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MEMORANDUM

DATE November 24, 2009
TO Transportation Planning and Programming Committee
FROM Jonathan Belcher
RE Evaluation of MWRTA Fixed-Route Network

EXECUTIVE SUMMARY

This study evaluates MetroWest Regional Transit Authority (MWRTA) fixed-route transit services in order to recommend potential improvements to present routes and schedules; it also assesses the desirability of adding new routes.

In order to assess existing ridership patterns for the purposes of this study, CTPS conducted a “ridecheck” of the network. In order to assess future demographic and work trip characteristics, CTPS analyzed U.S. Census Bureau data and produced forecasts using its regional model.

Having analyzed these data sources, as well as recommendations from past studies, and having considered comments received from MWRTA staff, board members, and MPO members, CTPS developed recommendations for changes in service. They are summarized below. Some key findings of the analyses underlying the recommendations are also cited.

Existing Route Network: Recommended Changes and Improvements

- The existing MWRTA network has ridership comparable to that of other Massachusetts RTAs when measured by passengers per vehicle mile.
- A review of existing conditions shows that two key routes in Framingham, Routes 2 and 3, need more realistic schedules to deal with existing traffic conditions. Changing the travel times for these two routes should improve their on-time performance substantially and their overall reliability moderately.
- A third route operating primarily within Framingham, Route 4, could be slightly reconfigured to make it a more attractive option for travel between downtown Framingham and the Route 9 employment and shopping areas.
- Route 7 between Framingham and Marlborough is one of the particularly well-utilized routes; the MWRTA should consider adding new weekend service on this route.

Potential for Network Expansion

- A review of U.S. Census Bureau projections for 2010 population and employment suggests that parts of Marlborough have the greatest potential to support new fixed-route service.
- Sherborn, Sudbury, Wayland, and Weston could benefit from expanded service; however, because of their lower population and employment densities, introducing new demand-response service would be the appropriate approach.
- The existing MWRTA Natick Commuter Bus service could be expanded to provide limited commuter bus service to Wayland.
- A new MWRTA service between Framingham and the MBTA's Green Line in Newton, Route 1, implemented in March of this year and funded by the Suburban Mobility Program of the Boston Region Metropolitan Planning Organization (MPO), significantly improves the ability of passengers in the MWRTA and MBTA networks to make transfers between the two systems.
- Cavalier Coach presently operates limited commuter bus service from Northborough to Boston via Marlborough, Sudbury, Wayland, and Weston. Providing a new subsidy to Cavalier through the MWRTA could make possible more peak period trips and an increase in midday service. Some of this service could be operated via either Riverside or downtown Waltham to provide connections to MBTA bus and commuter rail service.
- Cavalier Coach also provides service from Marlborough to Boston via Southborough, while Peter Pan Bus Lines provides express bus service from Flutie Pass in Framingham to Boston. A subsidy to these carriers could ensure continuation of this service, which has recently lost state subsidies.
- A review of the potential for new transit facilities in the vicinity of Flutie Pass is also provided in this memorandum.

1 INTRODUCTION

Purposes of This Study

This study evaluates MetroWest Regional Transit Authority (MWRTA) fixed-route transit services to identify potential improvements to present routes and schedules; it also assesses the desirability of adding new routes. The study was limited to improvements and new routes that could be implemented without increasing the net operating cost of the system. Improvements that could benefit coordination between MWRTA and Massachusetts Bay Transportation Authority (MBTA) services and increase ridership on both were of particular interest. In addition, the study provided technical assistance to the MWRTA in its analysis of whether to establish a new transportation hub in the Shoppers World/Natick Collection commercial area for the purpose of improving connections between routes taken over from LIFT and Natick Neighborhood Bus, potential new MWRTA services, and existing MBTA-supported Hi-Ride commuter buses.

Overview of This Memorandum

Section 2 reviews briefly the MWRTA's history and route structure, and inventories the transit services operated in the MWRTA service area by other providers.

Section 3 describes the demographic and work trip characteristics that may be expected in 2010 in the service area.

Section 4 summarizes recommendations from past studies of transit service in the MWRTA area. It also lists service changes that have been implemented since the completion of the past studies.

Section 5 presents this study's findings and recommendations. It begins by giving the existing MWRTA fixed-route system's ridership patterns, through data collected in the field by CTPS staff in October 2008. The characteristics are also compared with those other RTAs' services. Then, route by route, the study's findings and recommendations are presented.

An appendix provides all of the field data collected.

The New Route 1

The creation of a new Route 1 (as described under Background, below) occurred after the data collection for this study had been completed. Therefore, data on Route 1 does not appear in this memorandum's tables. However, this study's analysis includes Route 1.

2 BACKGROUND

MWRTA History and Current Fixed-Route Service

The MWRTA was formed in 2007 for the purpose of improving public transportation options for residents and workers in the MetroWest area of metropolitan Boston. By the fall of 2007, nine towns had joined the MWRTA: Ashland, Framingham, Holliston, Hopkinton, Natick, Sherborn, Sudbury, Wayland, and Weston. Governor Patrick signed legislation authorizing the City of Marlborough to switch from the Worcester RTA to the MWRTA on February 13, 2008, increasing the membership of the Authority to 10 communities. Southborough also switched later in 2008, which brought the number of member municipalities to 11.

MWRTA transit service began on July 1, 2007, in that the Authority then became responsible for overseeing operations of the long-established Local Intra-Framingham Transit (LIFT) fixed-route bus system, which up to that time had been overseen by the Town of Framingham. The former LIFT network consisted of six routes operating in Framingham, Ashland, Marlborough, Holliston, Hopkinton, Southborough, Milford, and a small area of Natick. The route numbers, 2, 3, 5, 6, 7, and 9, were retained by the MWRTA.

Routes 2 and 3 operate as a circuit, primarily within Framingham but with some service into Natick to serve Sherwood Plaza and the Natick Mall/Natick Collection. Routes 2 and 3 have operated since the mid-1980s, with some minor alterations in routing made over time. Route 5 connects Framingham to Hopkinton via Ashland and has operated since 1987 except for a brief period in 2004 when service was discontinued because of funding problems. Route 6 connects Framingham with Milford via Ashland and Holliston. LIFT took over Route 6 from a private carrier in 1992; service on this route, also, was briefly discontinued in 2004 because of funding problems. Route 7 operates between Framingham and Marlborough via Southborough; it began as a completely new service in 2000. Route 9, which is the only former LIFT route that does not serve downtown Framingham, began in 2006. It operates primarily along highway Route 9 between the Natick Mall/Natick Collection and the area near Exit 12 of the Massachusetts Turnpike.

In July 2008, the MWRTA took over full operation of the Natick Neighborhood Bus system. The Natick Neighborhood system has operated in some form since 1976. In 2003, the route structure was streamlined following the recommendations of a town Transportation Task Force, which had been formed in 2002. Service on the former Natick Neighborhood network consists of three routes: Route 10, a circuit route connecting the center of Natick with the highway Route 9 commercial area; Route 11, a midday route that travels the same circuit as the full-time route, but in the opposite direction of travel; and Route 12 (the Natick Commuter Bus), a commuter shuttle service connecting the Natick commuter rail station with several large employers in the community and with local neighborhoods.

Also in July 2008, the MWRTA opened a new “Central Hub” on Waverly Street in Framingham, midway between downtown Framingham and the Natick/Framingham border. The Central Hub consists of a maintenance and storage facility for the bus fleet, offices for MWRTA staff, a bus shelter for passengers, and an area for parking buses between runs. Most of the routes in the combined former LIFT and Natick Neighborhood networks were slightly altered to serve the Central Hub; the former LIFT 9 service and the Natick Commuter Bus are the only fixed-route services in the network that do not serve it. Two other changes were made to the network at this time: Route 6 service to Milford was reduced to only operate in the rush hour, with midday service terminating in Holliston; and a new route, operating between Ashland, Framingham, and the Natick Collection, was created to take over a portion of Route 6 in those communities. The new route is Route 4. An MWRTA system map displaying the network as it appeared in July 2008 is provided at the end of this memorandum’s appendix.

Routes 2, 3, 5, 9, 10, and 11 and the Natick Commuter Bus all utilize one vehicle each to provide service. Route 7 utilizes two vehicles, because of its length. Route 6 utilizes two vehicles in the peak periods, when it operates to Milford. In the midday, one of these two vehicles operates on Route 4, while the other remains on the truncated version of Route 6. The total peak vehicle requirement for scheduled fixed-route service is 11, although a 12th vehicle is added in the afternoon to provide extra service from the Staples complex in Framingham to Framingham Station along part of Route 7.

The MWRTA received funding through the Boston Region MPO's Suburban Mobility program to institute a new route. Route 1 began service in March 2009 and connects Framingham, through Natick and Wellesley, to the MBTA's Green Line at Woodland in Newton. This service utilizes four additional vehicles.

Like all regional transit authorities in the Commonwealth, the MWRTA does not directly operate or maintain any of the vehicles, but relies on a contractor to provide the service. The present contractor for the fixed-route network is First Transit, an international firm that manages a large number of transit systems worldwide. First Transit's contract with MWRTA began on December 1, 2007. New equipment was also introduced at that time. The primary equipment for fixed-route service consists of 18-seat minibuses, with bodies by El Dorado National, built on a Ford cutaway chassis.

Other Service Providers in the MWRTA Service Area

In addition to the MWRTA routes described above, several other fixed-route bus services operate in the MWRTA service area.

Massport contracts the operation of Logan Express bus service from a parking facility in Framingham near Shoppers World direct to Logan Airport. Service is provided 365 days a year from 4:00 a.m. to 11:00 p.m. every 30 to 60 minutes.

Cavalier Coach presently provides commuter bus service from Northborough to Boston operating via Marlborough, Sudbury, Wayland, and Weston along highway Route 20. Service is limited to one a.m. round-trip and one p.m. round-trip. Cavalier Coach also has a second route from Marlborough to Boston via Southborough and the Exit 12 park-and-ride lot in Framingham, operating one single inbound a.m. trip and a single p.m. outbound trip. Operating support from the state for these two services was discontinued in November 2008. Cavalier Coach intends to maintain the Route 20 service, adding a second a.m. trip, but has considered eliminating the Marlborough-Boston-via-Southborough route.

Peter Pan Bus lines operates regional service from New York, Hartford, Springfield, and Worcester to Boston. The service from Hartford and New York is jointly operated with Greyhound Lines as a pooled service. Eight trips throughout the day on these regional routes stop at Massport's Logan Express facility in Framingham. Peter Pan also operates a commuter bus service from Worcester to Boston, which serves the Flutie Pass commuter parking lot. There are three trips in the a.m. peak from Flutie Pass to Boston and two return trips in the p.m. peak. An operating subsidy from the state was discontinued in November 2008. Peter Pan initially announced plans to reduce service to only one trip in each direction, but agreed to maintain the existing morning schedule and two evening trips at least until early 2009.

The MBTA commuter rail network directly serves five communities in the MWRTA district. Natick (with two stops), Framingham, Ashland, and Southborough are located on the Worcester commuter rail line. Weston is served by one full-time stop (Kendall Green) and two stops with limited service (Hastings and Silver Hill) on the Fitchburg

commuter rail line. Holliston, Hopkinton, Sherborn, Sudbury, Marlborough, and Wayland do not have direct commuter rail service, but all are adjacent to other communities with commuter rail service.

There was no direct service to the MWRTA service area from any MBTA rapid transit line until Route 1 service to the Riverside branch of the Green Line in Newton was introduced in March 2009.

3 DEMOGRAPHIC AND WORK TRIP CHARACTERISTICS FOR 2010 FOR THE MWRTA SERVICE AREA

A number of factors can contribute to the potential of a fixed-route bus service to be successful. Higher residential density and higher employment density increase the likelihood of multiple potential transit customers sharing common commuting patterns. Both older and younger members of the population may not have the ability to drive an automobile, increasing the need for mobility options and the potential for transit ridership. Lower levels of automobile ownership per household in an area could suggest a higher potential demand for transit service. Large numbers of residents traveling to Boston or Cambridge could suggest a demand for access to the commuter rail network . The following characteristics are important in predicting MWRTA transit usage:

- Population density.
- Age of the population.
- Vehicle ownership.
- Employment density.
- Work trips to Boston and Cambridge and within the service area.

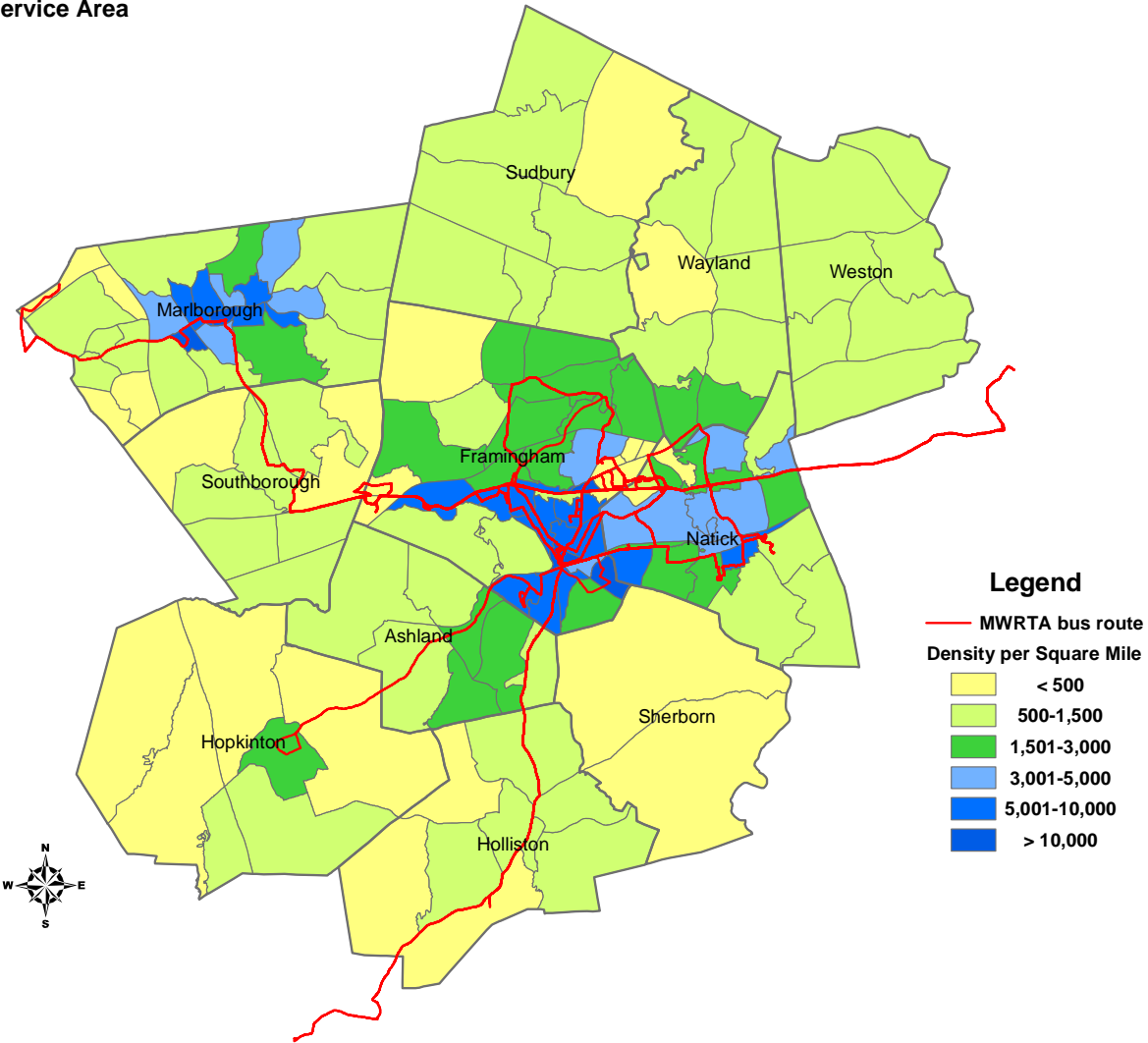
Each characteristic as it applies to the MWRTA service area is discussed below. The data was obtained from the CTPS regional travel demand model, which covers 164 communities in eastern Massachusetts. The model contains 2,727 transportation analysis zones (TAZs), which are geographical areas delineated by transportation planners for tabulating transportation-related data like population, employment, and households for use within a travel demand model. A TAZ usually consists of one or more census blocks, block groups, or tracts. TAZs vary in size within an urban area, being smaller near central business districts (CBDs) and larger in suburban areas. They are delineated in a manner that aggregates and directs trip ends within a defined area toward their likely entry points onto collector roads and then onto the appropriate links in the highway and transit networks. The 2010 model year was used in the present study, as it is the closest approximation to today's demographics.

Population Density

Figure 1 shows population per square mile for each TAZ in the MWRTA service area.

Higher levels of population density increase the potential for fixed-route transit service to draw customers, as there is a greater probability of sufficient people within walking distance of a transit service sharing a common travel pattern. The most densely

FIGURE 1
Population Density, 2010
By CTPS Transportation Analysis Zone
MWRTA Service Area



populated areas in the MWRTA service area are in Framingham, Natick, and Marlborough. Most other communities in the service area are lightly populated. Sherborn has the lowest densities, with all TAZs having fewer than 500 people per square mile. The existing MWRTA fixed-route service operates through most of the areas of greater density. The most significant area with relatively high population density that is not covered by existing MWRTA fixed-route service is the eastern end of Marlborough along Route 20. The Cavalier Coach Route 20 commuter bus provides very limited service in this area.

Age

Greater percentages of residents aged 10-19 and 65 and older are a likely indicator of greater transit demand, as these age groups tend to have fewer mobility options and are thus more transit dependent. Figure 2 shows the percentage of service area population in these age groups. Overall, 26% of the projected 2010 population is expected to fall within these two age categories. The proportions are higher in the eastern section of the service area. Table 1 shows the town-by-town breakdown of population in the 10-19 and 65+ categories.

**TABLE 1
Transit-Dependent Age Groups in the MWRTA Service Area (2010)**

Community	Ten to Nineteen Year Olds	Percent Ten to Nineteen Year Olds	Sixty-five and Older	Percent Sixty-five and Older	Combined Populations
Ashland	1,771	11%	1,585	10%	21%
Framingham	7,383	11%	9,369	14%	24%
Holliston	2,218	16%	1,251	9%	24%
Hopkinton	2,234	15%	1,002	7%	22%
Marlborough	4,256	11%	4,381	12%	23%
Natick	3,613	11%	5,101	15%	26%
Sherborn	694	17%	508	12%	29%
Southborough	1,318	14%	847	9%	23%
Sudbury	2,762	16%	1,881	11%	26%
Wayland	1,956	14%	2,128	15%	29%
Weston	1,711	15%	2,081	18%	33%
TOTAL	29,916	12%	30,134	12%	25%

Vehicle Ownership

Vehicle ownership can also be an indicator of the demand for transit. The lower the level of vehicle ownership, the greater the demand for transit. Vehicle ownership is generally high in the MWRTA service area. Figure 3 shows the proportion of households without vehicles. In most of the service area, 5% or less of all households have no vehicles. The existing fixed-route network serves most of the areas with higher rates of

FIGURE 2
Population 10-19 Years Old or 65 or Older, 2010
By Municipality
MWRTA Service Area

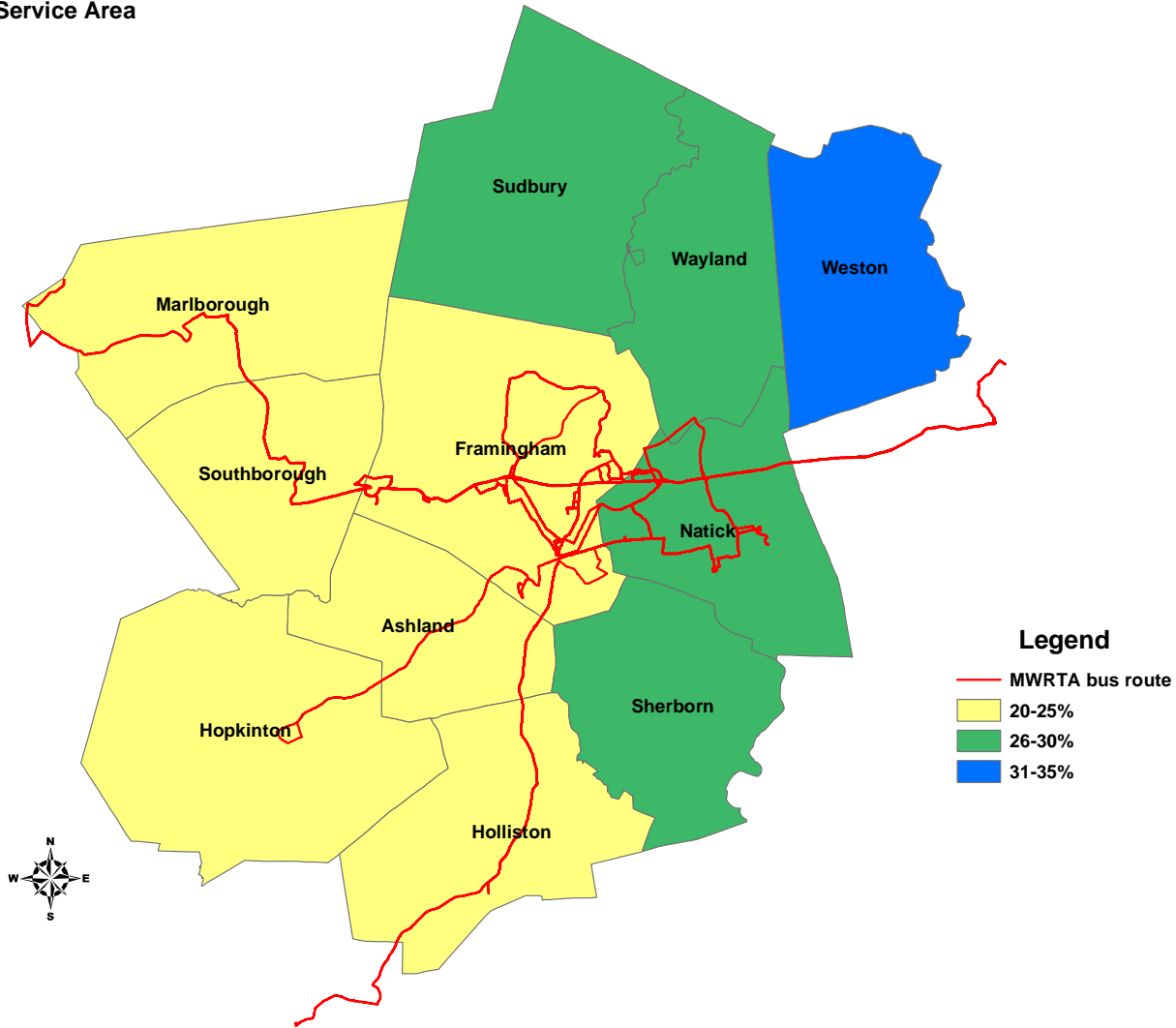
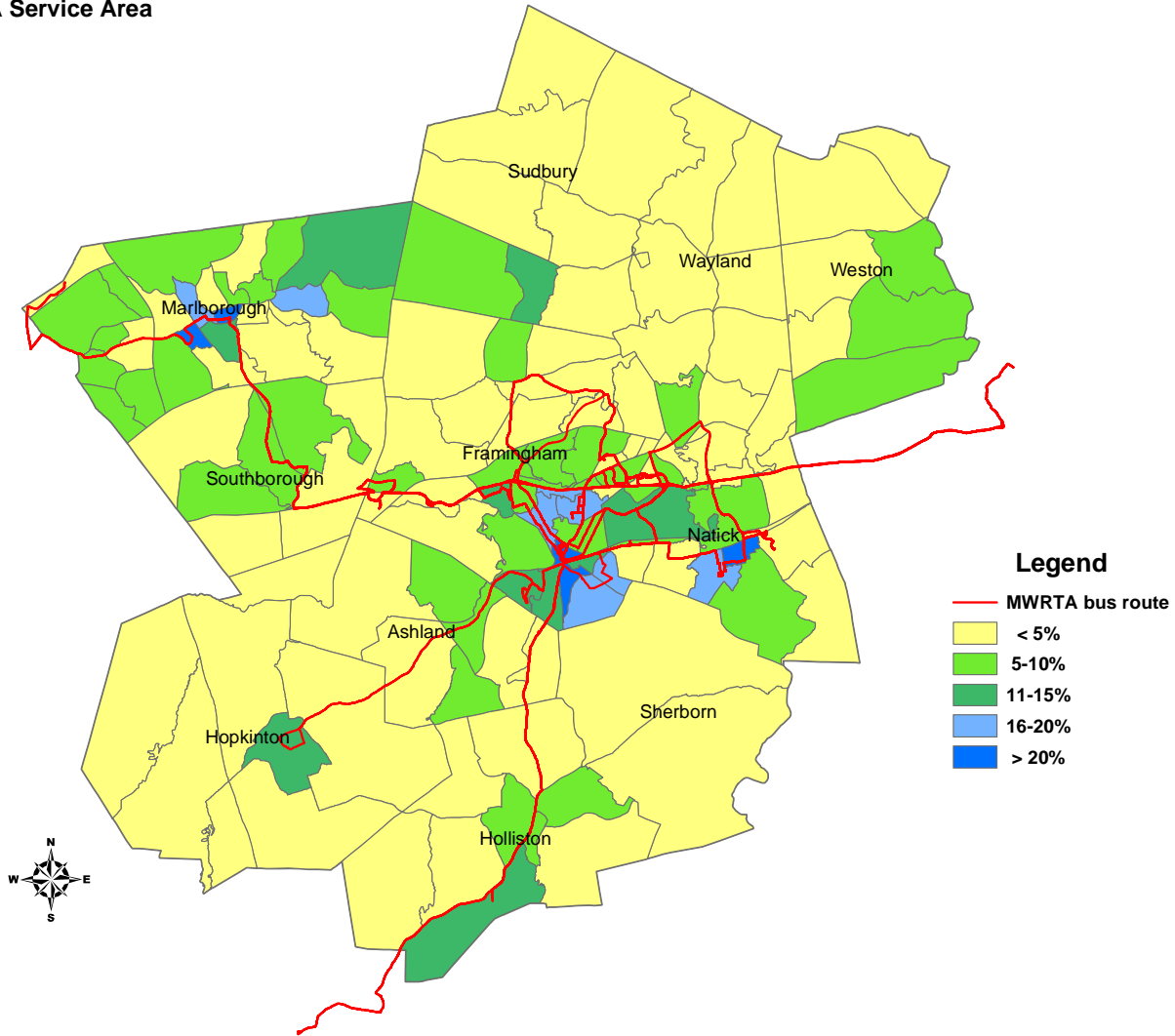


FIGURE 3
Percent Households without a Vehicle, 2010
By CTPS Transportation Analysis Zone
MWRTA Service Area



households with no vehicles. The most significant exception is the eastern section of Marlborough along Route 20.

Work Trips

Work trips represent a significant portion of public transit usage; therefore, it is useful to know where residents are traveling on their daily commutes. It is also useful to know where the most jobs are located in the MWRTA service area.

Residents Working in Boston and Cambridge or in the Service Area

Figure 4 presents the percentage of work trips from the service area to Boston. Commuters traveling to Boston would potentially be interested in new or expanded transit operations to reach either the commuter rail network, private express buses, or the rapid transit lines that serve Boston. It appears that communities in the eastern portion of the service area send more commuters to Boston. The proportion ranges from 14% in Wayland to 18% in Weston, whereas communities such as Marlborough and Hopkinton send 5% and 6%, respectively. Figure 5 shows the proportions of intra-service-area trips. The proportions range from a low of 19% in Weston to 56% in Framingham. Communities with higher proportions of intra-service-area trips would potentially have greater demand for local transit service focused within the service area itself.

Employment Densities and Locations within MetroWest Service Area

The Route 9 corridor in Natick and Framingham has the highest employment density within the service area. Other significant employment is found in Marlborough. The South Street area of Hopkinton (the location of EMC headquarters) and the area of Sudbury near the Raytheon facility along Route 20 are two of the most significant employment areas outside of Framingham, Natick, and Marlborough. Figure 6 shows employment density in the service area.

Summary

Overall, the existing MWRTA fixed-route network does operate in areas of the MWRTA district where demographic characteristics suggest the greatest potential for transit ridership. Exceptions include underserved areas of East Marlborough where population density may support increased transit options, other areas in Marlborough that are only served by demand-response services, and employment areas in Hopkinton with no transit access. Some modifications to the existing fixed-route network to serve these areas could be considered and are reviewed in this memo.

Demographic characteristics do not appear to be well suited for fixed-route transit service in Sherborn, Weston, Wayland, or Sudbury. However, more than 10% of the population in all four of these communities is over 65 in age, suggesting at least some need for demand-response service to provide basic mobility for those unable to drive.

FIGURE 4
Work Trips to Boston as a Proportion of Total Home-Based Work Trips, 2010
By Municipality
MWRTA Service Area

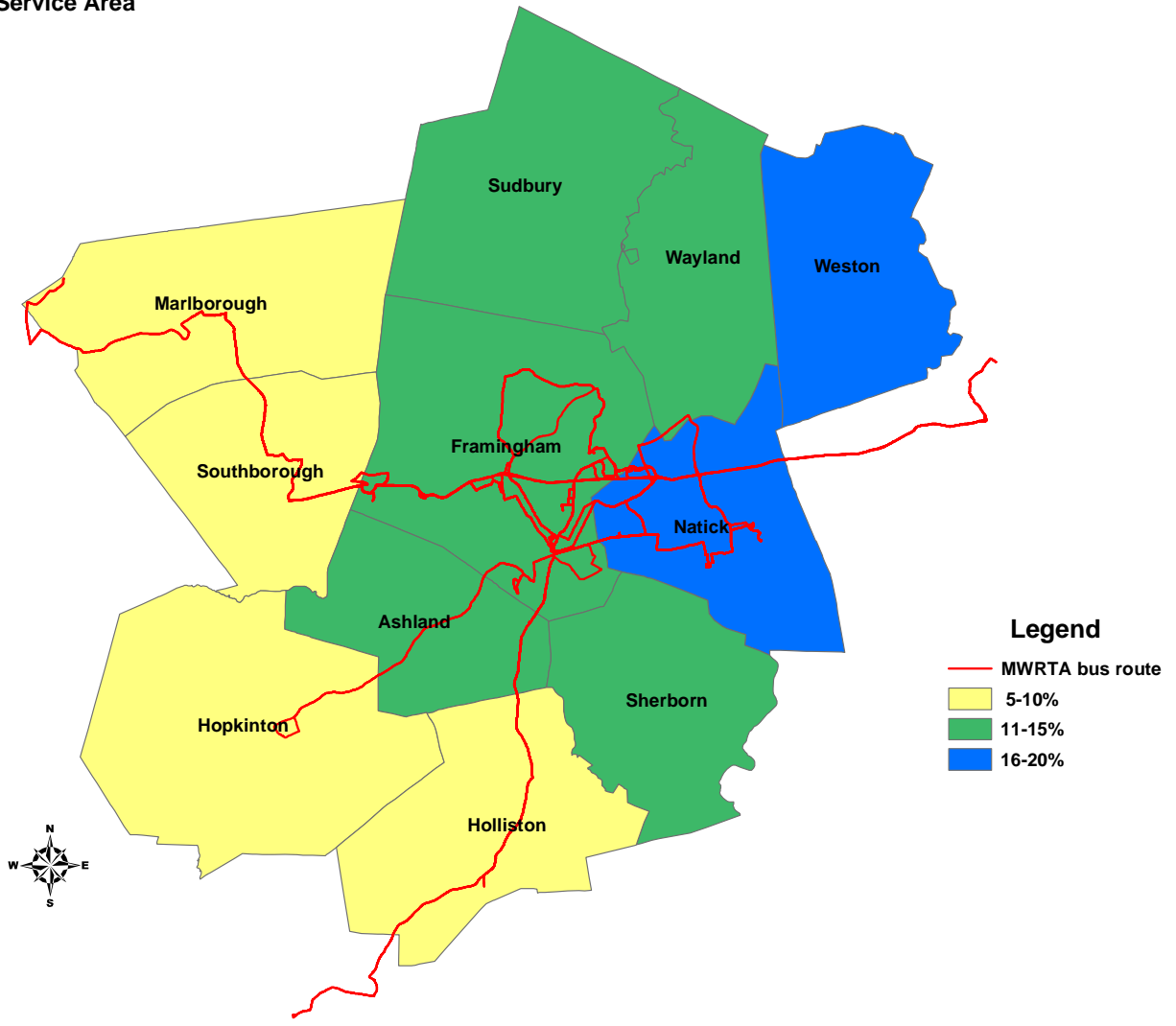


FIGURE 5
Intra-Service-Area Work Trips as a Proportion of Total Home-Based Work Trips, 2010
By Municipality
MWRTA Service Area

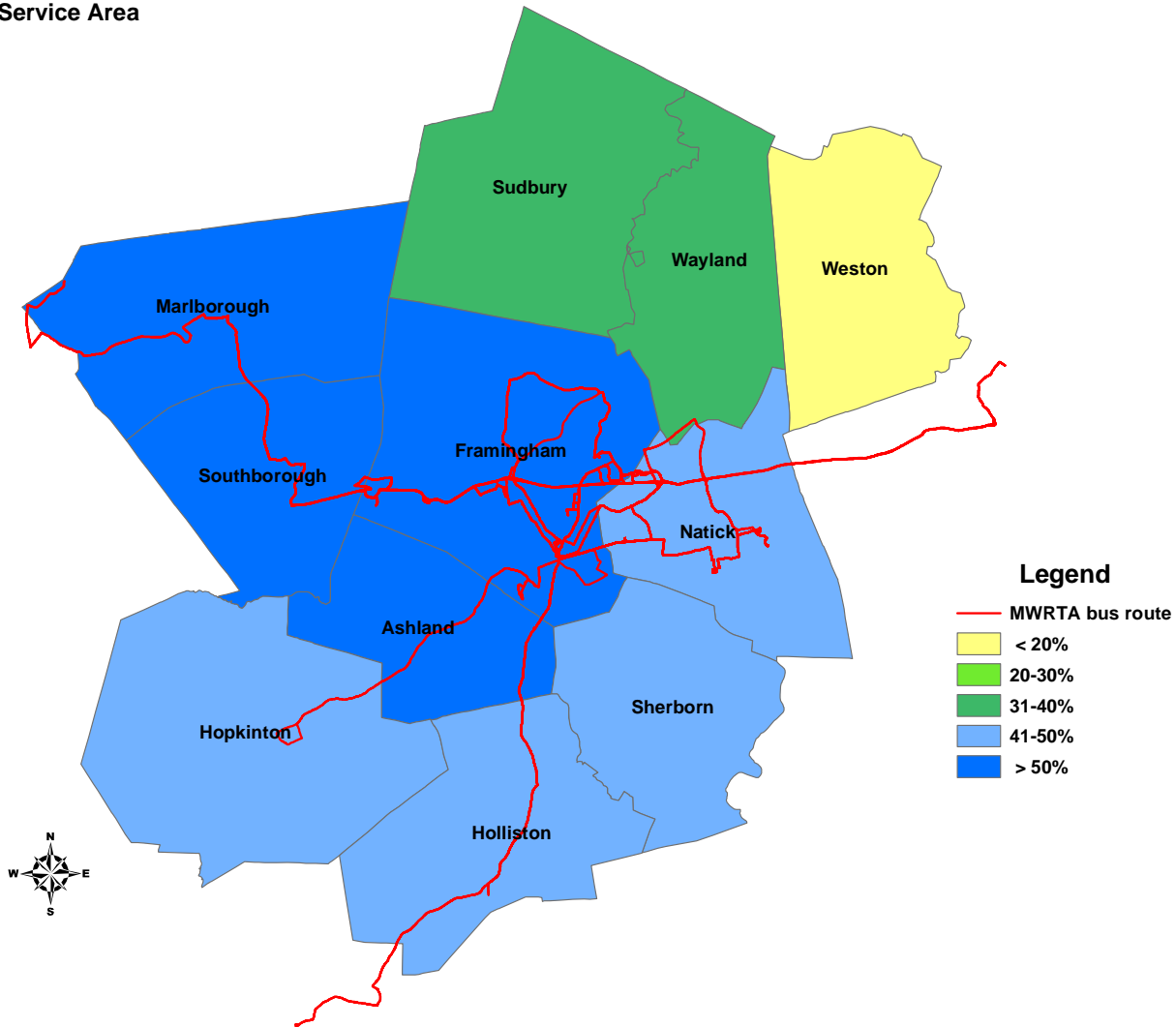
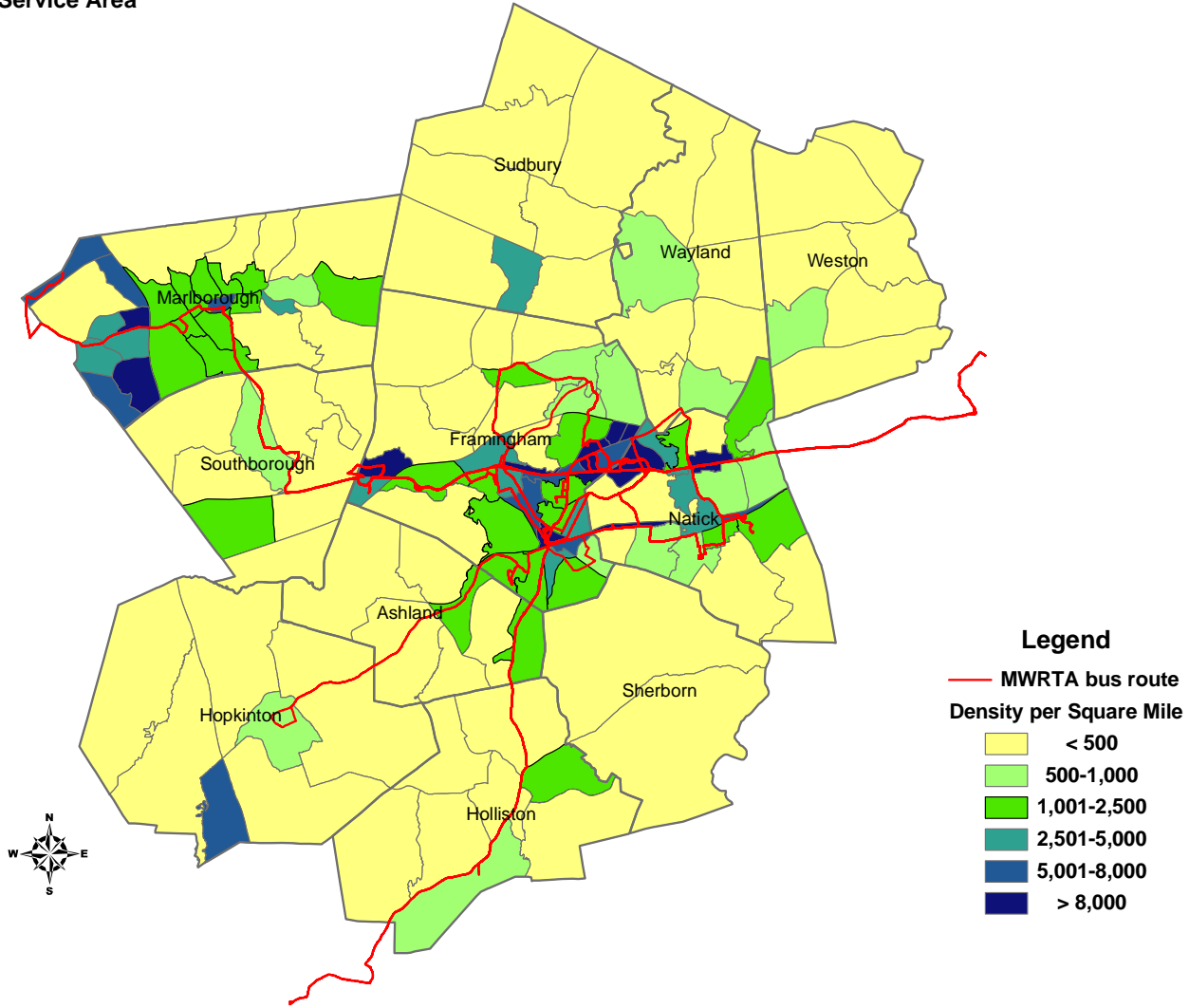


FIGURE 6
Employment Density, 2010
By CTPS Transportation Analysis Zone
MWRTA Service Area



4 RECOMMENDATIONS FROM PAST STUDIES

Several studies conducted by the Boston Region MPO as well as other entities have included a review of transit service, needs, or concerns in portions of the MWRTA service area. These studies' findings and recommendations related to those subjects are summarized below. They include comments about, and suggestions for changes to, MetroWest bus service. In addition, if any changes have been made since the referenced report to a service assessed in the report, those changes are described.

I-495 Transit Study, CTPS, October 2007

Transit Service Recommendation

(Note: The only MWRTA communities included in the study were Marlborough, Southborough, Hopkinton, and Holliston.) A new fixed-route transit service from Westborough to the Southborough commuter rail station was recommended.

As Westborough is not part of the MWRTA, the possibility of such a service was not considered in the present study.

Suburban Mobility, Phase II, CTPS, December 2005

Transit Service Findings

Census tracts located in Framingham and Marlborough that showed potential for supporting future transit service, based on socioeconomic data, were identified.

The possibility of an expansion of service between Framingham and Marlborough is discussed in the present memorandum.

Marlborough Public Transportation Marketing, Planners Collaborative, August 2005

Transit Service Findings

The kinds of travel for which Marlborough residents would be most likely to use transit are:

- Commuting to Boston.
- General travel to Framingham.
- Local travel within Marlborough by both transit-dependents and others.

Transit Service Recommendations

The City of Marlborough could improve service coordination in the following ways:

- Transit Center – Upgrade the existing bus stop on Bolton Street at Route 20 into a transit center to facilitate coordination of local demand-responsive, fixed-route, and commuter services.

- Local Service – Establish a brokerage for local services in coordination with surrounding communities.
- LIFT – Explore options for revising the current pulse system, with the goal of providing more frequent fixed-route service.
- Commuter Bus – Work with the MBTA to improve schedule and fare coordination for service from Marlborough Center to the Boston CBD.

Service Changes Since Study

- The Local Connection, a demand-response service in Marlborough and Southborough, began in 2005, with CMAQ funding provided by the Boston Region MPO. WRTA oversaw the service from its inception to 2008. MWRTA is now responsible for the service.
- The Cavalier Coach commuter bus service from Marlborough to Boston is no longer funded by the state.
- Gulbankian Bus Lines service from Marlborough and Southborough to Boston was taken over by Cavalier Coach and is no longer funded by the state.
- Full midday service was restored on MWRTA Route 7.

Worcester Comprehensive Service Design, Urbitran, May 2005

Transit Service Recommendations

The study:

- Suggested expansion of service from Worcester to Solomon Pond Mall as part of a long-term vision, without any estimated date for implementation.
- Noted that Marlborough has census tracts with relatively high population densities.
- Identified the following concentrations of employment within Marlborough, Hopkinton, and Southborough:
 - EMC Corporation in Hopkinton has 5,500 employees.
 - Verizon Communications on Locke Drive in Marlborough has 723 employees.
 - UMass Memorial–Marlborough Hospital on Union Street in Marlborough has 568 employees.
 - The New England Center for Children on Turnpike Road in Southborough has 550 employees.

Service Changes Since Study

The Local Connection in Marlborough and Southborough began in 2005, with CMAQ funding provided by the Boston Region MPO. WRTA oversaw the service from its inception to 2008. MWRTA is now responsible for the service.

The possibility of additional service in Hopkinton and Marlborough is discussed in the present memorandum. The potential for a direct service from Marlborough to Worcester

is not reviewed, as Worcester, Shrewsbury, and Northborough are not in the MWRTA service area.

Town of Framingham Community Development Plan 2004, Executive Order 418

Transit Service Recommendations

- The plan recommended an exploration of options for rerouting LIFT service to provide better access to additional job sites on Route 9 and increasing service hours to provide better access to jobs on existing LIFT routes.
- The plan also called for the support of reverse-commute efforts in order to provide better access to jobs in downtown Ashland.

Service Changes Since Study

LIFT 9 service was introduced along Route 9 in August 2006. MWRTA Route 1 service, linking Route 9 to the MBTA's Green Line in Newton, was introduced in March 2009; the Boston Region MPO's Suburban Mobility Program provided the funding.

Suburban Transit Opportunities Study, CTPS, January 2004

Transit Service Findings

The study included a survey of LIFT riders; the results included the following:

- LIFT Routes 2 and 3: Very few riders transferred to or from commuter rail. Over 50% of riders on the two routes were traveling to or from work.
- LIFT 5 (Hopkinton service): No passengers were transferring to or from commuter rail. Passengers traveling to or from work made up 50% of all ridership.
- LIFT 6: The survey was conducted at a time when the routing was altered from its present routing; thus the results of the survey might not reflect present ridership patterns.
- LIFT 7 (Marlborough): This route had more transfers to or from commuter rail than any other LIFT route.

Transit Service Recommendations

A review of what was then Natick Neighborhood Bus service produced the following comments and suggestions:

- Seek to maximize ridership by including segments of the population other than the transit-dependent.
- Avoid inadvertently "branding" the service (for the elderly or for the economically disadvantaged, for example).
- Utilize "shared town resources" (for example, the service may be able to share town maintenance lots).
- Ensure that buses are on time.
- Utilize the smallest vehicle possible.
- To produce revenue, seek contributions and offer advertising on the bus.

- Have a consistent, electronic means of storing and retrieving data.

Feasibility of a Regional Transit Authority, Multisystems for EOTC, February 2003

Transit Service Recommendations

Needs and concerns in individual communities were identified by Multisystems, with input from each community. Multisystems identified the following needs and concerns:

Ashland

- Service to/from commuter rail stations.
- Service for seniors.
- Service to nearby major employers, such as TJX.
- Service for employees during the day.

Framingham

- Service to/from railroad stations.
- Connections between downtown Natick and downtown Framingham along Route 135.
- Service along Route 9.
- Framingham shopping shuttle.
- More frequent service.
- More direct service to 9/90 and Framingham Technology Park.
- Saturday Route 7 service.
- Service to Framingham State College.
- Maintenance of existing midday service.

Hopkinton

- Service to/from commuter rail stations.
- Service to Senior Center.
- Shopping, health care, employment, and recreation trips along I-495 and highway Route 9.
- Service to hospitals in Milford, Framingham, and Marlborough.
- Service to major employers such as EMC.
- Service from Southborough Station to South Street Industrial Park (EMC).

Marlborough

- Service to/from commuter rail stations.
- Service to employers in the I-495 corridor.
- Service to relieve congestion.
- Work trip options for teenagers.
- Increased level of service and access to Worcester for seniors.

Natick

- Service to provide an alternative necessitated by inadequate parking at the Natick Center and West Natick commuter rail stations.

- New connections to Marlborough or the I-495 corridor.
- Service to employers: Apple Hill, TJX, Staples, Boston Scientific, 9/90.

Southborough

- Service to relieve congestion.
- Service for reverse-commuters (EMC).
- Service for seniors.

Wayland, Weston, Sudbury, and Sherborn were not analyzed in this study.

Specific route changes recommended in the study were as follows:

- Routes 2 and 3: Include service to Logan Express Transportation Center, relocate terminus to Framingham Station, and expand span of service to 8:00 p.m.
- Route 5: Maintain basic configuration but move terminus to Framingham Station; introduce Saturday service.
- Route 6: Maintain basic configuration but move terminus to Framingham Station; introduce Saturday service.
- Route 7: Extend service to Natick Center; introduce Saturday service.
- Routes 10 and 11: Operate the routes not as a loop, but as two separate services from Natick Center to Flutie Pass. One route would operate via South Natick and West Natick via Pond Street, Mill Street, and Hartford Street. The other would operate between the MetroWest Medical Center and Flutie Pass via Natick Center, North Main Street, and Route 9. A third route would replace the Natick commuter service and operate as an East Natick loop via North Main Street, Pine Street, Oak Street, and Bacon Street.
- New service: Provide direct service from Framingham to 9/90.
- New service: Provide local Marlborough loop service.

Service Changes Since Study

- The Natick Neighborhood Bus was restructured in 2003, and service was reduced to East Natick and South Natick.
- The Central Hub was established in 2008, and Natick Routes 10 and 11 were extended to connect with Framingham routes. A direct connection in South Framingham between the Natick routes and the remainder of the MWRTA network was not envisioned in the 2003 study. The 2003 study recommended extending Route 7 (Solomon Pond Mall–Framingham) to Natick Center in order to establish a bus connection between South Framingham and Natick.
- The routing for Route 7 within Framingham was changed in 2006 to operate via Salem End Road and Franklin Street in place of a portion of Route 9 and Union Street.
- Route 9 was not in operation at the time of the study. The study also did not anticipate the new Route 1 service from Newton to Flutie Pass.

MBTA Reverse-Commuting Study, CTPS, May 2001

Transit Service Recommendation

The study concluded that the best opportunity for a reverse-commute service in the I-495 area was a service from the Worcester commuter rail line to employment areas in Marlborough.

Service Changes Since Study

The Local Connection in Marlborough and Southborough began in 2005; CMAQ funding was provided by the Boston Region MPO. WRTA oversaw the service from its inception to 2008. MWRTA is now responsible for the service. It provides a connection between Southborough Station and employment areas in Marlborough.

Congestion in the MetroWest Area, CTPS, September 2000

Transit Service Findings and Recommendations

The study identified characteristics of the most successful employer shuttle services:

- Coordination of public transit services and schedules with the privately operated vans and buses.
- Strong institutional and financial support from employers.
- Effective marketing program for shuttle services.
- When the geography is right, frequent commuter rail or express bus service in a congested highway corridor; a seamless, low-cost transfer to a shuttle bus; and a direct route to major employment concentrations within a 20-minute (maximum) bus ride.

The study concluded that ridesharing initiatives, including carpooling, vanpooling, and shuttle connections to nearby rail stations and long-distance-bus stops, offer much better trip-reduction possibilities than do new transit services, for most MetroWest employer locations.

Other suggestions from the study included:

- Shuttles from commuter rail stations to downtown centers, office parks, and colleges.
- Shuttles from middle and high schools to jobs for teens and school activities (for example, sometimes fields for after-school sports are not at the school).
- Service to hospitals, nursing homes, low-income housing, apartment complexes, libraries, shopping centers, parks, town offices, and park-and-ride lots.
- Service to/from Riverside, Alewife, and Forest Hills Stations.
- Reverse-commute service from Franklin and Southborough commuter rail stations.

5 FINDINGS AND RECOMMENDATIONS

This section discusses:

- Existing ridership and travel times based on ridecheck data collected by CTPS staff in 2008.
- Possible changes to existing routes, with an emphasis on no-cost and low-cost changes.
- Possible completely new services, which would increase operating costs.
- The potential to modify fixed routes to operate to or near high schools in the service area.
- The potential to improve coordination with commuter rail service.
- The potential to connect better with private carrier bus service.
- The potential demand for a transfer hub at Flutie Pass.

Existing Ridership and Travel Times

Data from October 2008 Ridecheck

In October 2008, CTPS staff conducted a “ridecheck” of the existing MWRTA fixed-route network. CTPS tabulators rode once on each regularly scheduled MWRTA trip on each of the fixed routes in the network. The results are summarized in Table 2 below. The full results of the ridecheck, by route, including travel times, can be found in the appendix.

Route 7 has the highest total number of daily boardings for an individual route, with 316. If Routes 2 and 3 were counted as one combined service, their combined ridership would be 366.

On weekdays, the entire fixed-route network carries 9.3 passengers per revenue vehicle hour of service. Routes 2, 3, and 7 are the best-performing routes, with Route 3 carrying just over 15 passengers per hour and Routes 2 and 3 just over 10. Route 10 and Route 12 (also known as the Natick Commuter Bus) are just under the 10-passengers-per-hour threshold, with 9. Routes 4, 5, 6, and 11 all carry between 5 and 8 passengers per hour. The worst-performing route in the existing network is Route 9, which carries fewer than 4 passengers per hour.

Saturday service, while much more limited in coverage and span of service than weekday service, is well utilized, with the average number of passengers per revenue hour being 14.2.

Comparison of Existing Ridership to Other Massachusetts RTAs

When compared to the fixed-route services of the 11 other regional transit authorities serving urbanized areas in the Commonwealth, the MWRTA network’s number of passengers carried per revenue vehicle hour was the same as or higher than that of three other agencies: the Montachusett Area Regional Transit Authority (MART), Greater Attleboro Taunton Regional Transit Authority (GATRA), and Cape Cod Regional

TABLE 2
Total Ridership by Route, Typical Day (October 2008 Counts)

Route	Daily Passengers	Number of Round-Trips	Scheduled Hours of Service	Passengers	
				Per Round-Trip	Per Hour
Route 2--Framingham Circuit (clockwise)	160	13	13.00	12.3	12.3
Route 3--Framingham Circuit (counterclockwise)	206	13	13.25	15.8	15.5
Route 4--Market Basket/Beaver Park/Natick Collection	72	10	9.00	7.2	8.0
Route 5--Outbound to Ashland/Hopkinton	49				
Route 5--Inbound from Ashland/Hopkinton	57	11	13.60	9.6	7.8
Route 6--Outbound to Holliston/Milford	41				
Route 6--Inbound from Holliston/Milford	51	13	17.75	7.1	5.2
Route 7--Outbound to Southborough/Marlborough	183				
Route 7--Inbound from Southborough/Marlborough	153	14	26.82	24.0	12.5
Route 9—Eastbound	27				
Route 9—Westbound	31	10	15.83	5.8	3.7
Route 10—Natick	117	13	13.00	9.0	9.0
Route 11--Natick midday	43	6	6.00	7.2	7.2
Route 12--Natick Commuter Bus--from station AM	40				
Route 12--Natick Commuter Bus--to station AM	3	3			
Route 12--Natick Commuter Bus--to station PM	24				
Route 12--Natick Commuter Bus--from station PM	2	3	7.50	11.5	9.2
Staples PM extra trip	12	1	1.00	12.0	12.0
Weekday Total	1,271	110	136.75	11.6	9.3
Saturday					
Route 2	106	8	8.00	13.3	13.3
Route 3	161	8	8.00	20.1	20.1
Route 10	74	8	8.00	9.3	9.3
Saturday Total	341	24	24.00	14.2	14.2

Transit Authority (CCRTA); see Table 3. Its total number of weekday fixed-route passengers carried was greater than that of one agency, the Cape Ann Transportation Authority (CATA). Thus, while MWRTA is at the lower end of the ridership spectrum when compared to other RTAs serving urbanized areas in the Commonwealth, it has

neither the lowest ridership nor the lowest number of riders when measured on a per-hour basis.

TABLE 3
Comparison to Other Massachusetts RTAs' Fixed-Route Services in Urbanized Areas

Area--Agency	Average Passenger Trips			Weekday Revenue Hours	Weekday Riders per Revenue Hour
	Weekday	Saturday	Sunday		
Cape Cod--CCRTA ¹	1,511	550	315	275	5.5
Taunton--GATRA	2,515	1,518	0	285	8.8
Fitchburg--MART	2,279	1,207	0	244	9.3
MWRTA*	1,271	341	0	137	9.3
Pittsfield--BRTA	1,706	1,073	0	149	11.4
Cape Ann--CATA	867	505	529	70	12.4
New Bedford/Fall River--SRTA	5,811	2,401	0	345	16.8
Lowell--LRTA	4,975	925	0	287	17.3
Lawrence/Haverhill--MVRTA	7,327	3,504	0	396	18.5
Brockton--BAT	9,590	4,141	1,111	425	22.6
Worcester--WRTA	10,841	4,431	1,510	478	22.7
Springfield--PVRTA	35,626	16,665	5,325	1,114	32.0

*MWRTA ridership figures are generated from CTPS manual counts, while those of the other RTAs are from 2007 FTA National Transit Database for Mode: Motor Bus.

Possible Changes to Existing Route Network

Based on data collected and observations of service, the following conclusions were reached concerning possible changes in service that would not increase the net cost of operating the system or would introduce relatively low new costs: Please note that additional review of proposals specifically serving schools, coordinating with private bus service, and coordinating with commuter rail are included in subsequent subsections of this report.

Routes 2 and 3

- *Improving on-time performance*

Data collected during the CTPS counts suggests that Routes 2 and 3 routinely have trouble maintaining existing schedules due to heavy traffic, especially in the afternoon. On the days observed, a total of 3 trips out of 26 scheduled for both routes combined were not operated in order that late-running buses could get

¹ CCRTA--Cape Cod Regional Transit Authority, GATRA--Greater Attleboro Taunton Regional Transit Authority, MART--Montachusett Regional Transit Authority, BRTA--Berkshire Regional Transit Authority, CATA--Cape Ann Transportation Authority, SRTA--Southeastern Regional Transit Authority, LRTA--Lowell Regional Transit Authority, MVRTA--Merrimack Valley Regional Transit Authority, BAT--Brockton Area Transit, WRTA--Worcester Regional Transit Authority, PVRTA--Pioneer Valley Regional Transit Authority

back on schedule for later trips. The MWRTA has modified some trips to bypass some segments during the most congested hours. It appears, though, that this has still not provided enough time to maintain schedules, and schedule reliability can be poor, especially between 12:00 p.m. and 5:00 p.m.

The best method to improve reliability without increasing costs would be to decrease schedule frequencies (headways) from a bus every 60 minutes to a bus every 75 to 80 minutes. This would provide more travel time as well as some recovery time at the Central Hub. While clock-face departure times are usually desirable in public transit to simplify route-to-route transfers and make the schedule easier to remember for the riding public, maintaining on-time performance should still be a priority, even if it requires the deployment of schedules that are not at even, 60-minute intervals. New resource-neutral schedules based on more realistic travel times would give the impression that service is being reduced, although in fact such schedules may actually be a more realistic reflection of the level of service already provided.

Another alternative for solving this problem would be to add another vehicle each to Routes 2 and 3; this would allow service to operate at frequencies shorter than 60 minutes, or to maintain every-60-minutes service and have a very generous allowance for recovery time to accommodate possible delays. Adding vehicles would, however, increase the operating costs by up to 12 hours of service (one additional bus each on Routes 2 and 3 from 12:00 p.m. to 6:00 p.m.).

A partial mitigation for decreasing the frequencies for Routes 2 and 3 to every 75-80 minutes would be to stagger departures between the two routes, so that a bus would leave the Central Hub every 40 minutes on one route or the other. This would be similar to the Saturday pattern already in place, where Route 2 leaves the Central Hub on the half hour and Route 3 leaves on the hour. Presently, on weekdays both routes are scheduled to leave the Central Hub at the same time. Both routes cover the same operating territory, with one route operating in a clockwise direction and the other in a counterclockwise direction. A significant amount of the total ridership on both routes is traveling between downtown Framingham and the commercial area along Route 9. Passengers making this journey can choose either of the routes. Changes to Route 4 (discussed below) could also provide additional trip options between downtown Framingham and Route 9 and could provide a higher frequency of service in the combined corridor, even if the frequencies for each individual route were made longer.

- *Extending evening service*

Until the introduction of Route 1 in March 2009, the last trips from the Route 9 malls to downtown Framingham all occurred well before the closing time for most retail stores on Route 9. This situation has improved, in that the last trip of Route 1 service runs to the Central Hub from the Natick Collection at 7:53 p.m. However, consideration could be given to also providing later service on Route 2

or 3. Any later operation of either of those routes would add one hour of service for each additional trip added.

- *Sunday service*

Saturday ridership on Routes 2 and 3 combined is fairly reasonable. There may be enough demand to consider limited Sunday service on at least one of the two routes. This would provide workers with access to their jobs on Sundays and could also attract Sunday shoppers.

Route 4

Route 4, if restructured, could provide additional service between downtown Framingham and the shopping areas along Route 9, supplementing Routes 2 and 3, but the present route arrangement makes Route 4 unattractive. Service to the Central Hub is only provided in the southbound direction, requiring any passengers boarding at the Central Hub bound for Route 9 to travel through Beaver Park and Ashland. Conversely, downtown Framingham is only served in the northbound direction, so any passengers desiring direct service back to the Concord and Howard Streets area from Route 9 must either walk a considerable distance, transfer to another bus at the Central Hub, or travel the entire distance of the Beaver Park and Ashland segments of Route 4 to reach Concord and Howard as the bus returns north. If Route 4 were modified to serve both downtown Framingham and the Central Hub in both directions, this would make it a more attractive supplemental service to Routes 2 and 3 between downtown Framingham and Route 9. It would also simplify service for passengers boarding or alighting in the Beaver Park segment, as round-trips, either to Ashland in one direction or to Route 9 in the other direction, would be more direct.

Route 5

- *Service to South Street/EMC*

There have been requests to the MWRTA to extend service to the large EMC facility on South Street. Under a constrained-resources scenario, such an extension would require operating frequencies on Route 5 of greater than 60 minutes. Operating one new a.m. trip from Framingham to South Street and a return p.m. trip would provide minimal mobility options for reaching this employment area, while having the least impact on service frequencies along the existing route.

- *Service to Ashland Station*

A request to the MWRTA was also made by members of its advisory board to consider altering service along Route 5 to directly serve the Ashland commuter rail station. While the route does presently connect with commuter rail in Framingham, it would require a considerable change in the routing to provide

service to Ashland Station. There are presently 13 inbound trains per day operating through Ashland Station, while there are 21 trains operating from Framingham Station. Given the larger number of potential trains to connect with at Framingham, it would seem reasonable to maintain Framingham Station as the connecting point to commuter rail for Route 5.

- *Demand-response service during the midday*

The existing midday ridership on Route 5 is very low. Therefore, consideration could be given to providing midday service through a demand-response operation instead of as a fixed-route service.

Route 6

- *Off-peak service to Milford*

The remaining service to Milford is well utilized; full loads were observed on some morning trips. The midday service, which only operates as far as Mission Springs in Holliston, has very low ridership. Given the peak period pattern, it is reasonable to expect that off-peak service to Milford could be justified, if the community were to join MWRTA.

- *Demand-response service during the midday*

As noted above, the existing midday ridership on Route 6 is very low. Therefore, if the extension of midday service to Milford suggested above is not implemented, consideration could be given to providing midday service through a demand-response operation instead of as a fixed-route service.

Route 7

- *Increasing frequency of service*

Route 7 has the heaviest ridership of all the routes in the MWRTA network, or the second-heaviest if Routes 2 and 3 are considered as one combined corridor. Several trips were observed with standing loads. Consideration should be given to either adding another vehicle to the route in peak times or introducing a second route to Marlborough, which could overlap and be coordinated with Route 7 between downtown Marlborough and Framingham, which is the busiest segment.

- *Saturday service*

Saturday service, in off-peak as well as peak periods, should be considered, given the weekday demand. Saturday ridership observed on Routes 2 and 3 combined is presently 73% of the weekday ridership. If that ratio is applied to Route 7 weekday ridership, the resulting estimate of Saturday ridership on Route 7 is 245 per day.

Route 9

- *Combining with new Route 1 service in rush hours*

Route 9 is poorly utilized overall, but it does carry some commuter traffic to the Framingham Staples location. Combining Route 9 peak service with the new Route 1 could accommodate these existing riders while also allowing for a new through service from the MBTA's Green Line to employment locations along highway Route 9.

Update

Since ridership data was collected in October 2008, new Route 1 service has been put into operation weekdays, and Route 9 peak period and evening service has been merged into the new Route 1. The MWRTA received funding from the Boston Region MPO's Suburban Mobility Program to initiate the new service between Framingham and the MBTA's Green Line at Woodland Station. The original proposal was for this service to operate between Flutie Pass and Woodland, with some stops made along the way. During the Suburban Mobility Program's process for selecting funding recipients, the MPO suggested that the new service be operated farther along highway Route 9 to serve employers at the western end of Framingham; this suggestion was implemented.

Route 1 service began on March 12, 2009. The existing peak period service on bus Route 9 was combined into the new Route 1 service. In addition, as all buses on Route 1 must leave from the maintenance facility at the Central Hub, these trips operate in-service from the Central Hub to downtown Framingham, to Flutie Pass, before continuing along highway Route 9 to Newton and the Green Line. This provides an additional connection between Framingham and the Green Line beyond the original proposal at a low added cost. Evening buses returning to the maintenance facility reverse this pattern.

In more detail, the operating pattern for Route 1 is as follows:

Five trips leave the Central Hub between 5:45 a.m. and 7:25 a.m. and proceed to Woodland Station on the Green Line via downtown Framingham, Flutie Pass, and highway Route 9. After a layover at Woodland, the buses operate outbound back to Flutie Pass, and then continue along bus Route 9 through to the western section of highway Route 9 in Framingham, Staples being the last stop.

The evening service operates in the reverse of this pattern, with buses traveling from the Central Hub or Staples, to Flutie Pass, to Woodland, and returning from Woodland, to Flutie Pass, to downtown Framingham, and then to the Central Hub.

Route 9 service continues to operate as a separate service in the midday on weekdays, during hours when Route 1 does not operate.

- *Operating last trip in service to downtown Framingham*

Consideration should be given to letting the last trip on Route 9 from the Natick Mall continue in service back to downtown Framingham and the Central Hub. As the bus must return to this location for storage, there would be no added cost to do this.

Update

Since ridership data was collected in October 2008, new Route 1 service has been put into operation and Route 9 peak period and evening service has been merged into the new Route 1. The last westbound trip of Route 1 does continue to downtown Framingham and the Central Hub.

Route 10, Route 11, and Route 12 (Natick Commuter Bus)
(These are the former Natick Neighborhood Bus services.)

- *Route 10*

Route 10 is the best-utilized of the Natick services. Service was reconfigured in 2003, when it was a Natick Neighborhood Bus route, and was modified again in 2007 to accommodate the extension to the Central Hub. The extension to Framingham has already generated a reasonable amount of activity. There does not appear to be an immediate need to make further changes to Route 10.

- *Route 11 and possible East Natick service*

Route 11 has low ridership, especially compared to the other Natick services, and does not operate during peak service hours. It does, however, provide a more direct westward link from Natick Center to the Central Hub than Route 10, as Route 10 travels to the Natick Collection first before proceeding to the Central Hub. Changes are not called for at this time based solely on the performance of Route 11; however, Route 11 could be modified to provide additional service to East Natick if there is a strong community desire to operate transit service to that area.

There have been requests that additional service be operated to East Natick, restoring some coverage that was lost with the modification of the Natick Neighborhood Bus route network in 2003. Route 12 (Natick Commuter Bus) does provide some level of peak service to East Natick, but it is poorly utilized as a neighborhood feeder.

Route 11 could be rerouted via North Avenue, Marion Street, Bacon Street, and Oak Street to provide coverage to East Natick. This would require the frequency of service to be longer than every 60 minutes, to compensate for the longer travel time necessary to cover East Natick.

Summary of Potential Improvements to Existing Route Network

- A review of existing conditions shows that two key routes in Framingham, Routes 2 and 3, need schedules that take existing traffic conditions into account more realistically. Changing the travel times for these two routes should improve their on-time performance substantially and their overall reliability moderately.
- A third route operating primarily within Framingham, Route 4, could be slightly restructured to make it a more attractive additional option than its present configuration for travel between downtown Framingham and the Route 9 employment and shopping areas.
- Route 7 between Framingham and Marlborough is one of the particularly well-utilized routes and would be a candidate for new weekend service.

Potential Introduction of New Fixed Routes

Any expansion of the fixed-route network beyond the items identified above could substantially increase the net cost of operating the system. However, given that during the course of this study interest was expressed in potential new services, a brief review by community of expansion suggestions, if any, is provided below. Along with service concepts, some of the circumstances in each community that are relevant to the potential or lack thereof for new service are presented.

Ashland

Portions of existing Routes 4, 5, and 6 presently serve Ashland. Routes 4 and 6 provide service along Route 126, with the greatest activity being found at the Market Basket supermarket. Route 5 provides service along Route 135. Suggestions have been made to provide direct service to the Ashland commuter rail station. Serving Ashland Station without reducing the existing level of service along Route 5 would require operating an additional vehicle. There are more commuter rail trains presently serving Framingham Station than Ashland, providing more trip choices to commuters if connections are made at Framingham Station.

Framingham

Framingham has the most extensive coverage of all communities in the MWRTA district, with service from Routes 1, 2, 3, 4, 5, 6, 7, 9, 10, and 11. Given this extensive coverage, the provision of service to any new locations should be accomplished through modifications to the existing network.

Peter Pan Bus Lines presently provides commuter express bus service from Flutie Pass to downtown Boston. Cavalier Coach provides service from the Exit 12 park-and-ride lot in Framingham to downtown Boston as part of a route operating from Marlborough to Boston via Southborough and Framingham. State subsidies for these services were discontinued in November 2008. Both carriers have considered reducing or eliminating service in response to the end of operating subsidies. The MWRTA could consider providing new operating subsidies to these carriers in the future if it appears the carriers

are not able to cover costs solely from fare revenues. Although commuter rail provides service from Framingham to Boston, the private carriers provide direct service from areas of Framingham that are some distance from the train station.

Holliston

Holliston is served by Route 6. The MWRTA has recently changed midday service to operate to Mission Springs. There does not appear to be an immediate need to expand service.

Hopkinton

Hopkinton is served by Route 5. There have been requests to provide some service to the EMC campus on South Street. Based on a limited-resources scenario, the most cost-effective way to provide service would be to extend the existing Route 5. This would, however, require a reduction in the frequency of service to accommodate the longer travel time to South Street. Providing more extensive coverage to South Street without having a negative impact on existing Route 5 service would require adding a vehicle.

Marlborough

- *Service to East Marlborough*

Marlborough is served by Route 7. The portion of the highway Route 20 corridor to the east of downtown Marlborough has a density of population that potentially could support some local fixed-route transit. As noted in the review of existing routes, there are crowded conditions on existing Route 7 peak trips. Operating a new route which is identical to Route 7 between Framingham and downtown Marlborough but which then continues to East Marlborough along highway Route 20 could reduce crowding on the existing Route 7 as well as provide service to a new area.

This potential new route could also be structured to provide service to the UMass Memorial Hospital. Although serving the medical center would not be part of a direct route to East Marlborough, the route could detour from a more direct route along Main Street by operating (outbound) via Main Street, Mechanic Street, Hudson Street, UMass, Union Street, and Bolton Street, and then along East Main Street to a terminal in East Marlborough.

- *Converting existing demand-response trips to fixed-route*

In 2003, a TMA-sponsored fixed-route service operated between Marlborough and Southborough, and it had very few riders. Demand-response service has, however, been provided to employment areas of Marlborough since The Local Connection (TLC) service began in 2005. The MWRTA is now responsible for this service and reports that currently there are approximately 14 passengers per day traveling from Southborough Station to employment areas in Marlborough.

Since there is only a limited amount of “reverse-peak” commuter rail service operated to Southborough Station, only a small amount of new fixed-route bus service would be required to replace the existing peak period demand-response service connecting with commuter rail trains.

- *Combining potential new East Marlborough service with potential fixed-route replacement service*

There may be some potential for achieving additional efficiencies by combining a new fixed-route service from Southborough Station to the Marlborough employment areas with a new, second fixed-route service operating from Framingham to East Marlborough, to supplement Route 7.

Under such a combination, a bus could leave the Central Hub and provide an extra trip in the morning along Route 7 as far as Southborough. The bus, however, could continue along highway Routes 9 and 85 to Southborough Station to wait for the 7:23 train from Worcester and 7:42 train from Boston. From the station, the bus would serve, on a request-stop basis, the employment locations that currently are served by demand-response service. On completing this segment, the bus could continue to downtown Marlborough and East Marlborough, and then operate back and forth from East Marlborough to Framingham for multiple trips along a corridor shared with Route 7. A return trip in the afternoon would, diverting from the normal pattern, operate from East Marlborough to the I-495 employment area and pick up passengers to bring them to Southborough Station for the 4:53 p.m. train to Worcester and the 4:56 p.m. train to Boston. After serving the train station, the bus could continue in service to the Central Hub, providing an additional trip along the Route 7 route in the segment from Staples to downtown Framingham.

Natick

Routes 10, 11, and 12 (the Natick Commuter Bus) provide service to large areas of Natick. Routes 2, 3, 4, and 9 also serve the Natick Collection mall.

There have been requests for service to East Natick. The most cost-effective method of providing this would be expanding Route 11. Route 11 presently replicates Route 10, operating counterclockwise around the same loop Route 10 travels in a clockwise pattern. Altering Route 11 to serve East Natick would increase the travel time for the loop and could result in some stops’ not being served by Route 11, but the impact on existing riders would be minimal, as Route 10 would still be able to accommodate riders on the loop.

Sherborn

There have been requests for feeder service to commuter rail. Due to the low population density of Sherborn, it would be difficult to develop a fixed-route service that picks up passengers near their homes. A remote feeder service operating from a parking area in

Sherborn to commuter rail has been suggested by the MWRTA as an alternative. The Greater Attleboro Taunton-Regional Transit Authority (GATRA) has operated a commuter rail feeder service from Medway to Norfolk that could serve as a template for such a service. However, according to 2000 census data, Sherborn has a population density of 263 people per square mile, compared to 1,087 in Medway. Given the lower population and population densities, a demand-response subscription service for a commuter rail feeder from Sherborn to West Natick Station may be a more suitable match for potential demand. There would be a later opportunity to convert the service to a fixed-route service if a demand-response service revealed enough demand.

Southborough

Southborough is served by Route 7.

The existing demand-response service provided by the MWRTA is now carrying 14 passengers in each direction between Southborough Station and employment locations in Marlborough. The discussion of Marlborough, above, suggests a possible method for meeting some of this demand with a fixed-route trip.

Sudbury

The low population density of the community suggests that the highest priority should be establishing demand-response service for seniors and the disabled. Providing a demand-response service that is open to the general population, such as the former TLC service in Marlborough/Southborough or the “Ring and Ride” service provided by the Merrimack Valley Regional Transit Authority to several communities in northeastern Massachusetts, would be a next step to consider to expand service. A demand-response operation could also provide connections to the existing MWRTA fixed-route network at Natick Mall and Marlborough. Once such a system is in operation, it would be possible to examine travel patterns to determine if a fixed-route service operating within the town could be justified.

Cavalier Coach presently provides limited commuter bus service along highway Route 20 from Northborough to Boston via Marlborough, Sudbury, Wayland, and Weston. State support for this service has recently been discontinued, but the carrier has chosen to continue service with no operating subsidy. Consideration should be given to the MWRTA’s providing a subsidy to Cavalier Coach and expanding the number of trips provided. Additional operating funding would be required to expand evening service and provide possible midday service.

Wayland

A small amount of fixed-route service is now provided into the Cochichuate section of Wayland by bus Routes 10 and 11 along highway Routes 27 and 30.

The existing Route 12 (Natick Commuter Bus) service could be expanded at minimal cost into Wayland for its first a.m. trip and last p.m. trip. Although potential ridership

would be limited, it would at least provide a minimal service and could be evaluated later to determine if there is demand for expansion.

The low population density of the community suggests that the highest priority should be establishing demand-response service for seniors and the disabled. Providing a demand-response service that is open to the general population, such as the former TLC service in Marlborough/Southborough or the “Ring and Ride” service provided by the Merrimack Valley Regional Transit Authority to several communities in northeastern Massachusetts, would be a next step to consider to expand service. A demand-response operation could also provide connections to the existing MWRTA fixed-route network at Natick Mall or Flutie Pass. Once such a system is in operation, it would be possible to examine travel patterns to determine if a fixed-route service operating within the town could be justified.

Cavalier Coach presently provides limited commuter bus service along Route 20 from Northborough to Boston via Marlborough, Sudbury, Wayland, and Weston. State support for this service has recently been discontinued, but the carrier has chosen to continue service with no operating subsidy. Consideration should be given to the MWRTA’s providing a subsidy to Cavalier Coach and expanding the number of trips provided. Additional operating funding would be required to expand evening service and provide possible midday service. To provide more travel options, some of these additional trips could be routed either via Riverside Station on the Green Line or via Central Square Waltham, where connections could be made to MBTA commuter rail and other MBTA bus routes.

Weston

Cavalier Coach presently provides limited commuter bus service along Route 20 from Northborough to Boston via Marlborough, Sudbury, Wayland, and Weston. State support for this service has recently been discontinued, but the carrier has chosen to continue service with no operating subsidy. Consideration should be given to the MWRTA’s providing a subsidy to Cavalier Coach and expanding the number of trips provided. Additional operating funding would be required to expand evening service and provide possible midday service.

Weston receives demand-response service for qualified passengers through THE RIDE program of the MBTA.

Summary of Potential Introduction of New Fixed Routes

Key findings and recommendations regarding potential introduction of new fixed routes are as follows:

- A review of U.S. Census Bureau projections for 2010 population and employment suggests that parts of Marlborough have the greatest potential to support new fixed-route service.

- Sherborn, Sudbury, Wayland, and Weston could benefit from expanded service; however, because of their lower population and employment densities, introducing new demand-response service would be the appropriate approach.
- The existing MWRTA Route 12 (Natick Commuter Bus) service could be expanded to provide limited commuter bus service to Wayland.
- Cavalier Coach presently operates limited commuter bus service from Northborough to Boston via Marlborough, Sudbury, Wayland, and Weston. Providing a new subsidy to Cavalier Coach through the MWRTA could make possible more peak period trips and an increase in midday service. Some of this service could also be operated via either Riverside Station or downtown Waltham to provide connections to MBTA bus and commuter rail service.
- Cavalier Coach also provides service from Marlborough to Boston via Southborough, while Peter Pan Bus Lines provides express bus service from Flutie Pass in Framingham to Boston. Subsidies to these carriers could ensure continuation of these services, which have recently lost state subsidies.

Possible Route Modifications to Serve High Schools

A suggestion was made during a meeting with the MWRTA Advisory Board to investigate the possible modification of routes to provide service to high schools, particularly service aimed at participants in activities that take place after school, when regular school transportation may be more limited.

Ashland

Ashland High School, at 65 E. Union Street, is not far distant from Route 5 service, but it is arguably beyond a reasonable walk. The route could be modified to serve the school on some trips. A negative effect would be an increase in the travel time and service frequency for existing riders, as would be the case with modification of Route 5 to serve EMC in Hopkinton. If service to the school were implemented on top of service to EMC, even more substantial waits between trips would be necessary in order to accommodate the added travel time.

Framingham and Natick

Framingham High (at 115 A Street), the private Marian High (273 Union), and Natick High (15 West Street) are within walking distance of existing MWRTA routes, although present ridership patterns do not show any sign of notable use by students. Each community presently provides considerable school transportation.

Holliston

The Holliston High School complex at 370 Hollis Street is a considerable distance from Route 6 service on Washington Street. A diversion could be added via Hollis Street and Highland to serve the school. The most likely use of such a diversion would be to provide service from after-school activities, connecting to stops along Washington Street. The trips that would be diverted for that purpose would be afternoon trips. The

afternoon outbound trips on Route 6, however, are operating through to Milford and are some of the most well-utilized trips on the route. A diversion to serve the high school would greatly inconvenience existing commuter riders.

Hopkinton

The present loop of Route 5 could be extended further along Hayden Rowe Street to serve Hopkinton High School at 90 Hayden Rowe Street. Extending the existing 3:00 p.m. or 4:00 p.m. trip could provide transportation for participants in after-school activities. However, extending these trips could conflict with a possible extension to serve EMC on South Street.

Marlborough

The existing Route 7 service operates some distance from Marlborough High School, which is at 31 Bolton Street, and diverting some trips to operate via the school would add a considerable amount of time to the schedule. A new service along Route 20 to East Marlborough would also not be able to serve the high school without making a long diversion from a more direct route.

The Assabet Valley Vocational School, at 215 Fitchburg Street, is also a considerable distance away from the existing Route 7 and would be difficult to provide service to without greatly inconveniencing existing riders.

Southborough

Southborough operates a joint school district with Northborough; the district's Algonquin Regional High is located in Northborough. As Northborough is not in the MWRTA district, there is no possibility of serving the school.

Potential for Increased Coordination with Commuter Rail

The MBTA's Worcester/Framingham commuter rail line has two stations in Natick (Natick and West Natick Stations) and one each in Framingham, Ashland, and Southborough. There are presently 13 inbound and 12 outbound Worcester-Boston trains per weekday stopping at Ashland and Southborough Stations. There are an additional 8 inbound and outbound trains operating between Framingham and Boston. All 21 inbound and 20 outbound trains stop at Framingham Station. A slightly smaller number of trains stop at West Natick, while 18 inbound and 15 outbound trains stop at Natick Station.

Figure 5 in the section on demographic characteristics, above, identifies work trips to Boston as a percentage of total work trips. Of all MWRTA communities, the two in the easternmost sector of the district, Natick and Weston, have the largest percentages of home-based work trips to Boston, each having over 15%. From Ashland, Framingham, Sudbury, Sherborn, and Wayland, 10%–14% are bound for Boston; from Holliston, Hopkinton, Southborough, and Marlborough, 5%–8%.

MBTA commuter rail schedules do not serve stations on regular, even cycles. Trains must be scheduled based on track capacity constraints as well as operating budget constraints. As a result, trains do not operate at exact intervals such as every 30 minutes or every 60 minutes. There can be significant gaps between trains during off-peak hours (such as the hour and 49 minute gap between the 12:20 p.m. inbound-to-Boston train at Framingham Station and the next inbound train at 2:09 p.m.). Consequently, it can be very difficult to precisely match a bus service operating with regular fixed frequencies (such as every 60 minutes, or every 90 minutes) with train arrival times.

Natick Station and West Natick Station

Routes 10 and 11 operate near both Natick Station and West Natick Station; Route 12 (also known as the Natick Commuter Bus) also serves Natick Station. Route 12 is specifically coordinated with commuter rail schedules, and the vast majority of its riders are coming from or going to a train. While it is well utilized by reverse-commuters traveling to employment areas in Natick, few Natick residents travel to the commuter rail station in the morning and return in the evening. Because of the existence of Route 12, there has been less of a need to specifically schedule peak period Route 10 or 11 service to meet train arrival or departure times.

Framingham Station

Routes 2, 3, 4, 5, 6, and 7 travel within walking distance of Framingham Station on their existing routes. If proposed schedule changes for Routes 2, 3, and 4 are implemented, the combined frequency of service between downtown Framingham and the Route 9 malls would improve, resulting in more opportunities for passengers to transfer to or from commuter rail, with less waiting time.

Route 5

All trips on Route 5 inbound are presently scheduled to arrive at Framingham, near the commuter rail station, at 25 past the hour every hour from 6:25 a.m. to 7:25 p.m., while outbound trips pass the train station at 35 past the hour from 5:35 a.m. to 6:35 p.m. In the inbound direction, the first Route 5 trip arrival time, 6:25, is the precise departure time of a train to Boston. The next Boston-bound train is at 6:50 a.m. The 7:25 a.m. and 8:25 a.m. Route 5 arrivals both precede a train departure time to Boston by no more than 15 minutes. After the morning rush hour, the longer times between train departures make it very difficult to coordinate the Route 5 schedule with them. Trips arriving at 5:25 p.m. and 6:25 p.m. both precede inbound train departures by no more than 15 minutes, offering reasonable connections for any reverse-commuters returning toward Boston; they also provide reasonable connections to trains traveling towards Worcester.

In the outbound direction for Route 5, the existing 7:35 a.m. departure connects with a 7:30 train arrival from Boston and a 7:15 arrival from Worcester. The 8:35 a.m. trip is within 20 minutes of an 8:16 a.m. arrival from Boston and an 8:19 a.m. arrival from Worcester. These may be the best candidates for individual trips of Route 5 to extend to EMC (service to EMC is also discussed above in Possible Changes to Existing Route

Network and in Potential Introduction of New Fixed Routes). In the evening peak, the 5:35 p.m. and 6:35 p.m. Route 5 buses both depart no more than 15 minutes after a train arrival from Boston.

Route 6

All of the peak period Route 6 trips make a slight diversion to directly serve the commuter rail station; otherwise, a walk of about 2 blocks would be required in order to make a connection. Route 6 service from Milford arrives at Framingham Station at 6:20 a.m. and 7:20 a.m., meeting 6:25 a.m. and 7:40 a.m. train departures for Boston. Evening trips to Milford leave the station at 4:40 p.m., 5:40 p.m., and 7:06 p.m. The 4:40 p.m. bus departure trip misses a train connection from Boston at 4:42 p.m. per the printed schedule for the route, although in actual operating practice, the bus was observed to wait for the train connection. The schedule should be modified to make clear to passengers that the bus actually makes the connection. The 5:40 p.m. Route 6 departure connects with 5:25 p.m. and 5:37 p.m. arrivals from Boston, while the 7:30 p.m. departure connects with a 7:28 p.m. arrival from Boston. Other than the need for a slight adjustment to the 4:40 p.m. trip as referenced above, the existing Route 6 schedule is reasonably well coordinated with peak period commuter rail service.

Route 7

Route 7 outbound service to Marlborough departs from the stop on Concord Street closest to the Framingham commuter rail station at 6:02 a.m. on its first trip, and the remaining trips depart every hour from 6:32 a.m. to 6:32 p.m. Outbound Route 7 trips leave within 15 or 16 minutes of outbound trains arriving at Framingham from Boston at 7:30 a.m., 8:16 a.m., 5:25 p.m., and 6:31 p.m.

Inbound Route 7 trips arrive at the stop closest to Framingham Station every hour from 6:25 a.m. to 7:25 p.m. and then at 7:55 p.m. Inbound trips, if on schedule, arrive no more than 20 minutes before train departures towards Boston occurring at 6:25 a.m. (the next train is at 6:50 if this close connection is missed), 7:40 a.m., 8:40 a.m., 5:40 p.m., 6:43 p.m., and 7:45 p.m. Because of delays due to traffic, the MWRTA has operated an extra direct trip from the Staples Complex in Framingham to Framingham Station to meet the 5:40 p.m. train.

Ashland Station and Southborough Station

Because fewer trains operate beyond Framingham to Worcester, the opportunities for new or expanded interaction with commuter rail at Ashland or Southborough Station are more limited. As discussed earlier in the town-by-town review of potential expansions of fixed-route service, there may be some merit in converting existing demand-response service operating between Southborough Station and Marlborough employment areas into a fixed-route service.

Potential for Connections with Private-Carrier Commuter Bus Service

Private-carrier commuter bus service in the MWRTA service area is limited to one route operated by Peter Pan Bus Lines and two routes operated by Cavalier Coach Trailways; one of the Cavalier routes has recently lost state operating subsidies but continues to operate without subsidy.

Peter Pan

The Peter Pan service operates from the Flutie Pass commuter lot near Shoppers World to downtown Boston. Morning departure times from Framingham are at 6:45, 7:15, and 7:45. Evening arrivals are scheduled for 4:55 and 5:55. Given the limited schedule of the Peter Pan service, the greatest potential for coordination is to have two Route 2 trips in the a.m. peak and two Route 3 trips in the p.m. peak directly operate via Flutie Pass to serve the commuter bus pick-up/drop-off location. This would provide a link from the Nobscott and Saxonville areas to the commuter bus service. For most other parts of the existing MWRTA network, connections with commuter rail would provide a faster method of reaching Boston than a connection with the Peter Pan bus, as passengers from Routes 5, 6, and 7 can transfer to commuter rail in downtown Framingham, whereas they would need to transfer to Route 2, 3, or 4 just to reach Flutie Pass.

The new MWRTA Route 1 service from Woodland Station to Flutie Pass can provide current Peter Pan commuter bus customers with additional trip options, as passengers can utilize Route 1 and the MBTA's Green Line to make journeys between Flutie Pass and Boston. The MWRTA service could be marketed to Peter Pan passengers as a backup option they can use should they miss their regular Peter Pan trip.

Cavalier Coach

Cavalier Coach operates a service from Northborough to Boston via highway Route 20 that makes local stops in Marlborough, Sudbury, Wayland, and Weston. There is a single morning trip to Boston leaving Northborough at 6:45 a.m. and stopping in downtown Marlborough at 6:58 a.m. The return trip from Boston arrives at Marlborough at 6:35 p.m. Cavalier Coach also operates a route from Marlborough to Boston via Southborough and Framingham that makes stops at downtown Marlborough, Southborough Center, and the park-and-ride lot at the MassPike's Exit 12 in Framingham. The bus leaves Marlborough at 6:30 a.m., Southborough at 6:40, and the Framingham park-and-ride lot at 6:52. The return trip from Boston arrives at Framingham at 5:25 p.m., Southborough at 5:40 p.m., and Marlborough at 5:50 p.m. Cavalier Coach has considered eliminating the Marlborough-Boston-via-Southborough service.

The primary opportunity for interaction between Cavalier Coach and the MWRTA would be in Marlborough, where MWRTA Route 7 operates. However, as the Cavalier Coach service continues to Northborough, it already overlaps along highway Route 20 with the MWRTA Route 7 service from downtown Marlborough to the Marlborough/Northborough town line. This limits the potential number of passengers

that might desire a transfer, as passengers already have a one-seat ride on Cavalier Coach from locations along Route 20 west of downtown Marlborough shared with Route 7.

The new Route 1 service from Woodland Station to Framingham serves both the Flutie Pass park-and-ride facility served by Peter Pan and the Exit 12 park-and-ride facility served by Cavalier Coach. Route 1 can be promoted to current express bus riders as an alternative they can use should they either miss their regular express bus trip or need to travel at later hours when the express buses are not operating. Passengers can transfer to/from Route 1 and the Green Line for travel to/from Boston. While this journey would have a much longer travel time and might not be a suitable direct alternative for the express bus service, it would provide the equivalent of a “guaranteed ride home” during the hours that Route 1 operates.

Potential for a Transfer Hub at Flutie Pass

The 2003 *Feasibility Study for a Regional Transit Authority for MetroWest* (Multisystems with KKO & Associates, for Executive Office of Transportation and Construction) explored the concept of “transportation centers” at downtown Framingham, the Framingham Logan Express facility at Flutie Pass, Natick Center, the 9/90 park-and-ride lot, Marlborough (Route 20 at I-495), and Westborough (Route 9 at I-495).

The facility at the Framingham Logan Express lot was envisioned as follows:

The development of a transportation center at the Framingham Logan Express Lot would provide a hub for services to employment centers and shopping centers in that area, including TJX, the Natick Mall, and Shoppers World. This location would be served by Peter Pan service to Boston and Worcester, by local bus routes, and . . . by demand responsive shuttles to worksites.

Several MWRTA routes presently provide service in this area. Passengers may board at multiple stop locations. Passenger activity by stop is summarized in the table below.

TABLE 4
Existing Passenger Activity at Stops in the General Area of Flutie Pass
(from 2008 CTPS ridechecks, does not include Route 1)

Stop Location	Total Passengers Boarding (all routes combined)
Natick Mall @ Macy’s	45 (Routes 2, 3, 4, 9, 10, and 11)
Super Stop & Shop @ Old Connecticut Path	38 (Routes 2 and 3)
Sherwood Plaza	15 (Routes 3, 4, 9, 10, and 11)
Flutie Pass @ Speen Street	12 (Routes 3, 4, 9, 10, 11)
Shoppers World shelter	8 (Routes 2, and 9)
Speen Street @ Superior Drive	4 (Routes 3, 9, and 10)
Ring Road @ Shoppers World East	3 (Routes 2 and 3)

The single location with the greatest number of boardings was the Macy's at Natick Mall, with 45. It would appear that existing riders could best be served by upgraded bus stop facilities located at or very close to the Natick Mall itself. Installation of a sheltered waiting area with bus schedule information at this location would benefit existing riders. A display monitor for real-time bus locations would also benefit them; the MWRTA already collects and provides this information over the Internet.

Routes 1, 2, 3, 4, 9, 10, and 11 all directly serve the Natick Mall. Passengers boarding any of these routes do not have to transfer to reach the mall area. Routes 5, 6, 7, and 12 do not provide direct service to Natick Mall. In order to reach the mall: passengers on Routes 5 and 6 must transfer at either downtown Framingham or the Central Hub to Routes 2, 3, 4, 10, or 11; passengers on Route 7 may transfer at either of those locations or may transfer to Route 1, Route 2, or Route 9 at Framingham State College; passengers on Route 12 can transfer to Routes 10 or 11 in downtown Natick.

Based on the existing network, the only significant potential for route-to-route transfer activity at the Natick Mall/Flutie Pass is likely to be from Routes 1, 2, 3, 4, or 9 to Routes 10 or 11. Transfers at this location are most likely smaller in number than those presently occurring at the Central Hub in Framingham and are likely to remain so.

APPENDIX

Passenger Activity by Stop, Riders by Trip, and Running Times: All Routes

Data from October 2008 Ridecheck

CTPS field staff rode, and collected data for, each trip of each route once during October 2008. *Route 1 service between Framingham and the MBTA Green Line was not yet in operation at the time of these counts.* The data is presented here, first for weekday service and then for Saturday service. In each of those two sections, there is a pair of tables for each route: one on passenger activity by stop, and one on riders by trip and actual travel times. Each of the weekday tables is followed by some brief remarks.

Because the MWRTA system allows passengers to board or alight anywhere that it is safe to do so, in the tables below that present passenger activity by stop, the boardings and alightings have been grouped by street segment and major activity point.

WEEKDAY SERVICE

ROUTE 2

Table A-1

Route 2: Framingham Circuit Clockwise

Passenger Activity by Stop (all trips combined, composite weekday)

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	11	0
Central Hub	12	0
Howard Street @ Concord Street	34	1
Lincoln St.	6	0
MetroWest Med Ctr	2	3
Union Avenue	4	3
Main Street	0	2
Edgell Road @ Worcester Road	0	2
Vernon Street @ Oak Street	0	3
Edgell Road	8	9
Water Street	15	10
Concord Street-North of 9	5	6
Super Stop & Shop @ Old Connecticut Path	25	16
Ring Road @ Shoppers World East	3	5
Natick Mall @ Macy's	15	23
Shoppers World Shelter	4	3
Ring Road @ Kohls	1	3
Ring Road @ Cochituate Road	0	2
Cochituate Road	5	4
Concord Street-South of 9	1	1
Corregidor Road @ Arsenal Road	0	1
Arsenal Road	7	8
Normandy Road Extension @ John J Brady Drive	3	0
Normandy Rd Ext @ Mass Bay Comm College	0	1
Rose Kennedy Lane	5	6
Concord Street-south of Rose Kennedy	0	10
Lincoln Street @ Pearl Street	0	1
Pearl Street @ Thompson Street	0	1
Proctor Street @ Franklin Street	0	4
Howard Street	5	18
Bishop Street @ Waverley Street	0	2
Central Hub	0	12
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	11
Total	171	171
Net Ridership	160	

The greatest stop activity along Route 2 occurred in downtown Framingham and at the shopping and commercial areas located between highway Routes 30 and 9. There were 11-12 passengers in each direction boarding or alighting at the Central Hub. Stops along

Edgell Road and Water Street generated the greatest activity in any of the residential neighborhoods served by Route 2.

Table A-2

Route 2: Framingham Circuit Clockwise

Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:30	8	52	60	-8
7:30	17	56	60	-4
8:30	15	61	60	+1
9:30	14	57	60	-3
10:30	16	64	60	+4
11:30	15	70	60	+10
12:30	8	57	60	-3
13:30	17	66	60	+6
14:30	12	63	60	+3
15:30	14	57	60	-3
16:30	15	60	60	0
17:30	Not operated		60	
18:30	9	45	60	-15
Total	160			

Maintaining adequate running time was difficult for many trips on Route 2, especially in the afternoon. One trip in the afternoon had to be cancelled in order for the vehicle to catch up to the schedule and operate its last trip on time. It would appear that more time is required in order for buses to maintain schedules. Afternoon stops at Sherwood Plaza have already been eliminated in order to reduce running time, but travel time still remains tight, with very little opportunity for drivers to make up time losses caused by even routine delays.

ROUTE 3

Table A-3
Route 3: Framingham Circuit Counterclockwise
Passenger Activity by Stop (all trips combined, composite weekday)

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	3	0
Central Hub	30	0
Howard Street @ Freeman Street	1	0
Howard Street @ Concord Street	56	0
Concord Street-South of Rose Kennedy	34	3
Normandy Road @ Arsenal Road	0	3
Normandy Road Extension @ John J Brady Drive	0	2
Rose Kennedy Lane	3	5
Arsenal Road	1	2
Concord Street-north of Rose Kennedy, South of 9	1	13
Anzio Road @ Concord Street	0	4
Cochituate Road @ Walsh Street	7	3
Cochituate Road @ Caldor Road	0	15
Caldor Road @ Walmart	9	21
Sherwood Plaza @ Worcester Road	6	20
Speen Street @ Superior Drive	2	4
Flutie Pass @ Speen Street	4	14
Natick Mall @ Macy's	9	5
Flutie Pass @ Ring Road	0	3
Ring Road @ Shoppers World East	0	1
Ring Road @ Cochituate Road	1	1
Whittier Street @ Newbury Street	1	2
Newbury Street @ Old Connecticut Path	0	2
Super Stop & Shop @ Old Connecticut Path	13	8
Concord Street-North of 9	6	6
Central Street @ Water Street	4	2
Water Street (not served during PM peak)	11	8
Edgell Road	1	4
Main Street	1	1
Union Avenue	2	3
Lincoln Street	1	9
Pearl Street	0	7
Union Avenue @ Proctor Street	0	2
Proctor Street @ Franklin Street	0	10
Howard Street	4	16
Bishop Street @ Waverley Street	0	3
Central Hub	0	8
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	5
Total	211	211
Net Ridership	206	

The heaviest passenger activity along Route 3 was observed downtown, with 56 passengers boarding at Howard Street and another 34 boarding along Concord Street.

Thirty passengers boarded at the Central Hub. Route 3 provides the most direct routing to the Route 9 area and thus is the most attractive option among the multiple options provided by the MWRTA network.

Table A-4
Route 3: Framingham Circuit Counterclockwise
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:15	20	51	75	-24
7:30	28	67	60	+7
8:30	18	54	60	-6
9:30	17	58	60	-2
10:30	22	62	60	+2
11:30	21	61	60	+1
12:30	Trip not operated		60	
13:30	11	60	60	0
14:30	16	62	60	+2
15:30	17	75	60	+15
16:30	Trip not operated		60	
17:30	19	62	60	+2
18:30	17	61	60	+1
Total	206			

As was the case with Route 2, the scheduled travel times on Route 3 appear to be inadequate. Buses are not able to recover time lost from even minor delays, and they subsequently get later and later on each trip. Ultimately, on the days observed, two fewer trips than scheduled were actually operated, in order to allow buses to catch up with delays and operate the last trips of driver assignments on time.

Service is not provided along Water Street in Nobscot; the purpose of this is to reduce required travel time, but even with that measure in place the trip at 3:30 p.m. took 75 minutes to complete, 15 more than the 60 minutes that is scheduled.

ROUTE 4**Table A-5****Route 4****Passenger Activity by Stop (all trips combined, composite weekday)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	6	0
Central Hub	18	0
Taralli Terrace	7	4
Beaver Street	5	3
Irving Street @ Arlington Street	1	2
Hollis Street (southbound)	2	2
<i>Ashland</i>		
Market Basket @ Pond Street	3	6
<i>Framingham</i>		
Hollis Street (northbound)	0	2
Concord Street	15	3
Union Avenue @ Lexington Street	0	1
Lexington Street @ Lincoln Street	2	3
Grant Street	2	0
<i>Natick</i>		
Hartford Street @ Bishop Street	0	1
Speen Street @ Superior Drive	0	1
<i>Malls</i>		
Flutie Pass @ Speen Street	1	14
Natick Mall @ Macy's	10	8
Flutie Pass @ Ring Road	0	3
Sherwood Plaza @ Worcester Road	5	3
<i>Framingham</i>		
Bishop Street	1	7
Central Hub	0	9
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	6
Total	78	78
Net Ridership	72	0

The greatest number of boardings for Route 4 were at the Central Hub, with 18. Boardings downtown and along Concord Street numbered 15. There were 10 boardings at Natick Mall.

Route 4 is operated like a circuit route, although it is actually serving a north-south, point-to-point function. Only buses traveling south from the Natick Mall serve the Central Hub, while only northbound buses serve downtown Framingham. This pattern forces potential round-trip riders to travel a great distance out of their way in at least one direction.

On the day observed, ridership to the supermarket in Ashland was relatively light, with 6 passengers alighting and 3 passengers boarding.

Table A-6
Route 4
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:30	6	53	60	-7
7:30	5	62	60	+2
8:30	5	54	60	-6
9:30	5	51	60	-9
10:30	6	57	60	-3
11:30	5	53	60	-7
12:30	7	55	60	-5
13:30	10	58	60	-2
14:30	9	65	60	+5
15:30	20	70	60	+10
Total	78			

Throughout most of the day, the Route 4 trips observed had enough time to complete a round-trip within the scheduled travel time. The last two trips, at 2:30 p.m. and 3:30 p.m., however, did require up to 10 minutes more than scheduled.

ROUTE 5**Table A-7****Route 5: Framingham-Ashland-Hopkinton
Passenger Activity by Stop (all trips combined, composite weekday)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
OUTBOUND		
Passengers already on bus, from previous trip	4	0
Central Hub	11	0
Waverley Street @ Concord Street	25	1
Waverley Street	9	6
Union Street	0	27
West Union Street @ School Road	0	1
East Main Street	8	3
Main Street @ Hayden Rowe Street	2	1
Hayden Rowe Street	1	2
Pleasant Street	1	1
Main Street	3	7
Passengers remaining on bus, continuing to next trip	0	15
Total	64	64
Net Ridership, Outbound	49	
INBOUND		
Passengers already on bus, from previous trip	15	0
Main Street @ Grove Street	7	0
East Main Street	5	1
West Union Street	3	0
Union Street	16	0
Waverley Street-west of Bethany Road	3	1
Winthrop Street @ Bethany Road	4	0
Waverley Street-east of Bethany Road, west of downtown	2	1
Waverley Street-near train station	5	31
Waverley Street-east of train station	1	6
Central Hub	0	17
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	4
Total	61	61
Net Ridership, Inbound	57	

Route 5 connects Framingham with Ashland and Hopkinton along highway Route 135. The vast majority of trips begin or end within Framingham. There were 27 inbound passengers boarding at stops in Hopkinton, and 19 in Ashland. Another 11 passengers boarded in Framingham for travel just within Framingham. Only 1 of the 57 inbound passengers left the bus before reaching Framingham.

Table A-8
Route 5: Framingham-Ashland-Hopkinton
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
5:30	2 (2 inbound + 0 outbound)	Outbound: 24 Inbound: 25	Outbound: 30 Inbound: 30	Outbound: -6 Inbound: -5
6:30	10 (6 inbound + 4 outbound)	Outbound: 28 Inbound: 27	Outbound: 30 Inbound: 30	Outbound: -2 Inbound: -3
7:30	19 (12 inbound + 7 outbound)	Outbound: 32 Inbound: 35	Outbound: 30 Inbound: 30	Outbound: +2 Inbound: +5
8:30	6 (5 inbound + 1 outbound)	Outbound: 32 Inbound: 34	Outbound: 30 Inbound: 30	Outbound: +2 Inbound: +4
9:30	7 (5 inbound + 2 outbound)	Outbound: 24 Inbound: 25	Outbound: 30 Inbound: 30	Outbound: -6 Inbound: -5
10:30	6 (2 inbound + 4 outbound)	Outbound: 30 Inbound: 27	Outbound: 30 Inbound: 30	Outbound: 0 Inbound: -3
11:30	7 (4 inbound + 3 outbound)	Outbound: 25 Inbound: 25	Outbound: 30 Inbound: 30	Outbound: -5 Inbound: -5
12:30	0 (0 inbound + 0 outbound)	Outbound: 26 Inbound: 25	Outbound: 30 Inbound: 30	Outbound: -4 Inbound: -5
13:30	5 (4 inbound + 1 outbound)	Outbound: 29 Inbound: 23	Outbound: 30 Inbound: 30	Outbound: -1 Inbound: -7
14:30	6 (2 inbound + 4 outbound)	Outbound: 35 Inbound: 28	Outbound: 30 Inbound: 30	Outbound: +5 Inbound: -2
15:30	10 (6 inbound + 4 outbound)	Outbound: 30 Inbound: 24	Outbound: 30 Inbound: 30	Outbound: 0 Inbound: -6
16:30	16 (6 inbound + 10 outbound)	Outbound: 33 Inbound: 25	Outbound: 30 Inbound: 30	Outbound: +3 Inbound: -5
17:30	6 (3 inbound + 3 outbound)	Outbound: 39 Inbound: 23	Outbound: 30 Inbound: 30	Outbound: +9 Inbound: -7
18:30	6 (0 inbound + 6 outbound)	Outbound: 33 Inbound: 19	Outbound: 30 Inbound: 30	Outbound: +3 Inbound: -11
Total	106 (57 inbound + 49 outbound)			

The 60 minutes allocated for each round-trip appears to be adequate for the majority of trips observed. However, there is not much excess time available to accommodate any route change that might increase travel time.

ROUTE 6

**Table A-9
Route 6: Framingham-Ashland-Holliston-Milford
Passenger Activity by Stop (all trips combined)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
OUTBOUND		
Passengers already on bus, from previous trip	4	0
Central Hub	11	0
Waverley Street @ Concord Street	12	1
Hollis Street	11	1
Pond Street @ Rodman Road	0	1
Market Basket @ Pond Street	0	5
Pond Street –south of Market Basket	0	6
Washington Street	2	4
Mission Springs @ Summer Street	0	2
<i>Milford</i>		
K-Mart / La Quinta @ Beaver Street	0	2
Beaver Street @ Medway Road	1	0
East Main Street @ Hayward Street	0	1
East Main Street @ Alteri Court	0	3
School Street @ Main Street	0	15
Passengers remaining on bus, continuing to next trip	0	0
Total	41	41
Net Ridership, Outbound	41	
INBOUND		
Passengers already on bus, from previous trip	0	0
<i>Milford</i>		
School Street @ Main Street	16	0
Main Street @ Court Street	10	0
East Main Street @ Middleton Street	1	0
K-Mart / La Quinta @ Beaver Street	0	6
Beaver Street @ East Main Street	1	1
<i>Holliston</i>		
Mission Springs @ Summer Street	0	0
Washington Street	5	0
Concord Street @ Taylor Road	1	0
Pond Street	7	1
Market Basket @ Pond Street	6	1
Hollis Street	1	15
Hollis Street @ Waverley Street	0	2
Waverley Street	5	10
Central Hub	0	15
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	4
Total	55	55
Net Ridership, Inbound	51	

Route 6 connects Framingham with Ashland, Holliston, and Milford. Service is only provided to Milford during peak hours, with midday trips terminating in Holliston instead. Despite the reduced service to Milford, 28 of the 51 inbound boardings observed were from stops in Milford. There were 6 inbound passengers boarding in Holliston and 13 boarding in Ashland. Within Ashland, 6 of the 13 boardings were at the stop serving the Market Basket supermarket, which is also served by Route 4. There were just 2 inbound boardings in Framingham for trips entirely within Framingham. From the total inbound ridership, 7 passengers left the bus in Milford, meaning their journey was entirely within Milford. There were 2 passengers leaving an inbound bus within Ashland. The remaining 42 passengers left the bus in Framingham, with 15 leaving the bus at the Central Hub.

Table A-10
Route 6: Framingham-Ashland-Holliston-Milford
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
5:00 (Milford)	4 (4 inbound + 0 outbound)	Outbound: 24 Inbound: 31	Outbound: 45 Inbound: 45	Outbound: -21 Inbound: -14
6:00 (Milford)	27 (24 inbound + 3 outbound)	Outbound: 34 Inbound: 49	Outbound: 45 Inbound: 45	Outbound: -11 Inbound: +4
7:30	7 (0 inbound + 7 outbound)	Outbound: 25 Inbound: 43	Outbound: 35 Inbound: 35	Outbound: -10 Inbound: +8
8:45	2 (1 inbound + 1 outbound)	Outbound: 27 Inbound: 28	Outbound: 35 Inbound: 45	Outbound: -8 Inbound: +17
10:00	3 (2 inbound + 1 outbound)	Outbound: 32 Inbound: 30	Outbound: 35 Inbound: 35	Outbound: -3 Inbound: -5
11:15	5 (3 inbound + 2 outbound)	Outbound: 40 Inbound: 35	Outbound: 35 Inbound: 35	Outbound: +5 Inbound: 0
12:30	2 (2 inbound + 0 outbound)	Outbound: 31 Inbound: 38	Outbound: 35 Inbound: 35	Outbound: -4 Inbound: +3
13:45	5 (4 inbound + 1 outbound)	Outbound: 35 Inbound: 33	Outbound: 35 Inbound: 35	Outbound: 0 Inbound: -2
15:00	2 (0 inbound + 2 outbound)	Outbound: 30 Inbound: 35	Outbound: 40 Inbound: 35	Outbound: -10 Inbound: 0
16:10	3 (3 inbound + 0 outbound)	Outbound: 27 Inbound: 47	Outbound: 40 Inbound: 50	Outbound: -13 Inbound: -3
16:30 (Milford)	16 (8 inbound + 8 outbound)	Outbound: 42 Inbound: 53	Outbound: 70 Inbound: 45	Outbound: -28 Inbound: +8
17:30 (Milford)	15 (1 inbound + 14 outbound)	Outbound: 48 Inbound: 33	Outbound: 55 Inbound: 30	Outbound: -7 Inbound: +3
19:00 (Milford)	2 (0 inbound + 2 outbound)	Outbound: 38 Inbound: 36	Outbound: 45 Inbound: 45	Outbound: -7 Inbound: -9
Total	93 (52 inbound + 41 outbound)			

The travel time given to each individual Route 6 trip varies depending on the time of day and the outer terminal for each trip. The majority of trips observed did operate within the time given.

ROUTE 7**Table A-11****Route 7: Framingham-Southborough-Marlborough
Passenger Activity by Stop (all trips combined): Outbound**

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	7	0
Central Hub	22	0
Bishop Street	2	0
Howard Street	0	1
Concord Street	76	4
Franklin Street	0	2
State Street @ Maynard Road	0	7
Maynard Road	5	1
Salem End Road @ Winter Street	0	1
Super Stop & Shop @ Temple Street	3	8
Temple Street @ Worcester Road	7	3
Worcester Road @ Country Club Lane	9	7
Worcester Road @ California Avenue	3	11
California Avenue @ New York Avenue	0	1
Staples Shelter	0	18
Crossing Boulevard	0	4
Turnpike Road	0	2
White Bagley Road @ Partridge Hill Road	1	0
Boston Road @ East Main Street	0	1
Main Street @ Marlboro Road	1	1
Marlboro Road @ Saint Marks Road	0	2
Maple Street	8	3
Bolton Street Extension @ Main Street	1	3
Main Street @ Court Street	3	10
Main Street-west	12	11
Mechanic Street	6	10
Lincoln Street	19	16
Broad Street @ West Main Street	1	1
West Main Street	0	8
Lakeside Avenue	0	3
Boston Post Road West	8	23
Boundary Street @ Elm Street	1	0
Solomon Pond Road	1	7
Solomon Pond Mall	0	14
Passengers remaining on bus, continuing to next trip	0	12
Total	195	195
Net Ridership Outbound	183	

Of the observed outbound passengers, 68 were traveling entirely within Framingham, 60 were traveling entirely within Marlborough, and 8 either boarded or alighted from the bus in Southborough. The remaining 59 passengers were traveling from locations in Framingham to locations in Marlborough.

Table A-12
Route 7: Framingham-Southborough-Marlborough
Passenger Activity by Stop (all trips combined): Inbound

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	12	0
Solomon Pond Mall	23	0
Solomon Pond Road	1	0
Boundary Street	0	2
Boston Post Road West	10	2
Lakeside Avenue @ West Main Street	0	1
West Main Street	4	3
Broad Street	2	5
Lincoln Street	18	8
Mechanic Street	7	1
Main Street	13	5
Bolton Street Extension	19	1
Maple Street	1	5
Marlboro Road	2	4
Main Street @ Boston Road	1	0
White Bagley Road	1	1
Turnpike Road	5	0
Crossing Boulevard	2	0
Staples Shelter	4	2
Crossing Boulevard @ Worcester Road	1	0
Route 9 Park and Ride @ Worcester Road	1	0
Worcester Road @ Country Club Lane	14	1
Worcester Road @ Temple Street	0	4
Super Stop & Shop @ Temple Street	5	2
Salem End Road	0	3
Maynard Road	3	2
Church Street @ Mayflower Circle	1	0
Maple Street	1	2
Franklin Street @ Mount Wayte Avenue	0	1
Franklin Street	5	16
Franklin Street @ Howard Street	4	56
Bishop Street @ Waverley Street	0	2
Central Hub	0	24
Passengers remaining on bus, continuing to next trip	0	7
Total	160	160
Net Ridership Inbound	153	

Of the observed inbound passengers, 37 were traveling entirely within Marlborough, 30 were traveling entirely within Framingham, and 14 either boarded or alighted from the bus within Southborough. The remaining 72 passengers, close to 50% of total inbound ridership, were traveling from locations in Marlborough to locations in Framingham.

Table A-13
Route 7: Framingham-Southborough-Marlborough
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:00 (to Lincoln & Pleasant)	9 (8 inbound + 1 outbound)	Outbound: 39 Inbound: 40	Outbound: 45 Inbound: 45	Outbound: -6 Inbound: -5
6:30	30 (8 inbound + 22 outbound)	Outbound: 55 Inbound: 63	Outbound: 60 Inbound: 60	Outbound: -5 Inbound: +3
7:30	41 (16 inbound + 25 outbound)	Outbound: 73 Inbound: 62	Outbound: 60 Inbound: 60	Outbound: +13 Inbound: +2
8:30	25 (8 inbound + 17 outbound)	Outbound: 66 Inbound: 49	Outbound: 60 Inbound: 60	Outbound: +6 Inbound: -11
9:30	31 (11 inbound + 20 outbound)	Outbound: 63 Inbound: 53	Outbound: 60 Inbound: 60	Outbound: +3 Inbound: -7
10:30	20 (10 inbound +10 outbound)	Outbound: 60 Inbound: 65	Outbound: 60 Inbound: 60	Outbound:0 Inbound: +5
11:30	26 (16 inbound + 10 outbound)	Outbound: 61 Inbound: 56	Outbound: 60 Inbound: 60	Outbound: +1 Inbound: -4
12:30	27 (9 inbound +18 outbound)	Outbound: 60 Inbound: 53	Outbound: 60 Inbound: 60	Outbound:0 Inbound: -7
13:30	25 (15 inbound + 10 outbound)	Outbound: 60 Inbound: 55	Outbound: 60 Inbound: 60	Outbound:0 Inbound: -5
14:30	28 (20 inbound + 8 outbound)	Outbound: 60 Inbound: 59	Outbound: 60 Inbound: 60	Outbound:0 Inbound: -1
15:30	35 (18 inbound +17 outbound)	Outbound: 60 Inbound: 60	Outbound: 60 Inbound: 60	Outbound:0 Inbound:0
16:30	14 (7 inbound + 7 outbound)	Outbound: 66 Inbound: 60	Outbound: 60 Inbound: 60	Outbound+6: Inbound:0
17:30	18 (8 inbound + 10 outbound)	Outbound: 52 Inbound: 45	Outbound: 60 Inbound: 60	Outbound-8: Inbound: -15
18:30 (to Lincoln & Pleasant)	8 (0 inbound + 8 outbound)	Outbound: 45 Inbound: 43	Outbound: 45 Inbound: 45	Outbound:0 Inbound: -2
Total	336 (153 inbound + 183 outbound)			

Because of the length of Route 7, there is a greater opportunity for traffic delays to result in buses' operating behind schedule, although it does not appear to be as consistent a problem as that observed on Routes 2 and 3. During the CTPS manual counts, one bus was able to maintain the 120-minute round-trip scheduled travel time throughout the day, while the other was late by as much as 30 minutes, as the bus did not make up time lost during the 7:30 a.m. outbound trip. The 7:30 trip also had the heaviest passenger load, 25, of all Route 7 trips observed. The greatest number on board was 19 passengers, with 8 of those passengers leaving the bus at Staples.

ROUTE 9

Table A-14

**Route 9: Natick Mall–Staples
Passenger Activity by Stop (all trips combined)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
EASTBOUND		
Passengers already on bus, from previous trip	5	0
Staples Shelter	10	0
Worcester Road @ Country Club Lane	0	4
Jefferson Hills Apts @ Country Club Lane	4	0
Country Club Lane @ Worcester Road	1	2
Worcester Road @ Temple Street	0	1
Super Stop & Shop @ Temple Street	2	3
Worcester Road @ Winter Street	1	0
Maynard Road @ Salem End Road	2	0
Maynard Road @ State Street	0	1
High Street @ Main Street	0	1
Worcester Road @ Curve Street	0	1
Worcester Road @ Main Street	3	0
Worcester Road @ Oaks Road	0	1
Worcester Road @ Jordan's Furniture	0	1
Opp. Shoppers World Shelter	0	2
Logan Express	0	1
Sherwood Plaza @ Worcester Road	0	3
Speen Street @ Superior Drive	1	2
Flutie Pass @ Speen Street	0	3
Natick Mall @ Macy's	0	1
Passengers remaining on bus, continuing to next trip	0	2
Total	29	29
Net Ridership, Eastbound	27	
WESTBOUND		
Passengers already on bus, from previous trip	2	0
Natick Mall @ Macy's	4	0
Shoppers World Shelter	4	0
Worcester Road @ Caldor Road	1	0
Worcester Road @ Greenview Street	0	1
Worcester Road @ Prospect Street	1	2
Worcester Road @ Vernon Street	2	0
Super Stop & Shop @ Temple Street	5	2
Temple Street @ Worcester Road	3	1
Jefferson Hills Apts @ Country Club Lane	10	9
California Avenue @ New York Avenue	3	2
New York Avenue @ Boston Road	1	2
Crossing Boulevard	0	1
Staples Shelter	0	11
Passengers remaining on bus, continuing to next trip	0	5
Total	36	36
Net Ridership, Westbound	31	

There were 10 passengers leaving the bus at Staples in the westbound direction and 11 boarding in the eastbound direction. These 21 passengers make up 36% of the total 58 passengers observed.

Table A-15
Route 9: Natick Mall–Staples
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Jefferson Hills	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:00	3 (1 eastbound + 2 westbound)	Eastbound:26 Westbound:49	Eastbound:40 Westbound:50	Eastbound:-14 Westbound:-1
7:30	18 (5 eastbound + 13 westbound)	Eastbound:42 Westbound:46	Eastbound:40 Westbound:50	Eastbound:+2 Westbound:-4
9:00	4 (3 eastbound + 1 westbound)	Eastbound:32 Westbound:44	Eastbound:40 Westbound:50	Eastbound:-8 Westbound:-6
10:30	4 (3 eastbound + 1 westbound)	Eastbound:28 Westbound:48	Eastbound:40 Westbound:50	Eastbound:-12 Westbound:-2
12:00	1 (1 eastbound + 0 westbound)	Eastbound:64 Westbound:27	Eastbound:40 Westbound:50	Eastbound:+24 Westbound:-23
13:30	2 (0 eastbound + 2 westbound)	Eastbound:29 Westbound:49	Eastbound:40 Westbound:50	Eastbound:-11 Westbound:-1
15:00	3 (0 eastbound + 3 westbound)	Eastbound:35 Westbound:36	Eastbound:40 Westbound:50	Eastbound:-5 Westbound:-14
16:30	5 (2 eastbound + 3 westbound)	Eastbound:37 Westbound:51	Eastbound:40 Westbound:50	Eastbound:-3 Westbound:=1
18:00	17 (13 eastbound + 4 westbound)	Eastbound:29 Westbound:46	Eastbound:40 Westbound:50	Eastbound:-11 Westbound:-4
19:30	1 (0 eastbound + 1 westbound)	Eastbound:19 Westbound:23	Eastbound:40 Westbound:50	Eastbound:-21 Westbound:-17
Total	58 (28 eastbound + 30 westbound)			

The travel time given to Route 9 buses has been increased over time to allow for sometimes-lengthy delays caused by traffic. The majority of trips observed operated on time, although at one point the 12:00 noon trip was late by 24 minutes. The bus was able to ultimately recover this time.

The most activity observed by trip was on the 8:10 a.m. westbound trip, which had 13 passengers, and the 6:00 p.m. eastbound trip, which also had 13 passengers. The ridership on these two trips accounts for almost 50% of the entire ridership of Route 9. These 26 passengers were all making relatively short trips from stops at the residential areas along Route 9, west of Temple Street, to the stop at Staples.

ROUTE 10**Table A-16****Route 10: Natick Counterclockwise Loop
Passenger Activity by Stop (all trips combined)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	28	0
Central Hub	17	0
West Central Street @ Kendall Lane	0	2
West Central Street @ Speen Street (Roche Brothers)	5	6
Pond Street @ Oakland Street	0	1
Oakland Street @ West Street	1	0
Cedar Terrace	12	12
Curve Street @ High Street	2	0
Circular Avenue @ Cottage Street	0	1
Cottage Street @ South Main Street	3	0
South Main Street @ Common Street	0	2
East Central Street @ Park Street (Natick Center)	18	11
East Central Street (other stops)	0	2
Union Street @ Westview Avenue	0	0
Leonard Morse Hospital	8	11
Senior Center	1	2
East Central Street @ Dewey Street	1	0
South Avenue @ Main Street	0	1
North Main Street @ North Avenue	10	2
North Main Street (other stops)	3	1
9 / 27 Shopping Plaza	6	10
Commonwealth Road @ Stanton Street	0	1
Speen Street @ Flutie Pass	1	5
Old North Main Street @ Lakeshore Road	1	0
Speen Street @ Superior Drive	1	1
Flutie Pass @ Speen Street	6	2
Natick Mall @ Macy's	7	8
Sherwood Plaza @ Worcester Road	4	7
Mill Street @ Kennedy Middle School	0	1
Sherwood Village @ Mill Street	2	4
West Central Street @ Home Avenue	2	1
Boden Lane	0	3
West Central Street @ Kendall Lane (West Natick)	4	3
Central Hub	0	17
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	26
Total	143	143
Net Ridership	117	

Although the extension to the Central Hub is relatively new, there were already 17 passengers observed boarding a Route 10 bus at the hub and 17 passengers alighting there. The 17 passengers represent 14% of the total 117 passengers observed. The stops with the most boarding activity were those near Natick Center, with 18 boarding at East Central at Park and another 10 boarding at North Main Street at North Avenue. There

were 12 passengers observed boarding at Cedar Terrace. The next-busiest stops were Leonard Morse Hospital with 8, Natick Mall at Macy’s with 7, Flutie Pass at Speen Street with 6, and the 9/27 Plaza with 6.

Table A-17
Route 10: Natick (Counterclockwise Loop)
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
6:30	5	60	60	0
7:30	7	63	60	+3
8:30	9	61	60	+1
9:30	4	58	60	-2
10:30	10	55	60	-5
11:30	5	58	60	-2
12:30	12	57	60	-3
13:30	11	63	60	+3
14:30	12	57	60	-3
15:30	15	57	60	-3
16:30	13	59	60	-1
17:30	12	61	60	+1
18:30	2	59	60	-1
Total	117			

For some trips, the actual travel time for a round-trip was greater than the 60 minutes allocated, although the majority of trips did operate within 60 minutes. There is not much time for recovery in the event of a major delay, however, and it would be difficult to add any new segments or any off-route request stops to Route 10 without having to change the schedule to a greater-than-60-minute frequency.

ROUTE 11

Table A-18

**Route 11: Natick Midday (Clockwise Loop)
Passenger Activity by Stop (all trips combined)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	15	0
Central Hub	5	0
Waverley Street @ Taralli Terrace	1	0
West Central Street @ Boden Lane	1	0
Sherwood Village @ Mill Street	3	2
Hartford Street @ Barnesdale Road	0	1
Natick Mall @ Macy's	0	10
Sherwood Plaza @ Worcester Road	0	2
North Main Street @ Megongo Road	0	1
9 / 27 Shopping Center	6	4
North Main Street @ Meadow Street	1	0
North Main Street @ Middlesex Avenue	0	2
Main Street @ East Central Street	2	0
East Central Street @ Park Street	2	1
Leonard Morse Hospital	1	1
Cottage Street @ Cross Street	1	0
Curve Street @ Pitts Street	1	0
Cedar Avenue @ Cedar Terrace	2	2
Cedar Terrace	7	4
Curve Street @ Cedar Avenue	1	0
Oakland Street @ West Street	0	1
Pond Street @ Speen Street-Roche Brothers	3	3
West Central Street @ Speen Street	0	1
West Central Street @ Mill Street	0	1
West Central Street @ Kendall Lane (West Natick)	6	0
Waverley Street @ Second Street	1	0
Waverley Street @ Coolidge Street	0	4
Central Hub	0	3
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	16
Total	59	59
Net Ridership	43	

Route 11 serves the same locations as the Route 10 circuit route but operates clockwise around the loop. The largest single boarding location was Cedar Gardens, with 7 passengers, followed by the 9/27 Shopping Center, with 6 passengers. There were 10 passengers observed leaving the bus at Natick Mall, but no passengers were observed boarding the bus there.

Table A-19
Route 11: Natick, Clockwise Loop
Riders by Trip and Actual Travel Times (composite weekday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
8:30	6	59	60	-1
9:30	9	57	60	-3
10:30	2	58	60	-2
11:30	9	59	60	-1
12:30	14	60	60	0
13:30	3	59	60	-1
Total	43			

All trips observed completed the loop within the allowed 60-minute schedule, although there is little room to recover from any lengthy delays.

ROUTE 12

Table A-20

**Route 12: Natick Commuter Bus
Passenger Activity by Stop (all trips combined)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
A.M. SERVICE TO TRAIN STATION		
Waverly @ Coolidge	1	0
Boston Scientific-Main Gate	0	0
Boston Scientific-Building A	0	1
North/Walnut	0	0
Oak/Connecticut	0	0
Oak/Keane	1	0
Oak/Beacon	0	0
Bacon/Marion	1	0
North/Walnut-Natick rail	0	2
Total	3	3
A.M. SERVICE FROM TRAIN STATION		
North/Walnut-Natick rail	40	0
Natick Labs	0	6
190 North Main (Rt 27)	0	1
Mathworks	0	27
Oak/Michigan	0	1
Oak/Erie	0	0
Cognex	0	2
1075 Worcester St. (Rt 9)	0	1
Calico Shop	0	1
Boston Scientific	0	1
North/Walnut-Natick rail	0	0
Total	40	40
P.M. SERVICE TO TRAIN STATION		
Oak & Erie	1	0
Cognex	0	0
Boston Scientific	4	1
Math Works	19	0
North/Walnut-Natick rail	0	23
Total	24	24
P.M. SERVICE FROM TRAIN STATION		
North/Walnut-Natick rail	2	0
Perry/N Main	0	1
Beacon/Rutledge	0	1
Beacon/Marion	0	0
Beacon/Oak	0	0
Waverley/Coolidge	0	0
Total	2	2

The vast majority of riders of the Natick Commuter Bus are traveling from the commuter rail station to employment areas in the a.m. peak and returning to Natick Station in the p.m. There were 40 passengers observed boarding in the morning at Natick Station; 27 were traveling to the Mathworks campus, 6 to Natick Labs, 2 to Cognex, and 5 to other stops. The return pattern observed in the p.m. was 23 passengers returning from Mathworks, 4 from Boston Scientific, and one from another location.

The ridership from Natick residential areas to the commuter rail station in the a.m. and returning in the p.m. was extremely low. There was one passenger boarding at Oak and Keane Streets and another at Beacon and Marion, both traveling to Natick Station.

A table has not been provided on riders by trip and actual travel times, because of the unusual nature of Route 12.

SATURDAY SERVICE

Saturday service patterns on Routes 2, 3, and 10 are similar to weekday patterns but with a shorter total span of service hours and a lower total level of ridership. The number of passengers per trip is comparable to weekday figures. Routes 2 and 3 continue to have travel time problems similar to the problems on weekdays.

ROUTE 2

Table A-21

Route 2

Passenger Activity by Stop (all trips combined, composite Saturday)

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	6	0
Central Hub	9	0
Bishop Street @ Howard Street	2	0
Concord Street	26	1
Union Avenue @ Thurber Street	3	2
Main Street @ High Street	0	1
Worcester Road @ Vernon Street	0	3
Vernon Street	1	2
Edgell Road	1	0
Edgell Road @ Water Street	9	3
Water Street	2	3
Central Street @ Concord Street	1	0
Concord Street –north of Route 9	1	3
Super Stop & Shop @ Old Connecticut Path	13	14
Target @ Whittier Street	0	2
Whittier Street @ Cochituate Road	1	0
Ring Road @ Shoppers World East	0	3
Ring Road @ Flutie Pass	0	2
Sherwood Plaza @ Worcester Road	1	1
Flutie Pass @ Speen Street	3	9
Natick Mall @ Macy's	6	5
Shoppers World Shelter	3	0
Ring Road	8	2
Cochituate Road	1	1
Concord Street @ Fairbanks Street	2	0
Corregidor Road @ Arsenal Road	3	0
Arsenal Road	5	11
Rose Kennedy Lane	3	5
Normandy Road @ Concord Street	1	0
Concord Street @ Hartford Street	0	1
Lincoln Street @ Pearl Street	0	1
Pearl Street	0	2
Union Avenue @ Proctor Street	1	1

(cont.)

Table A-21, cont.

Stop(s) Location	Passengers Boarding	Passengers Alighting
Proctor Street @ Franklin Street	0	1
Howard Street	0	20
Bishop Street @ Waverley Street	0	2
Central Hub	0	5
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	6
Total	112	112
Net Ridership	106	

Table A-22

Route 2

Riders by Trip and Actual Travel Times (composite Saturday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
9:30	19	60	60	0
10:30	18	64	60	+4
11:30	13	69	60	+9
12:30	22	65	60	+5
13:30	11	67	60	+7
14:30	13	65	60	+5
15:30	5	62	60	+2
16:30	5	61	60	+1
Total	106			

ROUTE 3**Table A-23****Route 3****Passenger Activity by Stop (all trips combined, composite Saturday)**

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	14	0
Central Hub	13	0
Howard Street @ Grant Street	9	0
Howard Street @ Concord Street	58	1
Concord Street–south of Rose Kennedy	7	0
Rose Kennedy Lane	4	6
Normandy Road Extension @ Arsenal Road	2	0
Arsenal Road	6	5
Concord Street –north of Arsenal, south of 9	1	3
Cochituate Road @ Walsh Street	0	4
Cochituate Road @ Caldor Road	3	15
Caldor Road @ Walmart	5	10
Sherwood Plaza @ Worcester Road	7	15
Speen Street @ Superior Drive	2	24
Flutie Pass @ Speen Street	0	6
Natick Mall @ Macy's	7	8
Flutie Pass @ Ring Road	0	1
Ring Road @ Shoppers World East	0	1
Newbury Street @ Old Connecticut Path	0	2
Old Connecticut Path @ Hardy Street	0	1
Super Stop & Shop @ Old Connecticut Path	19	9
Concord Street-north of 9	3	3
Water Street	3	3
Water Street @ Edgell Road	0	6
Edgell Road	6	7
Union Avenue @ Mount Wayte Avenue	0	3
Lincoln Street @ Lexington Street	0	4
Union Avenue @ Proctor Street	0	3
Proctor Street @ Franklin Street	1	2
Franklin Street @ Howard Street/Howard @ Concord	3	19
Howard Street @ Bishop Street	2	0
Central Hub	0	0
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	14
Total	175	175
Net Total	161	

Table A-24

Route 3

Riders by Trip and Actual Travel Times (composite Saturday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
9:00	26	62	60	+2
10:00	31	64	60	+4
11:00	19	63	60	+3
12:00	17	67	60	+7
13:00	29	74	60	+14
14:00	Not operated		60	Not operated
15:00	17	60	60	0
16:00	22	64	60	+4
Total	161			

ROUTE 10

Table A-25

Route 10

Passenger Activity by Stop (all trips combined, composite Saturday)

Stop(s) Location	Passengers Boarding	Passengers Alighting
Passengers already on bus, from previous trip	32	0
Central Hub	3	0
West Central Street	4	4
Pond Street @ Oakland Street	1	1
Oakland Street @ West Street	1	0
Cedar Terrace	4	8
Curve Street @ High Street	1	0
Cottage Street	1	3
South Main Street	2	1
East Central Street @ Park	9	9
East Central Street @ Wilson Street	0	1
Leonard Morse Hospital	2	2
South Avenue @ Main Street	8	7
North Main Street @ Bacon Street	0	2
9 / 27 Shopping Center	9	8
Natick Mall @ Macy's	16	11
Sherwood Plaza @ Worcester Road	2	1
Sherwood Village @ Mill Street	6	5
Mill Street @ West Central Street	0	3
West Central Street @ Home Avenue	1	0
Boden Lane	3	0
Waverley Street @ Taralli Terrace	1	0
Central Hub	0	8
Passengers remaining on bus, continuing to next trip beyond Central Hub	0	32
Total	106	106
Net Ridership	74	

Table A-26

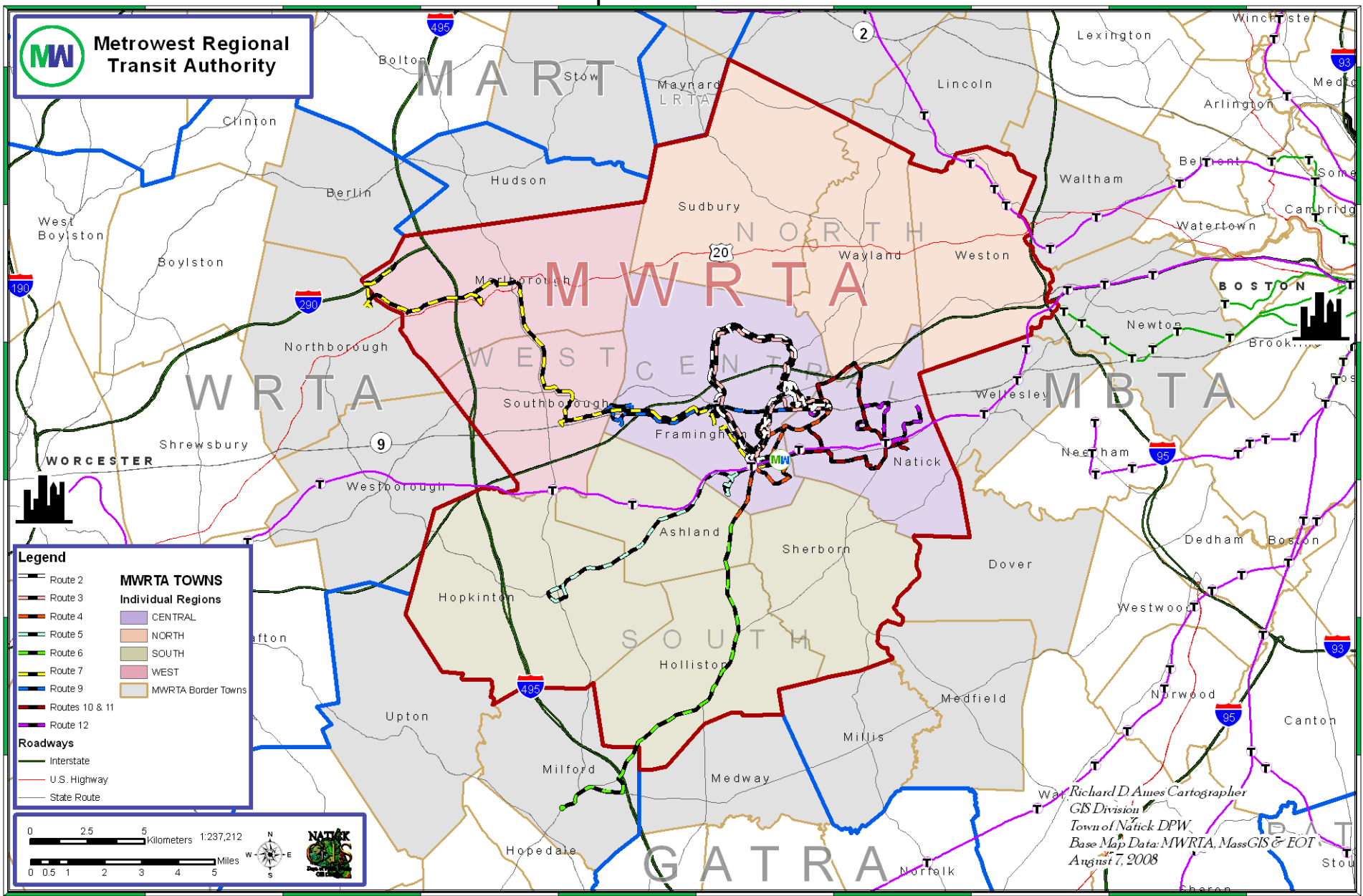
Route 10

Riders by Trip and Actual Travel Times (composite Saturday)

Departure Time from Central Hub	Total Riders on Trip	Actual Travel Time	Scheduled Travel Time	Variance from Schedule
9:30	7	59	60	-1
10:30	6	60	60	0
11:30	9	57	60	-3
12:30	13	59	60	-1
13:30	13	65	60	+5
14:30	7	55	60	-5
15:30	8	51	60	-9
16:30	11	57	60	-3
Total	74			

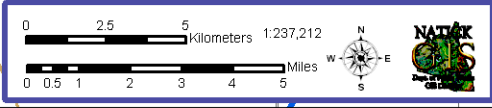


**Metrowest Regional
Transit Authority**



Legend

- Route 2
 - Route 3
 - Route 4
 - Route 5
 - Route 6
 - Route 7
 - Route 9
 - Routes 10 & 11
 - Route 12
- MWRTA TOWNS**
- Individual Regions**
- CENTRAL
 - NORTH
 - SOUTH
 - WEST
 - MWRTA Border Towns
- Roadways**
- Interstate
 - U.S. Highway
 - State Route



Way Richard D. Ames Cartographer
GIS Division
Town of Natick DPW
Base Map Data: MWRTA, MassGIS & EOT
August 7, 2008