trips were suitable for Boston work travel, including two Orleans round trips. Three inbound trips and six outbounds served Logan Airport but not downtown Boston.

This route was impacted less than P&B's shorter routes by Old Colony diversions. After a slight reduction in 1998, the number of trips after mid-1999 was higher than ever. The main change has been a greater separation of Logan and downtown Boston service. As of January 2000, the route as a whole had 35 inbound and 34 outbound trips a day, but 12 each way served Logan and not downtown Boston. Downtown Boston was served on 23 inbound and 22 outbound trips, of which four each way also served the airport. The outer end of four trips each way was Orleans, and one inbound trip originated at Sagamore. About half of the downtown Boston trips were scheduled for work travel.

Route 2453 - Duxbury and Marshfield to Boston

This route has always been one of the less frequently served in the P&B system. The numerous frequency and outer terminal changes described below are evidence of unsuccessful attempts to attract riders.

Plymouth & Brockton has operated the Marshfield portion of this route since 1952, when it was acquired from another independent carrier. The Duxbury segment has been revised several times. Prior to about 1970, P&B Marshfield - Boston weekday service was provided by one inbound A.M. peak and one outbound P.M. peak trip run as side diversions of Plymouth - Boston trips.

Around 1970 service began to be expanded. By 1973 there were five round trips between Marshfield and Boston. All trips ran at least as far south as Brant Rock, and one inbound and three outbound continued to Green Harbor. Service on the Duxbury segment had been discontinued by 1972, but resumed in 1975. Service then consisted of three inbound and two outbound South Duxbury trips and two Green Harbor round trips.

In 1978 service was increased to three South Duxbury round trips and three inbound and two outbound Green Harbor trips. By 1983, however, this had been cut back to two South Duxbury round trips and one inbound and two outbound trips with the outer end at Routes 3A and 139 in the north edge of Duxbury. An additional South Duxbury round trip was run experimentally in 1984, but lasted only a few months. One of the outbound short trips was dropped in 1985. In 1989 service was reduced to only the two South Duxbury round trips, and in 1992 the outer end of all trips was cut back to Route 3A and 139. This service was still in effect in 2000.

Further Details of History of P&B Marshfield - Boston Service History

Through bus service from Green Harbor in Marshfield to Quincy Square was first established by South Shore Coach Lines in 1949. (For several years prior to that, feeder bus service from Marshfield Center to the Greenbush commuter rail terminal had been provided by various private carriers as a replacement for discontinued commuter rail service.) The northern terminal was shifted to the Fields Corner rapid transit station in 1950. P&B extended the route to Boston shortly after taking it over in 1952. The Marshfield segment has always used the present Route 139. The present Mass. Routes 53 and 3A provided the original Boston link. By 1964, P&B was able to route Marshfield buses to Boston via the present Route 3 all the way from exit 12 in Pembroke.

The Duxbury segment of this route was originally part of a route from Plymouth to Boston mostly on the present state Routes 3A, 139, and 53, started by P&B in 1950. After acquiring the Marshfield route, P&B used it in a new Plymouth route variation. By 1960, P&B was running only one round trip per day from Plymouth to Boston through Duxbury and Marshfield via Route 3A to Route 3. The service in both directions ran in peak hours.

Route 2455 - Plymouth to Boston

This route was once one of the most heavily patronized and frequently served routes in the P&B system. Service and ridership had both fallen significantly from their peak

levels even before the resumption of Old Colony service, but much greater losses have occurred since that event.

Plymouth & Brockton first operated service between Plymouth and Boston in 1949. Numerous routings and variations have been used over the years. Just prior to the Old Colony startup, Route 2455 schedules included trips using various combinations of segments of state Routes 3, 3A, and 53 between Plymouth and Rockland and using Route 3 (including the Southeast Expressway) between Rockland and Boston.

Summary of Plymouth - Boston Service 1974 to 1984

By 1974, P&B Plymouth - Boston service had grown to 28 weekday round trips. The greatest number (19 in and 18 out) used a local routing on state routes 3A and 53 between Plymouth and Queen Ann Corner in the southern edge of Hingham. All of these ran non-stop between there and Boston, except for a few stopping at East Milton. The rest of the service used Route 3 to by-pass some or all of the stops north of Kingston. About 1977, P&B opened a new terminal in Plymouth off Route 3 at Industrial Park Road, with a commuter parking lot. Originally only buses on the Cape Cod route stopped there, but about 1980 Route 2455 buses began originating and terminating there although still serving downtown Plymouth.

Overall Route 2455 service frequency remained around the same as in 1974 until about 1982, when there was a major reconfiguring. Starting then, during peak hours, all Plymouth - Boston through trips ran non-stop between Kingston and Boston, with 11 such trips inbound and eight outbound. Three of these trips inbound made no stops between Plymouth and Boston. These and several others each way made no downtown Plymouth stops. During off-peak hours, most Plymouth trips continued using the local route from Plymouth to Queen Ann Corner. There were six such trips each way, plus one outbound running non-stop from Boston to Hanover.

Peak-period service on the local route was provided by new Route 2455A, from Duxbury to Boston. Seven inbound and nine outbound weekday trips made local stops between Duxbury and Queen Ann Corner. Two inbound short turns started in Hanover and two outbound trips ran non-stop from Boston to Hanover, then local to Duxbury. Routes 2455 and 2455A combined had slightly fewer total trips than had been running just prior to the split, but the number of trips per day at most individual stops dropped substantially. The East Milton stop was discontinued at around the same time. A new stop at a park-and-ride lot at Routes 228 and 3 in Rockland was added on local trips in 1983, and the next year the Queen Ann Corner stop was discontinued.

Summary of Plymouth - Boston Service 1984 to 1997

The separate Route 2455A designation was dropped in 1984, when service was rearranged again. In the A.M. peak, the number of trips running non-stop from Kingston to Boston was reduced to nine, but one trip from Plymouth making all local stops to Rockland, and one making local stops to Hanover were added. In the P.M.

peak, the number of outbound trips running non-stop to Kingston was reduced to seven, but another seven trips made all local stops from Rockland to Plymouth and another made local stops from Hanover to Plymouth. Inbound, Duxbury short-turns were reduced from seven to five and Hanover short turns from two to one. Outbound only two Duxbury short trips were retained. Seven trips inbound and 12 outbound served the Plymouth terminal but not the downtown stops. The net result of all of these changes was a slight increase in the total number of busses per day at most stops on the route, but a slight reduction in the amount of express service at outlying stops.

Over the next several years, there were many adjustments in departure times and stop combinations. The overall number of trips on the route changed little, but the amount of service to Duxbury, Pembroke, and Hanover decreased. In 1987 P&B began running some peak-period short trips between Boston and the Rockland park-and-ride lot.

Just prior to the start of Old Colony service in 1997, Route 2455 weekday schedules showed 14 inbound Plymouth trips, of which five ran non-stop from the terminal to Boston, five served no intermediate towns except Kingston, one made intermediate stops in Pembroke Center as an extension of Route 2459 and three ran local to Rockland. Supplementing these were one express and two local trips starting from Kingston, one local from Duxbury, and one short-turn from Rockland.

Outbound, there were 20 trips through from Boston to Plymouth. Of these, four made no intermediate stops between Boston and the Plymouth terminal, eight served no intermediate towns except Kingston, one ran via Pembroke Center, four made all local stops south of Rockland, and three made various combinations of local stops. There was also one trip to Kingston making most local stops and four short trips from Boston to Rockland. Overall, only six trips inbound and seven outbound still served downtown Plymouth.

Summary of Plymouth - Boston Service 1997 to 2000

Of the towns that were still served directly by the P&B Plymouth - Boston route in 1997, only Plymouth and Kingston are served directly by Old Colony trains. Plymouth has train service only during off-peak hours, but the Kingston station is only one exit further north on Route 3 than the exit to the P&B Plymouth terminal. Duxbury adjoins Kingston, and the survey results show large numbers of Duxbury residents using the Kingston, Halifax, and Hanson stations. Pembroke adjoins Hanson and Halifax and contributes many riders to the stations in those towns.

Rockland adjoins Abington, Whitman, and Weymouth, with most Rockland rail riders using the Abington station. Hanover adjoins Hanson, but the greatest number of Hanover rail users drive through Rockland to Abington. Norwell does not directly adjoin any town with a rail station, but accounts for some boardings at South Weymouth, Abington, and Whitman.

P&B reduced service on Route 2455 in June 1998, and further in September 1998, at which time it was subdivided into two routes. Trips identified as Route 2455A ran from the Plymouth terminal to Boston, with intermediate stops only at Kingsbury Plaza in Kingston or the Rockland park-and-ride lot. There were seven round trips on this route, of which all but one inbound stopped at Kingsbury Plaza but only three in and one out stopped at Rockland. Trips identified as Route 2455B ran from Plymouth to Boston making local stops along Routes 3A and 53 in Kingston, Duxbury, Hanover and Norwell and at the Rockland park-and-ride lot. Three round trips a day followed this route, with two of the inbounds omitting the Norwell stops. There was also one outbound local short trip from Boston to Kingston, omitting Norwell. All trips on both 2455A and 2455B ran during peak hours. This service was still in effect in January 2000, and was all receiving IDTS funding.

The Rockland park-and-ride lot was also served by other P&B routes, giving it a total of 16 inbound and 15 outbound downtown Boston trips and another eight inbound and six outbound trips serving only Logan Airport.

Earlier History of P&B Plymouth - Boston Service

The first P&B through route from Plymouth to Boston was started in 1949. It followed the present Route 3A in Plymouth and Kingston, Route 53 from Kingston to Quincy, and Hancock Street, Neponset Avenue, and Dorchester Avenue between Quincy and downtown Boston. The present Route 3 between Boston and Plymouth was built in several stages, with most sections being opened between 1956 and 1963. By 1964, P&B had obtained operating rights over all of this route.

By 1960, one year after the end of Old Colony service, P&B was running 12 inbound and 15 outbound trips between Plymouth and Boston on various routings on weekdays. Eight of 11 inbound A.M. peak trips and five of eight outbound P.M. peak trips ran non-stop between Kingston and Queen Ann Corner in Hingham via the present state Route 53. On the other peak trips and on most off-peak trips additional stops were made on Route 53 in Duxbury, Pembroke, Hanover, and Norwell. Some trips also made stops in Weymouth, Braintree, and Quincy.

By 1967, P&B was running 19 weekday round trips on the Plymouth to Boston route. All of these used Route 3 and the Southeast Expressway north of the border of Hingham and Weymouth. The majority (12 inbound and 14 outbound) used Route 3A from Plymouth to Kingston and Route 53 from there to Hingham making local stops on Route 53 in both peak and off-peak hours. The local trips included three inbound and four outbound Hyannis trips, and one inbound short trip from Duxbury. At the opposite extreme, four trips inbound and one outbound ran non-stop between Kingston and Boston via Route 3. The rest ran non-stop at least as far south as the northern edge of Hanover, except that some trips on each routing stopped at East Milton to drop off inbound or pick up outbound.

Route 2456 - Scituate to Boston

Plymouth & Brockton has operated bus service between Scituate and Boston on various routings since 1951, but did not begin to run frequent service suitable for Boston work trips until after the discontinuance of the Greenbush commuter rail line in 1959. By 1967, the Greenbush - Boston route had become the most heavily served route in the P&B system, with 23 inbound and 25 outbound weekday trips covering all or part of it. One trip started at North Scituate, one in Cohasset, and five at Old Hingham Center. The Cohasset trip ran non-stop to Boston. Two inbound trips started at North Scituate, ran outbound to Greenbush, and then ran non-stop to Route 3 through Norwell via Route 123. All other trips started at Greenbush, except for two that started at Scituate Harbor and ran via Hatherly and Gannett Roads in Scituate. All outbound trips terminated at Greenbush, except for one that ran via Route 123 and ended at North Scituate. Two Greenbush trips ran via Hatherly Road

By 1971, the Cohasset and Hingham short-turns had been replaced by Greenbush trips, and the Hatherly and Gannett Road variation had been reduced to one round trip. Overall service on the Scituate route peaked in 1973, when there were 25 trips inbound and 28 outbound. Included in these were three inbound expresses from North Scituate and one outbound express to Egypt via Norwell and one Hatherly Road round trip.

After 1973, the number of trips on the Scituate route was gradually reduced. As of 1981, there were still 18 inbound and 20 outbound trips on weekdays, but the Hatherly road variation was discontinued that year. About 1980, the outbound express trip through Norwell began dropping off passengers at Norwell Center. The three inbound express trips added a Norwell Center stop about 1982. In 1983, a stop was added at the park-and-ride lot at Routes 228 and 3 in Rockland, and the next year the Queen Ann Corner stop in Hingham was dropped. Service continued to decline throughout the 1980s, and had fallen to nine inbound and 11 outbound trips, including one each way via Norwell by 1988. In 1989, service was cut down to five weekday round trips, all in peak hours, including one inbound trip via Norwell.

The largest single factor in the decline of ridership on the Scituate route in the 1980s was the establishment of commuter boat service between Hingham and Boston. This had started in 1975 with one round trip per day, but gradually grew to include all-day service beginning in 1983. Although Hingham was the only town served directly by the boats, surveys showed significant numbers of riders being drawn from Cohasset and Scituate as well. By 1990, the commuter boats were carrying an average of 1,100 riders each way per day in non-summer months. This exceeded the total daily ridership that the P&B Scituate route had carried prior to the start of commuter boat service.

Five weekday P&B round trips between Greenbush and Boston were still being run just prior to the startup of commuter rail service on the Old Colony Plymouth/Kingston and Middleborough/Lakeville lines in September 1997. An inbound A.M. peak short turn from the Rockland park-and-ride lot was also shown in Greenbush schedules

stating in 1995, although it could just as well have been shown as a Plymouth route short turn.

The present Old Colony lines do not directly serve any towns on the P&B Scituate route, and the 1998 survey results indicated that fewer than 10 former P&B riders from Scituate, Cohasset, and Hingham combined had shifted to the trains. Of greater importance, about 90 riders a day were diverted to Old Colony trains from the Rockland park-and-ride lot, and many of them had formerly ridden the Scituate busses. In June 1998 P&B reduced service on the Scituate route to three weekday round trips, with none via Norwell Center. Service was further reduced to two round trips in July 1999 and to one round trip in June 2000.

Earlier History of P&B Scituate - Boston Service

The first P&B through route from Scituate to Boston, started in 1951, was initially a variation of the Plymouth - Boston route that had been started by P&B in 1949. It diverged from the older route near the Kingston/Duxbury town line and followed the present Route 3A to Greenbush. The southern end of the Scituate variation had not had previous bus service. From Egypt in Scituate to Hingham Center, however, the variation followed the alignment of a local route from Greenbush to the Hingham commuter rail station that had been started by another carrier in the late 1940s and acquired by P&B in 1950. From Hingham Center to Queen Ann Corner the Scituate route incorporated another formerly independent local bus route newly acquired by P&B. (That route had replaced a trolley line in the 1920s.) The Scituate route and the main Plymouth route rejoined at the intersection of the present Routes 228 and 53 in Hingham.

By 1952, Scituate and Plymouth service had been almost completely separated, with the outer end of most Scituate trips being Scituate Harbor. From 1954 to 1961, Scituate buses used a more direct routing between Hingham Center and Quincy via the present Mass. Route 3A. In 1961, Scituate buses were again re-routed via Queen Ann Corner, but used Route 3 and the Southeast Expressway from the Hingham/Weymouth town Line to Boston.

The operating rights for the Hatherly Road variation in Scituate and the express routing through Norwell were also originally used for local routes started by other carriers and acquired by P&B in 1950 and 1952. P&B appears to have made little or no use of these rights initially, but reactivated them as portions of variations of the Scituate route in the mid-1960s.

By the time of the Old Colony service startup in 1997, all trips on Route 2456 used unnumbered local roads from Greenbush through Scituate and Cohasset to Hingham Center, then followed state Routes 228 and 3 (including the Southeast Expressway) into Boston.

Route 2459 - Pembroke Center to Boston (Route 2452 until 1985)

This route was essentially a variation of P&B's local Plymouth - Boston route, discussed above. It never had very frequent service, and was never very successful. It was one of two routes discontinued entirely by P&B as a result of Old Colony service competition.

Route 2459 covered segments of state Routes 27 and 14 in Kingston and Pembroke, while most Plymouth local buses followed a more direct alignment on Route 53. P&B acquired the operating rights to the segments covered exclusively by Route 2459 in 1951, from an independent company that had used them for local routes connecting Pembroke with adjoining towns. The segment on Route 27 had replaced a trolley line in the 1920s. The rest dated from the 1940s.

By 1960, the year after the end of Old Colony service, P&B was running one round trip per day through Pembroke Center on the present state Route 14. This was part of a route that originated in the Monponsett section of Hanson to provide peak-period replacement service at the railroad stations there and at South Hanson.

By 1967, P&B had discontinued the Hanson segments of this route, running it instead through the Bryantville and Silver Lake sections of Pembroke via old rights that had been inactive for several years. Frequency had increased to three weekday round trips. These included one inbound A.M. peak trip and one outbound P.M. peak trip through from Plymouth. The other two round trips ran in off-peak hours and had Silver Lake Regional High School in Kingston as the outer endpoint. By 1972, service had been reduced to only the one peak round trip, on which the outer end had been cut back to Tura's Corner in Kingston. Starting about 1982, the outer end was shown as Bryantville Center in Pembroke.

In March 1984 service was experimentally increased to three inbound and two outbound trips, all in peak hours, and the outer end was extended to New England Villages in Pembroke. This was one of several service increases funded by the MBTA in conjunction with the Southeast Expressway reconstruction. It attracted few additional riders, and in 1985 service was reduced to two round trips. In 1988, service was cut back to one round trip again, but the outer end was extended to Plymouth. This schedule and configuration were still in effect when Old Colony service started. The remaining round trip was discontinued in September 1998.

Route 2458 - Brockton to Boston

This route had a much briefer history than those of most of the other P&B routes discussed here. P&B first began operating Brockton to Boston service in 1974, and discontinued it in September 1998, one year after the startup of Old Colony service. The P&B route started at the Brockton Area Transit (BAT) bus terminal in downtown Brockton and followed local streets to the Westgate Mall, where commuter parking was available. Buses then ran via state Route 24 and Interstate 93 (including the Southeast

Expressway) to downtown Boston. There had been no through bus service between Brockton and Boston for several years preceding this.

P&B initially ran eight weekday round trips between Brockton and Boston, with service all day. Frequency briefly increased to 10 round trips a day by the end of 1974, but began to be reduced gradually starting the next year. By 1980 there were only five inbound and four outbound trips. After some experimental increases in the early 1980s, service dropped to four inbound A.M. peak and four outbound P.M. peak trips in 1985. In 1987, with IDTS funding, service was increased to six round trips, and in 1988 a seventh inbound trip was added. The new trips ran in off-peak hours. This level of service was still in effect, with some changes in departure times, when Old Colony service began in September 1997.

The Middleborough/Lakeville branch of the Old Colony has three stations in Brockton, including one located a few blocks from the terminal of the P&B route. In December 1997, all off-peak P&B Brockton trips were eliminated, reducing service to three weekday round trips. All remaining service on the route was discontinued in September 1998.

Some midday and evening bus service between Westgate Mall and Boston is still provided by Bloom's Bus Lines. Bloom first began serving Westgate Mall in the late 1980s as an intermediate stop on their Taunton - Boston route, for travel between Taunton and the mall only. By 1992, travel between the mall and Boston was also permitted. Bus service from Brockton to the Ashmont Red Line terminal is still provided by BAT, on a route that has been run by various carriers since 1931.

Prior Brockton - Boston Bus Service

The first through bus service from downtown Brockton to downtown Boston was started in 1962 by the Eastern Mass. Street Railway Company. The alignment was similar to that of the later P&B route, except that the Eastern Mass. route made local stops along state Route 27 in Brockton, and used state Routes 128, 138 and 28 as the Boston entry. The Eastern Mass. was denied operating rights on the Southeast Expressway, largely because of opposition by the Metropolitan Transit Authority. Passengers transferring from Eastern Mass. buses to rapid transit lines were an important revenue source for the MTA, and it was feared that Eastern Mass. would divert all their South Shore buses directly into Boston if granted rights on the Expressway.

The Eastern Mass. route from Brockton to downtown Boston began with six weekday round trips. Within a year, this had increased to eight inbound and nine outbound trips. The route attracted very few riders, however, and by 1966 weekday service was down to one trip inbound and two outbound. The route was discontinued entirely in 1968, after the acquisition of the Eastern Mass. by the MBTA.

Route 2457 - Marshfield to Braintree

This is the only P&B route within the MBTA District that does not run directly to downtown Boston. It has been run by P&B under contract with the MBTA since 1985. It had been started as MBTA Route 250 in 1982, in response to complaints from the towns of Marshfield and Hanover that they were within the MBTA District but had never had direct MBTA service. As operated by the MBTA, Route 250 made a single stop in Marshfield at the High School, then followed state Routes 139 and 3 to Hanover. After making one stop at Hanover Mall (just off Route 3 at Route 53) buses continued non-stop to Braintree. The Red Line itself had been extended to Braintree in 1980.

The MBTA ran two inbound A.M. peak trips and three outbound P.M. peak trips on Route 250, plus one inbound P.M. peak trip non-stop from Marshfield to Braintree for equipment cycling. After taking over Route 250, P&B initially maintained the same schedule and stops as had been provided by the MBTA. In 1987, P&B began showing their Plymouth terminal as the first or last stop on trips by buses that would otherwise have run in non-revenue service between there and Marshfield or Braintree. This not only added peak-direction travel between Plymouth and Braintree as a possible use of the route but also allowed reverse commuting between Braintree (or other points on the Red Line) and Plymouth. Under P&B the route was first designated Route 2463, but was renumbered 2457 in 1988.

In 1994, P&B added a stop at the Rockland park-and-ride lot off Route 3 at Route 228. This lot had been served by several other P&B routes since 1983. Marshfield buses stopped there only on outbound trips from Braintree to Plymouth in the morning and on inbound trips from Plymouth to Braintree in the afternoon to provide reverse-commuting service to nearby work locations.

Frequency and stops remained unchanged until 1997, but morning departure times gradually became earlier during 1995 and 1996. In July 1997 Route 2457 service was doubled, from three round trips to six. All inbound departure times were changed. The number of inbound trips from Marshfield to Braintree increased from two to four in the A.M. peak and from one to two in the P.M. peak. The inbound A.M. trips all stopped at Hanover, but the inbound P.M. trips did not. The first two inbound A.M. trips started at Plymouth, and the last two returned to Plymouth with a stop at Rockland. Outbound service increased from three to four trips in the P.M. peak and in the A.M. peak two non-stop trips from Braintree to Marshfield were added. All outbound P.M. trips stopped at Hanover. The first two outbound P.M. trips started at Plymouth before going to Braintree and the last two continued to Plymouth from Marshfield. (As always, the trips stopping at only Marshfield and Braintree were run mostly for equipment cycling, and they carried almost no riders.) This service pattern was still in effect when Old Colony service started.

The Old Colony lines do not serve Marshfield or Hanover directly, and do not serve Plymouth during the times of day when Route 2457 had always operated. The 1998 survey results showed that about 35 former P&B bus riders from Hanover and about 15

from Marshfield had been diverted to Old Colony service, but these riders could have used P&B routes other than 2457.

The new schedule implemented in 1997 remained in effect until July 1999. At that time service was cut back to three round trips again. These included two inbound A.M. peak and two outbound P.M. peak trips between Marshfield and Braintree via Hanover. The first A.M. trip started at Plymouth and the second returned to Plymouth via Rockland. The first P.M. trip started from Plymouth to Braintree via Rockland, and the second continued from Marshfield to Plymouth. In addition to these, there was one inbound P.M. trip and one outbound A.M. trip stopping only at Marshfield and Braintree.

BROCKTON AREA TRANSIT (BAT)

Route 12 - Brockton to Ashmont

Bus service between downtown Brockton and the Ashmont Red Line terminal has been provided by private operators under contract to BAT since 1976. This route follows state Route 28, Central Avenue, and Dorchester Avenue. Bus service from Brockton to Ashmont on essentially the present route was started by the Eastern Mass. Street Railway Company in 1931, as a replacement for a trolley line between Brockton and Mattapan Square. When the Eastern Mass. was bought out by the MBTA in 1968, service was maintained on the full route, eventually becoming MBTA Route 240.

After the end of 1968, Brockton and Avon, which were outside the MBTA District, were required to contract with the MBTA for operation of Route 240 service within their borders. Starting in 1975, the newly-formed Brockton Area Transit Authority began contracting for the service instead of the towns. In 1976, BAT chose to contract with a private carrier instead of the MBTA for Ashmont service. Consequently, Route 240 was cut back to the border of Randolph and Avon. The new BAT route ran through from Brockton to Ashmont, but passengers were not permitted to use it for trips entirely within the MBTA District.

In the mid-1980s a peak-period express variation was started with funding from the IDTS program. Buses on this variation bypassed most of the southern end of the route by following state routes 27 and 24 and I-93 between Route 28 in downtown Brockton and Route 28 on the border of Randolph and Quincy. Five inbound A.M. peak trips and four outbound P.M. peak trips used this routing, supplementing service on the regular route. IDTS funding for the express service was eliminated after the Old Colony service startup. All of the express trips were discontinued in March 1999. Service on the older route remained at the prior level of 39 trips inbound, but outbound service was reduced slightly, from 40 trips to 38.